ECONOMIC GOVERNANCE INDEX (EGI)

# A Peek Under the Engine Hood:
## The Methodology of The Asia Foundation's Subnational Economic Governance Indices

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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 province from a poor backwater to a booming industrial powerhouse. With fourteen industrial zones, the highest foreign direct invest per capita in the country, a fast-growing domestic private sector, and a poverty ratio under 8%, 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 there 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 (Folkmanis 2006). Indeed, reflecting these policies, Binh Duong has ranked first for three consecutive years in the annual Provincial Competitiveness Index (PCI) that measures economic governance involving the private sector.

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 publically that if the barrier was not addressed satisfactorily, he would downgrade the province in the next PCI survey. Binh Duong officials corrected the offending legal document within the month.

The story encapsulates both the tremendous benefits of subnational Economic Governance Indices (EGIs) and their dangers. They provide voice and leverage to entrepreneurs who have previously been marginalized, while creating incentives for reform among provincial officials. Here in Vietnam's most successful province, there was still room for regulatory improvements and the entrepreneur knew exactly what buttons to push to get them. On the other hand, the onus on the creators of the index is tremendous. EGIs only have such profound influence if they are believed to provide an accurate depiction of the provincial environments they rank. A sound methodology is necessary to ensure the accuracy of the data and analyses underlying an EGI's findings.

In recent years, subnational Economic Governance Indices (EGIs) have been attempted in a range of diverse countries, including Vietnam, Cambodia, Sri Lanka, Indonesia, and the Philippines.[1] Each launch has received widespread attention from media, policy-makers, and development practitioners. The Vietnamese PCI, for instance, has been 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, addressed in hundreds of investigative news stories, and even served as the source of the final question in a prime time television game show.[2] In Cambodia, media attention has been a bit more muted but government officials have paid close attention. High-ranking officials of the Ministry of Industry, Mines, and Energy have

[1] Specifically, the Vietnamese Provincial Competitiveness Index (PCI, 2005-2007), the Cambodian Provincial Business Environment Scorecard (PBES, 2006 & 2008), and the Sri Lankan Economic Governance Index (EGI 2007). Similarly efforts are now being organized in Indonesia (Decentralization Watch) and the Philippines. All of these indices have created with the close collaboration and funding of The Asia Foundation.
[2] *Vietnam Televisison 1 (VTV 1)*. 2007. "Ring the Golden Bell," July 23.

vocally supported the use of the index in evaluating implementation of central business regulations. In Sri Lanka, the index is not even half a year old but had already been cited in a policy speech by the Central Bank Governor.

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 should be encouraged. Understanding how the scores are derived is critical for designing policies that can help solve governance deficiencies identified by the index Clarity about the methodology is also only fair. At its most basic level, an EGI is an annual report card of the job performance of thousands of 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, user-friendly summary of the basics of EGI creation. The article is structured as follows. First, it reviews the basic rationale underlying the index approach. Second, it describes the three methodological elements, which run through all EGIs, showing how potential pitfalls have been anticipated and addressed within the methodology.

## 1. Rationale

The ultimate goal of every EGI reviewed in this essay 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 surveys with firm owners and directors. 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. Three further philosophies undergird the assembly of these opinions.

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, infrastructure, size of the domestic market, and human resources), the EGI is able to determine that good economic governance practices are possible at the subnational level. For each EGI indicator, a “star” or top performing localities can be identified.

Further, these good economic governance practices explain why: i) some localities out-perform others; and ii) why some subnational units have similar economic performances, despite having quite different initial conditions for development in terms of infrastructure 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 normalizing the scores around best economic governance practices already found in the countries, the indices encourage subnational 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 one hundred by adopting all existing best practices already found in the country.

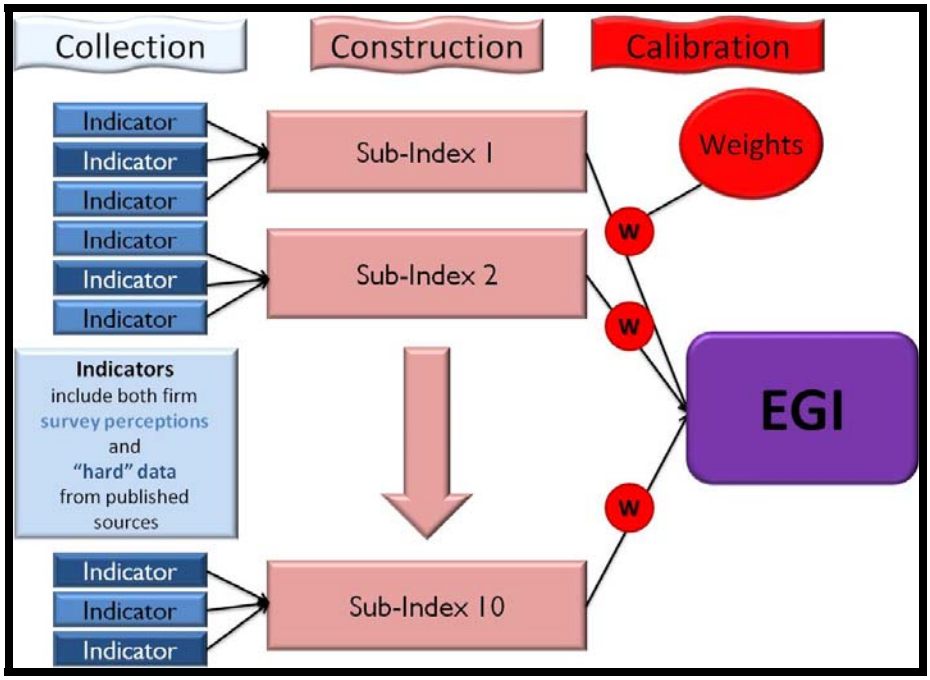
Third, by comparing economic governance practices against actual economic performance, EGIs provide initial estimates of how important governance practices are in attracting investment and generating growth. The research provides a compelling demonstration of the association between: i) business-friendly economic governance practices; ii) business responses to those practices; and iii) importantly, 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.

## 2. The Three Methodological Pillars of Indexing

Though details of the methodologies differ slightly in country where indexes have been created, all EGIs involve the same core elements, which we refer to as the three Cs: Collection, Construction, and Calibration. The entire process is displayed schematically in Figure 1. *Collection* involves the selection of indicators most relevant to private sector development in subnational 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 subnational leaders. Assessing provinces based on national regulatory policies or institutions controlled by national-policy makers is not only unfair, it provides little variance for measuring relative subnational performance. It is also important that the indicators present actionable information for local leaders. A low mark for "burdensome registration procedures," for instance, is not as immediately useful as a message that average waiting periods to receive a registration certificate are twice the national average.

**Figure 1: The Provincial Competitiveness 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: business registration and market entry, security of private property rights, transparency of subnational legal and planning documents, corruption, and the efficiency of legal institutions. Selection of sub-indices varies somewhat to reflect country-specific needs. For instance, Vietnam's transition from a centrally-planned economy requires a measure of provincial biases toward the state-owned enterprise sector, which is irrelevant in countries with no discernable state business activity. Similarly, crime and the cost of physical security comprise critical sub-indices for entrepreneurs in Cambodia and Sri Lanka but would hardly merit discussion among a group of Vietnamese entrepreneurs.

The final EGI represents the weighted sum of the ten sub-indices. A cornerstone of the Vietnamese PCI is to *calibrate* these sub-indices through individual weights so that the final score is a reflection of the relative

importance of each sub-index. The weights are derived from regressing the measures of private sector performance (size, investment rate, and profitability) on each of the ten sub-indices. A limited sample size of ten provinces and data limitations prevented calibration in Cambodia and Sri Lanka respectively, but the approach will be employed in Indonesia's on-going effort.

**Table 1: Sub-Indices Used in Different EGIs**

| Sub-Indices | Vietnam | Cambodia | Sri Lanka |
|---|---|---|---|
| 1 | Entry Costs (Registration and Licensing) | Entry Costs (Registration and Licensing) | Entry Costs (Registration and Licensing) |
| 2 | Land Access and Property Rights | Land Access and Property Rights | Land Access and Property Rights |
| 3 | Transparency of Business Information | Transparency of Business Information | Transparency and Firm Participation in Decision Making |
| 4 | Time Costs of Regulatory Compliance | Time Costs of Regulatory Compliance | Time Costs of Regulatory Compliance |
| 5 | Informal Charges (Bribes, Corruption in Contracting) | Informal Charges (Bribes, Corruption in Contracting) | Informal Charges (Bribes, Corruption in Contracting) |
| 6 | Legal Institutions and Dispute Resolution | Dispute Resolution | Legal Institutions and Dispute Resolution |
| 7 | Proactivity of Provincial Leadership | Proactivity of Provincial Leadership | Government Attitude toward Businesses |
| 8 | Private Sector Development Policies (Promotion, Trade Fairs, Technlogy) | Taxes (Fiscal and Administrative Burden) | Taxes (Fiscal and Administrative Burden) |
| 9 | Labor Training and Matchmaking | Crime and Costs of Security | Crime and Costs of Security |
| 10 | Bias toward State Owned Enterprises | Participation of Firms in Local Decision Making | Infrastructure and Business Services |

| | | |
|---|---|---|
| | Common to all three indices | Formal subindex namess and sequencing have been changed slightly from the original EGI reports to facilitate comparison. |
| | Common to only two indices | |
| | Unique to country index | |

### *2.1. 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 (Kaufmann et al. 2007, Iarossi 2006); and ii) those employing hard data in their analysis (World Bank 2007, Djankvov et al. 2001). 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 firm 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 provincial 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 (eg. 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 provinces are more likely to have under-staffed and poorly trained officers in their statistical agencies.[3]

Equally, expert opinions of business regulations are also prone to measurement error, based on individual experts' interpretations of often opaque and contradictory legal codes. Further, there are very few, if any, experts who can speak authoritatively about differences in local business regulations across all of countries subnational governments. 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.

**Table 2: Comparative Index Methodologies**

| Methodology | Vietnam | Cambodia | Sri Lanka | Indonesia |
|---|---|---|---|---|
| Iterations of Index Performed | 4 | 2 | 1 | 1** |
| Year Initiated | 2005 | 2006 | 2007 | 2008 |
| Unit of Analysis | Province | Province | MC & UC | District |
| Units Covered | 64/64 | 10/23 | 48/48* | 1/2 |
| Survey Distribution | Mail-Out | Face-to-Face | Face-to-Face | Face-to-Face |
| Sample Size | 6700 | 500 | 4696 | 12000 |
| Strata | Legal Form, Sector, Age | Sector, Size | Sector, Size | Sector, Size |
| Total Response Rate | 21% | 45% | 50% | TBA |
| Randomized Replacement of Non-Respondents | No | Yes | Yes | Yes |
| Subset of firms re-surveyed to create panel data | Yes | Yes | TBA | TBA |
| Hard Data Employed | Yes | Yes | Yes | Yes |
| Number of Sub-Indices | 10 | 10 | 10 | 10 |
| Weighting of Sub-Indices | Yes | No | No | Yes |

*Northern and Eastern Provinces were excluded due to civil unrest.
** The Decentralization Watch (KPPOD) Project in Indonesia revamped their methodology after a successful five-year (2001-2006) run using a different framework.
MC & UC: Municipal and Urban Councils
TBA: To be announced, as the Indonesian survey is still being conducted at this date.

*The Survey Questionnaire*

EGI surveys are similar in structure, but are each tailored to gather information of specific interest to the focus country. One of the most important initial research endeavors when creating an EGI is the month of detailed interviews with businesses, associations, and policy-makers that serves as the foundation for the survey instrument and allows 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 then follow up with a detailed set of questions probing firms' perspectives on provincial governance. Whenever possible, questions are written to elicit a directly comparable answer (e.g. How many inspections by local agencies have taken place in your business in the past month?), as opposed to those more likely to suffer from anchoring bias (e.g. Rate how burdensome inspections are for your business). About 20% of the questions among the country surveys are exactly the same, having been taken from the original PCI survey or modified from the World Bank's *Investment Climate Assessment*. These allow us to compare answers across the focus countries on key business issues. On average, EGI surveys run about fifteen pages and require between forty-five minutes and an hour to complete.

After a survey instrument is completed, it is 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

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

survey design flaws, such as high non-response bias on individual questions or framing effects within the survey wording and sequencing.

*Stratified Random Sampling*

All EGIs employ a stratified random sampling strategy, so that the subnational sample is an accurate reflection of the subnational population. The ease of sampling varied tremendously in the different country contexts. In Vietnam, accurate lists of registered firms in each province were available form the National Tax Authority, so it was very easy to identify subpopulations and randomly sample within each strata. Sri Lankan researchers used a sampling frame available from a previous study by *A.C. Nielson*, 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 provided the greatest challenge of all. 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, the Cambodian research team began their study with a full 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.

Once a list 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 (Fowler 2002). 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, baskets of critical populations are created and random sampling is performed within each basket.

Vietnam provides an illustrative example of the stratified random sampling that takes place in an EGI. PCI researchers began their study by obtaining a list of tax-paying firms in every province from the National Tax Authority. This list was considered preferable to similar lists from the registration offices of the provincial Departments of Planning and Investment (DPI) for two reasons. First, most observers tend to believe that the DPI lists are inflated. DPI lists are slow to drop operations after they are inactive. Moreover, firms themselves have an incentive to register without actually beginning operations. While illegal activities through "ghost firms" plays a small role in this problem, the majority of the gap between registrations and activities consists of firms that simply took care of the paperwork early while they went about preparing more difficult preliminary business activities. Second, addresses and phone numbers obtained from the Tax Authority were deemed to be more reliable as these came from the same data used by provincial tax officers to contact firms regarding payment.

The Tax Authority supplied a list of 177,815 firms for the sixty-four 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. Addresses and telephone numbers of all firms were verified by VCCI's branch offices. Because researchers wanted to compare provinces, it was necessary to construct sixty-four 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). Note that firm size was not used in the stratification, because it 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 twenty-four 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.[4] Consequently, when ranking provinces it is possible to say that this is an accurate reflection of the entire population in the new province, and is not subject to the whims of a particular industrial segment or legal form. This can be seen in Figure 2 below where we take a close look at the structure of the Binh Dinh provincial economy. In the top panel is the population breakdown from the National Tax Authority data. In the bottom panel, we list the breakdown of firms in the PCI dataset. As can be seen, the numbers are nearly identical. The only area with sampling error above the estimated 3% is percentage of firms registered before and after the Enterprise Law, but even here the dominance of new firms is clear in both panels. Binh Dinh is not a special exception; we could have provided the same analysis for any of the sixty-four provinces. Consequently, is not necessary to speak to every firm (as some provincial leaders have suggested); we have a representative cross-section of the population.

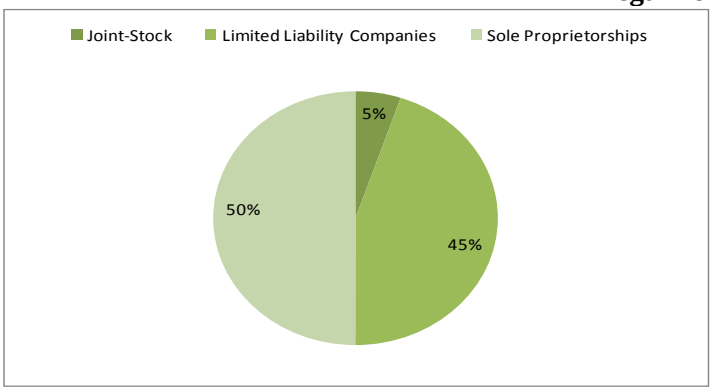
The bottom line is that random sampling yields a picture of the province very much like the true picture. Provincial leaders can consequently feel very comfortable that the data derived from the PCI is an accurate depiction of firm beliefs about their economic governance.

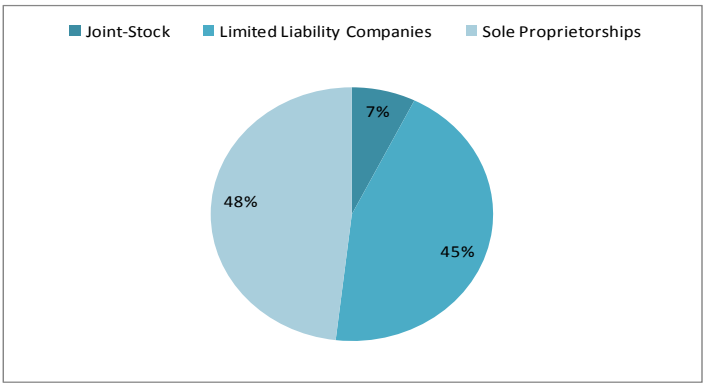
[4] We say as closely as possible, because no sampling strategy is perfect. Sampling error is for this particular approach is 3%, meaning the true population numbers may be anywhere between 3% above or below the sample percentages.

# Figure 2: Binh Dinh Population and Sampling Distribution

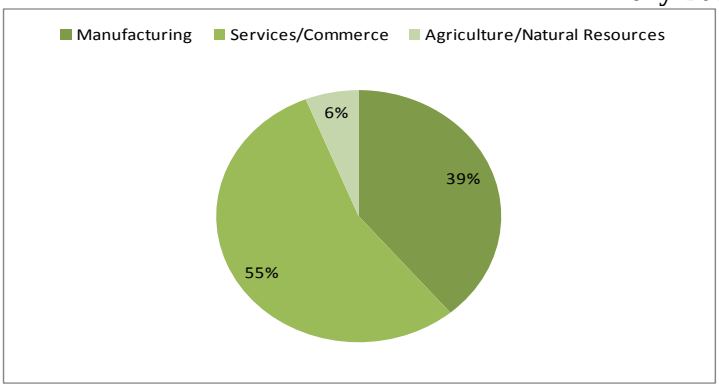
**Population** **Sample**

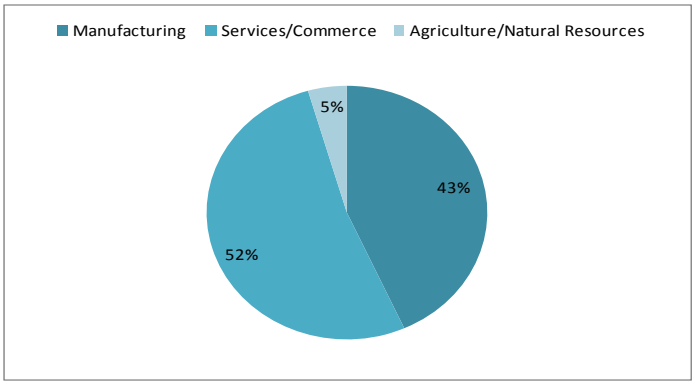
## Legal Form of Firm



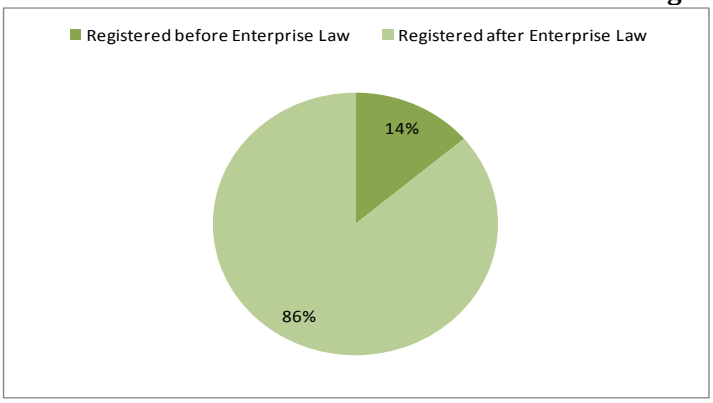



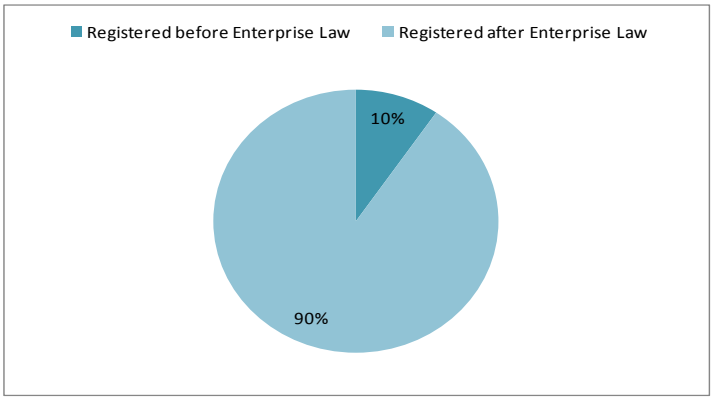

## Primary Business Sector




## Age of Firm



*Survey Distribution Mechanism*

EGIs differ in their choice of survey distribution. Vietnamese researchers employ a mail-out survey, while Cambodia, Sri Lanka, and Indonesia rely on face-to-face interviews. In Cambodia, 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, an 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 (Fowler 2002). There are two drawbacks to interviews, however, that can do potentially more damage than non-response bias. Researchers in Cambodia and Sri Lanka 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 both Cambodia and Sri Lanka, 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 interviewers, who introduce new "treatment effects" through their interview techniques or personalities (Fowler 2002, Druckman 2001). These treatments are non-systematic across provinces and can bias provincial rankings. The problem is compounded when working in heterogeneous populations with different cultures, dialects, or even languages. In both Cambodia and Sri Lanka, properly addressing these concerns required the creation of a detailed interview manual with clear prescriptions about how questions should be asked and how much assistance given to respondents. Interviewers were trained carefully using the manual and were tested in a series of pilots before being allowed in the field. In both cases, care was also given to select interviewers 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 sixty-four provinces would have been prohibitively expensive, limiting the amount 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 high quality paper and mailed in an eye-catching envelope the week after Tet, 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

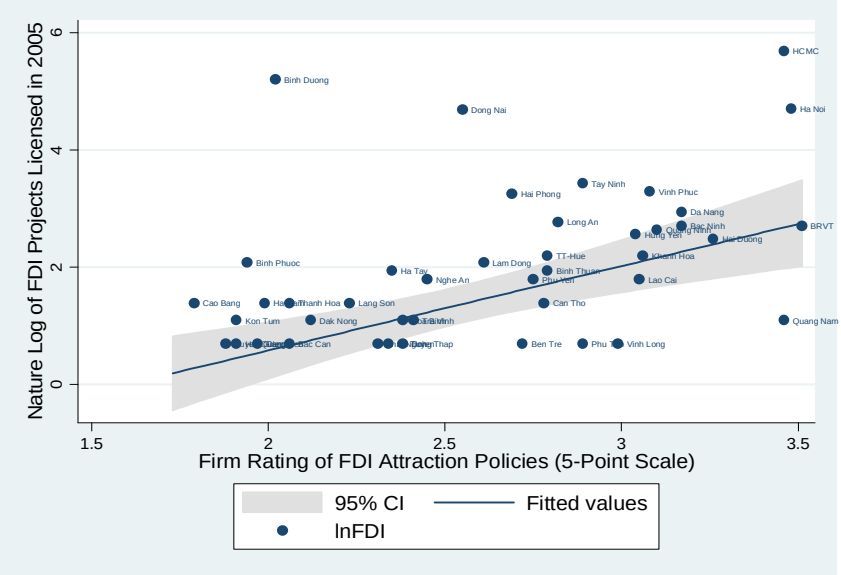
office of VCCI. Firms that had trouble responding to specific questions on the survey could also receive assistance if they requested it. Follow-up calls were implemented by a team of university students, who were specifically selected to provide a representative proportion of regional accents. Analysis of the response rates in the 2005 PCI concluded that firms in Southern Vietnam were less likely to respond to callers with Hanoi accents.

The cumulative response rate for PCI 2007 was 21%, compared with 20% for PCI 2006. 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%, and this small variation proved to have no impact on provincial scores in repeated robustness tests. Every province had over fifty respondents with only one exception. Lai Chau, the newly created province in Northwest Vietnam with very small firm population, had thirty-seven respondents, representing over 1/3 of its total business activity.

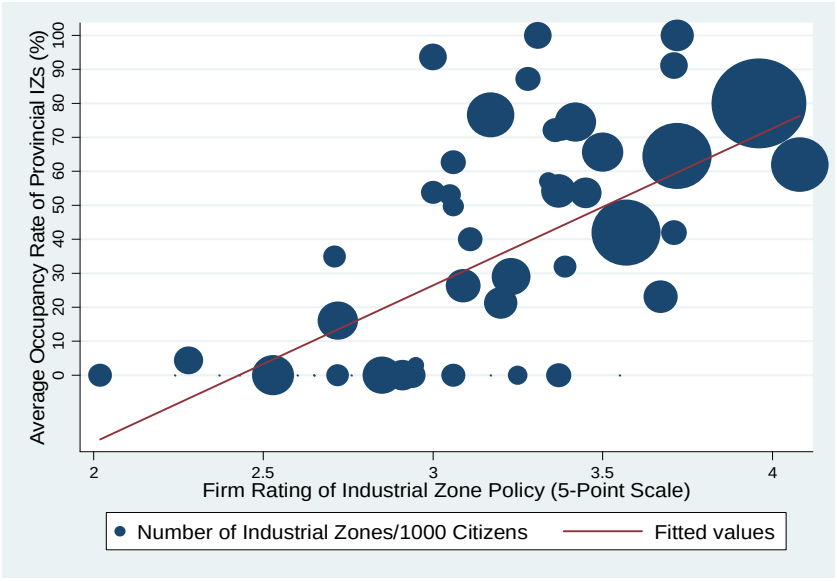
Nevertheless, a response rate of 21% does raise concerns, as it implies that four out of every five recipients of the survey chose not to respond. If the motivation for non-response is non-random (e.g. only satisfied firms answered) it could lead to bias in the results. To ensure that such non-response bias did not affect the final ranking, the team engaged in three further diagnostic checks. First, provincial sub-index scores were regressed on response rates 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 3). Finally, data from the mail-out 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.

# Figure 3: External Validity Tests of PCI Survey Data

## Test 1: Rating of FDI Attraction




## Test 2: Evaluation of Provincial Industrial Zone Policy



*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 (King, Murray, Salomon, and Tandon 2003). 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 provinces on the far side of the country. Therefore, on questions where they must rank a policy of their province along a scale, they may rank their province lower or higher than an objective observer with knowledge of all provinces would. As their reference point is only one province 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 collected 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 would more reliable score than perceptions alone.

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, 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 retail markets and foreign buyers of a major city. Infrastructure projects are also expensive endeavors that must be carefully considered on a national basis. For instance in Vietnam, it makes little sense to build a port in each provincial harbor, as international shipping companies are unlikely to make more than one or two calls on any trip. As a result, the national government must choose carefully the infrastructure projects that are likely to have the largest effect on the country as a whole, so an index that rewards provinces for having more or higher quality ports is unfair and misleading. The standard technique for holding certain variables constant (known as controlling for them) in order to see the direct impact of a key factor (in this case, economic governance) is multiple regression. In Vietnam, the PCI uses hard data for these purposes, controlling for:

- *Proximity to Market,* proxied by the distance from markets measured by the distance in kilometers from the provincial capital to Ha Noi or Ho Chi Minh City;
- *Quality of Human Capital,* measured by the secondary school graduates as a percentage of the population in 2000 to account for the relevant labor force private firms would draw upon; and
- *Initial Infrastructure Endowment*, measured by telephones per capita in 1995 to determine their relative contributions (or 'weights') to the sub-indices.[5]

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). Whenever possible, these outcome variables (or "dependent variables" in statistical terminology) 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 team, such as our evaluation of the openness of provincial web pages.

[5] Please note that results hold in the regression results even if we use 2004 data for structural conditions or other measures of infrastructure.

### *2.2. 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 and specific Vietnamese policy debates. The baskets of variables comprising the concepts become our 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 instance, Sub-Index 2 on Land Policy in the PCI was sub-divided into access to land and the security of land tenure in order to capture these two distinct elements of the policy debate. For interested readers, detailed descriptions of the theoretical foundations for each sub-index as well as the dimensions and indicators comprising them can be found in reports.

*Diagnostics Tests*

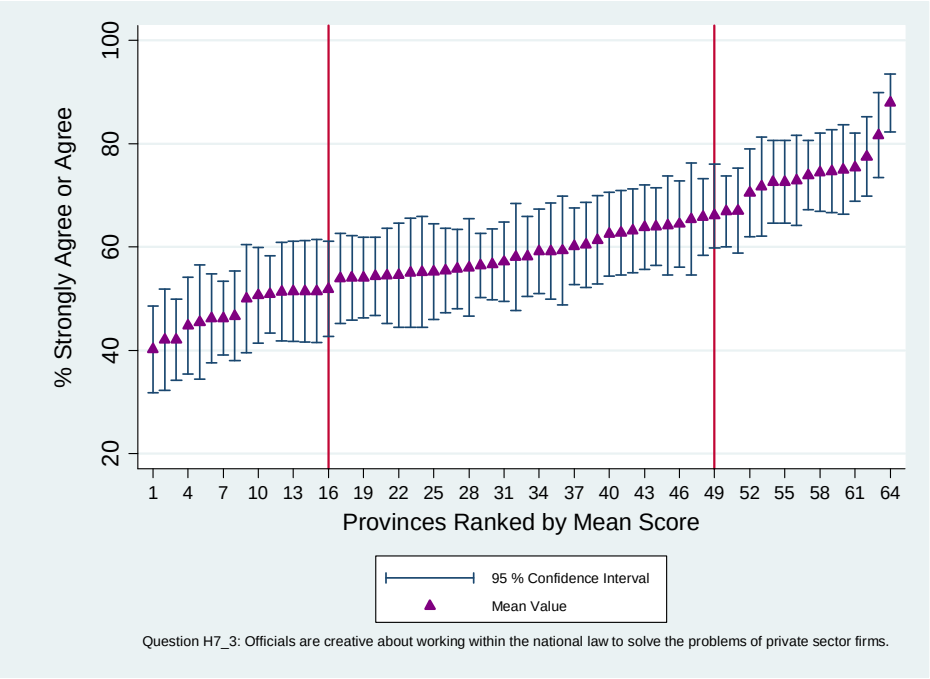
In addition to theoretical fit, indicators are only used in an index if they pass two additional tests. First, the standard errors around provincial aggregates must be small enough, so that scores of provinces at the 75$^{th}$ percentile of a particular indicator are significantly different from provinces at the 25$^{th}$ 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 a hundred separate samples of firms, ninety-five 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 4 below, where we show the confidence intervals around the percentage of firms, who agreed or strongly agreed with the statement that provincial officials were cleaver about resolving firm problems. Red lines show the 25$^{th}$ and 75$^{th}$ percentiles respectively. Responses above and below 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 provinces.

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) , 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.

Secondly, differences in provincial 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 provinces. 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. All such indicators were eliminated from the PCI analysis in 2006.

## Figure 4: Confidence Intervals around Indicator Scores

(Red Lines Denote 25th and 75th Percentile)



## Table 3: Comparison of 2006 and 2007 PCI Scores

| Index | Measure | 2006 | | 2007 | |
|---|---|---|---|---|---|
| | | Score | Province | Score | Province |
| Final Weighted Provincial Competitiveness Index | Min | 36.07 | Lai Chau | 37.96 | Dak Nong |
| | Median | 52.41 | Lam Dong/Thai Nguyen | 55.56 | Bac Giang/Phu Tho |
| | Max | 77.61 | Binh Duong | 77.2 | Binh Duong |
| | Correlation w/Previous Year | NA | | 0.85* | |
| Unweighted Total Index | Min | 42.51 | Lai Chau | 43.93 | Dak Nong |
| | Median | 55.23 | Hoa Binh/Lam Dong | 58.49 | Thai Binh/Ha Giang |
| | Max | 74.87 | Binh Duong | 76.02 | Binh Duong |
| | Correlation w/Previous Year | NA | | 0.82* | |
| Entry Costs | Min | 4.96 | Binh Phuoc | 6.23 | Hau Giang |
| | Median | 7.4 | Ha Tinh/BRVT | 7.87 | Hai Duong/Lam Dong |
| | Max | 9.17 | Da Nang | 9.49 | Quang Tri |
| | Correlation w/Previous Year | NA | | 0.33* | |
| Land Access & Security of Tenure | Min | 3.84 | Lai Chau | 4.32 | Ha Noi |
| | Median | 6 | Quang Ngai/Bac Kan | 6.27 | Lao Cai/Thai Nguyen |
| | Max | 7.98 | Soc Trang | 7.71 | Long An |
| | Correlation w/Previous Year | NA | | 0.68* | |
| Transparency | Min | 2.15 | Dak Nong | 2.24 | Dak Nong |
| | Median | 5.43 | TT-Hue/BRVT | 5.83 | Ha Tinh/Phu Tho |
| | Max | 8.5 | Binh Duong | 8.56 | Lao Cai |
| | Correlation w/Previous Year | NA | | 0.6* | |
| Time Costs of Regulatory Compliance | Min | 2.64 | Phu Yen | 2.99 | Lai Chau |
| | Median | 4.42 | Quang Ngai/Kien Giang | 6.21 | Vinh Long/Phu Tho |
| | Max | 7.12 | Binh Duong | 8.18 | Ha Tay |
| | Correlation w/Previous Year | NA | | 0.36* | |
| Informal Charges | Min | 5.05 | Ha Tinh | 5.35 | Ha Noi |
| | Median | 6.33 | Bac Kan/Bac Lieu | 6.58 | An Giang/Ha Giang |
| | Max | 8.35 | Ben Tre | 7.71 | Hung Yen |
| | Correlation w/Previous Year | | | 0.33* | |
| Bias toward State Owned Enterprises | Min | 4.7 | Ha Noi | 4.79 | Dak Nong |
| | Median | 6.49 | Da Nang/Lang Son | 6.72 | Quang Binh/Quang Nam |
| | Max | 8.4 | Lao Cai | 8.29 | Binh Duong |
| | Correlation w/Previous Year | NA | | 0.56* | |
| Proactivity | Min | 1.54 | Quang Ngai | 2.3 | Cao Bang |
| | Median | 4.83 | Tuyen Quang/Thai Binh | 4.95 | Phu Tho/Thai Binh |
| | Max | 10 | Binh Duong | 9.2 | Binh Duong |
| | Correlation w/Previous Year | NA | | 0.79* | |
| Private Sector Development Policies | Min | 2.4 | Dak Nong | 2.26 | Bac Lieu |
| | Median | 4.88 | Ha Giang/Kien Giang | 4.71 | Ben Tre/Tuyen Quang |
| | Max | 9.62 | Da Nang | 8.73 | HCMC |
| | Correlation w/Previous Year | NA | | 0.79* | |
| Labor Policies | Min | 1.99 | Lai Chau | 1.92 | Lai Chau |
| | Median | 5.1 | Lang Son/Quang Nam | 5.02 | Quang Nam/Quang Ngai |
| | Max | 9.6 | Da Nang | 8.34 | Da Nang |
| | Correlation w/Previous Year | NA | | 0.81* | |
| Legal Institutions | Min | 2.13 | Quang Ngai | 2.24 | Ha Tinh |
| | Median | 3.63 | Son La/Ninh Binh | 4.33 | Phu Tho/Vinh Phuc |
| | Max | 6.55 | Bac Giang | 6.56 | Bac Kan |
| | Correlation w/Previous Year | | | 0.37* | |

* Significant at 5% Level; NA = Not Applicable
All values are at the provincial-level.
Data includes only firms registered within two calendar years preceding the survey.
2005 data only include 42 provinces and do not include the full set of indicators used in subsequent years, reflecting changes in survey questions and ordering in 2006.

*Scaling*

Once indicators are selected for each sub-index, we standardize them all around a ten-point scale. Doing this allows us to take the simple average of indicators to calculate sub-index scores, confident that differences in measurement have no impact on final PCI scores. To re-scale, we used the following formula:

$$9*\left[\frac{\text{Province}_i - Minimum}{Maximum - Minimum}\right]+1$$

, where $\text{Province}_1$ is the individual provincial 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 provincial value in any

year. An example of such an indicator would be the percentage of firms who agreed the province had a positive attitude toward private business

On some items, a large number has 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:

$$11-\left[9*\left[\frac{\text{Province}_i - Minimum}{Maximum - Minimum}\right]+1\right]$$

*Sub-Index Score = Simple Average of Scaled Indicators*

Finally, sub-index scores are calculated by taking the simple average of indicators. If an indicator 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% 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 accounted for only 40% of the particular dimension, so as not to distort the overall meaning of the index.

### *2.3. Calibration of the Sub-Indices to Reflect Contribution of Private Sector Development*

Among the most important innovations of the PCI 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.

Weightings applied to each of the ten sub-indices are determined using a three-step statistical approach. This technique allows us to isolate the partial contribution of each sub-index to improvements on three critical measures of private sector performance (ie. the number of enterprises, the total investment per capita of these enterprises, and average firm profitability). Together, the three variables offer a comprehensive picture of provincial private sector development goals. The individual contributions of sub-indices to these three outcome variables serve as the weights in the final index. The approach means that policy makers can be certain that the final aggregate PCI scores and provincial rankings are calibrated to private sector performance.

In sum, the three steps, summarized in Table 3, are as follows. First, factor analysis is used to divide the sub-indices into three uncorrelated factors (baskets of variables).[6] In addition, this procedure provides us with "factor loadings," which are the bivariate correlation between each sub-index and these uncorrelated factors. Secondly, we regress 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. Third, by multiplying the regression coefficients for each factor by the factor loading of each sub-index, we are able to isolate the individual contribution of each sub-index to each dependent variable. For instance, Sub-Index 8 (PSD) is responsible for about 17.3% of the explained variance in the number of enterprises, 17.8% of the explained variance in investment, and 16.4% of the explained variance in profitability. Averaging these together, we learned that PSD was responsible for over 17.2% of total variance in all three dependent variables.

To simplify, we grouped the sub-indices into three groups (High, Medium, and Low). High contributors received 15% weights, medium contributors received 10%, and low contributors received 5% of in the final

[6] Factor analysis is necessary because high correlation between sub-indices leads to multicollinearity, making it difficult to assess the individual contribution of any one sub-index.

weighted PCI. The final PCI is simply the weighted sum of all ten sub-indices, using these rounded weights. Maintaining the exact same weightings for PCI 2006 and PCI 2007 was necessary to compare improvement on performance between the two years. Nevertheless, we 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. We found that these did not change enough to warrant altering the weightings.

## Table 3: Procedures Used to Derive the 2006 and 2007 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 |

**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://www.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.

## *3. 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 subnational 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.

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