The Turkey 2019 Enterprise Surveys Data Set

I. Introduction

This document provides additional information on the data collected in Turkey between September 2018 and May 2019. The survey was part of a joint project of the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB) and the World Bank Group (WBG). 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 180,000 firms in 150 countries, of which 141 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 2019 Turkey ES was selected using stratified random sampling, following the methodology explained in the *Sampling Note*[1]. Stratified random sampling[2] was preferred over simple random sampling for several reasons[3]:

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-

---

[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

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.

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.

Industry stratification was designed in the way that follows: the universe was stratified into six manufacturing industries and three services industries. Food and Beverages (ISIC Rev. 4.0 codes 10, 11), Textiles (ISIC 13), Garment (ISIC 14), Fabricated Metal Products (ISIC 25), Machinery and Equipment (ISIC 28), Other Manufacturing (ISIC 12, 15-24,26, 27, 29-33), Construction (ISIC 41-43), Retail (ISIC 47, 95) and Other Services (ISIC 45, 46, 49-53, 55, 56, 58, 61, 62, 79, and 95).

As it is standard for the ES, the Turkey ES was based on the following size stratification: small (5 to 19 employees), medium (20 to 99 employees), and large (100 or more employees).

Regional stratification for the Turkey ES was done at the NUTS-1 level (12 regions), namely, Istanbul Region (TR1), West Marmara Region (TR2), East Marmara Region (TR4), Aegean Region (TR3), West Anatolia Region (TR5), Central Anatolia Region (TR7), Mediterranean Region (TR6), West Black Sea Region (TR8), East Black Sea Region (TR9), Northeast Anatolia Region (TRA), Central East Anatolia Region (TRB), Southeast Anatolia Region (TRC).

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.

The Turkey 2019 ES was implemented by Yöntem Research.

The sample frame consisted of listings of firms from two sources: For panel firms, the list of 1344 firms from the Turkey 2013 ES was used; and for fresh firms (i.e., firms not covered in 2013), a listing of firms from the Turkish Statistical Institute (TUIK) was used, dated as of June 2018. The firms in the listing are all registered as businesses with the Trade Registry Office. Note that TUIK provided a subset of the full listing, this subset was selected randomly following the ES methodology. The ES team used this subset for the standard sampling procedures.

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

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	207	0	0	33	7	95	120	135	156	**1526**
	Medium (20-99)	31	0	0	4	0	32	300	120	265	
	Large (100 or more)	0	0	0	0	0	0	12	9	0	
Central East Anatolia	Small (5-19)	87	16	44	72	47	24	37	50	60	**1413**
	Medium (20-99)	97	8	33	13	9	129	180	170	169	
	Large (100 or more)	10	8	12	0	0	10	73	16	39	
Southeast Anatolia	Small (5-19)	43	74	92	76	60	47	37	39	51	**1500**
	Medium (20-99)	64	152	53	41	28	94	37	37	50	
	Large (100 or more)	25	146	48	4	0	35	62	33	72	
Istanbul	Small (5-19)	46	44	65	53	51	65	67	68	145	**1908**
	Medium (20-99)	43	51	137	45	36	87	39	38	46	
	Large (100 or more)	101	89	116	88	90	188	24	37	49	
West Marmara	Small (5-19)	37	88	71	275	131	24	24	37	36	**1455**
	Medium (20-99)	132	106	41	46	50	24	36	24	36	
	Large (100 or more)	29	39	21	7	7	72	12	12	38	
Aegean	Small (5-19)	45	40	41	43	102	66	42	56	63	**1772**
	Medium (20-99)	46	48	77	43	51	68	39	39	37	
	Large (100 or more)	85	129	101	61	59	240	50	51	50	
East Marmara	Small (5-19)	42	102	104	64	63	43	24	41	37	**1572**
	Medium (20-99)	65	102	51	37	110	49	37	24	24	
	Large (100 or more)	48	139	51	104	62	38	37	36	38	
West Anatolia	Small (5-19)	45	65	50	92	51	60	40	44	143	**1534**
	Medium (20-99)	39	27	96	50	38	57	38	38	39	
	Large (100 or more)	82	5	20	78	73	139	51	37	37	
Mediterranean	Small (5-19)	45	41	102	45	50	55	39	50	90	**1564**
	Medium (20-99)	45	97	115	103	24	56	37	37	39	
	Large (100 or more)	36	95	47	46	23	110	50	50	37	
Central Anatolia	Small (5-19)	51	51	46	64	95	75	64	91	50	**1284**
	Medium (20-99)	76	20	18	131	36	79	24	50	24	
	Large (100 or more)	15	17	5	11	3	94	32	27	35	
West Black Sea	Small (5-19)	90	26	53	76	120	45	50	90	25	**1346**
	Medium (20-99)	101	12	52	47	52	168	51	50	24	
	Large (100 or more)	16	0	55	5	0	56	29	25	28	
East Black Sea	Small (5-19)	75	16	36	123	33	64	24	50	60	**1329**
	Medium (20-99)	142	11	41	17	18	109	132	132	133	
	Large (100 or more)	20	1	11	0	0	0	49	12	20	
		2161	1865	1905	1997	1579	2597	1999	1855	2245	18203

Source: World Bank and TUIK

Table 2: Turkey Sample Frame (Panel)

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	3	0	0	1	0	0	0	3	0	**13**
	Medium (20-99)	2	0	0	1	0	1	0	0	0	
	Large (100 or more)	0	0	0	0	0	0	0	2	0	
Central East Anatolia	Small (5-19)	3	0	0	1	2	0	1	2	0	**28**
	Medium (20-99)	3	0	2	1	0	4	0	2	1	
	Large (100 or more)	1	3	0	0	0	1	0	1	0	
Southeast Anatolia	Small (5-19)	7	3	8	5	0	12	1	3	3	**101**
	Medium (20-99)	4	11	5	3	0	12	1	1	2	
	Large (100 or more)	3	7	2	1	0	2	2	3	0	
Istanbul	Small (5-19)	10	8	5	17	3	29	7	20	13	**280**
	Medium (20-99)	8	15	17	9	1	52	3	2	10	
	Large (100 or more)	7	5	10	6	0	21	0	1	1	
West Marmara	Small (5-19)	1	0	0	1	0	0	0	1	0	**3**
Aegean	Small (5-19)	9	4	5	7	6	30	6	20	15	**271**
	Medium (20-99)	11	12	17	8	3	32	3	3	1	
	Large (100 or more)	6	14	12	6	2	32	2	3	2	
East Marmara	Small (5-19)	6	7	8	4	3	7	0	5	1	**94**
	Medium (20-99)	5	8	3	1	2	13	2	0	0	
	Large (100 or more)	0	5	3	4	1	2	1	1	2	
West Anatolia	Small (5-19)	9	6	3	8	3	24	4	8	11	**169**
	Medium (20-99)	4	3	11	3	2	21	2	2	3	
	Large (100 or more)	6	5	12	3	1	10	3	1	1	
Mediterranean	Small (5-19)	9	5	7	9	2	19	3	14	6	**181**
	Medium (20-99)	9	8	9	10	0	20	1	1	3	
	Large (100 or more)	8	9	5	4	1	13	2	3	1	
Central Anatolia	Small (5-19)	4	3	1	4	3	4	4	7	2	**71**
	Medium (20-99)	5	3	0	6	0	7	0	2	0	
	Large (100 or more)	1	3	0	4	0	5	0	2	1	
West Black Sea	Small (5-19)	6	3	5	5	0	9	2	6	1	**102**
	Medium (20-99)	8	5	4	3	1	15	3	3	0	
	Large (100 or more)	2	0	8	2	0	8	1	2	0	
East Black Sea	Small (5-19)	5	1	0	2	0	4	0	2	0	**31**
	Medium (20-99)	2	1	1	2	0	3	0	0	1	
	Large (100 or more)	5	1	1	0	0	0	0	0	0	
		172	**158**	**164**	**141**	**36**	**412**	**54**	**126**	**81**	**1344**

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 1.4% (80 out of 5552 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	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	19			3	1	8	11	12	13	**139**
	Medium (20-99)	5			1		4	23	12		
	Large (100 or more)							1	3		
	Medium and Large (20+)									23	
Central East Anatolia	Small (5-19)	8	2	4	7	6	2	3	4	5	**135**
	Medium (20-99)	11	1	5		1	12	16	12	13	
	Large (100 or more)	2	3	1			1	7	3	4	
	Medium and Large (20+)				2						
Southeast Anatolia	Small (5-19)	7	4	8	6	6	4	3	3	5	**138**
	Medium (20-99)	5	11	6	4	3	10	3	3	3	
	Large (100 or more)	3	21	6	1		3	3	5	2	
Istanbul	Small (5-19)	3	3	5	4	2	24	7	19	15	**150**
	Medium (20-99)	3	3	4	3	2	4	3	3	8	
	Large (100 or more)	2	4	4	3	9	6	2	2	3	
West Marmara	Small (5-19)	2	9	7	28	13	2	2	3	3	**136**
	Medium (20-99)	11	11	4	5	5	2	2	2	3	
	Large (100 or more)	3	3	1	1	1	7	1	1	4	
Aegean	Small (5-19)	3	3	4	3	4	3	6	17	9	**145**
	Medium (20-99)	4	5	14	3	3	3	3	3	2	
	Large (100 or more)	4	11	6	6	7	8	4	4	3	
East Marmara	Small (5-19)	5	8	6	3	3	5	2	4	3	**134**
	Medium (20-99)	3	7	2	3	11	7	3	2	2	
	Large (100 or more)	2	15	9	12	8	2	3	2	2	
West Anatolia	Small (5-19)	8	7	4	6	3	8	5	4	5	**135**
	Medium (20-99)	4	4	5	2	4	6	4	3	4	
	Large (100 or more)	6	4	5	5	8	10	5	3	3	
Mediterranean	Small (5-19)	3	6	7	5	4	3	3	12	10	**139**
	Medium (20-99)	3	6	8	8	2	3	2	3	2	
	Large (100 or more)	7	11	7	5	3	9	2	4	1	
Central Anatolia	Small (5-19)	5	7	6	5	12	4	5	8	3	**136**
	Medium (20-99)	6	4	2	17		6	2	3	2	
	Large (100 or more)	2	3	1	5		13	3	4	4	
	Medium and Large (20+)					4					
West Black Sea	Small (5-19)	6	4	6	6	12	7	4	6	5	**138**
	Medium (20-99)	7	4	5	5		14	4	4	4	
	Large (100 or more)	2		12	1		6	2	4	2	
	Medium and Large (20+)					6					
East Black Sea	Small (5-19)	7			14	3	5	2	4	6	**131**
	Medium (20-99)	16	2	5	4	2	10	12	12	12	
	Large (100 or more)	5	1	2	0	0	0	5	1	2	

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
East Black Sea and Northeast Anatolia	Small (5-19)		3	4							**7**
		192	**190**	**175**	**186**	**148**	**221**	**167**	**194**	**190**	**1663**

Table 4: Achieved Interviews (Panel)

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	2								2	**10**
	Medium (20-99)	2			1		1				
	Large (100 or more)									2	
Central East Anatolia	Small (5-19)	2				1				2	**20**
	Medium (20-99)	2		2			3		2	1	
	Large (100 or more)	1	2							1	
	Medium and Large (20+)				1						
Southeast Anatolia	Small (5-19)	5	2	6	4		2	1	2	2	**68**
	Medium (20-99)	3	9	4	2		8	1	1	1	
	Large (100 or more)	1	7	1	1		1	1	3		
Istanbul	Small (5-19)	1	1	3	2		22	3	16	8	**81**
	Medium (20-99)	1	1	2	1		2	1	1	6	
	Large (100 or more)		2	2	1		4			1	
West Marmara	Small (5-19)				1					1	**2**
Aegean	Small (5-19)	1	1	2	1	2	1	4	15	6	**86**
	Medium (20-99)	2	3	12	1	1	1		1	1	
	Large (100 or more)	2	9	4	4	1	6	2	2	1	
East Marmara	Small (5-19)	3	6	4	1	1	3		2	1	**41**
	Medium (20-99)	1	5		1		5	1			
	Large (100 or more)		2	1	2	1		1			
West Anatolia	Small (5-19)	6	5	2	4	1	6	3	2	3	**75**
	Medium (20-99)	2	2	3		1	4	2	1	2	
	Large (100 or more)	4	4	4	1		8	3	1	1	
Mediterranean	Small (5-19)	1	4	5	3	2	1	1	10	3	**77**
	Medium (20-99)	1	4	6	6		1		1		
	Large (100 or more)	5	7	3	3	1	7			2	
Central Anatolia	Small (5-19)	3	2	1	3	2	2	3	6	1	**51**
	Medium (20-99)	4	2		5		4		1		
	Large (100 or more)	1	2		3		4		1	1	
West Black Sea	Small (5-19)	4	2	4	4		5	1	4	1	**71**
	Medium (20-99)	5	3	3	3		12	2	2		
	Large (100 or more)	1		7	1		4		2		
	Medium and Large (20+)					1					
East Black Sea	Small (5-19)	4			2		3		2		**26**
	Medium (20-99)	2	1	1	2		2			1	
	Large (100 or more)	4	1	1							

East Black Sea and Northeast Anatolia   Small (5-19)   1   **1**

76	90	83	64	15	122	31	88	40	609

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 prefix *"BM"* or "BMG" indicate questions specific to Turkey and other countries in Europe and Central Asia 2018/2019 and Middle East and North Africa 2019, 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. Interviews were conducted using Computer-assisted personal interviewing (CAPI) in Turkey. The variables *a4b* and *a6c* 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 firms interviewed had several fiscal years. Most firms had January to December 2018 as their last complete fiscal year. Variables a20m (starting month of last complete fiscal year) and a20y (last complete fiscal year) can be used to obtain the last complete fiscal year for each firm.

For questions pertaining to monetary amounts, the unit is the Turkish lira, TRY.

V. Universe Estimates
Universe estimates for the number of establishments in each cell in Turkey 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*.

Strict eligibility = (Sum of the firms with codes 1,2,3,4,&16) / Total
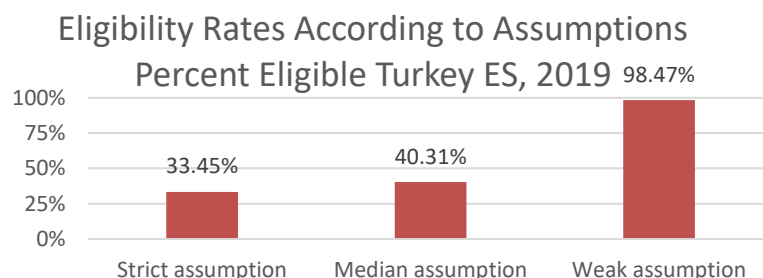
Median assumption: eligible establishments are those for which it was possible to directly determine eligibility and those that rejected the screener questionnaire, or an answering machine or fax was the only response. The resulting weights are included in the variable *wmedian*.

Median eligibility = (Sum of the firms with codes 1,2,3,4,16,10,11, & 13) / 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 *wweak*.

Weak eligibility= (Sum of the firms with codes, 1,2,3,4,16,10,11,13,91,92,93,94,12) / 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.

Eligibility Rates According to Assumptions
Percent Eligible Turkey ES, 2019

	Strict assumption	Median assumption	Weak assumption
Percent Eligible	33.45%	40.31%	98.47%

Universe estimates for the number of establishments in each industry-region-size cell in Turkey 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]

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

---

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

the week and in different business hours, no tone in the phone line, answering machine, fax line[6], 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.

Due to non-response rates, some stratification cells were collapsed for the purposes of weighting, to preserve the preserve the representativeness of the sample. The following cells have been transformed: In Central Anatolia for Machines, medium and large firms are treated as one cell; in West Black Sea for Machines, medium and large firms are treated as one cell; in Northeast Anatolia for Other Services, medium and large firms are treated as one cell; in Central East Anatolia for Fabricated Metal, medium and large firms are treated as one cell; small textiles in Northeast Anatolia and East Black Sea are treated as one cell; and small garments in Northeast Anatolia and East Black Sea are treated as one cell.

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 used 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

---

[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.

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.

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.

As the following graph shows, the number of interviews per contacted establishments was 0.30.[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 0.08.

Rejection rate and Interviews per Contact Turkey ES, 2019

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

References:

Cochran, William G., Sampling Techniques, New York, New York: John Wiley & Sons, 1977.

Deaton, Angus, The Analysis of Household Surveys, Baltimore, Maryland: Johns Hopkins University Press, 1998.

Levy, Paul S. and Stanley Lemeshow, Sampling of Populations: Methods and Applications, New York, New York: John Wiley & Sons, 1999.

Lohr, Sharon L. Samping: Design and Techniques, Boston, Massachusetts: Brookes/Cole, 1999.

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

---

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

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

1857	Eligible	1. Eligible establishment (Correct name and address)	1649
		2. Eligible establishment (Different name but same address - the new firm/establishment bought the original firm/establishment)	40
		3. Eligible establishment (Different name but same address - the firm/establishment changed its name)	20
		4. Eligible establishment (Moved and traced)	148
		16. Eligible establishment (Panel Firm - now less than five employees; this code applies only to panel firms.)	0

381	Screener refusal	13. Refuses to answer the screener	381

78	Ineligible	5. The establishment has less than 5 permanent full time employees	2
		616. The firm discontinued businesses - (Establishment went bankrupt)	29
		618. The firm discontinued businesses - (Original establishment disappeared and is now a different firm)	4
		619. The firm discontinued businesses - (Establishment was bought out by another firm)	4
		620. The firm discontinued businesses - (It was impossible to determine for what reason)	22
		621. The firm discontinued businesses - (Other)	5
		71. Ineligible legal status: not a business, but private household	0
		72. Ineligible legal status: cooperatives, non-profit organizations, etc.	2
		8. Ineligible activity: Education, Agriculture, Finances, Government, etc.	10
7	Out of Target	151. Out of target - outside the covered regions	0
		152. Out of target - moved abroad	0
		153. Out of target - Not registered with Statistical Authority	2
		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	5
		156. Duplicated firm within the sample	0
		157. Out of target - location that is not HQ and does not have financial statements prepared separately	0
3229	Unobtainable	91. No reply after having called in different days of the week and in different business hours	1498
		92. Line out of order	5
		93. No tone	1
		94. Phone number does not exist	1725
		10. Answering machine	0
		11. Fax line- data line	0
		12. Wrong address/ moved away and could not get the new references	0

5552	Total contacted

Response Outcomes : Turkey ES 2019 :

Target and totals		
Sample target	1680
Sample target completion rate	99.0%
Total contacts available in frame	18203
Total contacts issued	6024
Total contacts contacted	5552

Screening phase		
Screening in process	0
Eligibles	1857
Screener refusal	381
Ineligible + out of target	85
Unobtainable	3229

Interview phase (only if eligible)		
Complete interviews without extra module	26
Complete interviews with extra module	1637
Eligible in process + incomplete interviews	61
Interview refusal	47

Percent breakdown (relative to total contacted)		
Screening in process rate	0.0%
Screener refusal rate	6.9%
Ineligible + out of target rate	1.5%
Unobtainable rate	58.2%
Interview conversion rate	30.0%
Eligible in process + incomplete interviews rate	1.1%
Interview refusal rate	0.8%

Appendix B: Universe Estimate Based on Sampling Weights

Strict Universe Estimates – Fresh:

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	55	0	0	8	3	51	227	221	355	**1136**
	Medium (20-99)	8	0	0	1	0	9	93	33	0	
	Large (100 or more)	0	0	0	0	0	0	3	3	0	
	Medium and Large (20+)	0	0	0	0	0	0	0	0	65	
Central East Anatolia	Small (5-19)	92	5	14	22	15	127	566	387	622	**2507**
	Medium (20-99)	30	3	10	0	3	42	306	72	138	
	Large (100 or more)	3	3	4	0	0	3	22	5	10	
	Medium and Large (20+)	0	0	0	5	0	0	0	0	0	
Southeast Anatolia	Small (5-19)	258	93	125	115	44	511	1126	915	1969	**7185**
	Medium (20-99)	75	85	43	15	13	179	706	145	572	
	Large (100 or more)	9	51	17	1	0	13	56	12	38	
Istanbul	Small (5-19)	345	321	1430	577	298	2172	3207	2204	6595	**22809**
	Medium (20-99)	91	148	633	162	128	859	996	322	1542	
	Large (100 or more)	33	40	84	28	18	171	134	53	216	
West Marmara	Small (5-19)	191	22	19	70	37	270	801	650	1140	**3894**
	Medium (20-99)	50	26	18	12	15	81	177	85	167	
	Large (100 or more)	7	10	6	2	2	19	3	3	9	
Aegean	Small (5-19)	514	218	259	359	202	1319	2537	2210	4364	**15186**
	Medium (20-99)	161	134	157	96	95	496	672	266	792	
	Large (100 or more)	32	30	25	17	16	95	32	20	66	
East Marmara	Small (5-19)	394	276	242	447	196	1365	2101	1643	3421	**13278**
	Medium (20-99)	93	159	92	176	103	630	662	227	675	
	Large (100 or more)	19	39	14	29	19	147	43	15	50	
West Anatolia	Small (5-19)	182	25	74	329	224	959	2242	1085	2622	**10455**
	Medium (20-99)	82	6	28	112	113	331	880	174	620	
	Large (100 or more)	18	15	5	17	17	53	147	19	74	
Mediterranean	Small (5-19)	287	30	73	178	76	738	1480	1522	2964	**9479**
	Medium (20-99)	66	26	27	45	25	225	640	205	640	
	Large (100 or more)	9	20	10	10	5	27	46	16	88	
Central Anatolia	Small (5-19)	151	18	13	99	28	358	660	592	1054	**3877**
	Medium (20-99)	34	5	9	38	0	174	261	96	208	
	Large (100 or more)	4	4	1	5	0	27	10	7	8	
	Medium and Large (20+)	0	0	0	0	15	0	0	0	0	
West Black Sea	Small (5-19)	198	5	29	71	35	306	718	733	1056	**3912**
	Medium (20-99)	42	4	33	11	0	117	198	100	190	
	Large (100 or more)	4	0	14	1	0	13	7	6	6	
	Medium and Large (20+)	0	0	0	0	14	0	0	0	0	
East Black Sea	Small (5-19)	179	0	0	34	16	197	472	536	826	**2896**

				Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
	Medium (20-99)	45	4	15	5	6	38	227	82	180	
	Large (100 or more)	5	1	5	0	0	0	14	4	5	
East Black Sea and Northeast Anatolia	Small (5-19)	0	6	13	0	0	0	0	0	0	**19**
		3767	1833	3543	3095	1782	12122	22475	14669	33348	**96632**

Median Universe Estimates – Fresh:

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	53	0	0	8	3	52	218	225	343	**1111**
	Medium (20-99)	8	0	0	1	0	9	92	34	0	
	Large (100 or more)	0	0	0	0	0	0	4	3	0	
	Medium and Large (20+)	0	0	0	0	0	0	0	0	58	
Central East Anatolia	Small (5-19)	105	6	16	26	17	153	644	465	712	**2929**
	Medium (20-99)	35	3	11	0	3	52	357	89	162	
	Large (100 or more)	4	4	5	0	0	4	30	7	14	
	Medium and Large (20+)	0	0	0	5	0	0	0	0	0	
Southeast Anatolia	Small (5-19)	246	91	116	115	41	513	1072	921	1886	**7045**
	Medium (20-99)	74	85	41	15	13	184	690	150	562	
	Large (100 or more)	11	60	19	1	0	16	64	14	44	
Istanbul	Small (5-19)	474	454	1908	831	395	3144	4396	3194	9096	**32162**
	Medium (20-99)	129	215	867	239	174	1276	1401	480	2183	
	Large (100 or more)	54	68	135	48	29	298	222	93	359	
West Marmara	Small (5-19)	234	28	23	89	43	348	979	840	1402	**4886**
	Medium (20-99)	62	34	22	15	19	108	222	113	211	
	Large (100 or more)	10	15	8	3	3	29	5	5	13	
Aegean	Small (5-19)	570	248	279	417	217	1541	2807	2585	4859	**17292**
	Medium (20-99)	184	157	174	114	104	595	763	320	905	
	Large (100 or more)	43	41	32	23	21	134	43	28	88	
East Marmara	Small (5-19)	434	314	259	517	208	1586	2312	1911	3787	**15089**
	Medium (20-99)	106	186	101	209	112	751	748	271	768	
	Large (100 or more)	25	54	19	40	24	205	57	21	66	
West Anatolia	Small (5-19)	385	55	152	726	455	2130	4715	2414	5549	**22646**
	Medium (20-99)	178	13	59	254	235	754	1899	397	1348	
	Large (100 or more)	47	32	9	44	42	142	372	52	190	
Mediterranean	Small (5-19)	335	36	82	218	85	907	1723	1874	3473	**11369**
	Medium (20-99)	79	32	32	57	29	284	765	259	770	
	Large (100 or more)	11	29	14	14	7	39	65	24	124	
Central Anatolia	Small (5-19)	194	23	16	133	34	483	843	800	1355	**5106**
	Medium (20-99)	44	7	11	52	0	241	342	133	275	
	Large (100 or more)	6	7	2	5	0	43	16	11	13	
	Medium and Large (20+)	0	0	0	0	17	0	0	0	0	
West Black Sea	Small (5-19)	217	6	31	82	37	353	784	846	1160	**4388**

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
	Medium (20-99)	47	4	36	13	0	138	222	118	215	
	Large (100 or more)	6	0	17	1	0	17	9	8	8	
	Medium and Large (20+)	0	0	0	0	14	0	0	0	0	
East Black Sea	Small (5-19)	179	0	0	36	16	208	472	566	830	**2973**
	Medium (20-99)	46	4	15	5	6	41	233	89	185	
	Large (100 or more)	6	2	6	0	0	0	17	5	6	
East Black Sea and Northeast Anatolia	Small (5-19)	0	6	13	0	0	0	0	0	0	**20**
		4639	2318	4531	4358	2402	16780	29600	19366	43021	**127014**

Weak Universe Estimates – Fresh:

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Northeast Anatolia	Small (5-19)	209	0	0	32	12	181	840	851	1447	**4401**
	Medium (20-99)	30	0	0	3	0	31	348	127	0	
	Large (100 or more)	0	0	0	0	0	0	13	8	0	
	Medium and Large (20+)	0	0	0	0	0	0	0	0	271	
Central East Anatolia	Small (5-19)	291	16	42	72	45	373	1743	1239	2112	**8034**
	Medium (20-99)	96	9	30	0	9	125	949	233	472	
	Large (100 or more)	9	9	12	0	0	9	72	16	38	
	Medium and Large (20+)	0	0	0	15	0	0	0	0	0	
Southeast Anatolia	Small (5-19)	661	248	306	305	105	1215	2815	2381	5430	**18794**
	Medium (20-99)	195	229	105	39	32	429	1778	381	1590	
	Large (100 or more)	26	146	45	4	0	34	150	32	112	
Istanbul	Small (5-19)	1976	1924	7787	3418	1593	11543	17899	12798	40607	**132536**
	Medium (20-99)	526	895	3476	966	688	4602	5603	1887	9570	
	Large (100 or more)	201	256	493	176	105	976	806	333	1431	
West Marmara	Small (5-19)	720	87	68	272	130	945	2946	2488	4628	**14946**
	Medium (20-99)	189	105	66	46	55	287	657	330	684	
	Large (100 or more)	28	43	22	9	7	71	13	14	37	
Aegean	Small (5-19)	1762	782	845	1275	649	4202	8488	7693	16107	**52971**
	Medium (20-99)	557	486	517	343	306	1594	2266	935	2947	
	Large (100 or more)	118	116	87	64	55	326	115	75	260	
East Marmara	Small (5-19)	1252	920	733	1471	582	4032	6517	5301	11704	**42788**
	Medium (20-99)	299	535	281	583	308	1875	2071	738	2329	
	Large (100 or more)	64	140	47	101	61	466	142	52	183	
West Anatolia	Small (5-19)	761	111	295	1418	874	3716	9124	4596	11772	**44129**
	Medium (20-99)	346	26	112	487	443	1292	3608	742	2808	
	Large (100 or more)	82	42	13	77	72	222	644	88	359	
Mediterranean	Small (5-19)	1170	127	282	753	289	2794	5887	6301	13007	**39522**
	Medium (20-99)	271	113	107	193	98	859	2565	857	2832	
	Large (100 or more)	31	92	44	44	23	101	199	72	413	
Central Anatolia	Small (5-19)	543	67	44	367	92	1194	2309	2155	4070	**14110**

	Medium (20-99)	122	17	30	142	0	584	921	351	811	
	Large (100 or more)	15	18	5	11	0	93	38	26	34	
	Medium and Large (20+)	0	0	0	0	50	0	0	0	0	
West Black Sea	Small (5-19)	799	23	111	297	134	1140	2824	2999	4584	**15991**
	Medium (20-99)	169	7	126	47	0	440	787	412	833	
	Large (100 or more)	19	0	50	3	0	51	28	27	29	
	Medium and Large (20+)	0	0	0	0	55	0	0	0	0	
East Black Sea	Small (5-19)	610	0	0	121	52	624	1570	1855	3030	**10067**
	Medium (20-99)	153	13	48	18	19	120	761	285	664	
	Large (100 or more)	18	3	17	0	0	0	51	14	21	
East Black Sea and Northeast Anatolia	Small (5-19)	0	18	36	0	0	0	0	0	0	**54**
		14318	**7621**	**16284**	**13173**	**6941**	**46545**	**87542**	**58692**	**147228**	**398344**

Original Sample Design (Fresh)

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Istanbul	Small (5-19)	2	2	2	2	2	2	4	3	7	**69**
	Medium (20-99)	2	2	2	2	2	2	2	2	2	
	Large (100 or more)	2	2	2	2	9	2	2	2	2	
West Marmara	Small (5-19)	2	9	7	27	13	2	2	2	4	**137**
	Medium (20-99)	11	11	4	5	5	2	2	2	3	
	Large (100 or more)	3	4	2	1	1	7	1	1	4	
Aegean	Small (5-19)	2	2	2	2	2	2	2	2	3	**59**
	Medium (20-99)	2	2	2	2	2	2	2	2	2	
	Large (100 or more)	2	2	2	2	6	2	2	2	2	
East Marmara	Small (5-19)	2	2	2	2	2	2	2	2	2	**89**
	Medium (20-99)	2	2	2	2	11	2	2	2	2	
	Large (100 or more)	2	13	5	10	6	2	2	2	2	
West Anatolia	Small (5-19)	2	2	2	2	2	2	2	2	2	**59**
	Medium (20-99)	2	2	2	2	3	2	2	2	2	
	Large (100 or more)	2	0	1	4	7	2	2	2	2	
Mediterranean	Small (5-19)	2	2	2	2	2	2	2	2	3	**59**
	Medium (20-99)	2	2	2	2	2	2	2	2	2	
	Large (100 or more)	2	4	4	2	2	2	2	2	2	
Central Anatolia	Small (5-19)	2	5	5	2	9	2	2	2	2	**83**
	Medium (20-99)	2	2	2	12	4	2	2	2	2	
	Large (100 or more)	1	1	1	1	0	9	3	3	3	
West Black Sea	Small (5-19)	2	2	2	2	12	2	2	2	2	**62**
	Medium (20-99)	2	1	2	2	5	2	2	2	2	
	Large (100 or more)	1	0	5	0	0	2	2	2	2	
East Black Sea	Small (5-19)	3	2	4	12	3	2	2	2	6	**113**
	Medium (20-99)	14	1	4	2	2	8	12	12	11	
	Large (100 or more)	2	0	1	0	0	0	5	1	2	
Northeast Anatolia	Small (5-19)	17	0	0	3	1	8	11	10	13	**129**
	Medium (20-99)	3	0	0	0	0	3	23	12	23	
	Large (100 or more)	0	0	0	0	0	0	1	1	0	
Central East Anatolia	Small (5-19)	6	2	4	7	5	2	3	2	5	**116**
	Medium (20-99)	9	1	3	1	1	9	16	11	12	
	Large (100 or more)	1	1	1	0	0	1	7	2	4	
Southeast Anatolia	Small (5-19)	2	2	2	2	6	2	2	2	2	**70**
	Medium (20-99)	2	2	2	2	3	2	2	2	2	
	Large (100 or more)	2	14	5	0	0	2	2	2	2	
		117	**101**	**90**	**121**	**130**	**99**	**136**	**108**	**143**	**1045**

Original Sample Design (Panel)

		Food	Textiles	Garments	Fabricated Metal Products	Machinery and Equipment	Other Manufacturing	Construction	Retail	Other Services	Grand Total
Istanbul	Small (5-19)	1	1	4	1	2	1	1	1	1	71
	Medium (20-99)	1	1	8	1	1	1	1	1	1	
	Large (100 or more)	6	4	8	5	0	17	0	1	1	
West Marmara	Small (5-19)	1	0	0	1	0	0	0	1	0	3
	Medium (20-99)	0	0	0	0	0	0	0	0	0	
	Large (100 or more)	0	0	0	0	0	0	0	0	0	
Aegean	Small (5-19)	1	1	1	1	5	1	1	1	1	81
	Medium (20-99)	1	3	1	1	2	1	1	1	1	
	Large (100 or more)	5	11	10	5	2	17	2	2	2	
East Marmara	Small (5-19)	1	6	6	3	2	1	0	1	1	51
	Medium (20-99)	1	6	2	1	2	1	1	0	0	
	Large (100 or more)	0	4	2	3	1	2	1	1	2	
West Anatolia	Small (5-19)	1	5	2	6	2	1	1	1	8	81
	Medium (20-99)	1	2	9	2	2	1	1	1	1	
	Large (100 or more)	5	4	10	2	1	8	2	1	1	
Mediterranean	Small (5-19)	1	4	6	2	2	1	1	1	1	81
	Medium (20-99)	1	6	7	8	0	1	1	1	1	
	Large (100 or more)	6	7	4	3	1	10	2	2	1	
Central Anatolia	Small (5-19)	3	2	1	3	2	3	3	6	2	57
	Medium (20-99)	4	2	0	5	0	6	0	2	0	
	Large (100 or more)	1	2	0	3	0	4	0	2	1	
West Black Sea	Small (5-19)	5	2	4	4	0	4	2	5	1	78
	Medium (20-99)	6	4	3	2	1	12	2	2	0	
	Large (100 or more)	2	0	6	2	0	6	1	2	0	
East Black Sea	Small (5-19)	4	1	0	2	0	3	0	2	0	27
	Medium (20-99)	2	1	1	2	0	2	0	0	1	
	Large (100 or more)	4	1	1	0	0	0	0	0	0	
Northeast Anatolia	Small (5-19)	2	0	0	1	0	0	0	2	0	11
	Medium (20-99)	2	0	0	1	0	1	0	0	0	
	Large (100 or more)	0	0	0	0	0	0	0	2	0	
Central East Anatolia	Small (5-19)	2	0	0	1	2	0	1	2	0	24
	Medium (20-99)	2	0	2	1	0	3	0	2	1	
	Large (100 or more)	1	2	0	0	0	1	0	1	0	
Southeast Anatolia	Small (5-19)	5	2	6	4	0	1	1	2	2	70
	Medium (20-99)	3	9	4	2	0	8	1	1	2	
	Large (100 or more)	2	6	2	1	0	2	2	2	0	
		83	99	110	79	30	120	29	52	33	635