

Economics Working Paper 53

**An Assessment of the Encuesta Continua
de Presupuestos Familiares (1985- 89) as a
Source of Information for Applied
Research***

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Abstract

The Encuesta Continua de Presupuestos Familiares is a recent survey of the consumption patterns of Spanish households. Given the increasing trend in the use of micro-data in applied research in general and demand analysis in particular, this paper sets out to explore the possibilities offered by the survey in this context. An issue studied with special emphasis is the quality of the expenditure information. In this sense the panel structure of the survey is shown to be a feature which can facilitate the work of the researcher when specifying an econometric model of consumption containing limited dependent variables.

1 Introduction

The use of microeconomic data in the field of applied consumption analysis has become widespread in the last decade and continues to grow as new data sets are released. To a large extent, this popularity can be attributed to the ability of linking empirical regularities to consumer theory postulates without resorting to aggregation assumptions or "representative agent" frameworks. Not less important, however, are the high number of degrees of freedom which they offer to the researcher and the fact that, when arranged in a panel format, micro-data permit the possibility of incorporating dynamic considerations and controlling for unobserved heterogeneity in econometric models. Because of these advantages, it could be argued that household budget surveys are the best source of information available for applied demand analysts.

My concern in this paper consists in providing information on a recent budget survey of Spanish households, the Encuesta Continua de Presupuestos Familiares (ECPF), which presents some attractive characteristics in terms of potential research applications and therefore deserves some publicity within the circles of applied economists. For instance, as apposite to other Spanish budget surveys with random sampling, the ECPF is based on a sample of 3200 households which rotates in a 12.5% every quarter. This feature permits the construction of panels which, besides the standard advantages alluded to above, offer valuable evidence on the causes for zero expenditures records for consumption categories.

The last example is representative of the bias I shall adopt as far as the range of issues covered in this paper is concerned: the reader will find an inclination towards the discussion of

topics related to the estimation of systems of demand equations and simulation of indirect tax reforms. This is perhaps inevitable since the latter are topics on which I have worked during the past few years. However, I would dare to suggest that the competitive advantage of the ECPF resides precisely in the field of commodity consumption analysis, as information from Spanish households related to labour market issues is perhaps better covered in surveys such as the Encuesta de Población Activa. Thus in section 2 of this paper I discuss the ECPF sampling structure and rate of response in order to assess the validity of the survey for the calculation aggregate forecasts in revenue, say, after simulating a tax reform. In this section I also comment on the implications of panel attrition for the panel design of the survey and the quality of income and demographic information. The quality of expenditure data is debated in section 3. Along with a discussion of the reference periods used to capture information on the consumption patterns of households, I present evidence on the causes for zeroes in their expenditure records. As I shall argue, this evidence is of great value as an input to the econometric modelling of the demand for certain categories. A summary section will conclude the paper.

2 The ECPF 1985-1989

The Instituto Nacional de Estadística (INE) has conducted three different micro budget surveys to date. These are the Encuesta de Presupuestos Familiares (EPF), the Encuesta Permanente de Consumo (EPC) and the Encuesta Continua de Presupuestos familiares (ECPF).

The EPF is carried out every ten years and the latest release is for 1990. It consists of a large cross-section (23,000 households) collecting information on income and expenditure categories and a detailed number of demographic characteristics. During 1977-1983, a group of 2000 households out of the 1973 sample for the EPF were asked to collaborate in a quarterly panel

survey. This was known as the EPC. After a gap of two years, the INE started to conduct the ECPF, which is the ongoing rotating-sample quarterly expenditure survey in Spain.

2.1 Sampling design, field work and rate of response

The ECPF sample has been designed as a two stage process with stratification in order to arrive to an independent sample for each Autonomous Community (the set of these samples are designed to be representative of the whole national population). At a first stage, the total of 32,000 electoral constituencies in which Spain is divided are classified into different strata according to size of township. These strata are further subdivided according to the proportion of active population that falls within three different groups of activity. Subsequently, 584 constituencies are chosen from such classification in a manner proportional to the concentration of population, but at the same time including a minimum of 85 households for each Autonomous Community. For each chosen constituency, 5 or 6 households are interviewed and an equal number is held as potential substitutes for non-respondents. The procedure yields thus a theoretical sample of 3,200 households. These households are renewed at a rate of 12.5% every quarter. Therefore, in theory, every household remains in the sample for 2 years (eight quarters).

Each interviewer is assigned to one of the chosen constituencies. If the randomly chosen households are not available for interview because they are empty, used for purposes other than dwelling or otherwise not contactable, they are substituted by another household in the reserve list for the same constituency. Once the household is assessed as "interviewable", a four visit schedule is followed. The contents of such schedule and the possible contingencies in terms of response are outlined in table 1.

TABLE 1 ORGANISATION OF FIELD WORK AND POSSIBLE RESPONSE CONTINGENCIES FOR THE ECPF

	Refusal	Absence	Cooperation
First Visit (Monday)	Substitution	If it is the first quarter, substitution. If not, wait until second visit.	Delivery of all diaries for goods with weekly reference period. Collection of information on demographics.
Second visit (Wednesday).	Substitution. Demographic information replaced by that of the substituting household.	If there was absence in the first visit then substitution, if not, wait until third visit.	Collect information on expenditure on goods with monthly reference periods and any missing demographics.
Third visit (Friday).	No substitution. Collection of available information.	Wait until last visit.	Collect information on goods with quarterly reference period and household income.
Fourth visit (Tuesday)	No substitution. Collection of available information.	Discretionary treatment depending on supervisor assessment.	Collection of diaries for expenditure on goods with weekly reference periods.

N.B. The sequence of events for each contingency runs from the top to the bottom of each column.
Source: I.N.E. (1989).

In principle, there should be no departure from the theoretical sample size since non-cooperating households are replaced. However, the substitution of all refusing or absent households was not achieved in any of the quarters during the period I study. This is shown in table 2, which presents the sample size after replacement (column 1), the number of non-respondents at first trial (column 2), the number of successful substitutions to these non-respondents (column 3) and the divergence (after substitutions) between theoretical sample size (3200) and actual sample size as a percentage of the former (column 4).

TABLE 2 PERCENTAGE OF NON-RESPONSE AND SUBSTITUTION IN THE ECPF BY QUARTER. 1985-1989

Quarter	Actual sample size (1)	Non-resp. at first trial. (2)	Successful replacement (3)	Failure rate in attempted sbtns (%) (4)
1985 (1)	3049	1033	882	4.70
1985 (2)	3172	178	150	0.80
1985 (3)	3141	199	140	1.84
1985 (4)	3165	120	85	1.09
1986 (1)	3065	403	268	4.20
1986 (2)	2735	320	*	*
1986 (3)	2911	485	196	9.03
1986 (4)	2922	488	210	8.68
1987 (1)	3061	319	180	4.34
1987 (2)	3133	294	227	2.09
1987 (3)	3084	406	290	3.62
1987 (4)	3062	300	162	4.31
1988 (1)	3122	245	167	2.43
1988 (2)	3093	268	*	*
1988 (3)	2998	263	61	6.31
1988 (4)	3034	277	111	5.18
1989 (1)	3131	297	228	2.15
1989 (2)	3101	299	200	3.09
1989 (3)	3170	379	349	0.93
1989 (4)	3068	280	148	4.12

Notes:

Non-response can be due to refusal to cooperate or absence.

Successful replacements is the number of times that a drop of the sample size of one household is avoided by the interviewer through successfully interviewing a reserve household.

Failure rate denotes the divergence between actual and theoretical sample size.

N.B. There was no sample rotation until 1986, hence the good rate of response for the last three quarters of 1985.

The asterisk denotes inconsistencies in the reported number of substitutions. For the marked quarters, the reported number of substitutions was greater than that of initial refusals or absences.

Source: I.N.E. (1985) through to I.N.E. (1989)

As we can see, the divergence between theoretical and actual sample size ranges from 9.03% in the third quarter of 1986 to a low of 0.8% the year before. This should be unimportant if the incidence of refusals and absences at first interview (column 2) had been random (because the substitution is random) and if the refusals and absences when the reserve household is approached had been random too. However, the INE acknowledges in the introductory foreword to each of the survey reports from 1985 to 1989 that the opposite has been the case:

"Despite the resources applied in order to facilitate household collaboration (...), it has been impossible to avoid refusals; which, firstly, have not affected different Autonomous Communities in the same way and, secondly, have not followed an uniform pattern across socioeconomic strata, therefore the publication of results at the Autonomous Community level is impossible.."

To help quantify the importance of this differential response, the INE reports tables with the rates of response by Autonomous Community, number of members, size of township and educational level of the head of household separately for each quarter. This information is available because the interviewer fills a questionnaire for non-respondents in which these basic data are obtained either from the non-respondent (presumably at the house doorstep) or from the "Padrón" (municipal census). I report here the yearly average rate of response by Autonomous Community and a breakdown of non-response of "titular" households (i.e. not those used for the substitutions but the ones that are approached at first, which make up the figures of column 2 in table 2) by education level number of members and size of township for the year 1989 in order to illustrate the point that is made in the previous annotation. Although these figures do not include differential non-response of the reserve households, they can give a general idea of this problem in the ECPF. This is shown in tables 3 to 5.

TABLE 3 PERCENTAGE OF NON-RESPONSE BY YEAR AND AUTONOMOUS COMMUNITY FOR THE ECPF (1985-1989)

	Mean	1985	1986	1987	1988	1989
Andalucía	3.67	2.2	8.5	2.3	2.5	2.8
Aragón	3.22	1.2	6.4	3.6	3.6	1.3
Asturias	1.95	0	7.2	.5	.5	1.5
Baleares	2.02	.5	3.4	3.9	1.3	1.0
Canarias	15.3	4.2	7.4	17.1	21.0	27.0
Cantabria	0	0	13.5	12.0	7.0	.2
C. León	6.54	.7	3.4	2.0	2.6	1.6
C. La-Mancha	2.08	1.1	3.4	.6	.4	1.0
Cataluña	1.30	4.5	15.3	8.3	9.4	2.1
Valencia	7.92	1.9	5.4	1.4	1.1	2.3
Extremadura	2.42	6.0	25.6	3.4	.4	.4
Galicia	7.16	.9	9.0	1.4	.7	1.2
Madrid	2.64	1.8	5.4	1.7	5.5	5.0
Murcia	3.88	.4	5.6	.4	.8	.6
Navarra	1.56	1.8	6.0	.2	4.6	3.9
País Vasco	3.30	5.4	21.6	5.8	8.0	3.6
Rioja	8.88	.9	4.1	1.3	.5	.5
C.-Mel	1.46	1.8	3.1	.9	.9	5.3
National average	2.40	1.96	8.57	3.71	3.93	3.42

Source: I.N.E. (1985) through to I.N.E. (1989)

TABLE 4 NON-RESPONDENTS AS PROPORTION OF HOUSEHOLDS IN THE ACTUAL SAMPLE BY EDUCATION LEVEL AND NUMBER OF MEMBERS FOR THE ECPF IN 1989

Education	Ratio	# Members in household	Ratio
Illiterate	5.78		12.15
No schooling	8.68	One member	8.78
Primary school	6.84	Two members	8.17
Secondary school 1	7.17	Three members	6.84
Secondary school 2	7.86	Four members	6.26
Higher education 1	9.49	Five members	7.63
Higher education 2	9.40	Six or more members	

N.B. The columns headed "ratio" contain the percentage of non-response out of the total of households with the same characteristic in the actual sample.

Secondary school 1 and 2 refers to schooling from 10 to 14 and 15 to 18 years of age respectively.

Higher education 1 and 2 refers to first and second university degree respectively.

Source: Tables EVA-8 and EVA-12. I.N.E. (1989).

TABLE 5 RATE OF RESPONSE BY SIZE OF TOWNSHIP FOR THE ECPF. FOUR QUARTERS OF 1989

Quarter	Less 10,000	Up to 50,000	Above 50,000	Madrid and Barcelona
1989(1)	97.56	98.81	98.01	95.96
1989(2)	98.78	96.87	96.32	94.10
1989(3)	98.78	94.93	94.87	94.10
1989(4)	97.34	94.78	95.94	93.79

Source: Table EVA-2. I.N.E. (1989)

From table 3, the average rate of response for the whole of Spain over the 20 quarters studied is 4.3%. But while regions such as Murcia have a consistently low rate, the Canary Islands' mean non-response rate is 15.3%. Non-response over time is subject to substantial variation too. The figure for 1985 is the lowest but this is explained by the delay of sample rotation until 1986. For the last three terms of 1985, all households have already collaborated once (since there are no new entrants). Therefore relatively few households decide not to cooperate for the sample of the three remaining quarters of 1985. That is, non-cooperative households seem to have self-selected themselves out of the survey when they were approached in the first quarter. Thus the non-response rate is low for the last three quarters of 1985, as table 2 shows. In contrast, 1986 and thereafter, show a much higher rate of non-response. This is particularly obvious for 1986, which was the year in which sample rotation started. The high rate of non-response for this year seems to be attributable to the "teething pains" of the rotation scheme.

Table 4 shows how households with a high education level tend to have a higher non-response rate than the rest. This can be said too about one member households. Finally, table 5 shows how the response rate is lower for Madrid and Barcelona in a persistent way¹.

¹ These results are for 1989 but are representative of the general pattern over the five year period. A higher non-response rate seems to be the norm for big cities in a good deal of national expenditure and income surveys (see Atkinson and

These disparities in response rates are important when judging the representativity of the survey and the uses which it may be given. As far estimation goes, the differential rate of response would not seem to pose a serious problem. This is because each observation is an independent drawing. However, the ability to obtain accurate figures for aggregate revenue and for the distribution of gains and losses if the data are used to run tax simulations, say, may be impaired by differential non-response. In these circumstances it is desirable to count with sample weights in order to know the number of households with the same characteristics in the population that each household in the sample exactly represents. The ECPF contains these sampling weights ("factores de elevación"). The next sub-section discusses the nature of these weights or, as part of the literature on micro-surveys has dubbed them, "grossing-up factors".

2.1.1 Grossing-up factors in the ECPF

The INE calculates a grossing-up factor for each household in the sample and this is then used to compute the aggregate figures supplied in the survey handbooks. Every Autonomous Community is divided into three "zones" (except Madrid and Cataluña with four zones, and Ceuta-Melilla with one zone) according to the size of township (the actual population size is known from Census information). The factor is then computed as the ratio between population size and sample size for each "zone". There are thus 51 different grossing-up factors each quarter.

As it should emerge from the discussion in the previous section, it would be useful if these factors had been adjusted to account for the differential non-response by region and other characteristics. In particular, given the disparities in regional response rates, a re-weighting of the grossing-up factor to account for the missing households in each region would have been appropriate. However, since regional identifiers are suppressed

Micklewright 1992 for British and Eastern European examples).

from the information in the tapes, such re-weighting is not possible from the researcher's side. The only alternative to the inability to identify households by region would consist in exploiting the information on non-response by number of members in the household, education level of the head of household and size of township. The factors could be re-weighted by each of these variables (or a combination of them) given knowledge on the total number of households with the same characteristics in the population². The biggest disparities in response are by region, however, as the previous tables have shown so this re-weighting may not be of much use. A simpler solution would be provided by the INE if future ECPF release contained regional identifiers. The first release containing regional identifiers will combine the advantages of a fresh sample (reflecting the latest available information on the structure of the population) with the possibility of implementing a satisfactory re-weighting schedule³.

A last warning should be issued in the sense that even if the researcher counted with the correct grossing-up factors, the forecast figures obtained from simulating algorithms for aggregate figures would still be subject to departures from the "correct" forecasts due to the so called non-sampling errors. These may arise because of wrong coding, erroneous answers and, above all, the tendency to conceal certain types of expenditures which has been detected in other budget surveys such as the British Family Expenditure Survey.

2.1.2 Implications of non-response for the panel design of the ECPF

² See Atkinson and Micklewright (1983).

³ As a possible method to estimate the correct grossing-up factors, Atkinson et al. (1988) propose to solve a system of linear equations linking known household characteristics in the sample to their counterparts in the population.

I turn now to a discussion of the implications of non-response at first trial for the rotating panel structure of the survey. As explained above, substitution is aimed to minimise the divergence between actual and theoretical sample size but this does not preserve the size of the panel (we may recall here that every household should remain in the sample during eight quarters). Therefore the rate of attrition does not correspond to the rate of non-response. In fact, there is no direct way to obtain the attrition rate from the information supplied in the manuals so direct examination of the information in the tapes is required. The following table shows the number of households completing each one of the possible series of consecutive interviews (from one to eight).

TABLE 6 NUMBER OF HOUSEHOLDS IN EACH POSSIBLE SERIES OF CONSECUTIVE INTERVIEWS AND ATTRITION

Consecutive interviews	1	2	3	4	5	6	7	8
Number of households	2440	1707	1496	2477	1698	1633	1452	1508
Cumulated households	14411	11971	10264	8768	6291	4593	2960	1508
Associated attrition	17%	14%	14%	28%	27%	35%	49%	-
Cumulated Attrition	17%	28%	39%	56%	68%	79%	90%	-

- 1) Cumulated households contains the number of households collaborating at least the indicated number of times.
- 2) Associated attrition is the number of households that drop in moving from t to t+1 interviews as a percentage of the households collaborating t times.
- 3) Cumulated attrition is the number of households that drop in moving from 1 to t+1 interviews as a percentage of the households collaborating at least one time.

Source: Calculations from data kindly provided by Paula Adam.

The row headed "number of households" shows the number of households collaborating from one to eight times. These figures correspond to the sample sizes of the balanced panels that could be extracted from the ECPF (1985-89). The figures in the row headed "cumulated households" show the number of households that

collaborate at least the corresponding number of quarters. This permits the calculation of the sample size for all the potential unbalanced panels the survey can provide. For instance, an unbalanced panel of 2960 households out of which 1508 collaborate for eight quarters and 1452 for 7 quarters is obtainable.

It is also important to note the fair degree of attrition when passing both from the first interview to the t^{th} interview and passing from the t^{th} to the $t+1^{\text{th}}$. Since sampling is random, this finding is perhaps not so surprising, as the effort of keeping collaborating with the survey on behalf of households is by no means trivial and the reward for each quarter is not very high (2500 pta.).

2.2 Income information. Comparison with expenditure and reference periods

During the third visit by the INE interviewer, the household supplies information on income, which is then written into a questionnaire.

There is a good coverage of all income sources. Each member of the household is asked about any income, both pecuniary and in-kind, from any of the following sources⁴:

- 1) Wage income
- 2) Self-employment income
- 3) Capital and property income
- 4) Transfer income from pensions
- 5) Transfer income from unemployment benefit
- 6) Other income.

The period over which the survey collects information is one quarter and, for the expenditure figures, this corresponds to the

⁴ In principle, it is possible to obtain information on which members of the households are generating income, where from and how much. However, the tape made available for this study contained household totals for each of these six sources.

twelve weeks prior to the date of interview⁵. However, since income receipts follow in many cases calendar months, the figures in the survey refer to receipts during the three months prior to the month in which the interview is carried out. Except for households interviewed during the first week of the month, therefore, the periods of time in which the registered income is generated and registered expenditures made are not the same. This, however, should not introduce any systematic difference between income and expenditure across different quarters so the evidence I am about to show would suggest that there might be substantial under-reporting of income.

TABLE 7 DISTRIBUTIONAL FEATURES OF TOTAL INCOME AND TOTAL EXPENDITURE FOR THE ECPF. ALL HOUSEHOLDS AT FIRST INTERVIEW. 1985-1989

	INCOME	EXPENDITURE
Mean	354.01	402.48
Standard deviation	278.99	349.51
Maximum	8,785.72	13,758.36
Minimum	0.00	0.00
First 5%	65.30	63.39
First decile (10%)	107.38	112.49
First quartile (25%)	185.16	200.31
Median (50%)	300.00	329.25
Third quartile (75%)	451.15	514.37
Ninth decile (90%)	657.09	745.68
Ninety ninth percentile (99%)	1,271.25	1,650.75
Interquartile range	266.35	314.63
Skewness	5.50	6.96
Kurtosis	107.87	175.32

N.B. This figures refer to the expenditure and income distributions of 13,711 households at their first interview. Figures in thousands of pesetas.

We may note from table 7 that both distributions share common features in terms of positive skewness. Median and mean are 0.2 standard deviations apart in the two cases. Both distributions

⁵ Different goods have different reference periods. For instance, food is monitored for a week, clothing for a month and housing bills for a quarter. The expenditure records in the tapes for food, however, are twelve times the expenditure on food registered for the monitored week. That on clothing is four times the expenditure recorded in the questionnaire for monthly goods and so on.

seem to be quite tightly bunched around the median, as both the kurtosis parameters and the fact that the interquartile range is less than one standard deviation indicate. As it is common with income or expenditure distributions, there are outliers in the right flank of both distributions (the maximum value is very far from the ninety-ninth percentile).

Perhaps the striking fact is that except for the observations below the first 5%, the expenditure distribution lies above that of income (note that the ratio of the mean of income to that of expenditure is 87%). This could be given several interpretations. One, all "rich" households can borrow and consistently spend beyond their current income whereas the very "poor" save or, alternatively, there is a systematic under-reporting as soon as a certain threshold of income is passed. My impression would be that the latter might be a feasible explanation. Income tax evasion has been high lately in Spain⁶ due to the ability of agents to hide income sources. The fact that the survey is carried out by an institution that depends from the Ministry of Economy will not have encouraged households to fully report their income to the interviewer⁷.

These findings are important for potential applications of the data in the field of life-cycle consumption and savings. If more detailed examination of the distributions of income and expenditure by age and other characteristics could explain this apparently surprising feature, the ECPF could turn out to be a source of rich data for such analysis. On the other hand, if the under-reporting explanation was confirmed, the survey would perhaps have to be complemented with other sources.

⁶ See García et al. (1986).

⁷ It may be argued that this fact would induce non-response rather than under-reporting. Some tax-evading households, however, may prefer to collaborate and report only part of their income rather than to refuse and become suspicious of fiscal fraud.

2.3 Demographic information

The ECPF collects information on a wide range of demographic characteristics. The following is a summary of the most important headings.

- 1) Household composition: number and age structure of members, number of dependents, number of earners.
- 2) Labour market status for head of household and spouse: Distinction between active, searching unemployed, not active and retired.
- 3) Occupation of head of household and spouse: Distinction between self-employment with and without dependent workers, high rank civil servants, other civil servants and white collar workers, specialised blue collar and unskilled blue collar.
- 4) Education: Distinction between illiteracy, primary, secondary school and higher education.
- 5) Home tenure regime for first and second home: Distinction between home owner, free occupation, subsidised rent and free rent, second home tenure. Imputed rent value for home owners and rent payments for non-owners is included.

Table 8 shows the demographic characteristics of the households who are interviewed at least once during the five year period I study.

**TABLE 8 DEMOGRAPHIC CHARACTERISTICS IN THE ECPF.
1985-1989**

Demographic	Mean	Demographic	Mean
Household size		Dummies labour market status and occupation	
Number of Members	3.56	Unemployed	.057
Number of earners	1.65	Not active	.345
Dummies age of head		Pensioner	.060
Age < 35	.178	Working wife	.361
50 < Age < 65	.295	Unskilled blue collar	.119
Age > 65	.225	Skilled blue collar and low rank civil servants	.043
Dummies household composition		Self-employed	.146
Single parent	.006	Dummies education level of head of household	
Children below age 6	.216	Illiterate or unschooled	.178
Children aged 6-14	.326		.079
Children aged 1-23	.340	University degree	
Other dependents	.090	Dummies size of township	.274
Dummies home tenure		Less 10,000 inhabitants	.161
Renter	.171	More than 500,000	
Second home owner	.100		

Table obtained from the 13711 households at first interview. For a breakdown of demographic characteristics quarter by quarter, the reader is referred to the survey handbooks I.N.E. (1985-1989).

The sample used to calculate the statistics in the table above consists of a pool of the fresh households entering the survey for the first time along the twenty quarters at my disposal. There are 14411 such households (see table 6) but the observations for some 700 of those households contained coding errors and had to be eliminated from the sample.

The means of the dummy variables show the percentage of households with the corresponding characteristics in the sample and they are defined with respect to a "default" households for which all the dummies are zero. For this default group, the head of household has received intermediate education, is aged between 35 and 50 and is a white collar employee, the household is a childless couple living in owner occupied accomodation in a mid-urban area of less than 500,000 inhabitants. The proportions in the sample seem to be consistent with external sources of data

on the whole. For instance, the low proportion of young households reflects the progressive increase in the age of the population at the time of getting married. Men aged between 20-25 were in 46% of all marriages in 1975 but only in 30% of marriages in 1985⁸. The cohort marrying between 20-25 in 1975 or before constitutes the biggest group of households in the age structure of Spanish households. This is reflected in the ECPF's 35-50 age group (the default group), which makes up 30% of the sample. Similarly, the breakdown of labour status for heads of households in the ECPF is consistent with that in the Encuesta de Poblacion Activa (EPA, the Spanish Labour Force Survey) for all males. The EPA breakdown⁹ for males is 50% in employment, 6% unemployed and 36% not active which despite referring to both married and unmarried males, is very close to the breakdown in the ECPF (where the default group is employed head of household). The figure for working wives in the ECPF (36%) is also consistent with the 33% of active women in the whole of the population of which approximately 55% are married (EPA data). On the contrary, the EPA reports 20% of males being self-employed while the ECPF figure for heads of households is 14.6% but this difference may perhaps be a consequence of the different sampling populations. The Anuario Estadístico for 1989 reports 12% of all males being illiterate or having received no schooling and 4% having completed university education. These figures compare well with 17% and 7% respectively for heads of households in the ECPF.

3 Expenditure information and incidence of zero records

The ECPF aggregate expenditure figures are supplied under the same headings as the different groups of expenditure in the published consumption price index. Namely,

⁸ Source: Anuario Estadístico del INE (1989).

⁹ These are figures for 1988, the year at the mid-point of the ECPF sample.

- 1) Food drinks and tobacco.
- 2) Clothing and footwear.
- 3) Housing, fuel and electricity.
- 4) Medicines and health care.
- 5) Household durable and non-durable goods.
- 6) Transport and telecommunications.
- 7) Education and leisure.
- 8) Other goods and services.

But as I have mentioned in previous sections, individual expenditures are monitored for either of the following periods: the week, the month or the quarter. These figures are then multiplied by 12, 3 or 1 respectively to obtain the expenditures corresponding to the quarter, which are the ones supplied in the tapes¹⁰.

The components of each of the groups above do not have the same monitoring periods. Also, they differ in the degree to which all consumers perceive them as a "good". For instance, the first heading contains food drinks and tobacco but while all consumers will perceive food as a "good" and consume it, tobacco and/or alcohol will not be consumed by some of them. The same can be said about petrol, since not all households own a car. At the micro-economic level these distinctions are crucial, for they determine the type of econometric treatment that each category requires. This is because of the existence of zeroes in the expenditure records of households, which is one of the major problems associated with micro budget surveys.

In such surveys, it is generally accepted that zeroes might arise for any of the following reasons:

1. Because the household is maximising utility at zero consumption with its current budget (corner solution).

¹⁰ Of course, the implicit assumption is that expenditure on goods is uniform across time so that one week's expenditure on food, say, is exactly one fourth of the month's.

For instance, holidays abroad are desirable but they are too expensive so the household substitutes into an alternative form of leisure. Should the price of holidays decrease, the household would consume them.

2. Because the household does not participate in the consumption of some commodity. Even if cigarettes were handed out for free, some households would not consume them because they perceive them as a health hazard rather than a "good". Similarly, households who do not own a car will not be priced into the consumption of petrol by low prices at service stations, at least in the short run (in the long run they may buy a car).

3. Because no purchase has been made during the monitoring period although the household is a regular consumer of the good. The case may be that no purchases of clothing have been made during their monitoring period (a month in the ECPF) but all households consume (at least basic) clothing.

A considerable amount of effort has been made in previous literature to both identify the cause and treat zero records correctly. To name but a few, the work of Deaton and Irish (1984), Blundell and Meghir (1987), Atkinson et al. (1989), Jones (1989), Pudney (1989) and Meghir and Robin (1992) provide a good summary of the different methods that can be implemented to test the presence of the three sources of zeroes mentioned above and the relevant econometric models to tackle them. All these methods are designed for cross-section data.

With this data set, however, there is the possibility to go beyond the one-snapshot nature of information available in cross-sections in the sense that we can follow the expenditure record over time of the household who cooperates more than once. The implication is that if we observe an alternation of positive and zero records over the number of interviews that a household

undergoes, then we can infer that the household is a consumer of the good under consideration. And also that zeroes are, depending on the reference period and on the variability of the household budget between interviews, due to either infrequency of purchase or a switching regime between corner solutions and positive consumption. In most cases, however, common sense would rule one or the other. The obvious example in our data is tobacco consumption in that it is hardly conceivable that non-smokers are going to be priced into smoking so the mentioned alternation would most likely be due to infrequency of purchase. Of course, the distinction might not be so clear for goods such as "meals out", and in any case it is possible that infrequency of purchase produces zero records for tobacco over as many periods as a household stays in the survey leading us to wrongly classify it as non-smoking. But the probability of such erroneous inference decreases with the number of periods we observe for every household, therefore it is worth investigating the expenditure record of the group of households which collaborate over the maximum of eight quarters in the ECPF.

In order to provide evidence on the likely causes for zero records, I group the individual expenditures in the ECPF tapes according to the following criteria:

a) Uniform consumer behaviour: as explained above, food and tobacco are understood to be "different" in that some consumers might think of tobacco as "not a good" so they never buy it. Food, on the other hand, is universally consumed. Zeroes for these two categories will generally not be due to the same cause and therefore they need to be put apart.

b) Uniform monitoring periods: this is necessary because the incidence of zeroes due to infrequency of purchase will depend on the length of the monitoring period. As mentioned previously, the coverage for expenditures refers to the twelve weeks prior to the

date of interview. But within this "natural" quarter there are items whose monitoring period is the week (that is, their expenditure is collected in the diaries) and items whose monitoring period is either one month or one quarter, that is their expenditures are registered in a questionnaire asking whether there has been a purchase in the previous four weeks or twelve weeks respectively. While there cannot be infrequency of purchase for goods whose reference period is the quarter (for no purchase in the quarter goes unregistered), there is scope for petrol purchases, say, to take place after or before the week in which the household is interviewed.

Table 9 shows the components of the groups I study, together with their ECPF codes.

TABLE 9 EXPENDITURE GROUPS AND ECPF CODES CHOSEN FOR ANALYSIS

Category.	ECPF codes.
1. Food and non alcoholic beverages.	1011 to 1752
2. Alcoholic drinks.	1761 to 1812
3. Tobacco.	1830 to 1860, 8064
4. Clothing and footwear.	2013 to 2244
5. Housing. Imputed rent and repairs.	3018 to 3147
6. Fuel and electricity.	3156 to 3267
7. Non white durable goods. Furniture.	4017 to 4074
8. White durable goods. Fridges and other appliances.	4086 to 4233
9. Household non durable goods. Cleaning items etc.	4242 to 4284
10. Medical services. Medicines.	5010 to 5115
11. Vehicles and repairs.	6018 to 6054
12. Petrol.	6060
13. Public transport.	6102 to 6141
14. Telecommunications.	6150 to 6177
15. Leisure durable goods.	7017 to 7047, 7065, 7125, 7173, 7095, 7086
16. Leisure non durable goods.	7074, 7083, 7131, 7173
17. Education. Books and school fees.	7215 to 7296
18. Personal care.	8013 to 8040
19. Meals Out.	8091 to 8130
20. Holidays.	8148 to 8130
21. Other goods.	8172 to 9105.

For each of these groups of commodities, table 10 shows the monitoring period, the proportion of positive expenditures and the mean budget share for the positive expenditures

TABLE 10 REFERENCE PERIODS, PROPORTION OF POSITIVE EXPENDITURES AND MEAN OF POSITIVE BUDGET SHARES IN THE ECPF. 1985-1989

Category	Monitoring period	Positive proportion	Mean of budget shares
1. Food and non alcoholic beverages.	week		.317
2. Alcoholic drinks.	week	.99	.022
3. Tobacco.	week	.67	.025
4. Clothing and footwear.	month	.58	.107
5. Housing. Imputed rent and repairs.	quarter	.87	.186
6. Fuel and electricity.	quarter	.99	.034
7. Non white durable goods.	quarter	.98	.069
8. White durable goods.	quarter	.29	.033
9. Household non durable goods.	week	.41	.032
10. Medical services.	quarter	.78	.039
11. Vehicles and repairs.	quarter	.62	.092
12. Petrol.	week	.40	.067
13. Public transport.	week	.49	.025
14. Telecommunications.	quarter	.46	.015
15. Leisure durable goods.	quarter	.64	.032
16. Leisure non durable goods.	week	.32	.031
17. Education.	month	.50	.043
18. Personal care.	week	.36	.023
19. Meals Out.	week	.61	.079
20. Holidays.	quarter	.79	.041
21. Other goods.	quarter	.05	.054
		.75	

Table obtained from the same households as table 8.

The diverse incidence of zero records across categories of consumption is obvious from the figures above. For instance, while 99% of households record positive expenditures on food, only 67% do so for alcoholic drinks. At present it is difficult to tell what may be the causes (of the three possible alternatives explained before) for the 33% of zero alcohol expenditures. The same reasoning applies to the rest of categories with a non-negligible percentage of zero records. E.g is the 51% of zeroes for petrol due to infrequency of purchases or to 51% of households in the sample not using a vehicle?

The evidence in the following table seems to suggest possible answers for such questions. It is constructed from the eight consecutive observations on the households who collaborate eight times. As mentioned before, the cumulated attrition rate after

seven quarters is approximately 90% so the size of my eight period panel is of 1123 cross-section units¹¹. The table first shows the proportion of zero expenditures at the first interview. If, for a household, there is at least one positive record in any of its consecutive observations then such household contributes to the positive percentages in the second column of the table.

TABLE 11 PROPORTION OF POSITIVE EXPENDITURES AT FIRST INTERVIEW, EIGHT INTERVIEWS AND RESULTING REDUCTION IN THE PERCENTAGE OF ZERO RECORDS

Category	Positive at first interview	Positive in at least 1 interview	Drop in zeroes (percentage)
1. Food and non alcoholic beverages.	.99	.99	0
2. Alcoholic drinks.	.70	.95	25
3. Tobacco.	.59	.71	22
4. Clothing and footwear.	.90	.99	9
5. Housing. Imputed rent and repairs.	.99	1.0	1
6. Fuel and electricity.	.99	1.0	1
7. Non white durable goods.	.30	.84	54
8. White durable goods.	.40	.90	50
9. Household non durable goods.	.78	.97	19
10. Medical services.	.61	.91	30
11. Vehicles and repairs.	.41	.70	29
12. Petrol.	.51	.71	20
13. Public transport.	.46	.80	34
14. Telecommunications.	.62	.75	13
15. Leisure durable goods.	.31	.78	47
16. Leisure non durable goods.	.48	.80	32
17. Education.	.37	.58	21
18. Personal care.	.63	.95	32
19. Meals Out.	.79	.91	12
20. Holidays.	.05	.30	25
21. Other goods.	.78	.96	18

Table obtained from 1123 households with valid data which collaborate over eight periods during the twenty quarters of 1985-89.

We may note how, for all categories, there is a decrease in the

¹¹ The number of households cooperating eight times is 1,508. The difference down to 1,123 is made up of observations which had to be discarded because of missing values in their expenditure records. Note also from table 6 that I could have used a higher number of households if seven, rather than eight, quarters were investigated. My choice for the use of eight quarters responds to the belief that information for one extra quarter more than compensates a smaller sample size in this context.

proportion of zeroes when the complete sequence of expenditure observations on each household is taken into account. It would appear, however, that there are three classes of categories with respect to the incidence and causes for zero records.

Not problematic goods: This includes food, clothing, housing, fuel and the residual category. The proportion of zeroes in the first interview is low and most zeroes drop after eight interviews.

Mostly subject to infrequency of purchase: This would be made up of all durable categories, and then some goods with weekly monitoring periods such as alcohol, household non-durable, personal care, meals out and to a lesser extent public transport. The percentage of zeroes at first interview is high where purchases are lumpy by nature (this would be the case of all the durable goods) but it becomes low over eight interviews. For the weekly goods, the monitoring period seems to be too short to cover expenditures, but most zeroes disappear over the eight sampled weeks.

Subject to infrequency of purchase and other reasons: This would be the case of categories for which a substantial proportion of zeroes remain even after checking the expenditure record over eight interviews. Such are the cases of tobacco, petrol, vehicles and repairs, telecommunications, holidays and education. The nature of these goods suggests additional causes to infrequency of purchase. Tobacco has been discussed before. For petrol, there will be non-infrequency zeroes for those households who do not own a car (and these cases might be corner solutions with respect to vehicle ownership). The same argument applies to the telecommunications category, since it is mostly made up of telephone bills (i.e. some households do not

have telephone). With respect to education, it could be argued that non-infrequency zeroes are attributable to households without members in schooling age, but since this expenditure category includes books too, I would be inclined to think that reading is, to this effect, very much like smoking, i.e. some households do never read books. Zeroes in holiday expenditures not explained by infrequency of purchase might be perhaps the purest case of corner solutions in the sense that all households could be really priced into consumption.

In conclusion, there seems to be a general problem of infrequency of purchase. This could be ameliorated by simply extending the monitoring period for weekly goods. For goods such as tobacco, and petrol, the informational content of the survey would be much increased by simply asking the household whether there is a smoking member and a vehicle. With respect to durable goods, the lumpy nature of purchases may make infrequency of purchase difficult to eliminate so the appropriate complementary information should concern the stock of durable goods in the household.

These results also suggest that the data for expenditure on food, clothing and fuel is reliable in the sense that (save for misreporting) it can be considered to mirror underlying consumption. For alcohol, household non-durable goods and (perhaps to a lesser extent) public transport, the evidence above would justify treating zeroes as caused by infrequency of purchases. On the contrary, the zeroes for tobacco, petrol, telecommunications, education and holidays cannot be attributed to infrequency of purchase alone. Their econometric treatment therefore must allow for alternative causes such as non-participation and/or corner solutions.

4 Summary and conclusions

Upon the examination of the information contained in the ECPF for the period 1985-1989, the following conclusions are reached:

1) Non-response and its unequal incidence across different regions and socio-economic characteristics affect the survey in a non-trivial way. Focusing first on the problem of non-response, the ECPF fares relatively well in comparison with other micro-budget surveys. For instance, Atkinson and Micklewright (1983) report a rate of non-response of 30.5% in the Family Expenditure Survey for 1977. This is well above the 4.3% (recall that this percentage is calculated before substitution) I report in table 3. The substitution scheme decreases the divergence between theoretical and actual sample to 3.8% over the five years (average of column 4 in table 2). But concerning the incidence of non-response, it is unfortunate that the supplied "grossing-up factors" (sampling weights) are not re-adjusted to account for its differential impact across regions, especially since any attempt at correcting this is severely impaired by the unavailability of regional identifiers. These have been suppressed from the data in the tapes. Users of future ECPF releases could, therefore, benefit from some treatment of differential non-response on behalf of the INE. This benefit would arise also from the possibility of studying the differences in patterns of (consumption) behaviour induced by regional differences beyond relative prices: questions such as do households in sunny Andalucía consume less domestic fuel than those in wet Galicia? cannot be answered with econometric evidence from the ECPF at present.

2) A different suggestion applies for the design of the monitoring periods of some commodities. Where the week seems to be an excessively short period of time in order to avoid the incidence of zero records, the monitoring period could be extended to two weeks (the period over which diaries are filled in the Family Expenditure survey, for instance). Should this procedure be prohibitively expensive, researchers would still benefit from information regarding the existence of smokers,

drinkers and/or a vehicle in the household. Thus zero records whose cause is not as obvious as for clothing (infrequent purchases) would be easily classifiable.

3) There seems to be a non negligible under-reporting of income. To correct this may be not as straightforward as the INE would presumably wish. Future researchers may be interested in quantifying such under-reporting, however. It would be tempting to suggest, therefore, that the INE provided some kind of assessment derived from the confrontation of the ECPF with other sources of data.

4) A very convenient feature of the survey, nonetheless, is the ability to construct panels of households. As I have shown, this circumvents the inability to tell the cause for zeroes in the expenditure records of some households for several goods. The ECPF seems to be a rare case in the set of consumption surveys in Europe in this respect.

The shortcomings discussed above are perhaps attributable to the relatively short experience in the running of the survey but they can surely be ameliorated for future releases. Meanwhile, the survey still constitutes a very valuable source of information. Its specific features are likely to attract the attention of not only applied researches wishing to work on topics related to the Spanish economy but also researchers looking for true consumption panels elsewhere.

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