Sampling Design of the

Egyptian Industrial Firm Behavior Survey 2020/2021

Dr. Zakaria Abdel Sameei Othman

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1. Summary of sample design

The 2020 Egyptian industrial firm behavior survey was based on a designed sample of 2200 industrial establishments successfully interviewed with 5 employees or more. The sample was drawn from 2017 economic census sample of 33331 establishments which represent about 117149 establishments. The sample of establishments was disproportionally allocated over four strata: 1- from 5 to 19 employees; 2-from 20 to 100 employees; 3-from 101 to 400 employees; and 4-401 or more employees. Stratified multistage sample was used to select the 2020 Egyptian industrial firm behavior survey's sample.

2. The economic census sample design

The stratified random sample was used for designing the economic census sample; the frame of the economic census consists of all the establishments of 2017 Population, housing and establishments' census. The frame was divided into strata (about 6804 strata), which are all possible combinations consisting of the number of employees, economic activity and the governorate. All establishments, with 10 or more employees, are selected. 50% of establishments, with between 5 and 9 employees, are selected. 5% of establishments, with between 1 and 4 employees, are selected.

3. The Egyptian industrial firm behavior survey Sample Design Parameters

The survey sample design was based on the following parameters:

 a) The sample must produce highly precise estimates at the national level.

 b) The sample must produce highly precise estimates at the number of employee's strata (1-from 5 to 19 employees; 2-from 20 to 100 employees; 3-from 101 to 400 employees; and 4-401 or more employees)

c) The sample must produce highly precise estimates at the regional strata (1- Urban Governorates; 2- Lower Egypt; and 3- Upper Egypt).

d) The establishment's economic activity at 2 digits must be representative.

4. The sample size and selection

In order to reach 2200 industrial establishments successfully interviewed, 3149 establishments were selected. The sample is distributed to employee's strata as in the following table

Number of employees	Total
5-19	646
20 -100	1328
101 - 400	728
401 +	447

Total	3149

Stratified multistage sample was used to select the 2020 Egyptian industrial firm behavior survey's sample; first the sample in each employee's strata was allocated proportionally among the three reigns (Urban Governorate, Lower Egypt, and Upper Egypt) which represents about 99.17% of industrial establishments in Egypt. At the first stage a systematic random sample was used to select three governorates from each region using Probability Proportional to Size (PPS). The industrial establishments in each region were allocated among governorates proportional to their size. The sample is distributed to governorates as in the following table

Region	Governorate	Total
Urban Governorates	Cairo	483
	Alexandria	260
	Suez	51
	Total	794
Lower Egypt	Sharqia	504
	Qalyubia	639
	Gharbia	345
	Total	1488
Upper Egypt	Giza	710
	Bani Sweif	74
	Minya	83
	Total	867
Total		3149

In the second stage a systematic random sample was used to select the establishments in each governorate after sorting the establishments according to the number of employees and the economic activity for 4 digits.

5. The sample Result

The following table shows the sample size, the completed establishments and the response ratio

Governorate	Sample Size	Completed	Response ratio
Cairo	483	395	81.78%

Alexandria	260	184	70.77%
Suez	51	34	66.67%
Sharqia	504	401	79.56%
Qalyubia	639	431	67.45%
Gharbia	345	250	72.46%
Giza	710	524	73.80%
Bani Sweif	74	55	74.32%
Minya	83	64	77.11%
Total	3149	2338	74.25%

Number of employees	Sample Size	Completed	Response ratio
5-19	646	512	79.26%
20 -100	1328	896	67.47%
101 - 400	728	579	79.53%
401 +	447	351	78.52%
Total	3149	2338	74.25%

6. Sample weight

The sample weight is calculated based on the 2017 economic census selected probabilities and its response rate, also the 2020 Egyptian industrial firm behavior survey selected probabilities and its response rate.

The 2017 economic census: the establishments were classified into many strata (about 252 strata) based on the economics activity (2 digits) and the number of employees (1- 4, 5-9 and 10+), and the selected probability of the establishment from the strata number h in the governorate (9 governorates) number i is calculated as

$$P_{hi} = \frac{n_{hi}}{N_{hi}},$$

where P_{hi} is the probability of selecting the establishment from the strata number h in the governorate number i , n_{hi} is the sample size in the strata number h the governorate number i, and N_{hi} is total number of establishments in the strata number h in the governorate number i.

The response rate in the strata number h is calculated as

$$R_{hi} = \frac{C_{hi}}{E_{hi}},$$

where R_{hi} is response rate in the strata number h in the governorate number i , C_{hi} is the number of completed establishments and E_{hi} is the number of eligible establishments in the strata number h in the governorate number i.

The 2020 Egyptian industrial firm behavior survey: the establishments were classified into many strata based on the governorates economics activity (2 digits) and the number of employees (5- 19, 20-100, 101-400 and 401+) in the governorate number i, and the selection probability of the establishment from the strata number h in the governorate number i is calculated as

$$P_{ri} = \frac{n_{ri}}{N_{ri}},$$

where P_{ri} is the probability of selecting the establishment from the strata number r in the governorate number i, n_{ri} is the sample size , and N_{ri} is total number of establishments in the 2017 economic census in the strata number r in the governorate number i.

The response rate in the strata number r in the governorate number i calculated as

$$R_{ri} = \frac{C_{ri}}{E_{ri}},$$

where R_{ri} is response rate in the strata number h in the governorate number i, C_{ri} is the number of completed establishments and E_{ri} is the number of eligible establishments in the strata number r in the governorate number i.

The weight of the k$\underline{^{th}}$ establishment in the economic census strata number h and the Egyptian industrial firm behavior survey strata number r in the governorate number i is calculated as

$$W_{khri} = \frac{1}{P_{hi}R_{hi}P_{ri}R_{ri}P_i} ,$$

where P_i is the selection probability of the governorate number i is calculated as

$$P_i = \frac{3N_i}{N_s},$$

where N_i is total number of establishments in the 2017 economic census in the governorate number i and N_s is total number of establishments in the 2017 economic census in the region of governorate number i

Finally, the above weights are standardized.