ERF COVID-19 MENA Monitor – Enterprises: Sampling, response rates, and weights
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Summary
This document describes the sampling, response rates, and creation of the ERF COVID-19 MENA Monitor – Enterprises sample weights. Weights should be used in all analyses to ensure the basic characteristics of samples reflect the underlying universe. Weights cannot overcome unobservable dimensions of non-response bias.

Sample
The sample universe for the enterprise survey was enterprises that had 6-199 workers pre-COVID-19. Country-specific sample frames of enterprises were used (see below). Stratified random samples were used (strata varied by country; see below) to ensure adequate sample size in key strata. A target of 500 enterprises per country was set. The sampling strategy was incorporated into the weights.

Up to three attempts (five in Tunisia) were made to ensure response if a phone number was not picked up/answered, was disconnected or busy, or picked up but could not complete the interview at that time. After the third (or fifth) failed attempt, an enterprise was treated as a non-response and a random enterprise from the same stratum was used as an alternate.

Sampling frames
The sample frames varied by country as follows:

- Egypt: Yellow Pages (https://www.yellowpages.com.eg/en)
    - Data on broad categories (e.g. gas stations)
    - Coded into four strata: (1) services, (2) food & accommodation, (3) trade, manufacturing, and agriculture, (4) construction[1]
    - Restricted to enterprises with 6-199 workers in February 2020 based on an eligibility question during the phone interview
- Jordan: Kinz (a Jordanian corporate data mining website, which had a larger sample of enterprises than the Yellow Pages in Jordan).
    - Data on broad categories (e.g. Industry, Marketing)
    - Coded into five strata: (1) services, (2) food & accommodation, (3) trade and agriculture, (4) construction, (5) industry[2]
    - Initial frame restricted to enterprises with 5-250 workers. Further restricted to enterprises with 6-199 workers in February 2020 based on an eligibility question during the phone interview
- Morocco: Yellow Pages (no efficient digital copy available; a physical copy was used)
    - Data organized geographically, not categorically
    - Three geographic strata used: (1) Casa-Rabat, (2) North, (3) South

[1] A random enterprise number, e.g. the 750th enterprise, within a broad category and strata was selected (based on the desired sample per strata) (without replacement).
[2] A random enterprise number, e.g. the 750th enterprise, within a broad category and strata was selected (based on the desired sample per strata) (without replacement).

    - The page ranges for the strata were provided. A random page within a stratum was selected, and then a random enterprise on that page (without replacement).
    - The number of enterprises on the page was recorded and incorporated into the inverse probability weights.
    - Restricted to enterprises with 6-199 workers in February 2020 based on an eligibility question during the phone interview
- Tunisia: National Institute of Statistics (INS) and Agency for the Promotion of Industry and Innovation (APII) databases
    - Tunisia did not have a Yellow Pages or similar database, so administrative/statistics data sources had to be used
    - The sample started with the INS frame with 1,238 enterprises with 6-200 wage employees
        - Enterprises were stratified into: (1) Agriculture (2) Industry (3) Construction (4) Trade (5) Accommodation (6) Service
        - Enterprises were also stratified by size in terms of 6-49 versus 50-200 employees
        - A random stratified sample (order) was selected
        - Further restricted to enterprises with 6-199 workers in February 2020 based on an eligibility question during the phone interview
        - This sample frame was eventually exhausted
    - After the INS sample was exhausted, the APII sample was used
        - APII only covered enterprises with 10+ workers
        - APII only covered (1) services & transport, and (2) industry
    - Weights are based on the underlying data on all enterprises from INS, specifically: Enterprises privées selon l'activité principale et la tranche de salariés (RNE 2019).
        - We ultimately stratify the Tunisia weights by industry and enterprises sized: 6-9 employees (since APII only covered 10+), 10-49, and 50-199 in wave one and combine 6-49 and in some cases 6-199 in subsequent waves.

Cross sectional data

The cross sectional (one point in time) or repeated cross sectional (multiple points in time) data structure should be used for all point-in time-analyses. The data are structured so that a unique observation is a enterprise-wave combination (long data). Enterprises may have multiple observations, one for each wave; the variable wave identifies the wave and firmid the enterprise identifier in that wave.

Cross-sectional weight variable names:

- Enterprise weight: firm_wt

See details below on weight creation.

Panel data

The panel data are structured so that an observation is a unique enterprise (wide data), and time-varying variables have a _w# suffix where # denotes the wave. This data structure should be used for any analysis of transitions, whether from February 2020 (#=0) or across specific wave point in times (#), or any combination of these times.

Panel weight variable names [where first # is base wave and second # is subsequent wave]:

- Enterprise weight: panel_wt_#_#

Current combinations include:
*_0_1 (Feb. 2020 to Q1 2021)
*_0_2 (Feb. 2020 Q2 2021)
*_0_3 (Feb. 2020 Q3 2021)
*_1_2 (Q1 2021 to Q2 2021)
*_2_3 (Q2 2021 to Q3 2021)

See details below on weight creation.

Response rates

Table 1 includes responses and response rates. For the panel, response rates are among those who consented to follow-up. Phones that were not in service, disconnected/busy (after multiple calls) and enterprises who were not eligible are excluded from the response rate calculations. The responses are based on the final result, which may have been on the first, second, or third attempt (or fourth or fifth in Tunisia Q1 2021).

Table 1. Responses and response rates, by country and wave

	Wave 1				Wave 2 - Refresher				Wave 2 - Panel				Wave 3 - Refresher			Wave 3 - Panel		
Response	**Egypt**	**Jordan**	**Morocco**	**Tunisia**	**Egypt**	**Jordan**	**Morocco**	**Tunisia**	**Egypt**	**Jordan**	**Morocco**	**Tunisia**	**Jordan**	**Morocco**	**Tunisia**	**Jordan**	**Morocco**	**Tunisia**
Phone disconnected/busy	5	6	2	3	26	4	8	11	12	4	6	2	0	1	0	3	2	0
Not in service	45	12	41	7	13	18	15	46	0	1	2	22	18	38	40	0	0	0
Did not answer	7	13	10	22	19	10	11	8	11	16	24	20	2	1	0	8	9	0
Picked up and refused	25	29	8	9	26	32	35	19	36	12	32	19	47	19	34	10	35	42
Incomplete, and refused	2	3	3	7	3	5	1	4	8	3	6	6	1	2	4	2	4	1
Incomplete, return call	0	0	0	7	0	0	0	1	0	0	4	1	0	0	0	0	0	0
Complete	5	26	17	44	6	21	19	8	32	63	26	31	24	17	8	76	51	57
Not Eligible	10	10	20	1	7	9	11	4	0	0	0	0	8	23	14	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Response rate	14	36	45	50	11	31	29	19	37	67	28	40	33	45	17	79	51	57

Initial Weights

Inverse probability weighting was undertaken to account for the sampling strategy and non-response. Weights had the following inputs for each country:

- Total number, *T*, of enterprises in the stratum, *s*, in the sampling frame (T_s)
- Number, *N*, of enterprises in the stratum, *s*, successfully completed in the sample (N_s)
- Share of enterprises successfully contacted in the stratum that were eligible (e_s)

The baseline wave weight for an enterprise, *f*, in stratum *s* is calculated as:

$$w_{f,s} = (T_s * e_s)/N_s$$

We adjust the total number of enterprises in the sampling frame to account for the fact that not all enterprises were eligible by multiplying the sample frame number of enterprises in the strata, T_s, by the fraction eligible among contacted enterprises, e_s. Weights are then normalized to have a mean of one.

The resulting weight is the same for all enterprises that are in the same stratum in the same wave.

In Morocco the weight also accounts for the number of enterprises on the randomly selected page, N_p, as in:

$$w_{f,s,p} = (T_s * e_s * N_p)/N_s$$

Panel weights

All enterprises who consented to follow up in the prior wave were contacted in an attempt to include them in the subsequent wave. Varying degrees of follow-up occurred:

- From Q1 2021 to Q2 2021 data successfully tracked:
  - 29.8% (149 of 500) of Q1 2021 enterprises in Egypt
  - 58.8% (294 of 500) of Q1 2021 enterprises in Jordan
  - 25.2% (126 of 500) of Q1 2021 enterprises in Morocco
  - 25.1% (121 of 482) of Q1 2021 enterprises in Tunisia
- From Q2 2021 to Q3 2021 data successfully tracked:
  - 67.6% (338 of 500) Q2 2021 enterprises in Jordan
  - 48.7% (244 of 501) Q2 2021 enterprises in Morocco
  - 52.2% (261 of 500) Q2 2021 enterprises in Tunisia

We compute a response adjustment factor, *r*, to weight enterprises retained in the panel from one wave to the next, based on the predicted probably of attrition, Pr(*A*), from a probit model with attrition as the binary outcome, as follows:

$$r = \frac{1}{1 - \Pr(A)}$$

This response adjustment factor multiplies the preceding wave weights for enterprises that were retained, in order that they can represent the preceding (and ultimately base) wave universe.

The panel attrition models use a few base wave variables in addition to the strata[3] used for initial weighting. Specific additional variables are:

- Operating status in base wave (open normal, open reduced hours, closed)
- Revenue change (categorically) since Feb. 2020
- Industry as reported in the survey data (five categories)
- Size as reported in the survey data at the time of the wave (four categories)

Refresher weights

The refresher weights are created in an identical fashion to the base wave, initial weights, but for the refresher samples within the subsequent waves of the panel.

Combined weights

For subsequent waves (waves after the base wave), cross-sectional weights combine the panel and refresher data. Weights are normalized to one within each of the panel and refresher samples and then combined into a single, representative cross-sectional weight.

[3] In the case of Tunisia due to the change in sample frames, the strata had to pool some sizes starting in Q2 2021. Moreover, the initial strata of combined size and sector had small cell sizes, some of which fully attrited, so were combined across sizes and modified to create estimable panel models (see strata variable in the data for further details).