ANNEX 1 – MEASURING CONSUMPTION USING THE ENCOVI 2000

MEASURING WELFARE: TOTAL CONSUMPTION

1. Assessing poverty relies on some measure of welfare. Since well-being, or utility, cannot be measured directly, consumption is used as an indirect measure of welfare. Consumption is used instead of income for several reasons. **First,** consumption is considered a better indicator of standards of living since it fluctuates less than income during a month or year. When incomes change (e.g., in different seasons), individuals tend to use their savings (in cash and kind) to smooth consumption throughout the year. **Second,** consumption data tend to be more accurate than information on individuals' incomes. International experience has shown that respondents tend to provide more accurate information on consumption than income. The latter is often underestimated or difficult to measure due to informal or in-kind income. **Finally,** using consumption as a measure of welfare has the advantage that poverty lines can be derived from the same data and not from other information sources.

2. Consumption also has several advantages over other welfare measures, such as indicators of basic needs (as access to water, electricity, and schooling; malnutrition; etc.). While consumption is an *objective* measure of welfare, indicators of basic needs are based on various *subjective* definitions, including the level at which such needs would be "satisfied" and the respective weights assigned to their components. Moreover, indicators of basic needs are not responsive to short-term changes, since they mainly reflect public investments. As such, they are less useful for monitoring changes in economic conditions. Although the Poverty Assessment uses consumption as the basis to measure welfare and poverty, the vast array of data available from the ENCOVI 2000 allow for the use of basic social indicators (as malnutrition access and use of basic services) to complement this quantitative measure of poverty.

COMPONENTS OF TOTAL CONSUMPTION

Overview

3. The ENCOVI 2000 includes the data necessary to construct a measure of total consumption. This measure includes the annual consumption of food (both purchased and non-purchased, including own-production), housing (using an imputed value for owned housing), durable goods, spending on consumer goods and services, basic services (water, gas, electricity), and outlays on health and education. These components are described in detail below. The prices used to value the consumption of these components come mainly from the household and community surveys. A price index was established to adjust for geographical cost differentials (see below). Finally, information on household members was used to convert household consumption (collected in the survey) into a measure of the individual (per capita) welfare, taking into account household size.

Box 1 – Components of Total Consumption

Consumption of purchased food
Consumption of non-purchased food (own-production, gifts, donations)
Transport and communication
Spending on consumer goods
Household services and legal costs
Basic services (water, electricity, gas)
Annual use value of housing
Annual use value of durable goods
Education
Health

Food Consumption

4. **Purchased Food.** The main data source for purchased foods is Section 12.A of the ENCOVI 2000 household questionnaire ("Spending and Consumption of Food, Drinks, and Tobacco"). Question 3 (variable P12A03) indicates if household members purchased each item during the last 12 months. Using this section, the number of months (question 4, variable P12A04) in which each food item was consumed was multiplied by the average monthly value (question 5, variable P12A05) to obtain the annual value of consumption.

5. To calculate annual spending on foods purchased in supermarkets[1], Section 12.B of the ENCOVI 2000 ("Place and Frequency Purchases" of food) was used, multiplying the total value of purchases (question 12, variable P12B12) by the annual frequency of purchases (question 11, variable P12B11[2]). In addition, the annual value of food consumed *outside* the household was calculated by multiplying weekly expenditures in food and drinks consumed outside the home (variable GHOGAR for variable ITEM = 105) in Section 12.C (spending the last 7 days) by 52 (weeks per year).

6. Adding the annual expenses of all purchased foods, food purchased in supermarkets, and food consumed outside the home yields the total annual spending on purchased foods.

7. **Non-Purchased Food.** Even though the consumption of these items does not involve a monetary outlay, household welfare increases in the same way as with purchased food. The main data source for the consumption of non-purchased foods is Section 12.A in the ENCOVI 2000 household questionnaire ("Spending and Consumption of Food, Drinks, and Tobacco"). Question 7 (variable P12A07) indicates whether the item was obtained by own production or through other means (donations, partial reimbursement, or from a business) during the last 12 months. To obtain the annual *quantity*, the number of months in which each food was consumed (question 8, variable P12A08) was multiplied by the average monthly amount (question 9, variable P12A09A[3]) and by the corresponding price.

8. To obtain the annual *value* of non-purchased food consumption, the annual amount was multiplied by a *price*. In the case of non-purchased food, however, prices and values were not reported (since such quantities were never purchased or sold). Therefore, prices were imputed as follows. **First,** if the household also purchased the item (in addition to being consumed from non-purchase acquisitions), the price paid for the purchased quantities was used. To impute this paid price, the total value of purchases during the last 15 days (question 6d, variable P12A06D) was divided by the amount purchased during the last 15 days (question 6a, variable P12A06A) [4]. **Second,** if this price was unknown (because the good was never purchased), its value was estimated using the prices paid by nearby households (geographically), since they would presumably have access to similar markets. Information from the price questionnaire was used when no price information was available for an specific item in the nearby households.

9. The consumption of food from social programs was also included (from Section 4.c, "Participation and Benefits from Social Programs"). To obtain the annual value of free food consumed outside the home[5], the social programs "School Cookie", "School Breakfast", "Powder Milk", "Glass of Milk", and "Glass of atoll" were selected (question 1, variable P04C01 with values of 1, 2, 3, 4 or 5) and

[1] If no individual information for food purchases was provided

[2] For daily purchases, the frequency was 365, for weekly purchases it was 52, for monthly purchases it was 12 and for annual purchases the frequency was one.

[3] After taking into consideration the product unit from question GA109B.

[4] Unit weight information was collected from several local markets. This information was used to transform the units reported into pounds or units

[5] Not all the food was 100% free.

the reported value from questions 4, 8 and 12 (variables P04C04, P04C08 and P04C12) was multiply by 12 for the "powder milk" program, and by 10 for the other programs (month of services related to the school calendar).

10. The total annual value of non-purchased food consumption is obtained by adding the imputed annual expenses of all non-purchased foods consumed at home (internal consumption, gifts, donations) and food from social programs.

Spending on Consumer Goods and Services

11. The main data source for outlays on goods and services that are generally consumed in one year or less (such as matches, soap, detergent, newspaper, deodorants, books, school or non-work related transportation expenses, shoes, clothing, etc.) are include in section 12.c of the ENCOVI 2000. All expenses were reported in question 4 (variable GHOGAR). For expenses during the last 7 days, the value reported was multiplied by 52 weeks to obtain the annual value, for expenses during the last month, the value was multiplied by 12 months for the annual value, and annual expenses were included directly. Question 3 from the same section (variable ITEM) include all expenditures from the last seven days (codes 101-111), from last month (codes 201-231), and from last year (codes 301-326). **Transport and communication** included the annual value from questions 101, 102, 103, 104, 107, and 314. **Spending on consumer goods** included the annual value from questions 106, 108 through 217, 221, 222, 223, 225, 301, 302, 303,305, 308 through 313, 315 and 325. It also includes information provided in Section 4.c, questions 4, 8 and 12 (variables P04C04, P04C08 and P04C12) for the non food social programs benefits (variable P04C01 with values between 6 and 11[6]). **Household services and legal** included the annual value from questions 218, 220, 224, 231, 319, 322 and 326.

Household Services: Energy, Water, Telephone

12. Data on household water, sanitation and communication services expenses come from Section 1.a of the ENCOVI 2000 ("Housing conditions"). To obtain the annual value of household water consumption, monthly values from "piped water" (question 17, variable P01A17), and "non piped water" (question 24, variable P01A24) were multiplied by 12 months. For garbage recollection, the monthly expenditure from question 33 (variable P0A22) was multiplied by 12. To obtain annual spending on regular telephone, cellular telephone, beeper, internet and cable connections, the monthly consumption (question 29, variables P01A29A, B, C D and E) were multiplied by 12 months. Data on monthly spending on household energy sources consumption (candles, kerosene, gas, coal, batteries, electricity, firewood and others) come from Section 1.b ("Sources of Energy"). Yearly values were derived by multiplying monthly consumption (question 7, variable P01B07) by 12 months. Total annual spending on household services equals the sum of annual spending for each of the household services.

Annual Use Value of Housing

13. The annual use value of the housing must be included in total consumption for each household. Data on housing come from Section 1.c of the ENCOVI 2000 household questionnaire ("Housing ownership").

14. **Rented housing.** Rent is considered to be a good estimate of the use value of housing for those households that pay for the use of their house, apartment, or other type of home. As such, for rented

[6] School transport subsidy, scholarships, school materials, health program, female children program and others.

housing, the annual rent value was calculated by multiplying monthly rent (question 8, variable P01C08) by 12 months and included in the consumption aggregate.

15. **Owned Housing (not rented).** The annual use value of owned housing was imputed as follows: (i) in most cases, the value estimated by the owners was used; or (ii) for households that did not provide an estimated value, the use value of housing was estimated by a regression (as discussed below).

16. *(i) Value estimated by owners.* The use value estimated by owners was used for most cases of owned housing. Fortunately, the ENCOVI 2000 asked households that did not rent: "If you had to pay rent for this housing, how much would you pay on a monthly basis?" (question 7, variable P01C07). The answer to this question was used as an estimate of the rental value of the housing and therefore as an estimate of its use value (the estimated value was multiplied by 12 months to obtain the annual value).

17. *(ii) Value not estimated by owners.* In 0.36% of the 7,276 households, the respondents did not provide an estimate of the rental value for owned housing; consequently, their value was estimated from the average value of nearby households .

Value of the Annual Use of Durable Goods

18. Many goods are only partially consumed during the study period, such as cars, refrigerators, stoves, etc. Even if a television set has been purchased during the time period of the survey, it is expected to be used (and hence consumed) during many years to come. To reflect the current welfare that these goods provide to the household, the "value of one year of use" (annual use value) must be estimated and incorporated (rather than the actual purchase cost of these goods), whether the item was purchased in the current year or in previous years.

19. Data on the consumption value of household durables come from Section 14 of the ENCOVI 2000 (Household durable goods"). Since these goods are generally not entirely consumed during one year, the value of their use during the past year had to be estimated. For example, if someone bought a television set this year for Q/.3,000.00, the annual consumption value of this television set is not Q/.3,000.00, since the individual can also use the television during the following year, i.e., the Q/.3,000.00 will be consumed during a time period of more than one year. Food and other consumer goods do not have this characteristic, because if someone buys one liter of milk, this milk will be consumed in less than one year.

20. Three data points are needed to estimate the consumption value of the household durables (i) the age of the durable good (question 3, variable P14A03); (ii) the remaining use life of the durable good; and (iii) the current value of the durable good (question 5, variable P14A05).

21. To obtain the remaining use life of durable goods, we need to know the average lifetime of each good[7] or, as commonly referred to, its use life or expected lifetime. If the use life of the durable good is known, we will only need to subtract its age to obtain the remaining lifetime. Fortunately, ENCOVI 2000 data allow for an estimate of the expected lifetime of each durable good. Assuming that in one year a similar percentage of the population buys a durable good (say a television), it is likely that some individuals will have a new television, some will have televisions that are one-year old, others two-years old, etc. As such, calculating the average age of all televisions sets (average of P14A03) yields the mean life or average age of all televisions. By multiplying the mean life by two, the result would be the expected lifetime of a television set in years. If the reported age (variable P14A03) is subtracted from the expected lifetime of a television set, the remaining use life of each television set is obtained. Finally,

[7] Each item is identify in question 1, variable ITEM.

dividing the current value of a television set (variable P14A05) by the remaining use life yields the annual use value of the television set.

22. Applying this procedure for all durable good and adding the values of each item yields the annual value of the consumption of household durable goods.

Education

23. Data on household expenses on education (such as registration and enrollment fees, uniforms, books or material, travel) come from Section VII of the ENCOVI 2000. The ENCOVI 2000 asked households for *annual* pre-primary school expenses for children under 6 years (questions 3,4 and 5, variables P07A03, P07A04 and P07A05 in Section 7.a) and for students aged 6 and over (questions 12, 13 and 17; variables P07B12, P07B13 and P07B17 in Section 7.b). Households were also asked for the *monthly* expenses for children under 6 (questions 6-9, variables P07A06- P07A09 in Section 7.a) and students aged 6 and over (questions 19 through 22; variables P07B19 through P07B22 in Section 7.b). To obtain the annual value of the monthly expenses, they were multiplied by 10 months.

24. Total annual education consumption is obtained by adding the educational expenses and scholarships for all household members.

Health

25. The data source for health expenses for the past month is Section 6. Health spending for children 5 years and younger for diarrhea and respiratory problems are in Section 6.c, question 9 (variables P06C09A-P06C09F and P06C09T). Section 6.d has the information for all the household members expenditures during last month[8] on doctor fees (question 11, variable P06D11), medicines (question 12, variable P06D12), X-rays and tests (question 13, variable P06D13), transport to medical facilities (question 14, variable P06D14), orthopedic equipment (question 15, variable P06D15), glasses, hearing aid, dentures, etc (question 16, variable P06D16), hospitalization (question 18, variable P06D18), and health insurance premiums (question 19, variable P06D19). Expenditures related to pregnancy were reported in an yearly basis in Section 11 (questions 14 and 23, variables P11A14 and P11A23).

26. Section 12.c has the information for health expenditures for the last 12 months (excluding the previous month and all pregnancy expenses) in question 20 variable GHOGAR (for ITEM = 320). Monthly expenses on accident and death insurance reported in questions 28, 29, and 30 of Section 12.c (variable GHOGAR for ITEM = 228, 229 and 230) were also included.

27. Monthly expenses on accident and death insurance reported in questions 28, 29, and 30 of Section 12.c (variable GHOGAR for ITEM = 228, 229 and 230) were also included (multiplied by 12 months to obtain the annual value).

28. Total annual health spending is obtained by adding all expenditures reported in these questions.

Other

29. Total consumption did not include donations (Section 13.b) because it was difficult to avoid double counting. Out of 7,276 households 517 (7.1%) household reported receiving food consumed outside the house or goods (question 2, variables P13B02B or P13B02C = 1). Since the type of donation received accepted multiple answers, it is not always possible to differentiate from valid from invalid

[8] Excluding expenditures reported in section 6.c and pregnancy related health expenditures.

types[9]. Only 328 households reported valid types of donation and at the same time did not report invalid types. Finally, it was not possible to differentiate from this donations and information provided (and already included) from the social programs. Due to this problems, no information was included from this section.

Total Consumption

30. Finally, by adding all consumption values for each component (by household), we obtain the **total consumption** variable. Thirty three households were excluded from the original figure of 7,309 households (yielding a total of 7,276) because a large share of the consumption aggregate had to be estimated or imputed due to missing values.[10]

WEIGHTING TOTAL CONSUMPTION BY THE REGIONAL PRICE INDEX

31. The cost of living is not uniform throughout the country; as such, the value of total consumption was adjusted to account for regional variation in prices. Price indices were constructed for each Department (22), Area (Urban/Rural) combination (44 indices) using the information collected in the price questionnaire and the household questionnaire (Section 12.a) in the following manner.

32. Using consumption data from Section 12.a, **"national average consumption in pounds"** was calculated for each food article. This was achieved by dividing the national average value of annual *purchased and non purchased food*[11] (without the Social Programs component) by the national average price derived from question 6 (estimated dividing variables P12A06D by P12A06A).[12] The result is a file with one variable (pounds) for each of the 99 food articles (99 entries).

33. Next, prices for each article were estimated for each Department/Area combination. The average prices were estimated using the Household questionnaire (estimated dividing variables P12A06D by P12A06A). If such information was not available in the ENCOVI 2000 household questionnaire, prices reported in the price questionnaire were used[13]. With these prices, the purchase cost of the **"national average consumption in pounds"** in each Department/Area was estimated. The cost of the national average consumption in pound in each Department/Area was divided by the cost in Guatemala City to produce the **Geographical Food Index**.

34. To obtain a similar Index for the non-food items, the Price questionnaire, Section B was used. A weighted average for each Department/Area was computed. Items also present in the Guatemalan Consumer Price Index (CPI) were selected (questions 1-12 and 14-22, Variable PRECIO for ITEM = 41-52 and 54-62). The same weight values used in the CPI were applied.

35. Similar to the Geographical Food Index, all the non-food Department/Area values were divided by the Guatemala City value to produce the **Geographical Non-Food Index**.

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[9] Valid types: food consumed outside the house or goods. Invalid types: food consumed in the house (already included in non-purchased food), or cash (people do not consume cash)

[10] Also, only households with complete interviews were selected.

[11] Described previously under "Food Consumption".

[12] This national average price per item was used only for the estimation of the average national consumption quantities. Later, another "national average price" is estimated using a methodology based in the price questionnaire information.

[13] A minimum of 15 prices per article for each department/area combination were required. If neither the ENCOVI 2000 household questionnaire, nor the Price questionnaire had enough data points, the average for the Region(8)/Area combination was used (with a minimum of 25 data points), or the Departmental average (with a minimum of 35 data points) or the Regional average (with a minimum of 45 data point).

36. Finally, to obtain the overall **Geographical Index** for each Department/Area, the weighted average of the Geographical Food and Non Food Indexes was computed. The weight used is the same proportions between food and non-food observed in the consumption aggregate: 40.5% for the food component, and 59.5% for the non food component. The resulting variable allows for standardization of any expense at the Guatemala City level (to be used as a divisor).

37. Using the Guatemala City average as a basis (Guatemala City = 1), the FACT.GEO variable was found to vary between 0.99 and 1.07.

VALUE OF TOTAL CONSUMPTION PER CAPITA

38. For the final step to rank the population by welfare level (consumption) from the lowest to the highest, a share of the total consumption must be allocated to each household member. Per capita consumption is used in the Poverty Assessment, i.e., the total value of consumption of the household divided by the number of household members. There are several other ways of allocating household consumption to the different members, taking into account different requirements, economies of scale, and the presence of public services in the household. Per capita consumption was used due to its transparency, but other methods were used for sensitivity tests of the consumption aggregate.

LEVELS OF TOTAL CONSUMPTION PER CAPITA: GUATEMALA 2000

39. The population was ranked from the lowest to the highest level according to total per capita annual consumption (welfare). Per capita consumption varies considerably in Panama (see Fig. A1.1). On average, annual per-capita consumption is Q/.6,180. The richest ten percent of the population has an average consumption level of Q/.23,543 while the poorest ten percent has an annual average per-capita consumption of Q/.1,287.

FIG. A1.1: LEVELS OF CONSUMPTION: REPUBLIC OF GUATEMALA, 2000

% of population	Level of average annual per-capita consumption (Q/.)
100	
	23,543
90	
	9,862
80	
	6,940
70	
	5,243
60	
	4,240
50	
	3,537
40	
	2,916
30	
	2,369
20	
	1,876
10	
	1,287
0	

Lowest level of consumption
Source: ENCOVI 2000 2000