

The Bhutan 2015 Enterprise Surveys Data Set

I. Introduction

1. This document provides additional information on the data collected in Bhutan between May 2015 and July 2015. The objective of the Enterprise Survey is to gain an understanding of what firms experience in the private sector.

As part of its strategic goal of building a climate for investment, job creation, and sustainable growth, the World Bank has promoted improving business environments as a key strategy for development, which has led to a systematic effort in collecting enterprise data across countries. The Enterprise Surveys (ES) are an ongoing World Bank project in collecting both objective data based on firms' experiences and enterprises' perception of the environment in which they operate.

The Enterprise Surveys currently cover over 130,000 firms in 135 countries, of which 121 have been surveyed following the standard methodology. This allows for better comparisons across countries and across time. Data are used to create statistically significant business environment indicators that are comparable across countries. The Enterprise Surveys are also used to build a panel of enterprise data that will make it possible to track changes in the business environment over time and allow, for example, impact assessments of reforms.

The report outlines and describes the sampling design of the data, the data set structure as well as additional information that may be useful when using the data, such as information on non-response cases and the appropriate use of the weights. In addition to the usual Enterprise Survey, which targets establishments with 5+ employees, microenterprises (<5 employees) were also interviewed. An employee survey was conducted as well, using a separate questionnaire.

II. Sampling Structure

2. The sample for Bhutan was selected using stratified random sampling, following the methodology explained in the *Sampling Manual*¹. Stratified random sampling² was preferred over simple random sampling for several reasons³:

a. To obtain unbiased estimates for different subdivisions of the population with some known level of precision.

b. To obtain unbiased estimates for the whole population. The whole population, or universe of the study, is the non-agricultural economy. It comprises: all manufacturing sectors according to the group classification of ISIC Revision 3.1: (group D), construction sector (group F), services sector (groups G and H), and transport, storage, and communications sector (group I). Note that this definition excludes the following sectors:

¹ The complete text can be found at http://www.enterprisesurveys.org/documents/Implementation_note.pdf

² A stratified random sample is one obtained by separating the population elements into non-overlapping groups, called strata, and then selecting a simple random sample from each stratum. (Richard L. Scheaffer; Mendenhall, W.; Lyman, R., "Elementary Survey Sampling", Fifth Edition).

³ Cochran, W., 1977, pp. 89; Lohr, Sharon, 1999, pp. 95

financial intermediation (group J), real estate and renting activities (group K, except sub-sector 72, IT, which was added to the population under study), and all public or utilities-sectors.

c. To make sure that the final total sample includes establishments from all different sectors and that it is not concentrated in one or two of industries/sizes/regions.

d. To exploit the benefits of stratified sampling where population estimates, in most cases, will be more precise than using a simple random sampling method (i.e., lower standard errors, other things being equal.)

e. Stratification may produce a smaller bound on the error of estimation than would be produced by a simple random sample of the same size. This result is particularly true if measurements within strata are homogeneous.

f. The cost per observation in the survey may be reduced by stratification of the population elements into convenient groupings.

3. Three levels of stratification were used in this country: industry, establishment size, and region. The original sample design with specific information of the industries and regions chosen is described in Appendix E.

4. Industry stratification was designed in the way that follows: the universe was stratified into two manufacturing industries- Food and Beverages (ISIC Rev. 3.1 code 15), Other Manufacturing (ISIC codes 16-37) and two service sectors- Tourism (ISIC codes 55 and 63) and Other Services (ISIC codes 45, 50-52, 60-62, 64, and 72).

5. For the Bhutan Enterprise Survey (ES), size stratification was defined as follows: micro (less than 5 employees), small (5 to 19 employees), medium (20 to 99 employees), and large (more than 99 employees).

6. Regional stratification for the Bhutan ES was done across four regions: Thimphu – Paro, Phuentsholing, Gelephu, Samdrup Jongkhar.

III. Sampling implementation

7. Given the stratified design, sample frames containing a complete and updated list of establishments as well as information on all stratification variables (number of employees, industry, and region) are required to draw the sample. Great efforts were made to obtain the best source for these listings.

8. The National Statistics Bureau (Royal Government of Bhutan), henceforth NSB, conducted the Bhutan 2015 Enterprise Survey.

9. The sample frame consisted of listings of firms from four sources: 1) the list of 250 firms from the Bhutan 2009 Enterprise Survey (i.e. “panel” firms), 2) the business listing of registered companies under the Companies Act (eligible to pay CIT) from the tax authority, 3) list of businesses eligible to pay BIT (registered with a trade license) obtained from the tax authority, and 4) enumerated businesses, i.e. additional “fresh” firms that were not contained in the available lists on hand. The tax authority database contained the establishment’s name, address, sector of activity (manufacturing, services, trade) and phone number if available.

Bhutan ES, Sample Frame

Source: World Bank, Department of Revenue & Custom (Ministry of Finance), and National Statistics Bureau (Royal Government of Bhutan).

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	4	29	139	665	1148
	1 - Small (5-19)	2	25	66	130	
	2 - Medium (20-99)	0	7	21	44	
	3 - Large (100+)	0	2	3	11	
Phuentsholing	0 - Micro (1-4)	3	22	27	120	310
	1 - Small (5-19)	4	14	7	49	
	2 - Medium (20-99)	6	15	13	19	
	3 - Large (100+)	0	8	0	3	
Gelephu	0 - Micro (1-4)	4	4	12	58	100
	1 - Small (5-19)	0	3	2	10	
	2 - Medium (20-99)	0	5	0	2	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	1	11	47	165	275
	1 - Small (5-19)	0	13	12	20	
	2 - Medium (20-99)	0	3	0	2	
	3 - Large (100+)	0	1	0	0	
		24	162	349	1298	1833

10. Prior to survey fieldwork, a list of approx. 6,000 businesses was provided to NSB for verification. The intention was to have a list of verified, eligible businesses from which to draw the sample from. All Bhutan 2009 (n=250) and CIT business in the 4 regions (n=305) were included in the list of ~6K. A subset (n=5400) of BIT businesses were randomly selected from the list provided by the tax authority and included in the list of approx. 6,000. During the verification process, the majority of BIT records were found to be out of date or duplicates, etc. It was later learned that the database, which the tax authority used, was unable to purge closed businesses. Hence many of the records in the BIT list of n=5400 were ineligible for the survey. To compensate for the poor quality of the BIT list, NSB enumerated “fresh” BIT establishments which were eligible for the survey. The resulting list of eligible establishments used as the sample frame consisted of 1,833 firms. This list of eligible establishments includes: NSB-verified as still in existence businesses from the list of ~6K + NSB freshly enumerated businesses.

11. The quality of the frame was enhanced by the verification process conducted by NSB. However, the sample frame was not immune from the typical problems found in establishment surveys: positive rates of non-eligibility, repetition, non-existent units, etc.

12. Given the impact that non-eligible units included in the sample universe may have on the results, adjustments may be needed when computing the appropriate weights for individual observations. The percentage of confirmed non-eligible units as a proportion of

the total number of sampled establishments contacted for the survey was 14.6% (71 out of 485 establishments)⁴.

Breaking down by industry and size, the following sample targets were achieved (based on the sampling information):

Enterprise Survey Achieved sample

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	1	9	13	33	177
	1 - Small (5-19)	2	21	25	22	
	2 - Medium (20-99)	0	4	15	23	
	3 - Large (100+)	0	1	3	5	
Phuentsholing	0 - Micro (1-4)	3	14	2	7	85
	1 - Small (5-19)	2	11	5	6	
	2 - Medium (20-99)	5	7	8	11	
	3 - Large (100+)	0	3	0	1	
Gelephu	0 - Micro (1-4)	4	4	4	7	38
	1 - Small (5-19)	0	2	2	10	
	2 - Medium (20-99)	0	4	0	1	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	1	11	4	18	67
	1 - Small (5-19)	0	12	10	6	
	2 - Medium (20-99)	0	2	0	2	
	3 - Large (100+)	0	1	0	0	
Grand Total		18	106	91	152	367

Enterprise Survey Firms which have employees in the Employee Survey.

Note that Appendix F provides the number of achieved employee interviews.

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)			3	3	113
	1 - Small (5-19)	2	19	20	11	
	2 - Medium (20-99)		4	15	23	
	3 - Large (100+)		1	3	5	
Phuentsholing	0 - Micro (1-4)	3	12	1	7	79
	1 - Small (5-19)	2	11	5	4	
	2 - Medium (20-99)	5	7	8	11	
	3 - Large (100+)		3			
Gelephu	0 - Micro (1-4)					5
	1 - Small (5-19)					
	2 - Medium (20-99)		4		1	

⁴ Based on out of target contacts and impossible to contact establishments

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
	3 - Large (100+)					
Samdrup Jongkhar	0 - Micro (1-4)			1		7
	1 - Small (5-19)			1		
	2 - Medium (20-99)		2		2	
	3 - Large (100+)		1			
Grand Total		12	67	57	68	204

IV. Data Base Structure:

13. The structure of the data base reflects the fact that 2 different versions of the survey instrument were used for all registered establishments. Questionnaires have common questions (*core* module) and respectfully additional manufacturing and services specific questions. The eligible manufacturing industries have been surveyed using the *Manufacturing* questionnaire (includes the *core* module, plus manufacturing specific questions). Retail firms have been interviewed using the *Services* questionnaire (includes the *core* module plus retail specific questions) and the residual eligible services have been covered using the *Services* questionnaire (includes the *core* module). Each variation of the questionnaire is identified by the index variable, *a0*.

14. All variables are named using, first, the letter of each section and, second, the number of the variable within the section, i.e. *a1* denotes section A, question 1 (some exceptions apply due to comparability reasons). Variable names preceded by a prefix "BH" indicate questions specific to Bhutan, therefore, they may not be found in the implementation of the rollout in other countries. All other suffixed variables are global and are present in all country surveys over the world. All variables are numeric with the exception of those variables with an "x" at the end of their names. The suffix "x" denotes that the variable is alpha-numeric.

15. There are 2 establishment identifiers, *idstd* and *id*. The first is a global unique identifier. The second is a country unique identifier. The variables *a2* (sampling region), *a6a* (sampling establishment's size), and *a4a* (sampling sector) contain the establishment's classification into the strata chosen for each country using information from the sample frame. The strata were defined according to the guidelines described above.

16. There are three levels of stratification: industry, size and region. Different combinations of these variables generate the strata cells for each industry/region/size combination. A distinction should be made between the variable *a4a* and *d1a2* (industry expressed as ISIC rev. 3.1 code). The former gives the establishment's classification into one of the chosen industry-strata, whereas the latter gives the actual establishment's industry classification (four digit code) in the sample frame.

17. All of the following variables contain information from the sampling frame. They may not coincide with the reality of individual establishments as sample frames may contain inaccurate information. The variables containing the sample frame information are

included in the data set for researchers who may want to further investigate statistical features of the survey and the effect of the survey design on their results.

-*a2* is the variable describing sampling regions

-*a6a*: coded using the same standard for micro, small, medium, and large establishments as defined above.

-*a4a*: coded following the stratification by sector as defined above.

18. The surveys were implemented following a 2 stage procedure. Typically first a screener questionnaire is applied over the phone to determine eligibility and to make appointments. Then a face-to-face interview takes place with the Manager/Owner/Director of each establishment. However, sometimes the phone numbers were unavailable in the sample frame, and thus the enumerators applied the screeners in person. The variables *a4b* and *a6b* contain the industry and size of the establishment from the screener questionnaire. Variables *a8* to *a11* contain additional information and were also collected in the screening phase.

19. Note that there are variables for size (*11*, *16* and *18*) that reflect more accurately the reality of each establishment. Advanced users are advised to use these variables for analytical purposes. Variables *11*, *16* and *18* were designed to obtain a more accurate measure of employment accounting for permanent and temporary employment. Special efforts were made to make sure that this information was not missing for most establishments.

20. Variable *Bhbfsyear* provides the fiscal year reference used in the interview for each firm. Most firms (>90%) used the calendar year January to December 2014 as their fiscal year. The remaining firms used July 2013 to June 2014 as their fiscal year. Also note for questions pertaining to monetary amounts, the unit is the Bhutanese ngultrum. Variable *a17x* gives interviewer comments, including problems that occurred during an interview and extraordinary circumstances which could influence results. Please note that sometimes this variable is removed due to privacy issues.

V. Universe Estimates

21. Universe estimates for the number of establishments in each cell in Bhutan were produced for the strict, weak and median eligibility definitions. The estimates were the multiple of the relative eligible proportions.

22. Appendix B shows the overall estimates of the numbers of establishments in Bhutan based on the sample frame.

23. For some establishments where contact was not successfully completed during the screening process (because the firm has moved and it is not possible to locate the new location, for example), it is not possible to directly determine eligibility. Thus, different assumptions about the eligibility of establishments result in different adjustments to the universe cells and thus different sampling weights.

24. Three sets of assumptions on establishment eligibility are used to construct sample adjustments using the status code information.

25. Strict assumption: eligible establishments are only those for which it was possible to directly determine eligibility. The resulting weights are included in the variable *wstrict*.

$$\text{Strict eligibility} = (\text{Sum of the firms with codes } 1,2,3,4,\&16) / \text{Total}$$

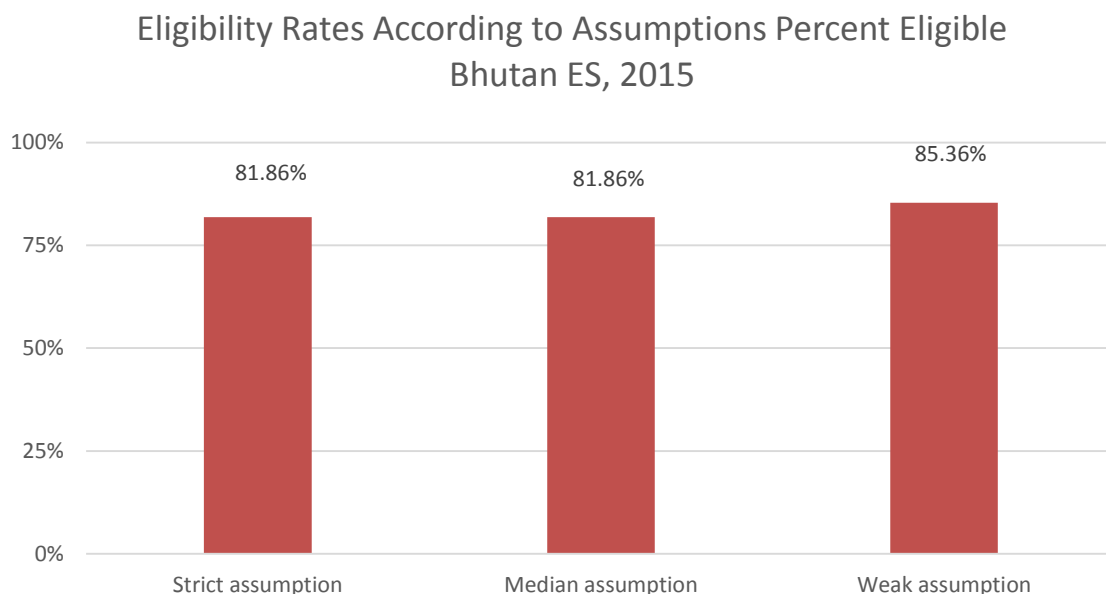
26. Median assumption: eligible establishments are those for which it was possible to directly determine eligibility and those that rejected the screener questionnaire or an answering machine or fax was the only response. The resulting weights are included in the variable *wmedian*.

$$\text{Median eligibility} = (\text{Sum of the firms with codes } 1,2,3,4,16,10,11, \& 13) / \text{Total}$$

27. Weak assumption: in addition to the establishments included in points a and b, all establishments for which it was not possible to contact or that refused the screening questionnaire are assumed eligible. This definition includes as eligible establishments with dead or out of service phone lines, establishments that never answered the phone, and establishments with incorrect addresses for which it was impossible to find a new address. Under the weak assumption only observed non-eligible units are excluded from universe projections. The resulting weights are included in the variable *wweak*.

$$\text{Weak eligibility} = (\text{Sum of the firms with codes, } 1,2,3,4,16,10,11,13,91,92,93,94,12) / \text{Total}$$

28. The indicators computed for the Enterprise Survey website use the median weights. The following graph shows the different eligibility rates calculated for firms in the sample frame under each set of assumptions.



29. Universe estimates for the number of establishments in each industry-region-size cell in Bhutan were produced for the strict, weak and median eligibility definitions. Appendix

D shows the universe estimates of the numbers of registered establishments that fit the criteria of the Enterprise Surveys.

30. Once an accurate estimate of the universe cell projection was made, weights for the probability of selection were computed using the number of completed interviews for each cell.

VI. Weights

31. Since the sampling design was stratified and employed differential sampling, individual observations should be properly weighted when making inferences about the population. Under stratified random sampling, unweighted estimates are biased unless sample sizes are proportional to the size of each stratum. With stratification the probability of selection of each unit is, in general, not the same. Consequently, individual observations must be weighted by the inverse of their probability of selection (probability weights or *pw* in Stata.)⁵

32. Special care was given to the correct computation of the weights. It was imperative to accurately adjust the totals within each region/industry/size stratum to account for the presence of ineligible units (the firm discontinued businesses or was unattainable, education or government establishments, no reply after having called in different days of the week and in different business hours, no tone in the phone line, answering machine, fax line⁶, wrong address or moved away and could not get the new references) The information required for the adjustment was collected in the first stage of the implementation: the screening process. Using this information, each stratum cell of the universe was scaled down by the observed proportion of ineligible units within the cell. Once an accurate estimate of the universe cell (projections) was available, weights were computed using the number of completed interviews.

34. Appendix C shows the cell weights for registered establishments in Bhutan.

VII. Appropriate use of the weights

35. Under stratified random sampling weights should be used when making inferences about the population. Any estimate or indicator that aims at describing some feature of the population should take into account that individual observations may not represent equal shares of the population.

36. However, there is some discussion as to the use of weights in regressions (see Deaton, 1997, pp.67; Lohr, 1999, chapter 11, Cochran, 1953, pp.150). There is not strong large sample econometric argument in favor of using weighted estimation for a common population coefficient if the underlying model varies per stratum (stratum-specific coefficient): both simple OLS and weighted OLS are inconsistent under regular conditions. However, weighted OLS has the advantage of providing an estimate that is independent of

⁵ This is equivalent to the weighted average of the estimates for each stratum, with weights equal to the population shares of each stratum.

⁶ For the surveys that implemented a screener over the phone.

the sample design. This latter point may be quite relevant for the Enterprise Surveys as in most cases the objective is not only to obtain model-unbiased estimates but also design-unbiased estimates (see also Cochran, 1977, pp 200 who favors the used of weighted OLS for a common population coefficient.)⁷

37. From a more general approach, if the regressions are descriptive of the population then weights should be used. The estimated model can be thought of as the relationship that would be expected if the whole population were observed.⁸ If the models are developed as structural relationships or behavioral models that may vary for different parts of the population, then, there is no reason to use weights.

VIII. Non-response

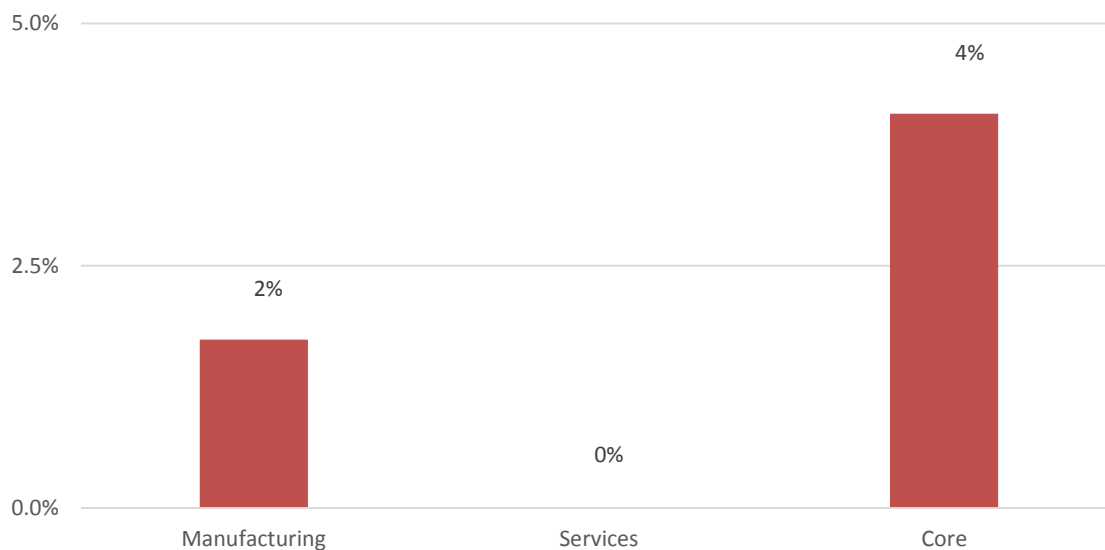
38. Survey non-response must be differentiated from item non-response. The former refers to refusals to participate in the survey altogether whereas the latter refers to the refusals to answer some specific questions. Enterprise Surveys suffer from both problems and different strategies were used to address these issues.

39. Item non-response was addressed by two strategies:
a- For sensitive questions that may generate negative reactions from the respondent, such as corruption or tax evasion, enumerators were instructed to collect the refusal to respond as a different option from don't know (-7).
b- Establishments with incomplete information were re-contacted in order to complete this information, whenever necessary. However, there were clear cases of low response. The following graph shows non-response rates for the sales variable, *d2*, by sector. Please, note that the coding utilized in this dataset does not allow us to differentiate between "Don't know" and "refuse to answer", thus the non-response in the charts below reflect both categories (DKs and NAs).

⁷ Note that weighted OLS in Stata using the command `regress` with the option of weights will estimate wrong standard errors. Using the Stata survey specific commands `svy` will provide appropriate standard errors.

⁸ The use weights in most model-assisted estimations using survey data is strongly recommended by the statisticians specialized on survey methodology of the JPSM of the University of Michigan and the University of Maryland.

Sales Non-response Rates Bhutan ES, 2015

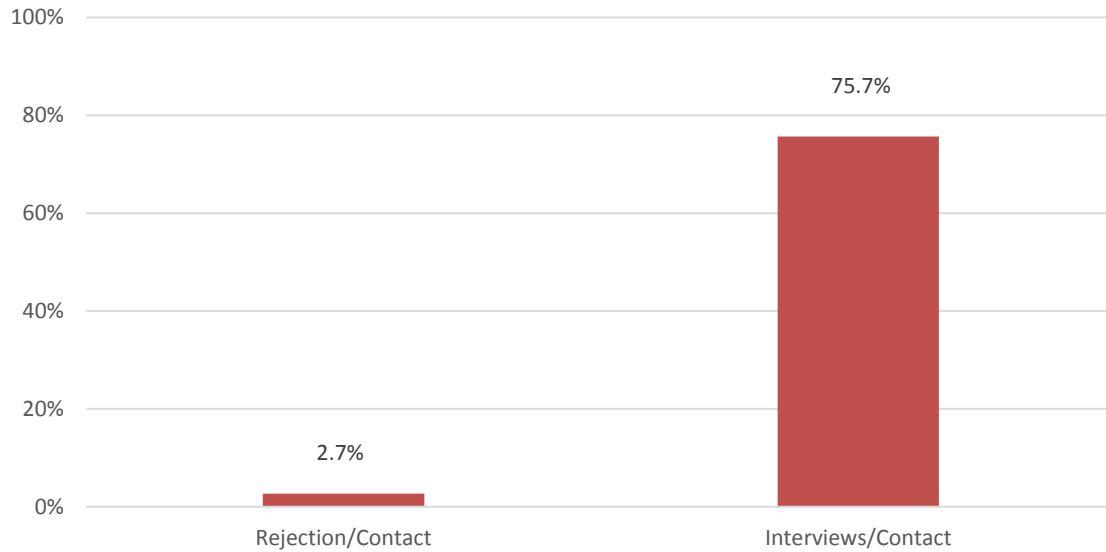


40. Survey non-response was addressed by maximizing efforts to contact establishments that were initially selected for interview. Attempts were made to contact the establishment for interview at different times/days of the week before a replacement establishment (with similar strata characteristics) was suggested for interview. Survey non-response did occur but substitutions were made in order to potentially achieve strata-specific goals. Further research is needed on survey non-response in the Enterprise Surveys regarding potential introduction of bias.

41. As the following graph shows, the number of interviews per contacted establishments was 0.76.⁹ This number is the result of two factors: explicit refusals to participate in the survey, as reflected by the rate of rejection (which includes rejections of the screener and the main survey) and the quality of the sample frame, as represented by the presence of ineligible units. The share of rejections per contact was 0.03.

⁹ The estimate is based on the total no. of firms contacted including ineligible establishments.

Rejection rate and Interviews per Contact Bhutan ES, 2014



42. Details on the rejection rate, eligibility rate, and item non-response are available at the level strata. This report summarizes these numbers to alert researchers of these issues when using the data and when making inferences. Item non-response, selection bias, and faulty sampling frames are not unique to Bhutan. All enterprise surveys suffer from these shortcomings, but in very few cases they have been made explicit.

References:

Cochran, William G., *Sampling Techniques*, 1977.

Deaton, Angus, *The Analysis of Household Surveys*, 1998.

Levy, Paul S. and Stanley Lemeshow, *Sampling of Populations: Methods and Applications*, 1999.

Lohr, Sharon L. *Sampling: Design and Techniques*, 1999.

Scheaffer, Richard L.; Mendenhall, W.; Lyman, R., *Elementary Survey Sampling*, Fifth Edition, 1996.

Appendix A

Status Codes Enterprise Survey (ES):

397	Eligible	1. Eligible establishment (Correct name and address)	397
		2. Eligible establishment (Different name but same address - the new firm/establishment bought the original firm/establishment)	0
		3. Eligible establishment (Different name but same address - the firm/establishment changed its name)	0
		4. Eligible establishment (Moved and traced)	0
		16. Eligible establishment (Panel Firm - now less than five employees; this code applies only to panel firms.)	0
0	Screener refusal	13. Refuses to answer the screener	0
23	Ineligible	5. The establishment has less than 5 permanent full time employees	0
		616. The firm discontinued businesses - (Establishment went bankrupt)	4
		617.	0
		618. The firm discontinued businesses - (Original establishment disappeared and is now a different firm)	1
		619. The firm discontinued businesses - (Establishment was bought out by another firm)	1
		620. The firm discontinued businesses - (It was impossible to determine for what reason)	2
		621. The firm discontinued businesses - (Other)	7
		7. Not a business: Private household	0
		8. Ineligible activity: Education, Agriculture, Finances, Government, etc.	8
48	Out of target	151. Out of target - outside the covered regions	3
		152. Out of target - moved abroad	0
		153. Out of target - Not registered with Statistical Authority	0
		154. Out of target - establishment is HQ without production or sales of goods or services	0
		155. Out of target - establishment was not in operation for the entirety of last fiscal year	14
		156. Duplicated firm within the sample	31
17	Unobtainable	91. No reply after having called in different days of the week and in different business hours	5
		92. Line out of order	0
		93. No tone	0
		94. Phone number does not exist	0
		10. Answering machine	0
		11. Fax line- data line	0
		12. Wrong address/ moved away and could not get the new references	12
485	Total contacted		

Response Outcomes Enterprise (ES) Survey:

	Bhutan		COMPLETE	
Sample Target	370		367	
1. Complete interviews	367	ELIGIBLES (Status Codes)		
2. Incomplete effective interviews	9			
4. Eligible in process	8			
3. Interview Refusals	13			
Ineligible	23			
Unobtainable	17			
Out of Target	48			
Refusal to the Screener	0			
Total	485			

Response rate	96.6%
Ineligible	4.7%
Unobtainable	3.5%
Out of target	9.9%

Appendix B

Universe Bhutan:

Source: The universe numbers are derived from the Establishment Census 2010, MoLHR, specifically Table 7.8 on pages 136-7 of the Statistical Yearbook of Bhutan 2014 (<http://www.nsb.gov.bt/publication/publications.php?id=3>). The number of IT firms was estimated as one-fifth the number of establishments in the “Real estate, Renting & Business Activities” group. Based on the sub-sector breakdown found in the sample frame, the number of food manufacturing establishments is apportioned out of the number for total manufacturing. Based on the size distribution found in the sample frame, these percentages (separately for manufacturing and for services) are applied to the Dzongkhag numbers in order to estimate Dzongkhag x Firm size numbers for the different business sectors.

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	10	111	456	1235	2525
	1 - Small (5-19)	9	92	111	301	
	2 - Medium (20-99)	2	24	37	100	
	3 - Large (100+)	1	7	8	21	
Phuentsholing	0 - Micro (1-4)	4	16	164	316	837
	1 - Small (5-19)	3	13	62	120	
	2 - Medium (20-99)	3	15	36	69	
	3 - Large (100+)	1	6	3	6	
Gelephu	0 - Micro (1-4)	6	18	140	298	574
	1 - Small (5-19)	2	7	24	51	
	2 - Medium (20-99)	4	11	4	9	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	1	11	71	206	351
	1 - Small (5-19)	1	12	11	31	
	2 - Medium (20-99)	0	3	1	2	
	3 - Large (100+)	0	1	0	0	
		47	347	1128	2765	4287

Appendix C

Strict Cell Weights Bhutan - Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.20	14.41	37.41	32.71
	1 - Small (5-19)	4.72	6.10	5.10	18.07
	2 - Medium (20-99)		5.15	1.89	3.98
	3 - Large (100+)		4.27	2.37	3.77
Phuentsholing	0 - Micro (1-4)	1.37	1.00	74.68	80.82
	1 - Small (5-19)	1.05	1.05	14.27	46.05
	2 - Medium (20-99)	1.00	1.35	4.12	8.16
	3 - Large (100+)		1.22		2.99
Gelephu	0 - Micro (1-4)	1.63	6.94	33.73	36.05
	1 - Small (5-19)		5.35	11.88	5.97
	2 - Medium (20-99)		5.71		
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)	1.18	1.00	18.54	18.77
	1 - Small (5-19)		1.10	1.18	6.92
	2 - Medium (20-99)		1.55		1.00
	3 - Large (100+)		1.00		

Strict Cell Weights Bhutan - Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)		1.48	1.00	1.00
	1 - Small (5-19)		1.03	1.10	1.48
	2 - Medium (20-99)		1.00	1.72	1.44
	3 - Large (100+)			1.00	1.00
Phuentsholing	0 - Micro (1-4)		1.14		2.35
	1 - Small (5-19)	1.24	1.00	1.00	1.40
	2 - Medium (20-99)	1.00	1.29	1.00	1.00
	3 - Large (100+)		1.91		
Gelephu	0 - Micro (1-4)		1.02		
	1 - Small (5-19)		1.00		1.09
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)				2.63
	1 - Small (5-19)		1.00		3.12
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				

Median Cell Weights Bhutan - Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.20	14.41	37.41	32.71
	1 - Small (5-19)	4.72	6.10	5.10	18.07
	2 - Medium (20-99)		5.15	1.89	3.98
	3 - Large (100+)		4.27	2.37	3.77
Phuentsholing	0 - Micro (1-4)	1.37	1.00	74.68	80.82
	1 - Small (5-19)	1.05	1.05	14.27	46.05
	2 - Medium (20-99)	1.00	1.35	4.12	8.16
	3 - Large (100+)		1.22		2.99
Gelephu	0 - Micro (1-4)	1.63	6.94	33.73	36.05
	1 - Small (5-19)		5.35	11.88	5.97
	2 - Medium (20-99)		5.71		
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)	1.18	1.00	18.54	18.77
	1 - Small (5-19)		1.10	1.18	6.92
	2 - Medium (20-99)		1.55		1.00
	3 - Large (100+)		1.00		

Median Cell Weights Bhutan - Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)		1.48	1.00	1.00
	1 - Small (5-19)		1.03	1.10	1.48
	2 - Medium (20-99)		1.00	1.72	1.44
	3 - Large (100+)			1.00	1.00
Phuentsholing	0 - Micro (1-4)		1.14		2.35
	1 - Small (5-19)	1.24	1.00	1.00	1.40
	2 - Medium (20-99)	1.00	1.29	1.00	1.00
	3 - Large (100+)		1.91		
Gelephu	0 - Micro (1-4)		1.02		
	1 - Small (5-19)		1.00		1.09
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)				2.63
	1 - Small (5-19)		1.00		3.12
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				

Weak Cell Weights Bhutan - Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.39	15.33	39.42	36.13
	1 - Small (5-19)	4.66	6.30	5.21	19.37
	2 - Medium (20-99)		5.83	2.12	4.68
	3 - Large (100+)		4.31	2.37	3.95
Phuentsholing	0 - Micro (1-4)	1.37	1.03	77.25	87.64
	1 - Small (5-19)	1.02	1.07	14.33	48.46
	2 - Medium (20-99)	1.00	1.50	4.54	9.43
	3 - Large (100+)		1.21		3.08
Gelephu	0 - Micro (1-4)	1.54	6.87	33.06	37.04
	1 - Small (5-19)		5.14	11.30	5.95
	2 - Medium (20-99)		6.01		
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)	1.14	1.00	18.54	19.67
	1 - Small (5-19)		1.08	1.15	7.04
	2 - Medium (20-99)		1.66		1.00
	3 - Large (100+)		1.00		

Weak Cell Weights Bhutan - Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)		1.46	1.00	1.00
	1 - Small (5-19)		1.05	1.13	1.54
	2 - Medium (20-99)		1.00	1.70	1.45
	3 - Large (100+)			1.00	1.00
Phuentsholing	0 - Micro (1-4)		1.13		2.37
	1 - Small (5-19)	1.70	1.00	1.00	1.47
	2 - Medium (20-99)	1.00	1.28	1.00	1.00
	3 - Large (100+)		1.89		
Gelephu	0 - Micro (1-4)		1.00		
	1 - Small (5-19)		1.00		1.12
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				
Samdrup Jongkhar	0 - Micro (1-4)				2.59
	1 - Small (5-19)		1.00		3.19
	2 - Medium (20-99)		1.00		1.00
	3 - Large (100+)				

Appendix D

Strict Universe Estimates – Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.20	86.48	411.54	981.25
	1 - Small (5-19)	9.43	67.07	96.87	234.89
	2 - Medium (20-99)	2.00	15.44	24.61	55.71
	3 - Large (100+)	1.00	4.27	4.74	11.30
Phuentsholing	0 - Micro (1-4)	4.10	10.00	149.36	242.46
	1 - Small (5-19)	1.05	4.21	57.09	92.10
	2 - Medium (20-99)	3.00	4.05	24.73	40.82
	3 - Large (100+)	1.00	2.45	3.00	2.99
Gelephu	0 - Micro (1-4)	6.51	13.88	134.93	252.36
	1 - Small (5-19)	2.00	5.35	23.77	41.77
	2 - Medium (20-99)	4.00	5.71	4.00	8.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	1.18	11.00	74.17	168.90
	1 - Small (5-19)	1.00	7.73	11.81	20.75
	2 - Medium (20-99)	0.00	1.55	1.00	1.00
	3 - Large (100+)	0.00	1.00	0.00	0.00

Strict Universe Estimates – Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	0.00	4.43	2.00	3.00
	1 - Small (5-19)	0.00	10.29	6.63	13.32
	2 - Medium (20-99)	0.00	1.00	3.44	12.97
	3 - Large (100+)	0.00	0.00	1.00	2.00
Phuentsholing	0 - Micro (1-4)	0.00	4.55	0.00	9.38
	1 - Small (5-19)	1.24	7.00	1.00	5.59
	2 - Medium (20-99)	2.00	5.15	2.00	6.00
	3 - Large (100+)	0.00	1.91	0.00	1.00
Gelephu	0 - Micro (1-4)	0.00	2.04	0.00	0.00
	1 - Small (5-19)	0.00	1.00	0.00	3.28
	2 - Medium (20-99)	0.00	3.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	0.00	0.00	0.00	23.65
	1 - Small (5-19)	0.00	5.00	1.00	9.36
	2 - Medium (20-99)	0.00	1.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00

Median Universe Estimates – Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.20	86.48	411.54	981.25
	1 - Small (5-19)	9.43	67.07	96.87	234.89
	2 - Medium (20-99)	2.00	15.44	24.61	55.71
	3 - Large (100+)	1.00	4.27	4.74	11.30
Phuentsholing	0 - Micro (1-4)	4.10	10.00	149.36	242.46
	1 - Small (5-19)	1.05	4.21	57.09	92.10
	2 - Medium (20-99)	3.00	4.05	24.73	40.82
	3 - Large (100+)	1.00	2.45	3.00	2.99
Gelephu	0 - Micro (1-4)	6.51	13.88	134.93	252.36
	1 - Small (5-19)	2.00	5.35	23.77	41.77
	2 - Medium (20-99)	4.00	5.71	4.00	8.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	1.18	11.00	74.17	168.90
	1 - Small (5-19)	1.00	7.73	11.81	20.75
	2 - Medium (20-99)	0.00	1.55	1.00	1.00
	3 - Large (100+)	0.00	1.00	0.00	0.00

Median Universe Estimates – Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	0.00	4.43	2.00	3.00
	1 - Small (5-19)	0.00	10.29	6.63	13.32
	2 - Medium (20-99)	0.00	1.00	3.44	12.97
	3 - Large (100+)	0.00	0.00	1.00	2.00
Phuentsholing	0 - Micro (1-4)	0.00	4.55	0.00	9.38
	1 - Small (5-19)	1.24	7.00	1.00	5.59
	2 - Medium (20-99)	2.00	5.15	2.00	6.00
	3 - Large (100+)	0.00	1.91	0.00	1.00
Gelephu	0 - Micro (1-4)	0.00	2.04	0.00	0.00
	1 - Small (5-19)	0.00	1.00	0.00	3.28
	2 - Medium (20-99)	0.00	3.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	0.00	0.00	0.00	23.65
	1 - Small (5-19)	0.00	5.00	1.00	9.36
	2 - Medium (20-99)	0.00	1.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00

Weak Universe Estimates – Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	10.39	92.01	433.65	1084.00
	1 - Small (5-19)	9.33	69.25	99.06	251.81
	2 - Medium (20-99)	2.00	17.49	27.61	65.52
	3 - Large (100+)	1.00	4.31	4.74	11.86
Phuentsholing	0 - Micro (1-4)	4.10	10.27	154.49	262.93
	1 - Small (5-19)	1.02	4.27	57.30	96.91
	2 - Medium (20-99)	3.00	4.50	27.23	47.13
	3 - Large (100+)	1.00	2.43	3.00	3.08
Gelephu	0 - Micro (1-4)	6.16	13.73	132.22	259.25
	1 - Small (5-19)	2.00	5.14	22.60	41.64
	2 - Medium (20-99)	4.00	6.01	4.00	8.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	1.14	11.00	74.17	177.05
	1 - Small (5-19)	1.00	7.57	11.46	21.11
	2 - Medium (20-99)	0.00	1.66	1.00	1.00
	3 - Large (100+)	0.00	1.00	0.00	0.00

Weak Universe Estimates – Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services
Thimphu - Paro	0 - Micro (1-4)	0.00	4.37	2.00	3.00
	1 - Small (5-19)	0.00	10.53	6.78	13.88
	2 - Medium (20-99)	0.00	1.00	3.39	13.01
	3 - Large (100+)	0.00	0.00	1.00	2.00
Phuentsholing	0 - Micro (1-4)	0.00	4.52	0.00	9.49
	1 - Small (5-19)	1.70	7.00	1.00	5.87
	2 - Medium (20-99)	2.00	5.11	2.00	6.00
	3 - Large (100+)	0.00	1.89	0.00	1.00
Gelephu	0 - Micro (1-4)	0.00	2.00	0.00	0.00
	1 - Small (5-19)	0.00	1.00	0.00	3.36
	2 - Medium (20-99)	0.00	3.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00
Samdrup Jongkhar	0 - Micro (1-4)	0.00	0.00	0.00	23.29
	1 - Small (5-19)	0.00	5.00	1.00	9.57
	2 - Medium (20-99)	0.00	1.00	0.00	1.00
	3 - Large (100+)	0.00	0.00	0.00	0.00

Appendix E

Original Sample Design, Bhutan:

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	1	10	11	30	161
	1 - Small (5-19)	2	24	12	18	
	2 - Medium (20-99)	0	7	16	14	
	3 - Large (100+)	0	2	3	11	
Phuentsholing	0 - Micro (1-4)	2	11	1	4	99
	1 - Small (5-19)	4	14	3	4	
	2 - Medium (20-99)	6	15	13	11	
	3 - Large (100+)	0	8	0	3	
Gelephu	0 - Micro (1-4)	4	4	4	6	41
	1 - Small (5-19)	0	3	2	10	
	2 - Medium (20-99)	0	6	0	2	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	1	11	3	18	69
	1 - Small (5-19)	0	13	11	6	
	2 - Medium (20-99)	0	3	0	2	
	3 - Large (100+)	0	1	0	0	
		20	132	79	139	370

Completed Interviews, Bhutan, Fresh:

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	1	6	11	30	129
	1 - Small (5-19)	2	11	19	13	
	2 - Medium (20-99)	0	3	13	14	
	3 - Large (100+)	0	1	2	3	
Phuentsholing	0 - Micro (1-4)	3	10	2	3	49
	1 - Small (5-19)	1	4	4	2	
	2 - Medium (20-99)	3	3	6	5	
	3 - Large (100+)	0	2	0	1	
Gelephu	0 - Micro (1-4)	4	2	4	7	28
	1 - Small (5-19)	0	1	2	7	
	2 - Medium (20-99)	0	1	0	0	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	1	11	4	9	48
	1 - Small (5-19)	0	7	10	3	
	2 - Medium (20-99)	0	1	0	1	
	3 - Large (100+)	0	1	0	0	
Grand Total		15	64	77	98	254

Completed Interviews, Bhutan, Panel:

		Food & Beverages	Other Manufacturing	Tourism	Other Services	
Thimphu - Paro	0 - Micro (1-4)	0	3	2	3	48
	1 - Small (5-19)	0	10	6	9	
	2 - Medium (20-99)	0	1	2	9	
	3 - Large (100+)	0	0	1	2	
Phuentsholing	0 - Micro (1-4)	0	4	0	4	36
	1 - Small (5-19)	1	7	1	4	
	2 - Medium (20-99)	2	4	2	6	
	3 - Large (100+)	0	1	0	0	
Gelephu	0 - Micro (1-4)	0	2	0	0	10
	1 - Small (5-19)	0	1	0	3	
	2 - Medium (20-99)	0	3	0	1	
	3 - Large (100+)	0	0	0	0	
Samdrup Jongkhar	0 - Micro (1-4)	0	0	0	9	19
	1 - Small (5-19)	0	5	0	3	
	2 - Medium (20-99)	0	1	0	1	
	3 - Large (100+)	0	0	0	0	
Grand Total		3	42	14	54	113

Appendix F

Employee Survey: Number of Employee Interviews Broken Out by Location x Job Category x Business' Activity

		Food & Beverages	Other Manufacturing	Other Services	Tourism		
Thimphu - Paro	Managers			4	17	13	264
	Professionals			8	30	14	
	Skilled Production Workers	1		25	20	30	
	Unskilled Production Workers	1		7	3		
	Non-production Workers			5	45	41	
Phuentsholing	Managers	4		13	11	3	344
	Professionals			3			
	Skilled Production Workers	11		29	5	15	
	Unskilled Production Workers	4		6	4	8	
	Non-production Workers	27		91	65	45	
Gelephu	Managers			2			24
	Professionals			4	1		
	Skilled Production Workers			5	1		
	Unskilled Production Workers			4	3		
	Non-production Workers			4			
Samdrup Jongkhar	Managers			1	3		27
	Professionals			2	2		
	Skilled Production Workers			4	2		
	Unskilled Production Workers						
	Non-production Workers			2		1	
	Non-production Workers			6	3	1	
Grand Total		48	225	215	171		659