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NON–SAMPLING ERRORS – A CASE STUDY

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NON-SAMPLING ERRORS - A CASE STUDY

Introduction

1. In sample surveys there are two types of errors namely sampling and non-sampling errors. The first represents the difference between the estimate and corresponding population value depending on the survey design, sample size and estimator used. Non-sampling errors arise in sample surveys as well as in complete enumeration and can be classified as

   (a) errors at the planning stage
   (b) errors at the stage of data collection
   (c) errors at the stage of data processing and printing

2. Errors at the planning stage occur due to defective frame and concepts and definitions used for the questionnaire items. Those at the stage of data collection are due to incomplete coverage and defective content. Those in the last stage arise in editing, data preparation, processing and printing.

3. This paper is based on the experience of an African country in an income and expenditure survey carried out recently for a period of one year. Though the non-sampling errors to be described reflect a particular time and situation in that country, it is hoped that this case study will help the other countries in designing and implementing their surveys. Especially it is intended to assist in establishing means of controlling non-sampling errors in the surveys undertaken under the African Household Survey Capability Programme.

Description of Survey Design

4. In that country no up-to-date and adequate maps of census enumeration areas were available when the survey was planned. Before that survey the local government structure had undergone considerable modification with councils being formed in urban and rural areas of the country. Hence the councils were conveniently used as primary sampling units and the number of households in them was estimated by the Department of Statistics in consultation with the local authorities.

5. A three-stage sampling was applied separately in urban and rural areas. In the first-stage 54 and 90 councils were selected respectively from those areas with probability proportional to their estimated size. The selected councils were visited to re-estimate the number of households and to divide them into segments of about 100 households each.

6. In the second stage, two segments from each selected urban council and one segment from each selected rural council were chosen with probability proportional to size of segments. Then all the households in the selected segments were listed and visited to collect some basic information including cash income. These records were sent to the headquarters where boundaries of strata were fixed so as to allocate an equal share of total cash income to each stratum. After assigning households to those three strata so formed, the overall sampling fraction for each stratum was calculated to allocate equal parts of the predetermined sample to each stratum. In the third stage, after stratifying the households in the selected segments, some households were selected from each stratum by simple random sampling.

7.   The sample size in the urban area was about 1160 households surveyed every month (with weekly visits) with complete replacement every quarter and that in the rural area was about 1757 households surveyed every month (with weekly visits) throughout the whole year without replacement. A field force of 60 and 90 interviewers headed by 12 and 18 supervisors were assigned in the urban and rural areas respectively to survey about three households per day. Although it was aimed to provide each supervisor with one vehicle, in practice this was not realised. Moreover shortage of fuel and poor communication hampered the organization of the survey. Questionnaires were designed such that the recall period was only one week.

Defects of Frame

8.   As the number of households was estimated before and after selection, if h_c and h_c' denoted the first and second estimates of size of councils (c) and h_s and h_s' denoted the first and second estimates of size of segment (s) in council (c) then their ratio

$$\frac{h_c'}{h_c} \cdot \frac{h_s'}{h_s} = a_{cs} \qquad (1)$$

showed the discrepancy between the first and second estimates. The frequency distributions of this ratio in urban and rural areas were given in Table 1.

Table 1

Distribution of ratios of second estimates to first estimates of council and segment sizes

Values of a_{cs}	Frequency distribution in	
	Urban area	Rural area
– 0.49	20	28
0.50 – 0.99	43	34
1.00 – 1.49	21	17
1.50 – 1.99	7	9
2.00 – 2.49	7	2
2.50 – 2.99	3	–
3.00 –	7	–
TOTAL	108	90

9.   It showed that in both urban and rural areas there were more segments in which second estimates were smaller than the first estimates. But in the urban area second estimates were much larger in some councils and segments, so much so that the average ratio became larger than one. Whereas in the rural area second estimates were generally smaller making the average ratio significantly less than one. Standard errors of ratios were small compared to their averages in both areas having coefficient of variation about 5 and 10 per cent respectively.

10.   In comparing the first and second estimates in councils and segments separately, it was found that the first estimates of councils were generally larger than the second estimates. As for estimates of segment sizes discrepancies were small comparatively, although the same general trend was observed.

11.   The number of households in urban and rural areas were estimated by

$$H_1 /_{2n_1} \sum \left. h'_c \, h'_s \middle/ h_c \, h_s \right\} \atop \text{and } H_2 /_{n_2} \sum \left. h'_c \, h'_s \middle/ h_c \, h_s \right\} \quad - \quad (2)$$

where H_1, H_2 were the first estimates of total number of households and n_1, n_2 were number of councils selected from urban and rural areas.

12.   When the estimates of number of households obtained by equation (2) were compared with projected values based on the population census, the estimates were found to be smaller. In fact, the first estimate H_1 for the urban area was smaller than the number of households enumerated in the census which was taken about four years prior to the survey. Such discrepancies arose because there were no up-to-date proper maps of councils and no reconciliation was carried out with the census data. Although sketches of selected segments were prepared, an element of bias was involved.

13.   The same kind of errors in the measures of size was encountered in the Integrated Sample Survey of another African country though the sampling frame was built up from the population census figures. With a six-year time lag, the projected measures of size often differed markedly from those obtained by quick approximate counts of households made in the field.

14.   Regarding questionnaires and training, a pilot test was carried out and supervisors and interviewers were trained for some time. Yet there were some points missed in that planning stage particularly in concepts, definitions and recording causing content error as described in the later sections of this paper.

Reweighting Factors

15.   As the sample designs applied in both urban and rural areas were not self-weighting, it was necessary to find the reweighting factors by taking into account:

    (a) probability of selection of a household,
    (b) number of households included in estimation after making adjustment for undercoverage, and
    (c) discrepancies between the estimated and census projection on the number of households.

16.   Since a three-stage sampling was applied, the inclusion probability of a household was:

> probability of selection of a council
> x probability of selection of a segment
> x probability of selection of a household

and therefore the inclusion probability of a household in the urban area was

$$P_1 = \frac{n_1 h_c}{H_1} \times \frac{2h_s}{h'_c} \times \frac{m_i}{h_i} \qquad - (3)$$

and that in the rural area was

$$P_2 = \frac{n_2 h_c}{H_2} \times \frac{h_s}{h'_c} \times \frac{m_i}{h_i} \qquad - (4)$$

where h_i denoted the number of households in a stratum (i) of segment (s) of a council (c) and m_i was the number of households selected from that stratum, in urban or rural areas.

17.   Suppose that m'_i was the number of households actually used in estimation or tabulation out of m_i after eliminating or correcting for non-response or under-coverage then the reweighting factors would be

$$\frac{m_i}{m'_i P_1} \quad \text{in the urban area} \qquad - (5)$$

$$\frac{m_i}{m'_i P_2} \quad \text{in the rural area} \qquad - (6)$$

18.   However, if the total number of households as estimated by equation (2) was considerably different from the census projected figure, reconciliation of the reweighting factors would be deemed necessary to make the results realistic. In the survey under discussion, such discrepancies were found. Since the estimates and tables at urban and rural levels of each region were required and census projections were available at that level, reconciliation was done accordingly.

19.   Let U_1 and U_2 be the number of households in urban and rural areas of a region (domains of study) as estimated by equation (2) and V_1 and V_2 be the projected number of households based on the census results then the reweighting factors would become

$$\frac{m_i}{m'_i P_1} \cdot \frac{V_1}{U_1} \quad \text{in the urban area} \qquad - (7)$$

$$\frac{m_i}{m'_i P_2} \cdot \frac{V_2}{U_2} \quad \text{in the rural area} \qquad - (8)$$

20.   These reweighting factors were calculated for each stratum of a segment of a council in the urban and rural areas and applied on the households in those respective strata by incorporating them in the computer programme. The reweighting factors were computed in two other African countries in nearly the same way to account for unequal weights in their sample designs.

21.   One point to be noted is that on applying the reweighting factors as given in equations (7) and (8), estimates for total population values become ratio estimates. Hence the estimates will be biased and computation of their standard errors will be more complicated.

Incomplete Coverage of Selected Samples

22.   Incomplete coverage or undercoverage of the selected sample was due to non-response or failure of interviewers to collect data in time or other factors. Non-response occured when households could not be contacted or necessary data could not be collected owing to:

    (i)   migration
   (ii)   not-at-home
  (iii)   loss of houses
   (iv)   wrong address
    (v)   refusal to answer

23.   In addition to these causes, the following were responsible for the under-coverage of the sample:

   (vi)   failure of interviewers to collect data in time
  (vii)   shortage of forms
 (viii)   loss of records
   (ix)   other causes

24.   In the income and expenditure survey under discussion, undercoverage in urban and rural areas were 4.4 and 6.8 per cent of the sample as shown in Table 3. These could not be considered to be high enough to impair the reliability of the survey but would be worthwhile to study them.

25.   In the urban area, incomplete coverage arose primarily because of migration, not-at-home and loss of houses as shown in Table 2. There was some migration but the rate was not as high as that in the rural area since urban households were surveyed for three successive months with complete replacement every quarter. Some households could not be contacted because responsible members were not at home or interviewers could not make call-backs. Some houses in two segments were lost being gutted by fire and some could not be located having wrong addresses. However, some migrated and un-cooperative households (about 1 per cent) were substituted in time; otherwise undercoverage in the urban areas would have been about 6 per cent.

26.   In the rural area, some households could not be covered due to migration, failure on the part of interviewers to collect data in time, shortage of forms and loss of records as shown in Table 2. In some rural areas, people migrated seasonally. In fact some were semi-nomads partially working in agriculture and moving out to the grazing grounds or water-points after harvest. Therefore in some councils almost all selected households disappeared after a few months of survey. In some councils households after six months or so away from their home reappeared. Other problems were loose controls by supervisors, drop-out of interviewers and failure to supply the forms in time due to lack of proper transport facilities.

27.   In order to study the undercoverage in urban and rural areas in respect of seasonal variation and income level, undercoverage percentage of sample selected is shown in Table 3.

28.   In both urban and rural areas, the percentage of undercoverage fluctuated monthly and was lowest in the first quarter and highest in the last quarter. In the urban area, the undercoverage rate varied significantly between the quarters but not so within each quarter. It probably reflected the response of households replaced quarterly. The highest undercoverage error in the last quarter was due to shortage of forms and interviewer drop-out. Whereas in the rural area the general rising trend of undercoverage was observed mainly caused by migration, organization and transportation factors.

29.   Both urban and rural areas were marked by having smallest rate of under-coverage in the lowest income stratum and largest in the highest income stratum showing that poor households were more co-operative. The study confirms the notion that the rate of undercoverage is directly related to the length of the survey period (or the retention of households in the sample) and income of those households.

Content Error

30.   In the income and expenditure survey under study, content errors appeared in the following forms:

    (a) incomplete records or omission
    (b) incorrect recording
    (c) respondents' and interviewers' failure
    (d) inconsistent data

31.   In scrutinizing the records prior to data processing, the incomes of some households in some months and operating cost of some farms and enterprises were not recorded. And expenditures on certain items like alcoholic and non-alcoholic drinks, tobacco, health and personal care were absent in many households as shown in Tables 4 and 5.

32.   Regarding missing income of households it was difficult at the data process-ing stage to determine the amount. Similarly absence of operating costs caused uncertainty as to whether the income recorded was net or gross.

33.   On expenditure relating to personal care and health, households might have spent nothing or too little or could not recall it. Interviewers might also fail to ask about expenditure from the persons who actually spent the money or could give such information. On the other hand since alcoholic drinks were not favoured by the religion of that country many households might not disclose expenditure, if there was any, to strangers. It was also possible that expenditure on personal care, health, drinks and tobacco were incurred by persons who could not be contacted by the interviewers. Such respondents' failure could be minimised by convincing the people confidentially of data and through friendly approach.

34.   With respect to source of income, it was found that incomes of some persons were mis-classified. For instance the income of a washing woman was recorded under services offered by trade, manufacturing and other non-agricultural enterprises. After finding these errors, records and codes were checked and corrected. These errors in income and expenditure recordings were due to misunderstanding of concepts and definitions of questionnaires by the interviewers. They could have been controlled had thorough training been given to supervisors and interviewers at the planning stage.

35.   To find out whether data were consistent, an urban council and a rural council were taken as an example and monthly averages in various strata were calculated as shown in Tables 4 and 5. In the urban council data were available for ten months only because those whose houses were gutted by fire could not be contacted in two months.

36.   In Table 4 it can be observed that income of urban households changed quarterly, possibly reflecting changes of samples. If it was so generally, then seasonal variation of income could not be determined. The income variation between strata shows that households were stratified by income properly. And expenditure fluctuated quarterly like income so it seems that its seasonal variation could have been influenced by changing the sample quarterly. Income and expenditure in each stratum of the urban council were strongly correlated.

37.   On comparing income and expenditure by their ratio in Table 4, income appeared to be generally higher than expenditure and by about two times in the second and third quarters. This was not the usual situation found in such surveys conducted in the developing countries in which income is generally lower than expenditure. In the present survey this abnormal situation was possibly due to overstatement of income (or being gross) or understatement of expenditure (by omission of expenditure on some items) or both. In examining the other expenditure in Table 4, that on clothing and footwear was very low in strata 1 and 2 but that on house rent and fuel fluctuated in all strata. Expenditure on food was almost all the time higher than that on non-food but their ratio decreased as income went up.

38.   In Table 5 income and expenditure of households in various strata of a rural council showed that although the same households were surveyed all the time, the pattern of monthly fluctuation of values did not appear to be the same in the different strata. The point that income and expenditure were not as closely correlated as in the urban area was probably a characteristic of rural households. However, income and expenditure for households with their ratio less than one in stratum I, about one in stratum II and higher than one in stratum III respectively appeared to be more realistic than their corresponding ratios in the urban area. Expenditure on food and non-food fluctuated between months to some extent but that on house rent and fuel was stable. Ratio of expenditure on food to non-food decreased as income increased as in the urban area.

39.   On comparing Tables 4 and 5, data collected from the rural area seem to be more consistent and complete. This might be due to the fact that people were more co-operative and friendly with the interviewers posted in the villages throughout the survey period and hence information were collected more completely from the rural area. Since average sample sizes in the three strata were 10, 6 and 2 in the urban area and 6, 14 and 4 in the rural area no general conclusion can be derived. However, assuming that data in the other urban and rural councils were of the same type as in Tables 4 and 5, then the following remarks can be made:

(a) Proper seasonal variation of income and expenditure might not be obtained if samples were completely replaced quarterly.
(b) Data would be inconsistent if some information was missing.

Errors at the Data Processing Stage

40.   Errors at the data processing stage involved mistakes in editing, adjustment of missing data, coding, punching, weighting, programming and tabulation. Had editing and correction been done in the field during enumeration, work at the data processing stage would have been much easier. But one danger was that if editing in the field was carried out by the same interviewers or supervisors there could be a bias. In practice, an independent team of scrutiny inspectors should be employed to edit and correct the monthly returns so that some errors or missing information could be referred back to the field for checking and correction.

41.   In this survey many problems arose such as shortage of editing staff, transportation, and other facilities and frequent turn-overs of head of survey organization and field staff. Consequently, though it was planned to prepare monthly summary results, it could not be implemented. As a result, all kinds of errors were found at the data processing stage as described in the above sections. Hence before processing data some salvaging work needed to be done.

42.   The first error to be considered was incomplete coverage of households. In the urban area some households could be surveyed only for one or two months or less out of a survey period of three months. In the rural area, some households could be enumerated for three months or less out of 12 months. In one or two rural councils, all households moved away after being surveyed for three months. It appeared that if all these partially covered households were rejected, it could affect the estimates. After studying this problem, case by case, a decision was taken to retain those which were enumerated at least one month in the urban area and at least three months in the rural area and impute the missing values using the available information and seasonal variation of similar households.

43.   There would be bias in imputing values but if those households were abandoned altogether, there would also be another bias. Hence it was a matter of choosing between two possible biases. Of course, those households uncovered for a long time were abandoned. Consequently, the percentage of incomplete coverage was reduced to around 2 per cent.

44.   Regarding control over content error such as incomplete records, incorrect recording and inconsistent data, even if data were edited in the field, an overall editing would be needed before data processing.

45.   If missing data was as important as income, it was imputed on the basis of household's sources of income (i.e., regular or irregular), income in the other months, expenditure in the different months. In doing so, seasonal variation in income and expenditure of similar households were used to make the necessary adjustments.

46.   With respect to incorrect recording and inconsistent social and demographic data, the CONCOR programme was used for automatic correction. Other items were checked using ranges. For instance, rent or imputed rent was checked using the possible range of rent in the specific area; unit values were checked against prevailing prices at the time of survey. Similarly consistency of income and expenditure were checked by their ratios. However, except for gross errors, it would be arbitrary to change these values.

47. One defect of the non-self-weighting survey design was the need to apply reweighting factors to each household or group of households creating some complication in the tabulation, particularly in the income and expenditure survey. If care was not taken at that stage, there could be some errors.

48. Other errors were those in coding, punching and data processing. At each step, some control was required to check possible mistakes. For instance, codes should be verified before punching and number of cards to be punched for each household should be recorded before and after punching and checked before processing. Households with their identification and sizes should be listed and checked.

Conclusion

49. This paper is based on the experience of an African country in an income and expenditure survey and data collected from one urban council and one rural council. When the paper was prepared only data of those two councils were available. Since the number of households selected from them was not large, no definite conclusions could be drawn as far as content errors were concerned. However, the following general recommendations are made to control some non-sampling errors in similar surveys:

(1) The frame should be based on proper maps and the number of households estimated should be reconciled with the census projections and other relevant data at the lowest possible level. In the penultimate stage households should be listed.

(2) A rotating sample should be used to reduce respondents' fatigue.

(3) Questionnaires should be clear and precoded as much as possible and tested.

(4) Definitions and concepts should be clearly understood by the field staff through thorough training.

(5) Co-operation of households should be sought through all available means.

(6) If rate of incomplete coverage is high, it is worthwhile to survey a sub-sample of households to reduce bias.

(7) Timely supervision is essential and for that transportation and other facilities, trained supervisors and scrutiny inspectors are necessary. On the other hand the field staff should be provided with incentives, rest and recuperation in carrying out tedious continuous long-term surveys.

(8) Call-backs should be made at a convenient time for respondents to minimise non-response and more attempts should be made by the more skilled interviewers or supervisors to reduce refusals.

(9) All questions should be asked whenever necessary to do so not to miss any point and all items should be filled in the interview. If the respondents do not know the answers such as expenditure on drinks, tobacco and health, then proper persons should be interviewed or requests should be made to supply such information.

(10) Survey can be designed in order to detect the interviewers' bias.

(11) Scrutiny inspectors or editors should check the forms and prepare monthly summaries.

(12) Editing and correction should be carried out in the field as much as possible.

(13) Coding and punching should be verified and some control should be applied.

(14) Data clearing and machine editing should be carried out using the possible values and range of values.

(15) Overall editing should be done at the headquarters or regional offices and imputation should be done by taking into consideration seasonal variation and relationship between the variables.

(16) Pilot survey should be conducted to test and improve the design and questionnaire, to train the field staff, and post-enumeration survey will be useful to assess the coverage and content errors and control them in later surveys.

50.   This paper by no means claims to cover all aspects of non-sampling errors and is not based on a sufficiently large sample to show some aspects of content error.

Table 2

Provisional percentage of undercoverage by various causes

		Percentage of undercoverage	
		Urban	Rural
1.	Migration	60	80
2.	Not-at-home	10	2
3.	Loss of houses	9	–
4.	Wrong address	5	–
5.	Refusal to answer	3	–
6.	Failure of interviewers to collect data in time	5	5
7.	Shortage of forms	5	4
8.	Loss of records	1	5
9.	Others	2	4
		100	100

Table 3

Percentage of undercoverage

Area	Stratum	1	2	3	4	5	6	7	8	9	10	11	12	Monthly Average
Urban	1	1.0	1.1	1.6	7.0	6.0	8.5	5.2	3.3	2.9	5.1	4.0	4.2	3.0
	2	4.4	6.5	6.5	6.3	5.8	7.1	4.7	2.8	2.3	9.9	9.1	7.5	4.4
	3	6.7	2.8	5.0	8.6	7.8	8.6	6.7	6.0	6.0	14.8	12.3	12.5	6.1
Average		3.8	3.5	4.2	7.2	6.5	8.0	5.4	3.6	3.5	9.3	7.9	7.6	4.4
Rural	1	2.0	2.1	3.2	3.4	3.4	4.0	5.2	4.4	5.0	4.8	5.9	4.3	4.0
	2	4.6	4.1	4.8	5.0	4.8	5.7	5.2	7.2	6.5	7.4	7.7	5.0	5.7
	3	11.5	9.7	10.6	11.8	11.1	11.8	15.2	14.3	12.9	16.9	16.6	12.7	12.9
Average		5.2	4.7	5.6	6.0	5.7	6.5	7.7	7.8	7.5	9.2	9.2	6.6	6.8

Table 4

Pattern of average household income and expenditure in an urban council

Quarter/ Month	Stratum	Income I	Expenditure E	I/E	Expenditure on food E_1	Expenditure on non-food E_2	E_1/E_2	Expenditure on drinks & tobacco	Expenditure on clothing & footwear	Expenditure on house rent & fuel	Expenditure on health care
Quarter I	1	35.4	42.7	0.83	27.9	14.8	1.88	0.6	0.7	7.6	-
Month 1	2	68.8	63.8	1.08	40.4	23.4	1.73	-	2.2	8.2	-
	3	117.1	61.1	1.92	38.9	22.2	1.75	4.8	2.5	8.0	-
	1	30.0	48.1	0.62	36.4	11.7	3.11	0.1	0.3	6.5	-
Month 2	2	65.8	57.6	1.14	38.8	18.8	2.05	0.2	0.9	7.1	-
	3	136.3	82.7	1.65	54.2	28.5	1.90	0.6	1.4	7.3	-
	1	30.2	48.7	0.62	29.9	18.8	1.59	0.1	4.6	6.4	-
Month 3	2	60.6	42.4	1.43	27.4	15.0	1.83	-	6.9	6.0	-
	3	119.3	79.4	1.50	47.4	32.0	1.48	-	15.0	9.1	-
Quarter II	1	90.2	46.6	1.94	30.4	16.2	1.88	-	-	6.3	-
Month 1	2	58.8	39.4	1.49	24.8	14.6	1.70	-	-	5.0	-
	3	107.0	45.4	2.36	31.3	14.1	2.22	-	-	5.1	-
	1	77.5	61.4	1.26	44.2	17.2	2.57	-	-	7.4	-
Month 2	2	77.2	58.4	1.32	38.5	19.9	1.93	-	-	7.1	-
	3	44.0	57.5	0.76	40.6	16.9	2.40	-	-	7.3	-
Quarter III	1	125.5	62.8	2.00	40.6	22.2	1.83	-	0.7	7.3	-
Month 2	2	138.0	68.0	2.04	56.9	11.1	5.13	-	1.4	6.8	-
	3	140.5	68.8	2.04	47.2	21.6	2.19	-	-	8.4	-
	1	101.8	78.0	1.30	52.3	25.7	2.04	-	0.9	10.2	-
Month 3	2	143.0	80.8	1.77	59.5	21.3	2.79	-	1.8	8.9	-
	3	163.5	78.2	2.09	50.8	27.4	1.85	-	-	10.2	-
Quarter IV	1	118.7	63.4	1.87	46.8	16.6	2.82	-	-	7.3	-
Month 1	2	136.2	90.6	1.50	60.6	30.0	2.02	0.3	1.3	10.4	-
	3	166.0	106.0	1.57	54.8	51.2	1.07	8.0	8.5	7.9	-
	1	121.6	108.6	1.12	60.3	48.3	1.25	-	-	8.3	-
Month 2	2	106.2	109.6	0.97	72.0	37.6	1.91	1.7	-	8.4	-
	3	162.5	112.6	1.44	55.2	57.4	0.96	4.2	11.2	6.6	-
	1	134.4	103.6	1.30	67.8	35.8	1.89	0.9	0.8	8.3	-
Month 3	2	99.8	139.9	0.83	80.0	39.9	2.00	1.8	-	10.0	-
	3	85.0	92.4	0.92	59.0	33.4	1.77	0.1	-	8.5	-
Monthly	1	82.1	77.1	1.06	50.6	18.8	2.69	0.2	0.7	7.4	-
Average	2	101.9	79.1	1.29	54.2	24.9	2.18	0.4	1.3	8.1	-
	3	150.3	94.2	1.60	57.9	36.4	1.59	2.0	5.1	9.5	-

Table 5

Pattern of average household income and expenditure in a Rural Council

Quarter/ Month	Stratum	Income I	Expenditure E	I/E	Expenditure on food E_1	Expenditure on non-food E_2	E_1/E_2	Expenditure on drinks & tobacco	Expenditure on clothing & footwear	Expenditure on house rent & fuel	Expenditure on health care
Quarter I Month 1	1	33.4	36.1	0.92	27.8	8.3	3.35	0.5	1.0	2.3	-
	2	38.8	44.1	0.88	30.7	10.4	2.95	1.2	1.2	2.8	0.9
	3	63.9	52.9	1.21	40.9	12.0	3.41	3.2	1.6	3.5	-
Month 2	1	38.3	48.1	0.80	31.9	16.2	1.97	-	7.6	3.3	0.7
	2	41.0	50.6	0.81	35.5	15.1	2.35	0.7	2.1	3.0	0.8
	3	72.9	70.0	1.04	48.1	21.9	2.19	2.6	4.9	5.4	0.6
Month 3	1	37.5	65.0	0.58	44.1	20.9	2.11	0.2	10.2	4.0	1.1
	2	43.0	56.6	0.76	41.2	15.4	2.68	1.0	5.7	3.0	-
	3	101.4	68.8	1.47	52.6	16.2	3.25	2.5	1.3	4.0	-
Quarter II Month 1	1	30.0	34.3	0.87	28.4	5.9	4.81	0.3	-	3.0	-
	2	44.9	50.7	0.88	38.0	12.7	2.99	1.4	0.1	3.8	-
	3	101.4	82.9	1.22	38.9	44.0	0.88	2.0	-	4.1	0.6
Month 2	1	33.5	61.5	0.54	26.5	35.0	0.76	0.4	2.6	3.6	-
	2	47.1	45.8	1.03	32.1	13.7	2.34	1.0	0.7	4.0	-
	3	57.9	88.6	0.65	44.5	44.1	1.01	1.2	-	4.8	-
Month 3	1	16.1	32.8	0.49	25.5	7.3	3.49	0.4	-	3.2	-
	2	48.0	43.7	1.10	30.8	12.9	2.39	1.0	0.6	3.8	-
	3	125.1	75.7	1.65	37.4	38.3	0.98	1.8	-	4.2	-
Quarter III Month 1	1	27.2	35.5	0.77	27.2	8.3	3.28	0.2	-	3.3	0.1
	2	46.1	46.7	0.99	32.3	14.4	2.24	1.0	0.2	3.6	0.4
	3	77.4	61.0	1.27	42.2	18.8	2.24	2.0	-	4.0	-
Month 2	1	30.6	38.0	0.80	29.8	10.2	2.92	0.4	-	3.5	-
	2	50.7	46.3	1.10	33.4	12.9	2.59	1.0	0.1	3.8	-
	3	74.1	58.1	1.28	39.4	18.7	2.11	1.6	-	4.0	-
Month 3	1	27.1	33.5	0.81	25.3	8.2	3.08	0.4	-	3.3	-
	2	46.3	45.1	1.03	31.5	13.6	2.32	1.2	0.2	3.6	0.1
	3	103.7	77.1	1.34	40.0	37.1	1.08	1.8	-	4.2	-
Quarter IV Month 1	1	29.3	36.3	0.81	28.4	7.9	3.59	0.6	-	3.3	0.3
	2	52.2	51.6	1.01	32.3	19.3	1.67	1.3	0.3	3.6	1.0
	3	111.1	84.0	1.32	38.6	45.4	0.85	1.8	3.1	4.1	-
Month 2	1	27.0	34.1	0.79	25.1	9.0	2.79	0.9	0.3	3.6	-
	2	53.4	53.0	1.01	33.7	19.3	1.75	1.0	3.4	3.8	0.4
	3	120.2	75.6	1.59	40.2	35.4	1.14	1.7	-	4.4	-
Month 3	1	27.8	37.9	0.73	28.7	9.2	3.12	0.6	-	3.7	-
	2	57.4	57.6	1.00	37.3	20.3	1.84	1.2	4.4	4.0	0.2
	3	117.7	95.5	1.23	43.5	52.0	0.84	1.4	9.9	4.1	-
Monthly Average	1	29.8	41.2	0.72	29.1	12.1	2.40	0.6	1.8	3.4	0.1
	2	47.5	49.3	0.96	34.0	19.3	1.76	1.1	1.6	3.6	0.3
	3	93.3	73.7	1.26	42.1	31.6	1.33	1.8	1.7	4.2	0.2