A Peek under the Engine Hood: The Methodology of Subnational Economic Governance Indices

Nina Merchant-Vega* & Edmund J. Malesky**

In recent years, The Asia Foundation (The Foundation) has conducted a series of Economic Governance Indexes (EGIs) in countries throughout South and Southeast Asia including Bangladesh, Sri Lanka, Vietnam, Cambodia, and Indonesia. EGIs are country-specific diagnostic tools used to assess and rank sub-national units (provinces, states, districts, etc.) on various aspects of their regulatory environments.

This article reviews the basic theoretical and programmatic rationale for the EGI. The overall rationale for this tool stems from the idea that economic governance impacts private sector development – independent of structural endowments such as location, infrastructure, and human capital. Therefore, good economic governance practices explain why some sub-national units out-perform others in spite of having similar initial endowments. EGIs have become an important tool to provide relevant economic governance information to policy makers, business leaders and citizens. Examining the methodological principles underlying the index approach, this article also describes how the three primary EGI methodological elements anticipate potential pitfalls and how they have been addressed within the methodology.

Introduction

In October 2007, a frustrated entrepreneur was interviewed by a television reporter in Vietnam's Binh Duong province. The location of the interview was telling. Binh Duong, bordering the southern metropolis Ho Chi Minh City, is renowned for its economic prowess. In fifteen years, its leadership transformed the

* Assistant Director Economic Reform and Development at The Asia Foundation.
** Assistant Professor of Political Science at the Graduate School of International Relations and Pacific Studies at the University of California in San Diego.

Hague Journal on the Rule of Law, 3 : 186–219, 2011

doi:10.1017/S1876404511200034

province from a poor backwater to a booming industrial powerhouse. With fourteen industrial zones, the highest foreign direct investment per capita in the country, a fast-growing domestic private sector, and a poverty ratio under 8 percent, the province has become the poster child for Vietnam's rapid reform and development. President Nguyen Minh Triet's ascent through the Vietnamese political hierarchy is often attributed to the economic program he set forth during his tenure as Party Secretary in the early 1990s – a reform program that was premised on the notion of reducing the regulatory costs faced by both foreign and domestic investors.[1] Indeed, reflecting these policies, Binh Duong ranked first for three consecutive years (2005-2007) in the annual Vietnam Provincial Competitiveness Index (PCI), a composite index to assess and rank Vietnamese provinces on various elements of their economic governance.[2]

So it was a tremendous surprise to viewers when a Binh Duong entrepreneur unleashed an emotional appeal to rescind a policy that was prohibiting him from importing advanced technology for his factory. It was a highly technical legal issue and nothing like the fundamental attitudinal issues that impede investors in other Vietnamese provinces. Nevertheless, he stated publicly that if the barrier was not addressed satisfactorily, he would rate the province less favorably on the next PCI survey. Binh Duong officials corrected the offending legal document within the month.

This story encapsulates both the tremendous benefits of The Asia Foundation's sub-national Economic Governance Indices (EGIs), as well as their potential dangers. EGIs are composite indexes, based on a 100-point scale that scores the economic governance of each sub-national unit (province, district, city, etc). They are composed of ten sub-indices that capture the key elements of the local business environment that can be influenced by local regulations and policy-makers. Each of the sub-indices is broken down into a series of indicators. The data required to capture these indicators is derived from: i) a comprehensive firm-level survey; and ii) 'hard data' from various published sources. The indicators are then scored, weighted, and aggregated to create composite scores for each sub-national unit.

As the story captures, EGIs provide voice and leverage to entrepreneurs who have previously been marginalized, while creating incentives for reform among local officials. Even in one of Vietnam's most successful provinces, there was still room for regulatory improvement and the entrepreneur knew exactly what buttons to push to get it. Thus, the onus on EGI researchers is tremendous. EGIs can only

[1] Jason Folkmanis, 'Ho Chi Minh City Party Leader Chosen as Vietnamese President', in: *Bloomberg Press.com* (June 2006).

[2] Data and questionnaires can be found at <www.pcivietnam.org/index.php?lang=en>. Also, see the Vietnamese Provincial Competitiveness Index (PCI, 2005-2008), <http://asiafoundation.org/publications>.

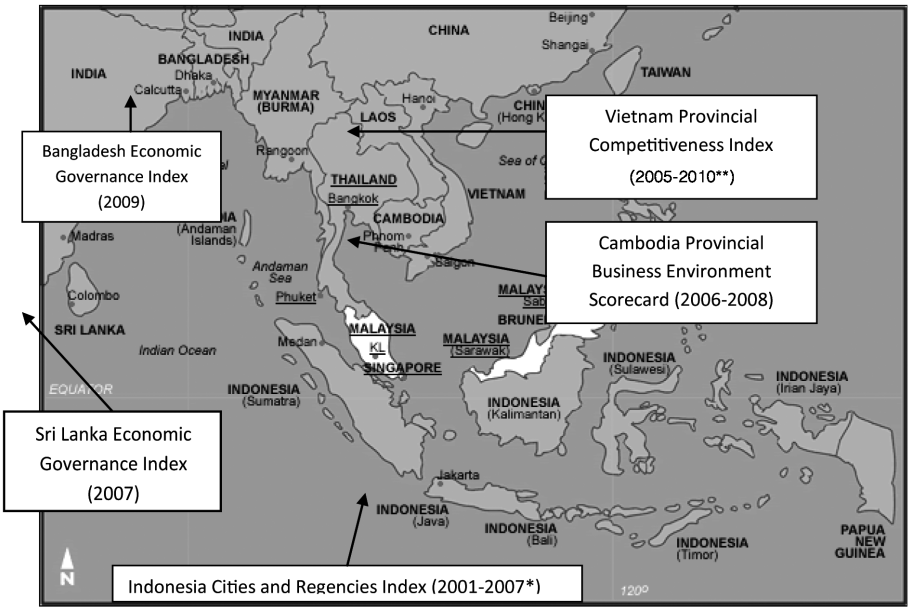
have such profound influence if they are believed to provide an accurate depiction of the sub-national environments they rank. If they do not, they can be easily manipulated by interest groups and other actors for political or personal gain. Thus, a sound methodology is necessary to ensure the accuracy of the data and analyses underlying an EGI's findings.

As illustrated in Figure 1, in recent years, The Asia Foundation has implemented Economic Governance Indices (EGIs) in countries throughout South and Southeast Asia, including Vietnam, Cambodia, Sri Lanka, Indonesia, and Bangladesh.[3] The Vietnam, Cambodia, and Indonesia indices have had annual or biennial iterations, and more iterations of the Bangladesh and Sri Lanka indices might be implemented in the future. Indices for Malaysia and Nepal are currently being planned.

Each EGI launch has received widespread attention from media, policy-makers, and development practitioners. The Vietnamese index, for instance, was voted one of the ten most important events of 2005 by Vietnamese Television, cited in the speeches of two successive Prime Ministers, used by a number of provincial officials in their reform activities, and addressed in hundreds of investigative news stories. In Cambodia, high-ranking officials of the Ministry of Industry, Mines, and Energy have vocally supported the use of the index in evaluating implementation of central business regulations. In Sri Lanka, the index was cited in a policy speech by the Central Bank Governor. And in Bangladesh the Commerce Minister promised several reforms aimed at increasing transparency and increasing the participation of women *during* the actual EGI launch.

In addition to the positive attention, each announcement of EGI rankings has been followed by vigorous and often critical discussion over the methodology used to generate the scores. These debates are healthy and encouraged. Understanding how the scores are derived is critical for designing policies that can help solve governance deficiencies identified by the index. At its most basic level, an EGI is an annual report card of the job performance of thousands of politicians and bureaucrats. Those receiving low marks deserve to know in detail why they received them and what they can do to improve their performance. Furthermore, methodological transparency is crucial for research teams. Feedback on the indexing approach helps us ensure that an EGI is relevant to the specific issues faced by entrepreneurs in these dynamic contexts. In this light, this paper presents a brief summary of the basics of EGI theory and creation. The article is structured in

[3] Specifically, the Vietnamese Provincial Competitiveness Index (PCI, 2005-2008), the Cambodian Provincial Business Environment Scorecard (PBES, 2006 & 2008), and the Sri Lankan Economic Governance Index (EGI 2007), Indonesia Cities & Regencies Index (2001-2007) and the Bangladesh Economic Governance Index (2009). All of these indices have created with the close collaboration and funding of The Asia Foundation, <http://asiafoundation.org/publications/>.



* Methodological changes introduced in 2007 to reflect the current EGI methodology.
** Not implemented by the Asia Foundation after 2008, but has continued in subsequent iterations through 2010.

Figure 1. EGI Implementation across Asia

three parts. First, it reviews the basic theoretical and programmatic rationale for the EGI. Second, it examines the methodological principles underlying the index approach. Third, it describes the three primary methodological elements which run through all EGIs, showing how potential pitfalls have been anticipated and addressed within the methodology.

Theoretical and Programmatic Rationale

In recent years, there has been a growing consensus that good governance promotes sustainable and equitable economic growth. The hypothesis that good governance positively influences growth is the subject of much academic research. Seminal papers by Knack and Keefer,[4] Acemoglu, Johnson and Robinson[5] as well as the

[4] Stephen Knack and Philip Keefer, 'Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures', in: 7 *Economics & Politics* (1995), at p. 207.

[5] Daron Acemoglu et al., 'The Colonial Origins of Comparative Development: An Empirical Investigation', in: 91:5 *The American Economic Review* (2001), at p. 1369.

work of Kaufmann, Kraay and Mastruzzi,[6, 7] have empirically linked measures of institutional quality with long-term growth rates. Moreover, bilateral and multilateral aid agencies have made good governance a cornerstone of their programs across the world, urging governments to address corruption and reduce red tape.

The focus on the connection between good governance and economic growth led to the development of EGIs as a country-specific diagnostic tool used to assess and rank localities on various aspects of their regulatory environments.[8] The overall rationale for creating this tool stems from the idea that economic governance and public service delivery impacts private sector development, independent of structural endowments such as location, infrastructure and human capital. Therefore, good economic governance practices and efficient public service delivery explain why some sub-national units out-perform others in spite of having similar initial endowments.

Thus, in order to effectively influence reform efforts, EGIs must provide relevant economic governance information to three important groups: policy-makers, firms, and development professionals. The aim of the EGI is to link these important groups to valid evidence in order to better diagnose problems, target prescriptions, and isolate the impact of policies and programs. Such evidence is crucial for implementing policies and programs that improve the business environment.

Policy-makers

Undoubtedly, one of the most important functions of EGIs is as a policy analysis tool for national and sub-national governments to use in diagnosing and addressing economic governance issues. For many years, policy-makers and researchers have inhabited almost parallel universes. Policy-makers complain that research is disconnected from reality and difficult to put into action, while researchers lament the primacy of 'political considerations' in the policy-making process.[9] This conflict reflects both the failure of researchers to take into account political constraints when designing technocratic policies *and* policy-makers' resistance to reform efforts that directly conflict with political incentives.

EGIs seek to overcome this conflict by being highly relevant and transparent. They aim to arm reform-minded policy-makers with understandable data on the business environment – including which policies and problems are most detri-

[6] Daniel Kaufmann et al., 'Measuring Governance Using Perceptions Data', in Susan Rose-Ackerman (ed.), *Handbook of Economic Corruption* 2006.

[7] Daniel Kaufmann et al., *Governance Matters VI: Governance Indicators for 1996-2006* 2007.

[8] EGI Methodology was developed and refined by Dr Edmund Malesky in 2005 originally for Vietnam.

[9] Overseas Development Institute. 'Bridging Research and Policy in International Development: An Analytical and Practical Framework', Policy Briefing, October 2004.

mental to the business environment – to help them craft effective reforms. Such objective data is also crucial to helping push through reforms that are politically sensitive or that face high opposition by providing political cover for reformers.

Firms

EGIs also provide a useful way for firms to monitor and create dialogue with local and national governments. Public-private sector dialogue is vital to economic development, as it provides governments with a better understanding of the micro-foundations for growth from the perspective of the private sector. EGIs are an obvious starting point for such dialogue because they provide a clear, empirical basis for discussion. In this way, they bolster the legitimacy of private sector concerns and are difficult for even normally unresponsive public sector organizations to ignore.

Development professionals

Lastly, EGIs are also an important tool for development practitioners who staff NGOs and multilateral aid organizations, and often provide advice and technical assistance to policy-makers. Like policy-makers, development practitioners have often been apathetic, uninterested, or even hostile toward using research to inform their programs. Lant Prichett, a lecturer at Harvard University and former World Bank employee, famously wrote in 2002 of the reluctance of Bank employees to embrace valid research:

> The World Bank is for the most part staffed by internationally recruited, high quality, highly trained, well-meaning, and experienced professionals and is arguably the premiere development institution. And yet nearly all World Bank discussions of policies or project design had the character of 'ignorant armies clashing by night' – there was heated debate amongst advocates of various activities but very rarely any firm evidence presented and considered about the likely impact of the proposed actions.[10]

Scholars have many theories on why there is such resistance to research-based development. Banerjee sites simple institutional inertia coupled with general ignorance about the importance of solid research.[11] Pritchett digs deeper and sites institutional incentives as the primary driver of research avoidance.[12] He argues

[10] Lant Prichett, 'It Pays to be Ignorant: The Simple Political Economy of Rigorous Program Evaluation', in: 5:4 *The Journal of Policy Reform* (2002), p. 251.

[11] Abhijit Vinayak Banerjee, *Making Aid Work* 2007, p. 7.

[12] Prichett, 'It Pays to be Ignorant: The Simple Political Economy of Rigorous Program Evaluation', above n. 10, at p. 251.

that many NGOs and multilaterals are staffed with 'true believers,' professionals who are attached to a particular paradigm or approach to solving problems. These people have little incentive to use research unless they believe that the research will confirm the use of their approach. This attitude, coupled with a donor community that has political incentives to demonstrate that every program it funds is successful, leaves little support for research-based development approaches.

EGIs contribute to 'evidenced-based' development programming by simply laying out where problems exist in the business environment sub-nationally. Therefore, development practitioners can clearly and easily discern where certain localities are falling short in the sub-indices or in the composite index as a whole and build targeted programs around the findings. While this doesn't fully overcome the structural incentive problems that development practitioners face, it can help better target and focus programs aimed at improving the sub-national business environment.

Methodological Principles

The ultimate goal of every EGI is to improve the productivity and performance of private entrepreneurs by reducing the extraneous regulatory burdens, corruption, and opacity of the legal environment in which they operate. To do this, each EGI relies unapologetically on the opinions of the private sector, gleaned through firm-level surveys. Efforts are made to address individual perception bias, but at its root, each EGI is a tangible manifestation of the aggregate voice of the private sector. The policy recommendations and rankings that emerge with each report are not possible without their input.

Four further philosophies undergird each EGI:

First, by separating out the economic growth generated by initial conditions (i.e., the fundamental underlying factors that contribute to economic growth in a province, but that are virtually impossible to address in the short-term, such as location, size of the domestic market, and human resources), the EGI is able to determine that good economic governance practices are possible at the sub-national level. For each EGI indicator, top performing localities can be identified.

Further, these good economic governance practices explain why: i) some localities out-perform others; and ii) why some sub-national units have similar economic performances, despite having quite different initial conditions for development in terms of location and human capital endowments. Actual improvements in these economic governance practices are strongly associated with improved economic performance, even when controlling for physical and human infrastructure.

Second, by standardizing the scores around best economic governance practices already found in the countries, the indices encourage sub-national governments to improve their performance, not against some ideal and possibly unattainable standard of good governance, but rather against the best performance already practiced by their peers. Any locality could attain a perfect score of 100 by adopting all existing best practices already found in the country.

Third, by comparing economic governance practices against actual economic performance, EGIs provide initial estimates of how important governance practices are in attracting investment and generating growth. The research provides a compelling demonstration of the association between: i) business-friendly economic governance practices; ii) business responses to those practices; and iii) welfare improvements. This last connection is critical, as it makes clear that business-friendly policies and practices benefit not just entrepreneurs, but also the broader society that relies upon private sector dynamism to provide the jobs that raise household living standards.

Fourth, data presented in EGIs is meant to be actionable. Beyond the total index and sub-index scores, each report reveals the specific scores underlying a region's ranking. Thus, rather than being told a region ranks low on property rights, a particular province will be informed that only 27 percent of businesses in their locality have valid title, and 93 percent of those do not believe they are secure. Thus, leaders are provided with concrete information about where they can make policy improvement, if they desire.

The Three Methodological Pillars of EGI Indexing

Though details of the methodologies differ slightly in countries where indexes have been created, all EGIs involve the same core elements, which we refer to as the three Cs: Collection, Construction, and Calibration (Figure 2). *Collection* involves the selection of indicators most relevant to private sector development in sub-national entities within a given country after a thorough review of the relevant theoretical and country-specific literature, as well as detailed conversations with economic experts in each country. It is important that indicators reflect policy decisions and implementation choices made by sub-national leaders. Assessing localities based on national regulatory policies or institutions controlled by directly national bureaucracies is not only unfair, it provides little variance for measuring relative sub-national performance. Once again, it is important that the indicators present actionable information for local leaders. For instance, a low mark for 'burdensome registration procedures' is not as immediately useful as is the message that average waiting periods to receive a registration certificate are twice the national average.

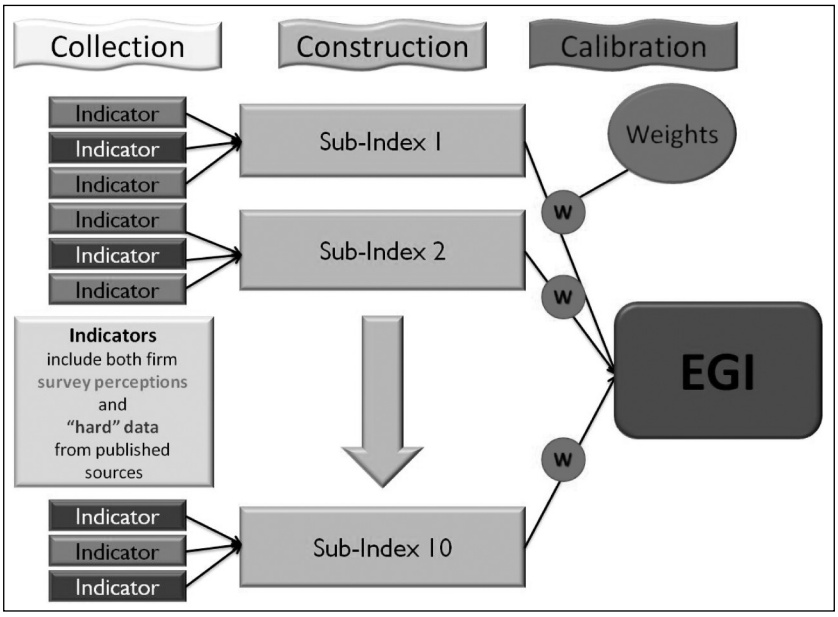


Figure 2. Basic EGI index methodology

Secondly, sub-indices are *constructed* as baskets of indicators reflecting the ten most important issues faced by the private sector within the country. Table 1 shows that many of the same sub-indices can be found among the countries with ongoing EGIs. These include Entry Costs, Land Access and Property Rights, Informal Charges (corruption), Transparency and Participation, and Time Costs of Regulatory Compliance. These sub-indices reflect universal economic governance challenges faced by the private sector across countries.

The selection of other sub-indices differs to reflect country-specific and contextual problems. For instance, Vietnam's transition from a centrally-planned economy required a measure of provincial biases toward the state owned enterprise sector, which is irrelevant in countries with little or no discernible state business activity. Similarly, crime and the cost of physical security comprise critical sub-indices for entrepreneurs in Cambodia, Sri Lanka, Indonesia, and Bangladesh, but would hardly merit discussion among a group of Vietnamese entrepreneurs.

The final, composite EGI represents the weighted sum of the ten sub-indices. A cornerstone of the Vietnam, Indonesia, and Bangladesh EGIs was the *calibration of* sub-indices through individual weights so that the final score was a reflection of the relative importance of each sub-index. The weights for each of these EGIs were constructed from different, but widely accepted, methods. The Vietnam and Bangladesh EGIs used econometric analysis that regressed measures of private sector performance (size, investment rate, and profitability or probability of expan-

Table 1. Sub-index commonalities among EGIs

Sub-indices	Vietnam (2006-2010)‡	Cambodia (2006, 2008)	Sri Lanka (2007)	Indonesia (2007)	Bangladesh (2010)
Entry costs (registration and licensing)	✓	✓	✓	✓	✓
Land access and property rights	✓	✓	✓	✓	✓
Informal charges (bribes, corruption in contracting)	✓	✓	✓	✓	✓
Transparency and firm participation in decision-making	✓	✓*	✓	✓	✓*
Time costs and regulatory compliance **	✓	✓	✓	✓	✓
Legal institutions and dispute resolution	✓	✓	✓		✓
Proactivity of provincial leadership	✓	✓	✓†	✓***	
Crime and cost of security		✓	✓	✓	✓
Taxes (fiscal and administrative burden)		✓	✓		✓
Infrastructure			✓	✓	✓
Business development policies	✓			✓***	
Labor training and matchmaking	✓			✓****	
Bias toward state-owned enterprises	✓				

Common to all five EGIs **Common to three EGIs**
Common to four EGIs **Common to two EGIs**

‡ Not carried out by The Asia Foundation after 2008.
* In Cambodia and Bangladesh, Transparency and Participation are measured separately.
** In Vietnam, Cambodia, Sri Lanka, Indonesia and Bangladesh, Time Costs and Regulatory Compliance measures the impact of regulations, using time as the measurement, whereas in Indonesia, the sub-index is called Local Regulation and it measures whether the local policies are informed by needs of business sector.
*** In Indonesia, it is called Capacity and Integrity of District Head.
**** In Indonesia, Business Development Polices and Labor Training and Matchmaking are measured in one sub-index called Business Development Programs.
† In Sri Lanka, this sub-index is known as Government Attitude Toward Business.

sion) on each of the ten sub-indices. A limited sample size of ten provinces in 2006 and data limitations prevented calibration in Cambodia and Sri Lanka respectively.

Collection of survey and hard data

The EGI approach does not take a stand on the methodology debate between: i) those advocating the importance of perceptions-based data;[13, 14] and ii) those employing hard data in their analysis.[15, 16] Instead, EGIs employ a strategy that seeks to maximize the benefits and minimize the disadvantages of both data sources.

A purely survey-based approach captures firms' opinions about the business environment, which is critical to our ultimate objective, but can be prone to perception biases, as many firms do not operate outside of their sub-national borders, and therefore lack the ability to compare their province with others accurately.

Conversely, using just hard data or legal regulations, avoids firm perception biases, but limits analysts to particular sets of data, which may omit critical elements of economic governance such as informal charges or the proactivity of leadership. Moreover, as we have learned on a number of occasions in constructing EGIs, using hard data does not eliminate biases. Measurement errors in hard data are often related to the collection process, and relatively under-developed localities are more likely to have under-staffed and poorly trained officers in their statistical agencies.[17]

Equally, expert opinions of business regulations, which are used more often international indices such as the World Bank's *Doing Business* indicators, are also prone to measurement error, based on individual experts' interpretations of often opaque and contradictory legal codes. Further, for sub-national indices like the EGI there are very few, if any, experts who can speak authoritatively about differences in local business regulations across all subnational governments of a country.

Thus, by combining perceptions-based data with hard, objective measures, we are able to cover wider ground than hard measures alone, while still accounting for perception biases in survey questions. Moreover, the composite approach ameliorates the impact of measurement error in published data.

[13] Kaufmann et al., 'Governance Matters VI'.

[14] Giuseppe Iarossi, *The Power of Survey Design: A User's Guide for Managing Surveys, Interpreting Results, and Influencing Respondents* 2006.

[15] World Bank, 2004-2010, *Doing Business: Benchmarking Business Regulations*, <doingbusiness.org> (accessed November 12, 2010).

[16] Simeon Djankov et al., 'The Regulation of Entry', in: 117:1 *The Quarterly Journal of Economics* (2002), p. 1.

[17] For example, the sum of the provincial GDPs in the 2006 PCI was 12 percent higher than the nationally reported amount. Obviously, some provinces may have over-reported their output, but which ones and why is unclear.

	a. Start-up documents required to legally operate the business [SHOW DOCUMENTS]	b. Obtained document for your business? 44 = Not applicable 1 = Yes; 2 = No; 3 = Applied and still waiting (state month and year of application); -99 = Don't know; -66 = Refused to answer	c. Month and year document obtained		d. What was the actual time (in days) required to get the document from the day you applied to the day you received?	e. Most recent year of renewal?	f. How much did you pay for the document?	
							(Total amount paid)	
			Month	Year			When registered (Taka)	Last renewal (Taka)
C1.	Trade license (from relevant local government)							
		C001A	C001B1	C00IB2	C001C	C001D	C001E1	C001E2

Source: 2010 Bangladesh EGI Survey Instrument.

Figure 3. Directly comparable questions

The Survey Questionnaire

EGI surveys are similar in structure, but are each tailored to gather information of specific interest to the focus country. Among the most important initial research endeavors when creating an EGI are detailed interviews with businesses, associations, and policy-makers that serve as the foundation for the survey instrument and allow for context that makes the indices relevant to local officials.

The surveys begin with a set of questions about basic business information and performance data, and then follow up with a detailed set of questions probing firms' perspectives on provincial governance. As Figure 3 from the 2010 Bangladesh EGI survey instrument shows, whenever possible, questions are written to elicit a directly comparable answer (e.g., What was the actual time (in days) required to get a trade licenses from the day to applied to the day you received it?), as opposed to those more likely to suffer from anchoring bias (e.g., Rate how burdensome it was to get a trade license).

About 20 percent of the questions among the country surveys are exactly the same, having been taken from the original Vietnam PCI survey or modified from the World Bank's *Investment Climate Assessment*.[18] These allow us to compare answers across the focus countries on key business issues. On average, EGI surveys run about fifteen pages and require about an hour to complete.

After a survey instrument is completed, it is often translated into the local language and then circularly translated into English to make sure the original meaning of the questions is retained. Next, a series of focus groups is designed in various parts of the country and with different types of firms. A moderator takes the firms through the survey question-by-question, gauging comprehension, as well as the willingness and ability of the respondents to answer. A second round of corrections follows that addresses problems identified within the focus groups. Finally, a pilot survey is used on a subset of the eventual sample in order to identify further survey design flaws, such as high non-response bias on individual questions or framing effects within the survey wording and sequencing.

Sampling frame

The ease of sampling varies tremendously within different country contexts, depending on the availability of reasonable sampling frames. In Vietnam, accurate lists of registered firms in each province were available from the National Tax Authority, so it was very easy to identify sub-populations and randomly sample within each strata. Sri Lankan researchers used a sampling frame available from a

[18] World Bank Investment Climate Assessments and Enterprise Surveys, <www.enterprisesurveys.org/>.

previous study by *A.C. Nielson*,[19] but after finding it was limited to only trading outlets, they supplemented it with municipal council lists of other sectors. In Indonesia, comparable lists of firms within districts did not exist across the country, but researchers were able to piece together a reasonable approximation from a range of different government and private sector sources.

Cambodia and Bangladesh provided the greatest challenges of all. In Cambodia, no comparable lists existed that allowed for easy identification of firms for the survey. Even worse, no standard addresses exist in many parts of the country, so researchers could not be sure that they could track-down and return to a potential respondent. To address this dilemma, in 2006 the Cambodian research team began their study with a 'firm listing' (similar to a census) of firms in the four largest population centers of the ten focus provinces. The team used a block-walking approach to record every business operation in a fixed location that had at least one employee who was not the owner. In total, 41,775 business operations were identified. Detailed information was recorded on the size, sector, and location of the firm. This exercise provided the most accurate record of private firms in Cambodia to date and served as a suitable sample frame for the research agenda. The business listing was repeated for the next EGI iteration in 2008 for all 24 provinces and yielded a sampling frame of 63,507 firms.

In Bangladesh, the research team originally wanted to use the Bangladesh Bureau of Statistics' (BBS) national census of fixed business establishments (conducted in 2003 and updated in 2006) as the primary sampling frame. However, the BBS decided not to make their census data on enterprises employing 10 or fewer workers available for general public use. Since firms with ten or fewer workers comprise the vast majority of Bangladeshi firms, the research team could not take advantage of the BBS listing. Therefore, like Cambodia, it was necessary to conduct a business listing of SMEs in each of the nineteen districts ranked in the 2010 Bangladesh EGI. Since the size of Bangladeshi cities is very large (the capital city of Dhaka has a population of more than fourteen million) the listing was taken in selected localities of business concentration in the urban headquarters of each district using a Probability Proportional to Size (PPS) cluster sampling method.[20] Using the PPS method, the research team randomly sampled areas (clusters) within the district headquarters and a 3KM radius around the district headquarters, conditional on those areas having a high concentration of firms, which helped ensure that the team obtained a reasonable picture of the population of firms in the district, without having to run a compete business listing. Once the clusters were chosen within a district, every firm in each cluster filled out a 'census' form.

[19] A.C. Nielson Retail Index, Sri Lanka, <http://lk.nielsen.com/products/crs_retailindex.shtml>.

[20] Graham Kalton, *Introduction to Survey Sampling* 1983, p. 38.

This listing exercise yielded 55,736 firms, which comprised the sampling frame for the EGI survey.

Stratified random sampling

All EGIs employ a stratified random sampling strategy, so that the sub-national sample is an accurate reflection of the sub-national population. Once a sampling frame is identified, researchers select the key population strata that need to be mirrored as accurately as possible in the sample. Random sampling alone will yield a highly representative sample, but in some cases normal survey error may lead to biases that affect the overall ranking.[21] For instance, older firms may have faced more difficulty in business entry than newer establishments. If a simple random sample slightly over selected older firms in a few provinces this could lead to lower rankings on key indicators. To avoid this problem, strata of critical populations are created and random sampling is performed within each basket.

Vietnam provides an illustrative example of the stratified random sampling for an EGI. In Vietnam, researchers began their study by obtaining a list of tax-paying firms in every province from the National Tax Authority. In 2007, the Tax Authority supplied a list of 177,815 firms for the 64 provinces in which the research team originally expected to conduct the survey. Population sizes ranged from 52,482 firms in HCMC to 197 in Lau Chau Province. The median province had 1,246 firms. Since researchers wanted to compare provinces it was necessary to construct 64 separate provincial-level stratifications rather than one large national-level survey that would have sampled most heavily in HCMC and Ha Noi.

To stratify, researchers used the Tax Authority lists to group firms by type of enterprise (Sole Proprietorship, Limited Liability Company (LLC), and Joint-Stock Company); economic segment (manufacturing, natural resource exploitation, service and commerce, and agriculture); and firm age (measured by whether the firm was registered before or after the 2000 Enterprise Law, which greatly facilitated business entry across the entire country). In this case, firm size was not used in the stratification because it is correlated too closely with type of firm. After verifying phone numbers and addresses, mail-out surveys were sent to firms based on their proportional representation in the 24 strata created by these divisions.

The benefit of the stratified random sampling is it yields a sample of firms that mirrors as closely as possible the structure of the provincial population.[22] Consequently, when ranking provinces it is possible to say that this is an accurate reflection of the entire population in the locality, and is not subject to the whims of a

[21] Floyd J. Fowler, *Survey Research Methods*, 3rd edn., 2002, p. 28.

[22] We say as closely as possible, because no sampling strategy is perfect. Sampling error is for this particular approach is 3 percent, meaning the true population numbers may be anywhere between 3 percent above or below the sample percentages.

Table 2. Phnom Penh population and sampling distribution

Population distribution of Phnom Penh												
# of employees/ establishment type	**Total**	**%**	**1 to 5**	**%**	**6 to 10**	**%**	**11 to 20**	**%**	**21 to 30**	**%**	**31+**	**%**
Services + Others	3,151	53%	2135	48%	600	61%	274	74%	77	74%	65	57%
Manufacturing, Construction, & Natural Resources	875	15%	677	15%	133	13%	33	9%	9	9%	23	20%
Commerce	1,973	33%	1610	36%	257	26%	61	17%	18	17%	27	23%
Sample Distribution of Phnom Penh												
# of employees/ establishment type	**Total**	**%**	**1 to 5**	**%**	**6 to 10**	**%**	**11 to 20**	**%**	**21 to 30**	**%**	**31+**	**%**
Services + Others	45	50%	31	47%	8	53%	4	67%	1	100%	1	50%
Manufacturing, Construction, & Natural Resources	13	14%	10	15%	2	14%	1	17%	0	0%	0	0%
Commerce	32	36%	25	38%	5	33%	1	17%	0	0%	1	50%

particular industrial segment or legal form. This can be seen in Table 2 on the preceding page where we take a close look at the structure of the Phnom Penh Provincial economy from the 2006 PBES. In the top panel is the population breakdown from the business listing. In the bottom panel, we list the breakdown of firms in the 2006 PBES dataset. As can be seen, the percentage breakdowns between the population distribution and the sample distribution are very similar. Phnom Penh is not a special exception; the same analysis could be provided for any of the other ten provinces in the 2006 Cambodia PBES (and then subsequently in the 2008 Cambodia PBES).

In some cases, EGI research teams may also employ an oversampling strategy for some strata to ensure that there are valid measures for some categories of firms. For example, the 2010 Bangladesh EGI research team took a stratified random district-level sample of 3,800 firms (200 per 19 districts). In total there were nine strata comprising sector type (manufacturing, trade and services) and firm size (3-5 workers, 6-9 workers and 10+ workers). However, the research team found that using a straightforward stratified random sampling methodology would yield too few medium and large firms in the sample, defined as 6-9 workers and 10+ workers, respectively. Therefore, the team devised a strategy to over-sample such firms for the survey so the confidence intervals around the respondent means for these strata would be valid. Once these means were obtained, the research teams used post-stratification weights, calculated from the business listing data to reweight the raw survey data back to its district sampling breakdowns for indexing calculations. This reweighting procedure ensures that even though some categories of firms were oversampled, the overall EGI still reflects the actual population of firms on the ground.

Distribution mechanism

EGIs differ in their choice of survey distribution. Vietnamese researchers employ a mail-out survey, while Cambodia, Sri Lanka, Indonesia, and Bangladesh rely on face-to-face interviews. In Cambodia, the fact that many businesses did not have recognized addresses rendered a mail-out impossible, but in other cases, research teams had a definitive choice. This decision has implications for data reliability and validity, so it is important to understand the motivations behind the decision and the trade-off.

The face-to-face interview approach

If possible, a face-to-face interview approach is preferable. Response rates have proven to be higher in a range of studies, which provides more confidence in the precision of results.[23] There are two drawbacks to interviews, however, that can do

[23] Fowler, *Survey Research Methods*, above n. 21, p. 117.

potentially more damage than non-response bias. Researchers in Cambodia, Sri Lanka, Indonesia, and Bangladesh took precautions to avoid these issues. First, researchers must provide respondents with sufficient anonymity. If respondents feel that their answers can traced back to them and they might be punished by angry officials for their candor, they will be unlikely to answer sensitive governance questions honestly. This may lead to high item non-response within the survey, or worse, to incorrect answers that cannot be properly assessed. In all of these countries, surveys were accompanied by introductions promising that responses would be confidential, and local officials were not informed of the timing of the survey or invited to participate.

Secondly, a project on a national scale requires hiring dozens of different enumerators, who introduce new 'treatment effects' through their interview techniques or personalities.[24, 25] These treatments are non-systematic across sub-national units and can bias rankings. The problem is compounded when working in heterogeneous populations with different cultures, dialects, or even languages. In each country properly addressing these concerns required the creation of a detailed interview manual and enumerator trainings with clear prescriptions about how questions should be asked and how much assistance given to respondents. Enumerators were trained carefully using the manual and were tested in a series of pilots before being allowed in the field. In all cases, care was also given to select enumerators from particular regions to conduct the interviews in their homelands if a distinct culture or dialect was evident.

The mail-out survey approach

The Vietnamese PCI employed a mail-out survey for two major reasons. First, sending complete research teams to all 64 provinces would have been prohibitively expensive, limiting the number of provinces which could be covered and eliminating the ease of surveying smaller firms based in rural localities. Second, door-to-door surveys would have eliminated the anonymity of respondents and reduced their openness.

Vietnamese law requires that the research goals of the survey be articulated to provincial officials in a letter of introduction prior to the onset of the research. While they may not attend the interview and directly influence answers (though this has been known to happen on occasion), firms would still worry that they could be identified and punished for critical answers.

Thus, the research team chose to use a mail-out survey, but introduced several precautions to limit the impact of non-response bias. The survey was printed on

[24] Fowler, *Survey Research Methods*, above n. 23, p. 134.

[25] James Druckman, 'The Implications of Framing Effects for Citizen Competence', in: 23:3 *Political Behavior* (2001), p. 225 at p. 227.

high quality paper and mailed in an eye-catching envelope the week after Tet, a major Vietnamese holiday, when respondents were most likely to be at their listed addresses.

The local-partner, the Vietnamese Chamber of Commerce and Industry (VCCI), included a letter explaining in detail the importance of this survey for improving the business environment and enhancing VCCI's ability to promote positive changes in the business environment. Respondents also had the option of receiving a free selection from VCCI's list of extensive publications. Finally, phone calls were made to a random sample of firms in every province that had not yet responded to the mailed survey. A prepared narrative was read during the phone call once again detailing the importance of the survey and reminding firms to complete and return the volume to the Ha Noi office of VCCI. Firms that had trouble responding to specific questions on the survey could also receive assistance if they requested it. Follow-up calls were implemented by a team of university students, who were specifically selected to provide a representative proportion of regional accents. Analysis of the response rates in repeated iterations concluded that firms in Southern Vietnam were less likely to respond to callers with Hanoi accents.

Response rates

Response rates for EGIs that employ face-to-face interviews tend to be quite high. For example, the 2010 Bangladesh EGI had an overall response rate of 89.4 percent and the 2008 Cambodia PBES had an overall response rate of 60 percent. While these response rates are not perfect, they are extremely high, particularly given the sensitive nature of some of the EGI questions. The measures taken to reduce non-response are partially responsible for this outcome, along with the fact that firm owners in developing countries tend to have a lower opportunity cost of time and, therefore, are more willing to fill out relatively long surveys than firm owners in developed countries.

For the mail-out survey approach, response rates tend to be lower. The cumulative response rates for Vietnam PCI in 2008 and 2007 were 24 percent and 21 percent respectively, rising to 32 percent in 2009. Both are considered reasonable for mail-out surveys in developing countries. Most importantly, the standard deviation of response rates across provinces was a minimal 5 percent, and this small variation proved to have no impact on provincial scores in repeated robustness tests. Nevertheless, a response rate ranging between 21-24 percent does raise concerns, as they imply that four out of every five recipients of the survey chose not to respond. If the motivation for non-response is non-random (e.g., only satisfied firms answered), it could lead to bias in the results.

To ensure that such non-response bias does not affect final rankings, EGI teams employ a series of diagnostic tests. The Vietnam example is illustrative. For the 2007 Vietnam PCI, provincial sub-index scores were regressed on response rates

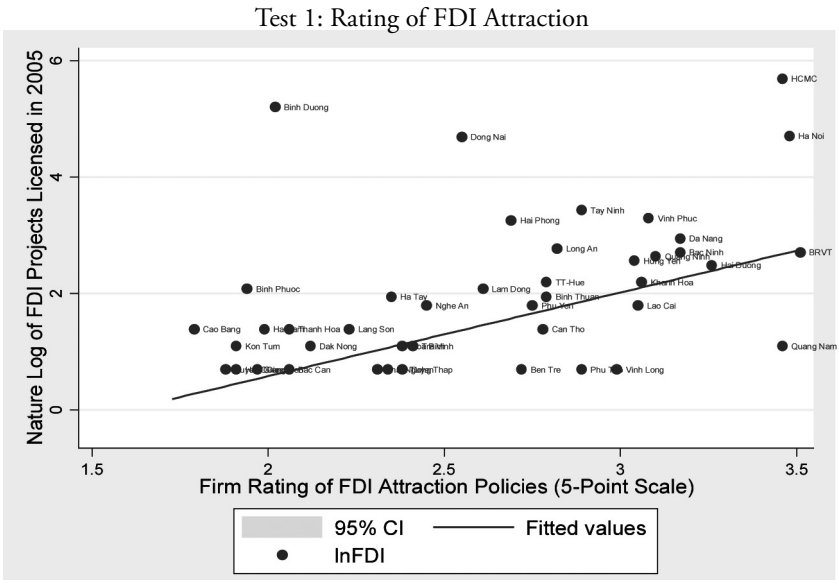


Figure 4. External validity tests of PCI survey data

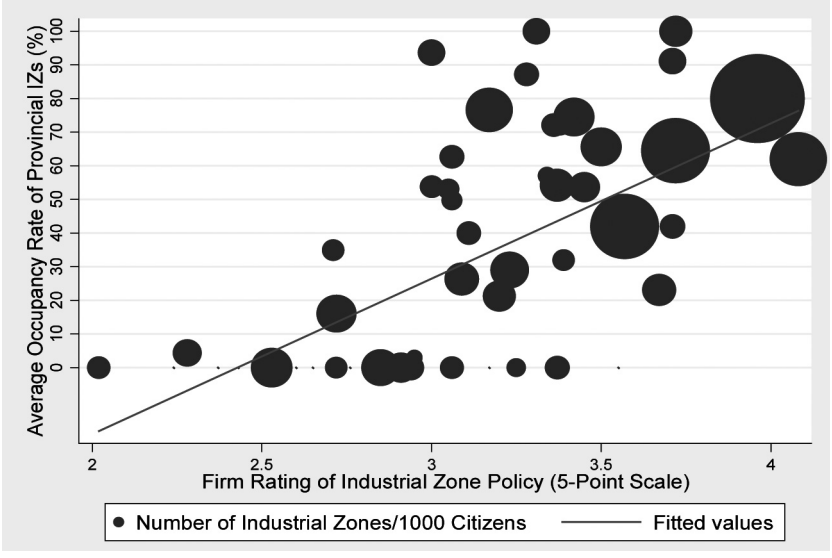


Figure 5. Evaluation of provincial industrial zone policy

to ensure that differential response rates did not impact the rankings. Second, survey data was compared to easily verifiable objective data to ascertain whether firms had answered correctly. For instance, firm perceptions of the extent of trade fairs, labor exchange services, industrial zones, and FDI attractiveness in their

provinces were strongly correlated with the number of actual trade fairs held, number of labor exchange centers, quantity and occupation rates of industrial zones, and the amount of implemented FDI (see Figure 4). Finally, data from the mail-out surveys was compared against data gained in face-to-face interviews in six provinces to make certain that scores and relative rankings did not differ radically.

Hard data collection

There are three primary reasons for the collection of hard data from published sources and third parties. First, researchers use hard data to offset the anchoring problem in survey research.[26] This issue, also known as differential item functioning (DIF), can pose dangers for EGIs. Put simply, firms – often of small or medium scale – that have operations only in one province do not know much about the administrative quality of their neighbors, much less the localities or regions on the far side of the country. Therefore, on questions where they must rank a policy of their locality along a scale, they may rank their locality lower or higher than an objective observer with knowledge of all localities would. Since their reference point is only one locality over time, they do not know how a specific policy may differ slightly in another province. Moreover, researchers have no concept of the ideal model that is being used by these firms as their comparative reference point. To address this problem, researchers collect as much data as possible from published sources and third parties and include these along with the perceptions data in the index under the assumption that the averaging of firms' perceptions with hard data is more reliable score than perceptions alone, as hard data is not subject to perceptions bias.

The second reason for the hard data collection effort is to build measures of structural endowments to be used in weighting. As mentioned above, one cornerstone of the EGI philosophy is to disentangle private sector performance related to good governance from performance caused by infrastructure,[27] proximity to markets, and human capital. As the EGI seeks to inform policy, a narrow focus on initial structural conditions is problematic. Equalizing differences in structural conditions is at best a long-term project and at worst an impossible goal. No matter how creative and clever the leadership and no matter how innovative the policies, a rural province's borders are unlikely to move any closer to the large

[26] Gary King et al., 'Enhancing the Validity and Cross-Cultural Comparability of Measurement in Survey Research', in: 98:1 *American Political Science Review* (2004), p. 191 at p. 192.

[27] Some EGIs do include infrastructure sub-indices. However they are generally in countries in which infrastructure is a major constraint throughout the country. In addition, to the extent possible, they measure infrastructure policy issues, which can be addressed by policy-makers, such as efforts to improve or maintain existing facilities.

retail markets and foreign buyers of a major city. Many EGIs use hard data for these purposes, controlling for:

1. *Proximity to Market,* proxied by the distance from markets measured by the distance in kilometers from the district or provincial capital to the capital city and second city (e.g., Dhaka and Chittagong in Bangladesh);
2. *Quality of Human Capital,* measured by the secondary school graduates as a percentage of the population, or the literacy rate, to account for the relevant labor force private firms would draw upon; and
3. *Initial Infrastructure Endowment*, measured by telephone landlines per capita or kilometers of road per square kilometer to determine their relative contributions (or 'weights') to the sub-indices.

The third reason for the hard data collection effort is to measure the relative contribution of sub-indices in order to weight the index by the impact each sub-index has on important private sector outcomes (i.e., number of active firms, investment and profit, or probability of firm expansion). Whenever possible, these dependent variables should be collected by a third party and therefore are not subject to the same methodological process as the survey data.

Data sources for hard data include government sources such as Statistical Bureaus, Ministries, State Banks, and the national budget, as well as other information collected directly by the research teams, such as data on the ease of obtaining business start-up information.

Construction of the sub-indices

Once all the perceptions and hard indicators are collected, EGI research teams begin the construction of the index. Unlike some other indexing approaches, we do not group indicators according to statistical correlations. Indices are selected to reflect the most appropriate measurements of key theoretical concepts in economic governance. The baskets of variables comprising the concepts become the sub-indices. Sometimes baskets of variables are too general to capture nuanced concepts. In these cases, we further divide the sub-indices into dimensions. For example, in the 2008 Cambodia EGI, the Informal Charges sub-index has two dimensions, micro-corruption and macro-corruption, representing firm-level corruption and systemic corruption respectively (Figure 6). Individual indicators are then grouped under the appropriate dimension. It is important to group indicators under such dimensions in order to keep them theoretically distinct. While not all of the sub-indices have more than one dimension – either because there are not enough indicators to justify more than one dimension or because there is no theoretical distinction between the indicators – the majority do have more than one. Within any given sub-index each of the dimensions is weighted equally (i.e.,

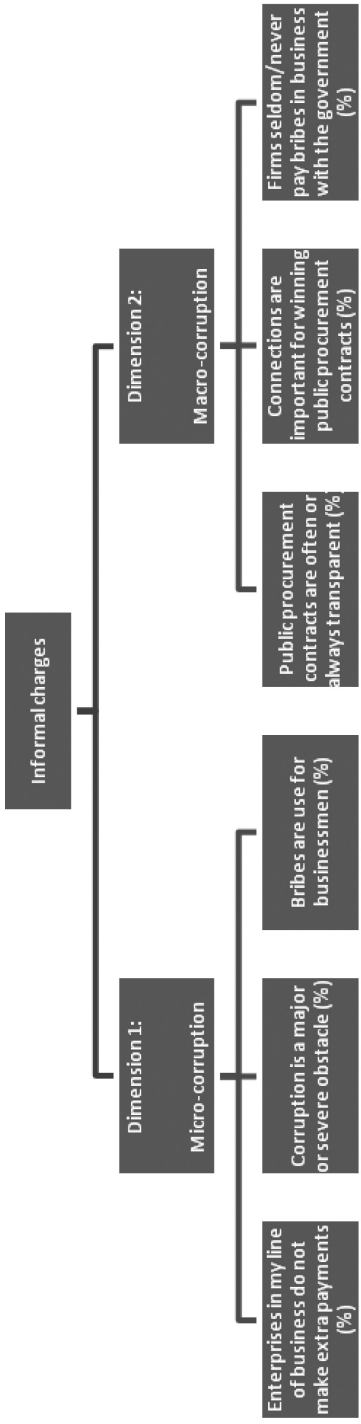


Figure 6. 2008 Cambodia PBES informal charges sub-index and dimensions

in a sub-index with two dimensions, each dimensions is worth 50 percent of the total sub-index).

Diagnostics tests

In addition to theoretical fit, indicators are only used in an index if they pass two additional tests. First, the standard errors around provincial aggregates must be small enough, so that scores of provinces at the 75th percentile of a particular indicator are significantly different from provinces at the 25th percentile. That is, the confidence intervals around those two scores should not overlap. This check is important, as it means that if an index were to be replicated on 100 separate samples of firms, 95 of those times, the same provinces would be at the top end and low ends of a particular score. This process is shown in more detail in Figure 7 from the 2010 Bangladesh EGI which shows the confidence intervals around the percentage mean scores for a trade license as reported by firms in the district. The major lines show the approximate 25th, 50th, and 75th percentiles. It is clear that confidence intervals below the 25th percentile and above the 75th percentile do not overlap, indicating that these ranges are statistically distinct. The lower bounds of the confidence intervals in the highly ranked provinces do not overlap with the upper bounds in the lower-ranked districts.

In the initial creation of an EGI, indicators that do not pass this test are eliminated. Of course, in future iterations of the index it is sometimes necessary to relax this rule so that indicators used in the construction are consistent over time. Our commitment to only choosing statistically significant indicators is a key reason for the robustness of the rankings year after year (see Table 3 for example),

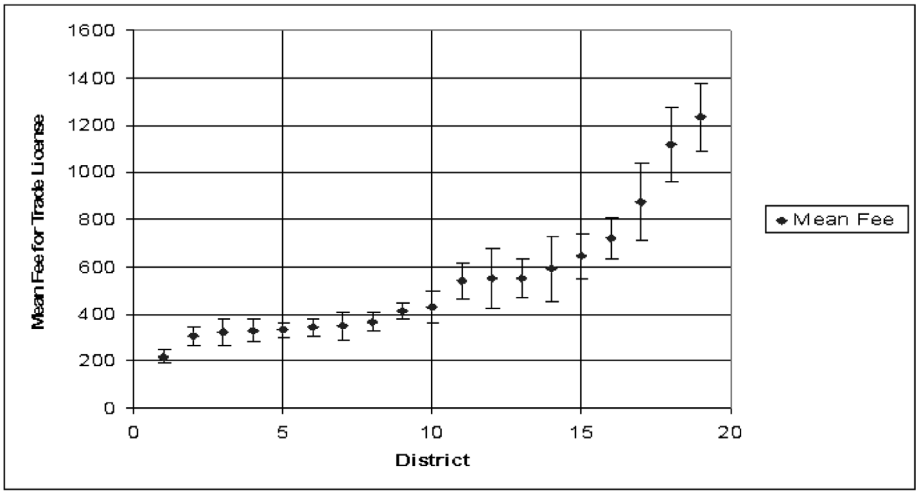


Figure 7. Confidence intervals around means for fee for trade license

Table 3. Comparison of 2006, 2007 and 2008 PCI scores

Index	**Measure**	**2006**		**2007**		**2008**	
		Score	**Province**	**Score**	**Province**	**Score**	**Province**
Final weighted provincial competitiveness index	Min	36.07	Lai Chau	37.96	Dak Nong	36.39	Dien Bien
	Median	52.41	Lam Dong/Thai Nguyen	55.56	Bac Giang/Phu Tho	53.17	Dak Lak/Binh Phuoc
	Max	77.61	Binh Duong	77.2	Binh Duong	72.18	Da Nang
	Correlation w/previous year	NA		0.85*		0.90*	
Unweighted total index	Min	42.51	Lai Chau	43.93	Dak Nong	45.29	Dien Bien
	Median	55.23	Hoa Binh/Lam Dong	58.49	Thai Binh/Ha Giang	58.17	Phu Tho/Kien Giang
	Max	74.87	Binh Duong	76.02	Binh Duong	72.87	Binh Duong
	Correlation w/previous year	NA		0.82*		0.88*	

as it eliminates the possibility that a new random sample could generate different provincial orderings. Indeed, the bivariate correlation between the 2006 and 2007 PCIs was 0.85 and the bivariate correlation between 2007 and 2008 was .90.

Secondly, differences in sub-national responses could not be shown through regression analysis to be caused primarily by variation in the type, legal status, or size of firms concentrated in particular areas. This test helps ensure that rankings result from universally applicable governance factors and not as a result of attributes of particular firms. For example, one might worry that registration procedures take longer for limited liability companies and a province with a disproportionate share of such firms would fare worse in the rankings. When possible, such indicators are eliminated altogether. When it is not possible to eliminate these indicators because that would result in too few indicators being included in a particular sub-index, the research team restricts the sample to a reasonable set of firms for the analysis. For example, in the 2010 Bangladesh Participation Sub-Index, it was clear that trade firms were more likely to be members of business associations than manufacturing or service firms and that this effect was differential across districts, meaning that districts with a higher concentration of trade firms would get higher scores than those with lower concentrations of trade firms. Therefore, the research team restricted the analysis on this variable to only trade firms, so that no matter the differing concentrations of firms across districts, the analysis was comparing like firms.

Scaling

Once indicators are selected for each sub-index, we standardize them all around a ten-point scale, or in the case of the 2007 Indonesia EGI, a 100-point scale. To re-scale, we used the following formula:

$$9 \times \left(\frac{District_4 - Minimum}{Maximum - Minimum} \right) + 1$$

where District 1 (or province) is the individual district value, minimum is the smallest provincial value in any of the years in which an EGI has been conducted in that country, and maximum is the largest district value in any year. An example of such an indicator would be the percentage of firms who agreed the district had a positive attitude toward private business.

On some items, a large number has a negative interpretation. In these cases, we reverse the index by subtracting the entire quantity from eleven. Such a negative indicator would be the number of total inspections experienced by each firm:

$$11 - (9 \times \left(\frac{District_4 - Minimum}{Maximum - Minimum} \right) + 1)$$

There are three principle reasons that EGIs use normalized indicators. First, it allows researchers to transform indicators into a value that is based solely on each sub-national score in comparison to other sub-national units. Second, the process of normalizing scores allows researchers to combine data from different indicators, which are often in different units, into one sub-index. For example, it allows researchers to combine an indicator which is expressed in 'average number of days' with an indicator which is expressed in 'average number of firms.' Third, normalizing the data facilitates a comparison of EGI scores across years throughout successive iterations.

Sub-index score = simple average of scaled indicators

After the indicators are normalized, the sub-index scores are calculated by taking the simple average of indicators. If a sub-index contains multiple dimensions, the average of the dimensions is used instead, so that dimensions receive equal weight. When hard data is used in a sub-index, the general rule is that the indicator must account for 40 percent of the total sub-index. If hard data is used in a sub-index that has multiple dimensions, however, the rule is adapted so that the hard indicators account for only 40 percent of the particular dimension, so as not to distort the overall meaning of the index. Figure 8 shows this process for the Entry Costs Sub-Index from the 2010 Bangladesh EGI.

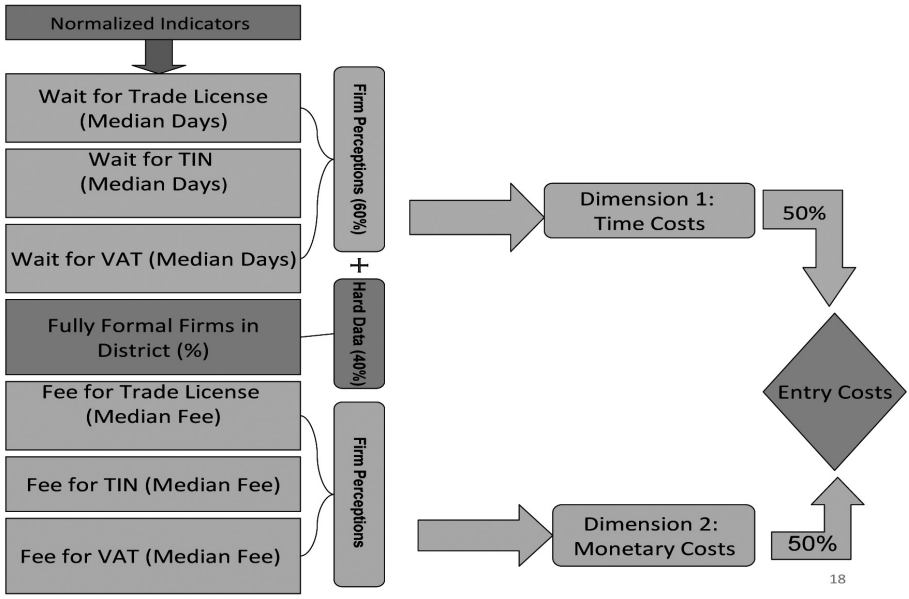


Figure 8. 2010 Bangladesh EGI entry costs sub-index construction

Calibration of the sub-indices to reflect contribution of private sector development

Among the most important innovations of EGIs is that care is taken to make sure that the final scores offer the most policy relevant information to provincial officials. This is done through the weighting of the sub-indices. Weights signal to local officials how to best prioritize their reform interventions for the biggest impact.

As noted, the EGIs in Cambodia and Sri Lanka did not use a system of weights. Instead, the final indexes were constructed by simply adding together the individual sub-index scores. In the Cambodia case, the first iteration of the Cambodia EGI, the 2006 PBES, included only ten provinces, so there were not be enough units of observation to properly run a regression to create weights. In the interest of consistency and comparability, the 2008 PBES also remained un-weighted. In the case of Sri Lanka, limitations in the variance among localities and a lack of hard data prevented regression-based weighting.

The EGIs that have used weights – Vietnam, Indonesia, and Bangladesh – have used several different weighting procedures, including weighting based on firm opinions and various regression techniques. The reason for this variance is to a large extent to due to data limitations, but also reflects philosophical debates about how to best measure the factors that are most adversely impacting the business environment. The Indonesia EGI created weights based on firm perceptions, while the Vietnam and Bangladesh EGIs used regression techniques that calibrated the index to actual business performance. While the ultimate decision of how to weight the indices is left to the in-country research teams and their various government and civil society partners, in general, Asia Foundation researchers and consultants generally advocate for regression-based approaches that use hard, objective data as the best technique to create sub-index weights.

Weighting based on firm perceptions

For the 2007 Indonesia EGI, researchers took an approach to weighting sub-indices that relied entirely on firm perceptions. The survey instrument included a question that asked firms to indicate which governance issue they considered to be the most significant constraint affecting business development. Answer choices for this question included a list of governance issues that corresponded directly to individual sub-indices. Sub-index weights were then determined based on the average percentage of firms nationwide that identified the corresponding governance issue as the most important.

However, there are reasons why this method of relying solely on firm perceptions may not be ideal. First, it is reasonable to assume that when asked which governance issue is the most *important* constraint on business development, many firms will select the governance issue which is the most *problematic* for their business, not the most important issue for private sector development. Secondly, because

in developing countries a lack of adequate infrastructure often places the biggest constraint on a business, this method of weighting sub-indices will likely place a great deal of emphasis on an infrastructure sub-index, if there is one. This is problematic because, in many countries, infrastructure policy is under the control of the central government, not the local governments. Even if the survey questions for an infrastructure sub-index are designed to address infrastructure issues within the purview of local governments, respondents' selection of infrastructure as the most important issue might reflect their concern about issues over which local governments have little control.

Regression-based weighting

Regression-based methods use an empirical approach to determining which sub-indices have the greatest impact on private sector development. The goal of a regression-based approach is to isolate the contribution of each sub-index to various measures of private sector performance. For example, for the 2006 Vietnam PCI, measures of private sector performance consisted of the number of enterprises per 1,000 people, the total investment per capita of these enterprises, and the average firm profitability. In order to isolate the impact of the sub-indices, researchers used control variables to account for other characteristics which were associated with these measures of private sector performance. For any particular EGI, such variables may include indicators of human resource capacity, distance from markets, infrastructure, and the size of the domestic market.

Researchers originally tried to simply run a single Ordinary Least Squares (OLS) regression that incorporated all ten sub-index scores as independent variables along with necessary control variables and the measures of private sector development as dependent variables. In an ideal scenario, the regression output would provide coefficients for each sub-index that could be used directly as weights for building the EGI. However, the regression that included all ten sub-indices as independent variables suffered from problems of multi-collinearity. In other words, correlation between the sub-indices in the regression led to coefficients that did not adequately represent each sub-indices relative contribution to the output measures. Since this was a problem, researchers ultimately chose to use a three-step factor analysis approach to resolve this issue.

The three steps are summarized in Table 4 below. First, factor analysis was used to divide the sub-indices into three uncorrelated factors (baskets of variables). In addition, this procedure provided researchers with 'factor loadings,' the bivariate correlation between each sub-index and these uncorrelated factors. Secondly, researchers regressed the three dependent variables (number of enterprises, new investment per capita, and profit per firm) on the three factors, controlling for provincial differences in infrastructure, human capital, and proximity to markets.

Table 4. Procedures used to derive PCI weights

Step 1: Calculate contributions of factors from multivariate regression (β: Impact of a one-point shift in derived factors on key outcome variables using standardized beta coefficients)					
Dependent variables	**Factor 1**	**Factor 2**	**Factor 3**	**Total**	
Profit per enterprise in millions of VND (β)	37.20	17.88	1.49	56.57	
Wgt1: Contribution to profit per enterprise (%)	65.76	31.61	2.63	100.00	
Number of Enterprises per 100,000 people in 2003 (β)	10.80	1.10	3.70	15.60	
Wgt2: Contribution to number of enterprises per 1,000,000 people in 2003 (%)	69.23	7.05	23.72	100.00	
Natural log of total average private sector investment 2000-2003 per capita (percent increase in investment) † (β)	42.96%	6.26%	3.19%	44.96%	
Wgt3: Contribution to average private sector investment per capita (%)	79.50	13.51	6.99	100.00	
Total factor contribution (%)	71.50	17.39	11.12	100.00	

Table 4. Continued

Step 2: Use factor loadings to derive individual sub-index contributions Multiply derived factor scores (Ω in Table 13) with ***total factor contribution (%)*** to generate final weight for each sub-index [((71.5**Factor 1*)+(17.39* *Factor 2*)+(11.12* *Factor 3*))/Total contribution]=final weight						
Sub-Index	**Factor 1**	**Factor 2**	**Factor 3**	**Contribution**	**Final weight**	**Rounded**
1. Entry Costs	0.0277	0.0385	0.8196	11.76	3.18%	5%
2. Land Access and Security	0.0103	0.7786	-0.0967	13.20	3.57%	5%
3. Transparency	0.7677	0.2805	0.0279	60.07	16.25%	15%
4. Time Costs of Regulatory Compliance	0.6826	-0.1258	-0.2312	44.05	11.92%	10%
5. Informal Charges	0.1555	0.6724	-0.1367	21.29	5.76%	5%
6. SOE Bias (Competition Environment)	0.1328	0.5346	0.2978	22.10	5.98%	5%
7. Proactivity	0.4991	0.5557	0.294	48.61	13.15%	15%
8. Private Sector Development Services	0.8191	0.1799	0.1725	63.61	17.21%	15%
9. Labor Training	0.7595	-0.0388	0.2798	56.74	15.35%	15%
10. Legal Institutions	0.3267	-0.1501	0.6676	28.17	7.62%	10%
TOTAL				**369.60**	**100.0%**	**100%**

* Regression coefficients are derived from ordinary least squares regression, controlling for initial infrastructure (proxied by telephones per capita in 1995), human capital (proxied by percentage of secondary school graduates in 2000), and proximity to markets (proxied by distance in kilometers from Ho Chi Minh city or Ha Noi, whichever is closer. Full regression results are available in the 2006 PCI Report (p. 101-103, <http://pcivietnam.org/reports-php>).

† Natural logarithms are converted to percentages by using the following formula $(e^b-1)*100$, where b is the coefficient from the regression.

Third, researchers multiplied the regression coefficients for each factor by the factor loading of each sub-index, to isolate the individual contribution of each sub-index to each dependent variable. For instance, Sub-Index 8 (PSD) was responsible for about 17.3 percent of the explained variance in the number of enterprises, 17.8 percent of the explained variance in investment, and 16.4 percent of the explained variance in profitability. Averaging these together, researchers learned that PSD was responsible for over 17.2 percent of total variance in all three dependent variables.

To simplify, researchers grouped the sub-indices into three groups (High, Medium, and Low). High contributors received 15 percent weights, medium contributors received 10 percent, and low contributors received 5 percent in the final weighted PCI. The final PCI was simply the weighted sum of all ten sub-indices, using these rounded weights. Maintaining the exact same weightings for PCI from 2006-2008 was necessary to compare improvement on performance overall all three years. Nevertheless, researchers did re-run the same three-step weighting technique on the 2007 PCI data, just to make certain that the policy environment has not shifted dramatically in the past year. They found that these did not change enough to warrant altering the weightings.

While the above procedure addresses the problem of multi-collinearity, in some cases it is not possible to find measures of private sector development to perform this analysis. This was the case for the 2010 Bangladesh EGI, for which independent measures of private sector development such as firm profit and new investment did not exist at the district level.[28] To overcome this problem, the research team regressed the binary variable 'Plans to Expand' – which indicates whether a firm is planning to expand or not over the next two years – from the EGI survey on each sub-index individually, controlling for firm and district level characteristics. To create the weights, researchers used probit models for which the marginal effects were calculated. As Table 5 shows, the regression coefficients gave the research team the marginal probability of a business expanding based on a 1-point improvement in any particular index. For example, a 1-point improvement in the Informal Charges Sub-Index leads to a 4.06 percent increase in the probability that a business will expand. Since this coefficient was highly significant at the 0.01 level, the team gave the Informal Charges Sub-Index a very high potential impact rating with a final weight of 15 percent. All of the other sub-indices were weighted accordingly in terms of marginal probability and significance.

[28] Data for the number of enterprises did exist on the district level from the Bangladesh Bureau of Statistics, but it was nearly a decade old, so researchers worried that would not accurately reflect the current state of Bangladesh's private sector development, which has gone through explosive growth in the past decade.

Table 5. Weights for 2010 Bangladesh Economic Governance Index

Sub-Index	Marginal probability of business expansion (based on 1-Point Increase in sub-index)	Potential impact	Final weight
Informal charges	4.06%***	Very high	15%
Law & order	3.41%***	Very high	15%
Transparency	2.81%***	High	12.5%
Time costs	1.98%***	High	12.5%
Dispute resolution	1.33%*	Med	10.5%
Infrastructure	1.26%*	Med	10.5%
Land access & tenure	0.28%	Med	10.5%
Entry costs	-0.16%	Low	5.5%
Tax administration	-1.1%*	Low	5.5%
Participation	-2.2%***	Very Low	2.5%

* Indicates that coefficient is significant at the 0.1 level.
** Indicates that coefficient is significant at the 0.5 level.
*** Indicates that coefficient is significant at the 0.01 level.

While this is a generally acceptable method for generating final EGI weightings, the fact that each sub-index's impact on the outcome variable is measured independently presents some problems. The reason why researchers calculated sub-index weights separately was because of multi-collinearity. However, this collinearity plays a significant role in the way each sub-index impacts the outcome variable. By removing the relationship each sub-index has with another by running the regressions separately is to fail to account for this aspect of each sub-index's impact on the outcome variable. Second, the dependent variable – probability of business expansion – comes directly from the survey instrument and therefore, not completely exogenous to firm perceptions reflected in each sub-index. It is therefore preferable to run a regression that includes all the sub-indices together, using the factor analysis method described above.

Conclusion

Nguyen Van Tu, Deputy Director of the Department of Planning and Investment in Vietnam's Ha Tay province, often describes his province's response to their low

2005 PCI score as *cốt tử*'. The word is generally translated as critical, but its connotation is one of dire necessity; a do or die activity. It is a striking and perhaps hyperbolic way to describe a decree detailing a list of regulatory reforms that the province planned to undertake.

As architects of such indices, it is also *cốt tử'* that we pay careful attention to such proclamations. We owe it to Tu and every other sub-national official that the information we provide is accurate, unbiased, and relevant to the needs of their economy. Moreover, we must also be transparent about the methodology we use to reach our conclusions. EGIs can only effectively be employed when all actors understand intimately how they are created.

In this article, we have endeavored to meet this challenge by detailing the motivation and methodology of the index. Such approaches always involve dozens of tradeoffs; each choice undoubtedly has potential costs. As we demonstrate in this article, however, we have thought deeply about these tradeoffs and believe, at the end of the day, that our approaches to data collection, construction, and calibration are the best available for the local contexts in which we have worked.

That said, EGIs must be dynamic tools. They must grow and adapt to the changing needs of the economies they evaluate. As our focus countries develop, they will face new reform challenges that must be reflected in new EGI indicators and sub-indices. This will in turn require changes in weighting strategies and perhaps even data collection methods. Consequently, we hope that this document will also serve to initiate a dialogue with EGI stakeholders. We hope that they will be able to use this as a baseline for their suggestions of improvements in our future methodological choices.