

The Kenya 2018 Enterprise Surveys Data Set

I. Introduction

This document provides additional information on the data collected in Kenya between May 2018 and January 2019. 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 the business environment 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 ES currently cover over 175,000 firms in 148 countries, of which 139 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 ES 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.

This 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.

II. Sampling Structure

The sample for 2018 Kenya ES was selected using stratified random sampling, following the methodology explained in the *Sampling Note*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: 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.

¹ The complete text can be found at http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Methodology/Sampling_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

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.

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 C.

In terms of industry, the universe was stratified into seven sub-sectors: Food and Beverages (ISIC Rev. 3.1 code 15); Textiles and Garments (ISIC codes 17, 18); Chemical, Pharmaceutical and Plastics (ISIC code 24, 25); Other Manufacturing (ISIC codes 16, 19-23, 26-37); Retail (ISIC code 52); Tourism (ISIC codes 55); and Other Services (ISIC codes 45, 50, 51, 60-64, and 72).

For the Kenya ES, size stratification was defined as follows: small (5 to 19 employees), medium (20 to 99 employees), and large (100 or more employees).

Regional stratification for the Kenya ES was done across ten regions: Mombasa, Kilifi, Machakos, Kirinyaga, Kiambu, Trans Nzoia, Uasin Gishu, Nakuru, Kisumu, and Nairobi.

III. Sampling implementation

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.

Ipsos Kenya was the main contractor that implemented the Kenya 2018 ES.

The sample frame consisted of listings of firms from two sources: For panel firms the list of 740 firms from the Kenya 2013 ES was used and for fresh firms (i.e., firms not covered in 2013) firm data from Kenya National Bureau of Statistics, was used.

Table 1: Kenya ES Sample Frame (Fresh and Panel Combined)

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	47	24	73	30	553	65	539	2254
	Medium	37	41	115	214	35	32	53	
	Large	77	40	74	134	23	21	27	
Mombasa	Small	25	4	14	38	35	26	34	434
	Medium	24	5	12	31	26	27	27	
	Large	20	11	5	19	5	16	30	
Kilifi	Small	6	2	0	11	29	47	33	187
	Medium	7	0	0	3	5	16	13	
	Large	5	3	0	2	1	2	2	
Machakos	Small	3	2	3	33	20	20	20	215
	Medium	9	3	3	6	14	20	21	
	Large	8	6	3	11	1	3	6	
Kirinyaga	Small	73	4	1	2	81	45	60	316
	Medium	21	0	0	1	7	2	4	
	Large	12	1	0	0	1	1	0	
Kiambu	Small	29	2	8	13	52	20	31	375
	Medium	62	4	1	13	21	12	19	
	Large	39	9	7	19	0	3	11	
Trans Nzoia	Small	11	0	0	4	30	33	30	142
	Medium	6	0	0	0	8	4	9	
	Large	4	0	0	0	1	0	2	
Uasin Gishu	Small	20	7	1	40	40	20	30	262
	Medium	12	2	1	9	18	27	17	
	Large	3	3	0	2	3	1	6	
Nakuru	Small	30	5	3	26	32	24	136	460
	Medium	24	1	3	13	26	49	40	
	Large	7	8	2	9	5	4	13	
Kisumu	Small	27	0	2	17	47	24	40	310
	Medium	8	3	0	12	23	26	38	
	Large	17	0	1	6	5	2	12	
		673	190	332	718	1147	592	1303	4955

Source: World Bank and Kenya National Bureau of Statistics

Table 2: Kenya Sample Frame (Panel)

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	7	7	3	10	53	15	39	349
	Medium	18	14	15	30	15	12	23	
	Large	16	10	17	33	4	1	7	
Mombasa	Small	6	2	2	16	15	6	14	144
	Medium	7	1	5	13	6	7	8	
	Large	5	2	1	11	2	10	5	
Kirinyaga	Small	6	1	0	1	2	0	0	16
	Medium	3	0	0	0	0	0	1	
	Large	2	0	0	0	0	0	0	
Kiambu	Small	11	0	0	2	2	0	1	41
	Medium	8	2	0	4	1	0	1	
	Large	2	1	0	3	0	2	1	
Nakuru	Small	12	3	2	7	13	4	6	92
	Medium	9	0	1	8	8	6	5	
	Large	2	3	0	0	2	0	1	
Kisumu	Small	9	0	1	8	28	5	10	98
	Medium	5	1	0	4	7	2	4	
	Large	8	0	1	2	2	1	0	
		136	47	48	152	160	71	126	740

Necessary measures were taken to ensure the quality of the frame; however, the sample frame was not immune to the typical problems found in establishment surveys: positive rates of non-eligibility, repetition, non-existent units, etc.

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 17.1% (545 out of 3178 establishments)⁴.

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

⁴ Based on out of target and ineligible contacts

Table 3: Achieved Interviews (Fresh and Panel Combined)

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	4	8	21	9	45	5	28	313
	Medium	4	12	41	34	7	4	7	
	Large	7	11	23	30	4	3	6	
Mombasa	Small	6	1	3	11	5	3	7	95
	Medium	6	1	0	5	3	6	6	
	Large	4	2	0	6	1	7	7	
	Medium and Large	0	0	5	0	0	0	0	
Kilifi	Small	2	0	0	0	14	14	12	70
	Medium	0	0	0	0	0	8	7	
	Large	0	0	0	0	0	2	1	
	Medium and Large	1	0	0	0	4	0	0	
	Small, Medium, and Large	0	1	0	4	0	0	0	
Machakos	Small	1	1	0	5	3	3	3	63
	Medium	3	1	0	2	0	0	10	
	Large	1	2	2	6	0	0	2	
	Small and Medium	0	0	1	0	0	0	0	
	Medium and Large	0	0	0	0	5	12	0	
Kirinyaga	Small	16	0	0	0	8	9	6	75
	Medium	16	0	0	0	3	2	2	
	Large	8	0	0	0	1	1	0	
	Small and Medium	0	0	0	1	0	0	0	
	Small, Medium, and Large	0	2	0	0	0	0	0	
Kiambu	Small	7	2	5	5	6	2	2	100
	Medium	21	3	0	6	4	4	4	
	Large	12	2	0	8	0	2	1	
	Medium and Large	0	0	4	0	0	0	0	
Trans Nzoia	Small	5	0	0	3	4	5	4	40
	Medium	3	0	0	0	0	3	4	
	Large	1	0	0	0	0	0	2	
	Medium and Large	0	0	0	0	6	0	0	
Uasin Gishu	Small	4	2	0	14	6	2	3	70
	Medium	0	1	0	0	0	12	7	
	Large	0	2	0	0	0	1	3	
	Small	0	0	1	0	0	0	0	
	Medium and Large	3	0	0	4	5	0	0	

Nakuru	Small	8	0	2	12	10	5	6	100
	Medium	6	0	3	9	8	4	6	
	Large	4	4	1	2	3	3	2	
	Small and Medium	0	2	0	0	0	0	0	
Kisumu	Small	4	0	0	4	10	3	6	75
	Medium	1	0	0	4	10	10	10	
	Large	2	0	0	3	3	1	3	
	Small, Medium, and Large	0	0	1	0	0	0	0	
		160	60	113	187	178	136	167	1001

Table 4: Achieved Interviews (Panel)

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	2	3	3	4	22	3	15	136
	Medium	2	9	6	21	5	2	5	
	Large	5	3	5	15	2	1	3	
Mombasa	Small	4	1	1	4	3	1	5	46
	Medium	3	0	0	4	1	4	1	
	Large	2	0	0	3	0	5	1	
	Medium and Large	0	0	3	0	0	0	0	
Kirinyaga	Small	6	0	0	0	0	0	0	11
	Medium	3	0	0	0	0	0	0	
	Large	1	0	0	0	0	0	0	
	Small, Medium, and Large	0	1	0	0	0	0	0	
Kiambu	Small	5	0	0	0	0	0	0	14
	Medium	3	1	0	2	0	0	1	
	Large	0	0	0	1	0	1	0	
Nakuru	Small	6	0	2	6	8	3	4	56
	Medium	4	0	1	5	6	2	4	
	Large	1	1	0	0	2	0	0	
	Small and Medium	0	1	0	0	0	0	0	

Kisumu	Small	1	0	0	1	8	1	4	30
	Medium	1	0	0	1	4	0	3	
	Large	1	0	0	1	2	1	0	
	Small, Medium, and Large	0	0	1	0	0	0	0	
		50	20	22	68	63	24	46	293

IV. Data Base Structure:

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*.

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 the prefix “KEN” indicate questions specific to Kenya, 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.

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.

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 based on the sample frame, whereas the latter gives the establishment’s actual industry classification (four digit code) based on the main activity at the time of the survey.

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 or outdated 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 small, medium, and large establishments as defined above.

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

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.

Note that there are variables for size (*l1*, *l6* and *l8*) that reflect more accurately the reality of each establishment. Advanced users are advised to use these variables for analytical purposes. Variables *l1* (number of permanent full-time workers at the end of the last complete fiscal year), *l6* (number of full-time seasonal workers employed during last complete fiscal year) and *l8* (average length of employment of full-time temporary employees during last complete fiscal year) 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.

The last complete fiscal year is January to December 2017. For questions pertaining to monetary amounts, the unit is the Kenyan Shillings (KES).

V. Universe Estimates

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

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.

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

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*.

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

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*.

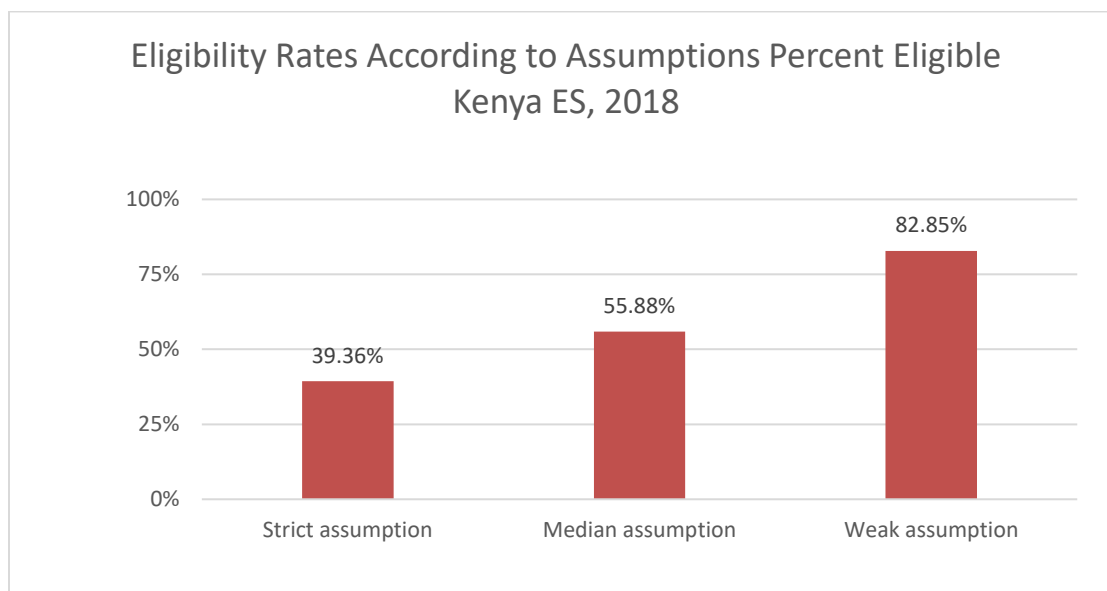
$$\text{Median eligibility} = (\text{Sum of the firms with codes } 1, 2, 3, 4, 16, 10, 11, \& 13) / \text{Total}$$

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 *wwweak*.

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

The indicators computed for the ES 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.



Universe estimates for the number of establishments in each industry-region-size cell in Kenya were produced for the strict, weak and median eligibility definitions. Appendix B shows the universe estimates of the numbers of registered establishments that fit the criteria of the ES.

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

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

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

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.

VII. Appropriate use of the weights

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.

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 have the advantage of providing an estimate that is independent of the sample design. This latter point may be quite relevant for the ES 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 use of weighted OLS for a common population coefficient.)⁷

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

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.

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

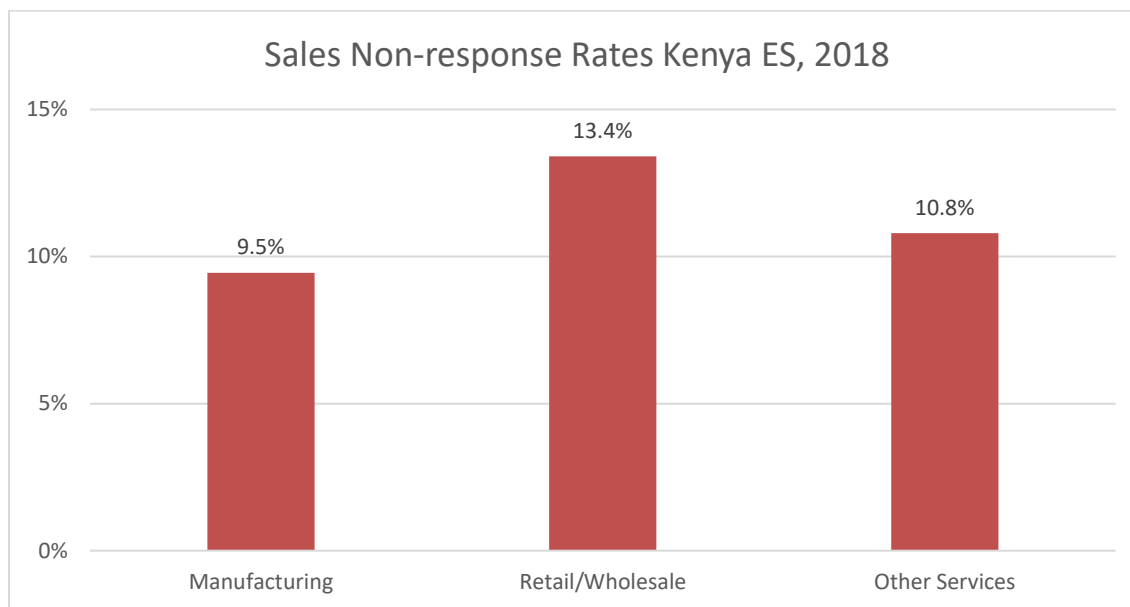
⁷ Note that weighted OLS in Stata using the command `regress` with the option of weights will estimate wrong standard errors. Using the Stata survey specific commands `svy` will provide appropriate standard errors.

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.

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 (-8) as a different option from don't know (-9).

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 for this specific question, refusals were not separately identified from “Don't know” responses.

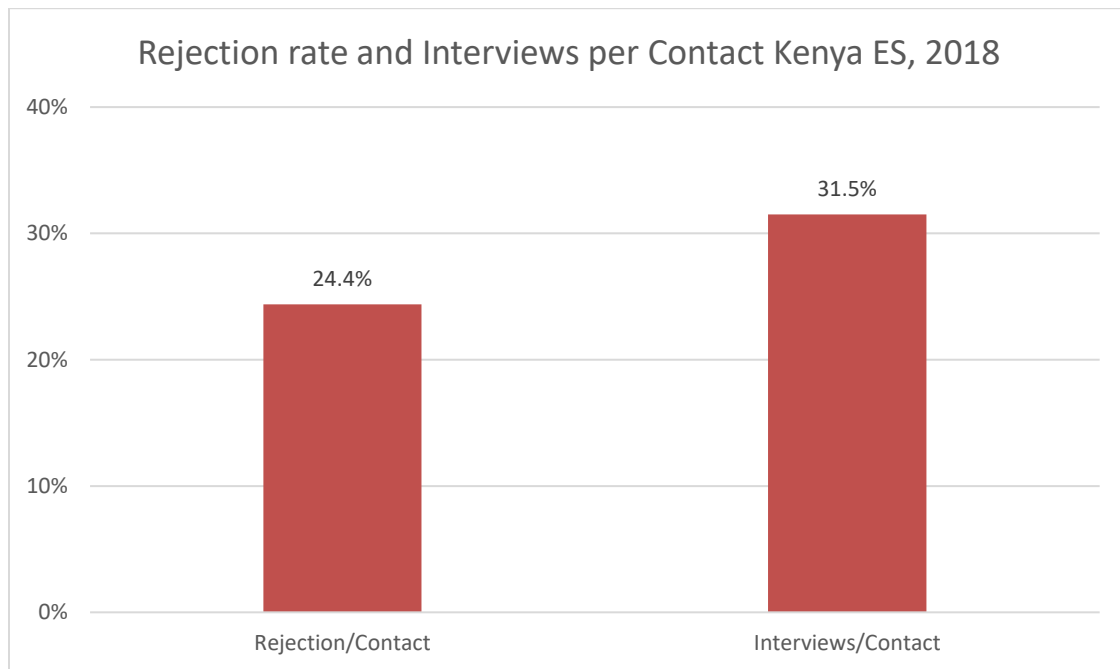


Survey non-response was addressed by maximizing efforts to contact establishments that were initially selected for interview. Attempts were made to contact the establishment for interview at different times/days of the week before a replacement establishment (with similar strata characteristics) was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

As the following graph shows, the number of interviews per contacted establishments was 0.32.⁹ 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

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

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 0.24.



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 Kenya. All enterprise surveys suffer from these shortcomings, but in very few cases they have been made explicit.

References:

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Appendix A

Status Codes Enterprise Survey (ES):

0	Screening in process	14. In process (the establishment is being called/ is being contacted - previous to ask the screener)	0
1251	Eligible	1. Eligible establishment (Correct name and address) 1239 2. Eligible establishment (Different name but same address - the new firm/establishment bought the original firm/establishment) 1 3. Eligible establishment (Different name but same address - the firm/establishment changed its name) 7 4. Eligible establishment (Moved and traced) 4 16. Eligible establishment (Panel Firm - now less than five employees; this code applies only to panel firms.) 0	
525	Screener refusal	13. Refuses to answer the screener	525
370	Ineligible	5. The establishment has less than 5 permanent full time employees 42 616. The firm discontinued businesses - (Establishment went bankrupt) 19 618. The firm discontinued businesses - (Original establishment disappeared and is now a different firm) 8 619. The firm discontinued businesses - (Establishment was bought out by another firm) 9 620. The firm discontinued businesses - (It was impossible to determine for what reason) 100 621. The firm discontinued businesses - (Other) 54 71. Ineligible legal status: not a business, but private household 1 72. Ineligible legal status: cooperatives, non-profit organizations, etc. 42 8. Ineligible activity: Education, Agriculture, Finances, Government, etc. 95	
175	Out of Target	151. Out of target - outside the covered regions 61 152. Out of target - moved abroad 1 153. Out of target - Not registered with Statistical Authority 1 154. Out of target - establishment is HQ without production or sales of goods or services 3 155. Out of target - establishment was not in operation for the entirety of last fiscal year 10 156. Duplicated firm within the sample 99	
857	Unobtainable	91. No reply after having called in different days of the week and in different business hours 0 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	857
3178	Total contacted		

Response Outcomes : Kenya ES 2018:

Target and totals	Sample target	1000
	Sample target completion rate	100.1%
	Total contacts available in frame	4955
	Total contacts issued	3441
	Total contacts contacted	3178

Screening phase	Screening in process	0
	Eligibles	1251
	Screeners refusal	525
	Ineligible + out of target	545
	Unobtainable	857
Interview phase (only if eligible)	Complete interviews without extra module	1001
	Complete interviews with extra module	0
	Eligible in process + incomplete interviews	0
	Interview refusal	250

Percent breakdown (relative to total contacted)	Screening in process rate	0.0%
	Screening refusal rate	16.5%
	Ineligible + out of target rate	17.1%
	Unobtainable rate	27.0%
	Interview conversion rate	31.5%
	Eligible in process + incomplete interviews rate	0.0%
	Interview refusal rate	7.9%

Appendix B: Universe Estimate Based on Sampling Weights

Strict Universe Estimates – Fresh:

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	155	8	21	47	1857	247	1351	4334
	Medium	49	15	49	91	59	60	160	
	Large	28	13	27	41	10	13	34	
Mombasa	Small	7	2	4	11	22	48	50	306
	Medium	12	2	0	13	8	25	54	
	Large	9	5	0	7	1	12	9	
	Medium and Large	0	0	7	0	0	0	0	
Kilifi	Small	3	0	0	0	14	25	12	100
	Medium	0	0	0	0	0	16	7	
	Large	0	0	0	0	0	2	1	
	Medium and Large	8	0	0	0	4	0	0	
	Small, Medium, and Large	0	2	0	6	0	0	0	
Machakos	Small	1	1	0	13	22	76	108	300
	Medium	8	2	0	4	0	0	12	
	Large	6	4	2	7	0	0	3	
	Small and Medium	0	0	5	0	0	0	0	
	Medium and Large	0	0	0	0	6	22	0	
Kirinyaga	Small	28	0	0	0	31	23	20	139
	Medium	16	0	0	0	3	2	2	
	Large	9	0	0	0	1	1	0	
	Small	0	0	0	2	0	0	0	
	Small,	0	2	0	0	0	0	0	
Kiambu	Small	51	2	5	6	221	95	141	700
	Medium	58	3	0	11	14	14	12	
	Large	32	6	0	13	0	3	6	
	Medium and Large	0	0	7	0	0	0	0	
Trans Nzoia	Small	6	0	0	3	35	24	46	145
	Medium	6	0	0	0	0	5	6	
	Large	4	0	0	0	0	0	2	
	Medium and Large	0	0	0	0	6	0	0	
Uasin Gishu	Small	9	2	0	14	114	77	120	391
	Medium	0	1	0	0	0	22	7	
	Large	0	2	0	0	0	1	3	
	Small and Medium	0	0	1	0	0	0	0	
	Medium and Large	8	0	0	5	6	0	0	
Nakuru	Small	35	0	2	14	105	86	460	909
	Medium	27	0	3	12	16	71	30	

Kisumu	Large	7	7	2	8	3	5	9	351
	Small and Medium	0	6	0	0	0	0	0	
	Small	13	0	0	5	40	94	118	
	Medium	7	0	0	6	11	20	16	
	Large	9	0	0	3	3	1	4	
	Small, Medium, and Large	0	0	2	0	0	0	0	
		609	87	137	340	2611	1088	2804	7675

Median Universe Estimates – Fresh:

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	214	9	25	84	2717	321	1896	6371
	Medium	75	27	84	179	96	87	250	
	Large	47	25	49	89	18	20	58	
Mombasa	Small	12	3	7	20	40	79	89	587
	Medium	23	5	0	32	16	44	108	
	Large	19	12	0	19	3	20	19	
	Medium and Large	0	0	17	0	0	0	0	
Kilifi	Small	3	0	0	0	14	29	12	125
	Medium	0	0	0	0	0	20	9	
	Large	0	0	0	0	0	2	1	
	Medium and Large	12	0	0	0	4	0	0	
	Small, Medium, and Large	0	4	0	13	0	0	0	
Machakos	Small	1	1	0	15	21	67	103	301
	Medium	8	3	0	6	0	0	13	
	Large	7	5	3	10	0	0	3	
	Small and Medium	0	0	4	0	0	0	0	
	Medium and Large	0	0	0	0	7	24	0	
Kirinyaga	Small	26	0	0	0	30	20	19	133
	Medium	16	0	0	0	3	2	2	
	Large	10	0	0	0	1	1	0	
	Small and Medium	0	0	0	2	0	0	0	
	Small, Medium, and Large	0	3	0	0	0	0	0	
Kiambu	Small	55	2	5	8	253	97	155	811
	Medium	69	5	0	17	18	16	15	
	Large	43	10	0	22	0	4	8	
	Medium and Large	0	0	11	0	0	0	0	
Trans Nzoia	Small	6	0	0	3	34	21	42	134
	Medium	6	0	0	0	0	5	6	
	Large	4	0	0	0	0	0	2	
	Medium and Large	0	0	0	0	6	0	0	

Uasin Gishu	Small	10	3	0	17	141	84	142	474
	Medium	0	2	0	0	0	27	9	
	Large	0	2	0	0	0	1	3	
	Small and Medium	0	0	1	0	0	0	0	
	Medium and Large	12	0	0	9	9	0	0	
Nakuru	Small	33	0	2	16	106	76	443	905
	Medium	29	0	4	17	18	71	33	
	Large	8	9	2	12	3	6	10	
	Small and Medium	0	6	0	0	0	0	0	
Kisumu	Small	15	0	0	7	51	105	143	428
	Medium	8	0	0	10	11	25	21	
	Large	13	0	0	5	3	2	6	
	Small, Medium, and Large	0	0	2	0	0	0	0	
		783	134	218	613	3622	1275	3622	10267

Weak Universe Estimates – Fresh:

		Food	Textiles and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Nairobi	Small	546	22	70	222	15175	816	7959	26557
	Medium	90	34	109	223	254	104	497	
	Large	55	31	62	107	47	23	111	
Mombasa	Small	17	4	11	29	126	113	211	815
	Medium	16	4	0	23	24	30	121	
	Large	12	9	0	13	4	14	21	
	Medium and Large	0	0	12	0	0	0	0	
Kilifi	Small	5	0	0	0	26	43	28	156
	Medium	0	0	0	0	0	14	11	
	Large	0	0	0	0	0	2	2	
	Medium and Large	8	0	0	0	5	0	0	
	Small, Medium, and Large	0	3	0	11	0	0	0	
Machakos	Small	2	2	0	26	78	111	282	588
	Medium	6	2	0	5	0	0	16	
	Large	5	4	2	8	0	0	4	
	Small and Medium	0	0	4	0	0	0	0	
	Medium and Large	0	0	0	0	12	18	0	
Kirinyaga	Small	61	0	0	0	153	46	72	380
	Medium	17	0	0	0	7	2	4	
	Large	10	0	0	0	2	1	0	
	Small and Medium	0	0	0	2	0	0	0	
	Small, Medium, and Large	0	4	0	0	0	0	0	

Kiambu	Small	78	2	7	11	790	137	364	1573
	Medium	47	3	0	12	26	11	16	
	Large	28	7	0	15	0	3	9	
	Medium and Large	0	0	8	0	0	0	0	
Trans Nzoia	Small	9	0	0	4	114	32	106	292
	Medium	5	0	0	0	0	4	8	
	Large	3	0	0	0	0	0	2	
	Medium and Large	0	0	0	0	8	0	0	
Uasin Gishu	Small	18	5	0	30	520	142	396	1187
	Medium	0	1	0	0	0	21	12	
	Large	0	2	0	0	0	1	4	
	Small and Medium	0	0	1	0	0	0	0	
	Medium and Large	9	0	0	8	15	0	0	
Nakuru	Small	40	0	3	21	284	94	896	1501
	Medium	17	0	3	11	22	41	31	
	Large	4	6	2	7	4	3	9	
	Small and Medium	0	4	0	0	0	0	0	
Kisumu	Small	24	0	0	12	180	170	383	876
	Medium	8	0	0	8	17	19	26	
	Large	10	0	0	4	3	2	8	
	Small, Medium, and Large	0	0	2	0	0	0	0	
		1150	148	297	810	17895	2018	11607	33925

Appendix C: Original Sample Design

Original Sample Design (Fresh)

		Food	Textile and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Mombasa	Small	2	1	2	2	2	2	2	43
	Medium	2	2	4	2	2	2	2	
	Large	2	2	2	2	2	2	2	
Kilifi	Small	4	1	0	7	8	11	8	75
	Medium	4	0	0	2	3	10	8	
	Large	3	2	0	1	1	1	1	
Machakos	Small	2	1	2	14	2	2	2	75
	Medium	5	2	2	4	3	6	3	
	Large	5	4	2	7	1	2	4	
Kirinyaga	Small	7	2	1	1	7	9	6	61
	Medium	11	0	0	1	4	1	2	
	Large	6	1	0	0	1	1	0	
Kiambu	Small	2	1	5	2	2	2	2	65
	Medium	2	1	1	5	2	2	2	
	Large	10	5	4	10	0	1	4	
Trans Nzoia	Small	6	0	0	2	4	5	3	40
	Medium	4	0	0	0	5	2	5	
	Large	2	0	0	0	1	0	1	
Uasin Gishu	Small	2	4	1	17	2	2	2	75
	Medium	7	1	1	5	5	9	5	
	Large	2	2	0	1	2	1	4	
Nakuru	Small	2	1	1	2	2	2	2	37
	Medium	2	1	1	2	2	2	2	
	Large	2	2	1	2	2	2	2	
Kisumu	Small	2	0	1	2	2	2	2	31
	Medium	2	1	0	2	2	2	2	
	Large	2	0	0	2	2	1	2	
Nairobi	Small	2	2	2	2	27	2	15	123
	Medium	2	2	14	2	2	2	2	
	Large	2	2	33	2	2	2	2	
		108	43	80	103	102	90	99	625

Original Sample Design (Panel)

		Food	Textile and Garments	Chem Pharma and Plastic	Other Manufacturing	Retail	Tourism	Other Services	Grand Total
Mombasa	Small	2	2	2	2	2	2	2	65
	Medium	2	1	4	10	2	2	2	
	Large	4	2	1	9	2	6	4	
Kilifi	Small	0	0	0	0	0	0	0	0
	Medium	0	0	0	0	0	0	0	
	Large	0	0	0	0	0	0	0	
Machakos	Small	0	0	0	0	0	0	0	0
	Medium	0	0	0	0	0	0	0	
	Large	0	0	0	0	0	0	0	
Kirinyaga	Small	5	1	0	1	2	0	0	14
	Medium	2	0	0	0	0	0	1	
	Large	2	0	0	0	0	0	0	
Kiambu	Small	9	0	0	2	2	0	1	35
	Medium	6	2	0	3	1	0	1	
	Large	2	1	0	2	0	2	1	
Trans Nzoia	Small	0	0	0	0	0	0	0	0
	Medium	0	0	0	0	0	0	0	
	Large	0	0	0	0	0	0	0	
Uasin Gishu	Small	0	0	0	0	0	0	0	0
	Medium	0	0	0	0	0	0	0	
	Large	0	0	0	0	0	0	0	
Nakuru	Small	2	2	2	6	7	3	5	63
	Medium	7	0	1	6	6	5	4	
	Large	2	2	0	0	2	0	1	
Kisumu	Small	2	0	1	6	2	2	2	44
	Medium	4	1	0	3	4	2	3	
	Large	6	0	1	2	2	1	0	
Nairobi	Small	2	2	2	2	30	2	5	154
	Medium	2	3	12	17	2	2	2	
	Large	11	8	14	26	3	1	6	
		72	27	40	97	69	30	40	375