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TITLE

Inequality, Poverty and Mobility: Choosing Income or Consumption as Welfare Indicators

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1. Introduction

An extensive literature on inequality and poverty has traditionally been devoted to the sensitivity of results to important methodological decisions such as the choice of equivalence scale [see Buhmann *et al.* (1988) ; Coulter *et al.* (1992a, 1992b); or Jenkins and Cowell (1994)[1]], the acconting period [Cantó *et al.* (2002)] or the welfare indicator [see Mercader-Prats (1998)]. In all cases, the approach considered both the theoretical issues involved in the decision and the empirical effects of the choice on the *level* and *evolution* of inequality and on the *incidence*, *intensity* or *characterization* of poverty for cross-sectional survey data. In recent times the literature on income distribution is starting to develop an important amount of research on a dynamic approach to measuring inequality and poverty, thus, for example, adding the idea of *intradistributional mobility* and the concept of *persistence* or the *duration* dimension in poverty analysis. In this context, it is only recently that some authors are starting to be aware of the consequences of their methodological decisions on analysing the income distribution in a dynamic perspective.[2]

The aim of this paper is precisely that of considering in depth the effects on empirical analysis of the choice of welfare indicator on the dynamics of the income distribution which may also provide some light on the consistency of various theoretical assumptions. With that purpose in mind we undertake the analysis using a longitudinal survey: the Spanish "Encuesta Continua de Presupuestos Familiares" (ECPF). This survey yields quarterly information on a sequence of about two years long (eight interviews carried out every three months). Using this data source we are able to consider information from sub-annual periods and to reconstruct the household's complete picture on incomes and expenditures over the year.

The relevance of the choice of a welfare indicator is such that from the very first issue of *what one would like to measure* one has to decide on a certain approach. The reason underlying the relative scarceness of interest in the literature in discovering the implications of the choice of welfare indicator on welfare dynamics is, clearly, not the little relevance of the issue but the lack of availability of adequate data for analysis.[3]

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[1] In the Spanish context consider Mercader (1993), Ruiz-Castillo (1993, 1998), Del Río and Ruiz-Castillo (1999, 2001) and Duclos and Mercader-Prats (1999).
[2] See Bradbury et al. (2001) or Cantó *et al.* (2002) for some research on methodological issues on analysing poverty dynamics.
[3] In fact, very few longitudinal surveys in developed countries provide detailed information on both households' incomes and expenditures. Most precisely, appart from the american Consumer Expenditure Survey for the US, it is mostly countries in transition from a planned to a market economy those who hold

In principle, it appears that the more adequate monetary indicator to measure household welfare is the sum of all disposable incomes of its members following the idea that in our developed societies there is some 'minimum right to resources'. This has been the choice of most of the empirical literature in inequality and poverty that, also in order to make international comparisons, has generally chosen income as the most homogeneous variable in different countries' survey data. However, there is a strong argument on the option of measuring inequality and poverty using consumption as related to a 'minimum standard of living' – Atkinson (1998). Indeed, there are theoretical reasons why consumption is believed to be more accurate than income in measuring well-being. One of them is that the shorter the period income flows are measured, the more important its transitory component making the estimated inequality and the probability of classifying households as poor higher (even if their period below the poverty line is relatively short).

Therefore, if our 'standard of living' concept is more stable than annual household income and we also consider that life-cycle effects are strongly driving income differences between households, it appears reasonable to think that it is *permanent* income the notion of welfare we should aim to measure. In this context, and facing the fact that one seldomly finds survey information on incomes on long accounting periods (longer than a year), many authors have considered that current consumption is a more accurate indicator of the long-term household position than current income.[4] Clearly here the relevant assumption is that households are able to smooth their consumption while facing fluctuating income flows. Therefore we must assume homogeneity of financial markets for households at all points of the income/consumption distribution.

In any case there are also some other reasons to believe that consumption may have important dissadvantages in the measurement of household welfare given that it highly depends on the habits of individuals and on the demographic group the household is inserted in – for example young and old households have radically different consumption patterns most posibly due either to very different needs or to intergenerational differences in preferences.

Further problems that may arise using consumption as a welfare indicator are related to the different periodicity in which some expenditures are sampled in household surveys which imposes the simple annualisation of weekly or monthly purchases. Moreover, the presence of

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reliable longitudinal datasets on incomes and expenditures - see Kapitany and Molnar (2002) on the use of data on incomes and expenditures for analysing the 'living standards' distribution with the Hungarian Household Panel or Klugman and Kolev (2001) on that of the Russian Longitudinal Monitoring Survey.
[4] See for example Slesnick(1991, 1993).

purchase infrequency in many of the items considered in surveys makes the estimation of real household consumption even less accurate.

However, it is not only conceptual considerations what may drive the choice of one of the two indicators but also the degree of reliability of the data available in household surveys. First, if we work with microdata, consumption may present a higher reliability than income given the expected underreporting of the latter. In fact, authors like Ruiz-Castillo (1987) or Ruiz-Huerta and Martínez (1994) have indicated that a large percentage of households in the Spanish Consumer Expenditure Survey (*Encuesta de Presupuestos Familiares*, EPF) report more expenditures than incomes. This result is also confirmed for the Spanish rotating panel survey (*Encuesta Continua de Presupuestos Familiares*, ECPF) data by Cantó (1998). Most precisely, in the Spanish context Sanz (1996) underlines the fact that using the EPF in 1990-91 it is not possible to recover Spanish National Account Data on household income. This is especially worrisome when we check that underreporting is not homogeneous in the population but is concentrated in capital incomes, self-employment incomes and social protection subsidies different from pensions. [5]

This paper is organized as follows. The next section revises the most important theoretical approaches on the choice of welfare indicator. Subsequently section three puts forward the most relevant issues of this choice for distributional dynamics and revises the literature on income distribution that uses each or both indicators. Section four focusses on the revision and comparison of previous results for Spain on the use of income or expenditure as a measure of well-being while section 5 presents details on both the definitions and the data source used. Section six deals with the sensitivity of inequality, poverty and mobility measures for Spain when changing indicator. Finally, the last section summarizes our main findings.

2. Changing income or changing consumption?: The issues.

Consumption is ideally defined as the sum of expenditures on current purchases plus the value of self-consumed goods (self-produced or not), the use-value of the expenditures on consumer durables and the imputation value of owner-occupied housing [see World Bank (2000)]. This definition shows that using consumption has an important range of problems related

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[5] Note however that Sabelhaus and Schneider (1997) underline that consumption data are by no means less prone to measurement error than income data while none of the two indicators account for financial wealth or changes in relative asset prices over time which would really add information on the explanation of the trends of well-being.

to the estimation of use-value of consumer durables and the need to use imputations on the value of housing. In practice, most of the empirical literature uses monetary expenditures as a proxy of consumption given the difficulties in both estimating the value of self-consumed goods, the use-value of durables[6] and calculating some credible imputation value for housing.[7]

The theoretical justification of the use of expenditure as a good indicator of household welfare is based on the predictions of intertemporal models of the choice between current and future consumption. These models are integrated either in life-cycle models such as Modigliani and Brumberg (1954) or in "permanent income hypothesis" models such as Friedman (1957) and predict that, in the presence of uncertainty, the concavity of utility functions will lead individuals to smooth consumption along their lifes through savings or incurring in temporary debt. These models suggest that, in this context, individuals' consumption will only respond to *permanent* increases in incomes and not to merely *transitory* changes in their earnings which will, instead, be destined to savings.[8]

Most studies on these matters underline that there is a high similarity in the pattern of expenditures and incomes over the life-cycle. Some authors have then resumed that the predictions of the life-cycle hypothesis do not hold while others have tried to search for alternative explanations. Indeed, some authors indicate that the year-to-year variability in expenditures is partially explained by household's changes in needs (changes in number of members and their composition) which implies that considering equivalent expenditures the pattern is slightly flatter, even if one still observes a large reduction of consumption at advanced ages (after retirement mostly). In line with Heckman (1974) this could be partially explained by the complementarity between the some goods' consumption and labour market participation – See Attanasio and Banks (1997) for an analysis of demographic and labour market factors and the life-cycle. Also, some authors have indicated that the wish to save in order to heir, invididuals risk aversion (precautionary reasons in an uncertain world) or individual liquidity constraints may explain a non-flat pattern of expenditures over the life-cycle. Most precisely, the existence of liquidity constraints in relevant parts of the income distribution may be one of the motives that may explain the existence of an excess reaction of expenditures to changes in net disposable incomes respect to the predictions of a life-cycle model. In fact, Japelli (1990) using the Survey

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[6] Slesnick (2001) tries to estimate the service flows from consumer durables for the US using various sources of information.
[7] From now onwards we will use the wording "expenditures" and "consumption" as equivalents even if we are concious of the differences.
[8] The main difference between life-cycle and permanent income models is that while the former consider a finite time horizon, the latter are constructed with an infinite one.

of Consumer Finances for the US shows that household's current income, current wealth and household member's age are relevant variables in determining if a household considers a credit claim. Thus if low income individuals may face liquidity constraints, this reasoning becomes particularly important when analysing incomes or expenditures in a distributional perspective.

Indeed, Mercader-Prats (1998) indicates that it is commonly recognized that in practice, liquidity constraints are important, particularly among poor households. The lower permanent income is the higher the need to increase savings to cover emergencies and thus the lower consumption will be. Also, age or social and cultural factors could be considered to explain low consumption of risk-averse consumers. She concludes that "*In sum, [...] consumption is more subject to individual idyosincracies than income, the superiority of consumption over income as a proxy of the household long run welfare level can no longer be taken for granted*".

Zeldes (1989) is a relevant piece of empirical evidence on these matters. The author finds that for those in the lower tail of the income distribution the rate of consumption growth (on food and drink, PSID) is related with the retarded value of incomes while that is not true for those at the higher tail of the distribution. He interprets this result as evidence on low income liquidity constraints. Other authors show a high correlation between the increases in expenditures (on food and drink) and wages. The empirical literature here, however, is rather limited and it could be the case that, as Attanasio (1999) notes, "*once one controls for the influence that demographics and labour supply might have on the marginal utility of consumption, there is no evidence of excess sensitivity of consumption to income or rejection of the overidentifying restrictions. Female labour force participation and family size seem to be particularly important in this respect*" (page 791). In Attanasio's view the life cycle model, enriched to account for demographic and labour supply variables, is not rejected by the available data. However, the same author indicates that the validity of the model is limited to mid-aged individuals (around 45 years of age), while there is much work to be done on consumption patterns of either the young or the old-aged. Precisely the old-aged are to be specially difficult to model given their significant changes in labour status that brings in the discussion the non-separability of leisure and work in their utility function. This, together with other characteristics associated with these households such as changes in size, health and the increase in the probability of death, may clearly affect household consumption. Thus, evidence on the important decrease in consumption of the old-aged may be a result of an optimal life-cycle model once one makes all the previous considerations. Clearly, it may also be the case that savings during active life turn out as insufficient at old-age and thus consumption

adjusts to this situation (this could take place if the individual overestimated his/her future pension).

Several empirical studies have tried to contrast the predictions of the models that imply that individuals' consumption should show a rather smoother pattern than income. However, there is a variety of methodological approaches in the studies that have tried to contrast empirically the life-cycle or the permanent income hypothesis. Basically, we find two types of approaches: those which analyse time-series of income and expenditure using National Accounts data and those who analyse microdata on household incomes and expenditures from large household surveys. Attanasio (1999) notes that the first agregate approach has serious problems in interpreting the estimated coefficients and this has led researchers to focus their efforts in microdata analysis.

However, the use of microdata is not free of difficulties. The lack of long enough household panels with sufficient information on expenditures and incomes has forced analysts to construct expenditures pseudo-panels from cross-sectional samples datasets such as the American Consumer Expenditure Survey. In this case researchers follow different cohorts as if it were the same individual i.e. constructing a pseudo-panel by grouping households in age cohorts. The other possibility has been the tentative to use a proper household panel such as the Panel Study of Income Dynamics (PSID) for the US, one of the worldwide's best long-term income panels available. The problem is that precisely this panel does not provide researchers with a reliable information on expenditures given that it has been proved to have strong biases because it only includes household's expenditures on food and drink.

Attanasio (1999) using National Accounts data for the UK (1965-1996) and the US (1959-1996), has showed that net incomes present a higher degree of variability than non-durable expenditures. In contrast, expenditure on durables, as one would expect, is subject to a high level of variability. Using cohort data this author shows also that both incomes and expenditures follow an inverted-U pattern where the maximum appears at the household's head age of 45, which seemingly seems to contrast with life-cycle theory which would predict a constant level of consumption. We should note, however, that, as expected, expenditures on non-durables show a significantly higher volatility than those on durables.

Blundell and Preston (1998) using British data (the British Family Expenditure Survey, FES) identify the increase in income variance due to either permanent shocks or temporary changes within the same cohort. They measure the temporary increase in the variance of incomes as the difference between the variance of incomes and the variance of expenditures (that

approximate the permanent increase in the variance). Other similar studies that have decomposed income changes into transitory and permanent shocks are Gottshalk and Moffit (1994), Moffit and Gottschalk (1995), Gittleman and Joyce (1996) or Buchinsky and Hunt (1997). More recently, and using a similar methodology, Attanasio *et al.* (2002) widen the focus of previous studies in order to analyse the path from inequality in hourly wages to consumption inequality using information on labour participation decissions, savings possibilities, transfers and formal or informal insurances that allow for household's consumption smoothing. These authors try to relate the increase in wage inequality in the UK and the contemporary increase in consumption inequality in order to test the hypothesis that insured wages shocks are not reflected in consumption while those not insured would be. They conclude that much of the growth in earnings inequality in the 1980s is attributable to growth in permanent wage inequality among younger cohorts.

3. Income or Consumption in analysing the income distribution: The evidence

The question is: should we use income or should we use consumption in order to measure individual's well-being? Both the use of expenditure and income data in order to measure inequality and poverty has been widespread. For example, until the mid-nineties Eurostat used consumption expenditure data to derive poverty ratios for each country in the UE [see Eurostat (1990)] while since the European Community Household Panel is available all results on poverty for UE countries are calculated using household income data.

As we indicated in the introduction there are advantages and dissadvantages of choosing one of these indicators. Also, there are good reasons to suppose that consumption and income measures will differ across population subgroups (see Slesnick, 1991). Lyfe-cycle models have had a strong influence on the literature on income distribution by generating a large and increasing list of papers which use expenditure as an indicator of individual long-term welfare. Expenditure inequality in the US has been analysed by Attanasio and Davis (1996)[9], Cutler and Katz (1991, 1992), Slesnick (1993, 2001) or recently by Krueger and Perri (2003) and in the UK by Goodman, Johnson and Webb (1997). Implicitly, the idea behind these pieces of research is that current household consumption is expected to be more associated with *permanent* income than current household income. Within the works on these matters we can also distinguish two

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[9] These authors analyse the variability of wages to consumption.

groups of studies: those that use households' pseudo-panels and those that use household panel datasets.

In principle, one would predict that, due to consumption smoothing, non-durable consumption distributions should be less skewed than income distributions. However, there are less economic reasons to predict why income and consumption distributions differ by age for example. Cutler and Katz (1991) and Slesnick (2001) for the US using the Consumer Expenditure Survey confirm that total annual expenditures are distributed more equitably than annual incomes and, as expected, non-durable expenditures are even more equally distributed than total annual expenditures. Cutler and Katz (1991), however, also present evidence on the fact that income inequality is more sensitive to changes in unemployment and inflation than consumption inequality. Sabelhaus and Schneider (1997) investigate the extent to which a consumption based measure of welfare differs from the, more traditional, income approach for Canadian households and obtain that the difference in dispersion of income and expenditure is small when opposing consumption to a relatively "permanent" income measure.

Regarding poverty, in his study for the US, Slesnick (1993) finds that current income overstates poverty respect to current consumption. A recent publication by Slesnick (2001) discusses specifically this matter for the US and claims that households classified as poor respect to disposable income are able to consume almost 1.7 times their annual income in 1985. He claims, even if it is not directly implied by his results, that this provides evidence on income smoothing of the poor. In any case, he finds that consumption poor households are less educated, have fewer physical assets and their relative expenditure on necessities is substantially larger than income poor households.

Recent research on income distribution has started to work on dynamics and has focussed on the mobility of household incomes and expenditures. For example Jappelli and Pistaferri (1999) try to evaluate the mobility in non-durable expenditures for Italian households by contructing transition matrices. They construct different models with decreasing levels of consumption smoothing. A complete consumption smoothing is rejected given that roughly 50 percent of Italian households move up or down in the consumption distribution between any two periods. They show that measurement error is unlikely to explain a large fraction of total cross-sectional variance of consumption and thus a great deal of consumption mobility is explained by idiosyncratic shocks that households are unable to insure. Fischer and Johnson (2002) undertake the same analysis for the US using both aggregate cohort data (Consumer Expenditure Survey,

CEX) and longitudinal data from the PSID. They show that results are very similar using both sources of data and that the level of mobility of income and expenditure is remarkably similar.

One of the few studies that consider the effects of the choice of welfare indicator on poverty dynamics is that of Bradbury *et al.* (2001). These authors mention that the implications of the indicator of welfare used for the measurement of transitions into and out of poverty is relatively simple: if a household falls in income poverty only during a short time thus leaving poverty quickly after entrance, welfare during that period will crucially depend on the household posibilities of saving-dissaving in order to finance consumption during a low income period. Some works have considered the measurement of the capability of consumption smoothing of low income households but have reached contradictory results. For the US, Rodgers and Rodgers (1993) conclude that "*there is always more evidence that some poor households can save and dissave and they actually do so*", while Kempson (1996) for the UK concludes that the households most vulnerable to poverty, especially those formed by young adults with children, often lack of savings or any other financial assets to finance consumption during low income periods. Other evidence for the US such as Ruggles and Williams (1989) underline than in the majority of cases households' savings do not permit maintaining consumption expenditures during the whole period of low income. In general, it looks as if households suffering from a decrease in their incomes tend to preferably retard their durable expenditures. Obviously, the longer the low income period the more difficult it will be for these households to maintain their previous level of consumption expenditures through either their savings or by incurring in financial debt.

4. Income or Consumption: The Spanish context.

The detailed analysis of income and expenditure time series for Spain can be found in Estrada and Buisán (1999) whose conclusions are that non-durable consumption and services is the most important and stable component of consumption but, in the same way as residential investment, has reduced its weight in favour of durable consumption. The three components of consumption are pro-cyclical, but while durable goods go some time ahead National Gross Domestic Product cycle, non-durables move at the same time so that in booms it looses relative weight and it recovers it at the peak. Savings are slightly procyclical too confirming the theoretical idea that, under certain circumstances, savings are a good indicator of individual's

expected incomes even after all changes in the extension and coverage of the Spanish Welfare State.

The main determinant of household long-term consumption is purchase power. However, while consumption on non-durables and residential investment present an income elasticity below one, durables consumption is estimated to be 1.4 which is near what one would expect for a luxury good. Other variables that seem to have a significant impact on household consumption expenditures are: the financial wealth-income *ratio* for non-durable goods; the use-value and the relative price of energy for durable goods and real interest rates and the relative price of housing in the case of residential investment. In the short-run, non-durables consumption decissions seem to be influenced by the financial wealth-income ratio, real interest rates, the unemployment rate and the evolution of inflation.

Regarding the effects of the choice of indicator on inequality and poverty in Spain we have that Ayala *et al.* (1993), Del Río and Ruiz-Castillo (1996), Gradín (2002) and Cantó (1998) find that using the cross-sectional data since 1973, or in the panel data since 1985, total annual consumption is more unequally distributed than total annual income. More exactly Del Río and Ruiz-Castillo (1996) indicate that "*The comparison between expenditure and incomes from the 1980 and 1990 EPF confirms the surprising results obtained by other authors* [see Ayala *et al.* (1993)], *that total incomes show lower inequality than total expenditures. This is so even if we compare incomes with non-durable expenditures (eliminating investment components)…*". Most authors have thought that this is to be due to a large measurement error in household's declared incomes in Spain and has been recurrently referred to justify the use of expenditures as welfare indicator.

Further, using expenditure data from the ECPF on Spanish households and in the line initiated by Blundell and Preston (1998), Cutanda (2002) analyses inequality using expenditure information on households. He centres the discussion in a very restricted definition of expenditures including only strictly non-durable goods and services such as food and drink, energy, water, transport services and communications. Adjusting this household expenditure with an OECD scale, eliminating the lowest and highest percentiles of the distribution and using a household-specific price deflator he reports a higher variance in incomes than in expenditures and a reduction in expenditure inequality along the 1985-95 period in Spain.

In any case, the evolution of inequality and poverty using both indicators has not been deeply studied. The use of consumption was defended by authors such as Ruiz-Castillo following the work of Slesnick (1991, 1993) as the best approximation to permanent household well-being.

Also, the works of Sanz (1996) and Mercader-Prats (1998) seem to offer solid arguments on the choice of consumption in order to measure well-being for Spanish households. We should mention the efforts made to improve the consumption expenditures indicator for Spain undertaken by Peña and Ruiz-Castillo (1998) where expenditure variables are corrected by the effect bulk-purchases for food and drink.

Income, however, has also been presented as an attractive source of information by various researchers on the Spanish distribution given its advantages in comparing results for Spain with those for other countries, the possibilities of decomposing inequality into the contributions of various income sources or in cases where authors aim to consider both the statics and the dynamics of the distribution. Indeed, the works undertaken by Pena (1996) or Cantó (2000) and those which focus the discussion on the choice of accounting period such as Cantó *et al.* (2002) use longitudinal income data in measuring mobility or poverty dynamics. These studies find that, during the 1980s and 1990s the level of household income mobility is significant in Spain given that 60 percent of households change decile from one year to the next. However, the change in incomes is rather limited given that only 14 percent of movers move two deciles or more. Income mobility shows in the 1985-1991 period a slightly increasing pattern while income inequality was consistently decreasing in Spain. Interestingly the levels of mobility obtained for Spain are outstandingly similar to those reported by Jarvis and Jenkins (1996) for the UK, in a period where both countries are experiencing a radically different evolution of inequality. Alsotheir results indicate that the shorter the accounting period the higher income poverty estimates.

5. *The longitudinal dataset and some relevant definitions*

5.1 *The* Encuesta Continua de Presupuestos Familiares *(ECPF)*

In this paper we use a sub-annual panel of incomes and expenditures on a sample of Spanish households similar to the American Consumer Expenditure Survey (CEX) or the Survey of Income and Program Participation (SIPP). In our case we have a rotating panel survey which interviews 3,200 households every quarter (substituting 1/8 if its sample at each wave) and offers us information on seven different sources of incomes and very detailed information on

expenditures. Further the panel includes a large amount of demographic and socio-economic household characteristics. Households are kept in the panel for a maximum of two years.[10]

An important methodological consideration is that of the need of defining a treatment of outliers, Cowell and Schluter (1998) have underlined the necessity of trimming the distribution tails given that the majority of mobility indicators are very sensitive to the presence of data contamination (either the presence of zeros or incredibly high reported incomes or expenditures). In order to minimise the problem we follow the same procedure as Schluter and Trede (1999) and Ayala and Sastre (2002) and for each wave we eliminate households whose equivalent income or expenditure is situated below the first or above the 99th percentile. The number of observations we lose is relatively low: 2 percent of the sample each quarter and 9 percent of the sample in the pool (in the case of the pool we eliminate all households that are *contaminated* in one of their interviews).

In the static analysis for each year we select the sample of households who are, at least, in their 4th interview the last quarter of the year in order to reconstruct their annual income and expenditures and calculate inequality and poverty indices. Further, to compare annual and quarterly information we consider their information for the second quarter of the corresponding year. After trimming the tails of the distributions, our mean sample for analysing distributional statics consists of 1,504 households. Note that all our calculations here are computed using on individuals.

For the dynamic analysis, instead, we need to reconstruct household's income and expenditure for two consecutive years. For this purpose we construct a *pool* sample of households observed in the panel during two years and we compute mobility measures comparing the first year's annual income or expenditure (the sum of their first four quarterly observations) with that of the second year (the sum of their last four quarterly observations). Finally we also calculate mobility measures for quarterly data by comparing this same households information at fourth and eighth interviews. After trimming the tails of the distributions, our *pool* sample consists of 7,177 households. Note that in all our results our samples will be systematically weighted for representativeness of the Spanish population and for attrition.

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[10] See Gradín *et al.* (2004) for details on the advantages and dissadvantages of this dataset and for details on the weighting method.

5.2 Some relevant definitions

The choice of the household as unit of study is based on the fact that an individual's well being is believed to strongly depend on total household welfare (if income is equally distributed within the household). Also, the shortage of demographic and socio-economic information (apart from age and sex) of individuals other than the head of household and the spouse in the data makes this choice advantageous. Following, to some extent, the terminology in Jenkins (2000), a clear way to write our economic measure of well being is to use the household income-equivalent or *HIE*. HIE_q^h is the needs-adjusted household h income or expenditure at quarter or year q. Thus:

$$HIE_q^h = \frac{\sum_{l=1}^{L}\sum_{k=1}^{K} x_{lkq}}{m(a,L)} ,$$

where l indicates the number of individuals in the household (l=1,2..., L) and k is each money income source or each expenditure group. The denominator is an equivalence scale factor, which depends on household size L and on a vector of household composition variables a (ages of individuals, etc.). Our welfare measure HIE_q^h is therefore adjusted by household needs using the parameterised Buhmann *et al*. (1988) scales, such that:

$$m(a, L) = (household\ size)^s, s \in [0,1],$$

with the value for the parameter fixed at an intermediate value, s=0.5.

Income is monetary individual disposable income defined as the net sum of all monetary incomes which flow to the household in the reference period (quarter or year) and includes employment and self-employment income, income from regular transfers (including pensions and unemployment benefits), investment income and income from other sources. It excludes social insurance contributions and it is net of pay-as-you-earn taxes.

Consumption is approximated by two expenditure variables: the sum of expenditures on current purchases excluding the value of self-consumed goods and the imputation value of owner-occupied housing is *total monetary expenditure* and the sum of expenditures on current purchases minus expenditures on durables is *non-durable*

monetary expenditure (avoiding the estimation of use-value of durables). Monetary expenditure excludes all expenditures on housing, in-kind wages and self-consumed goods. Non-durable monetary expenditure is monetary expenditure net of expenditures on new or second-hand vehicles or other personal means of transport and on housing conservation repairs of all kinds.[11] Non-durable expenditures are approximately a 7 percent smaller than total monetary household expenditures.
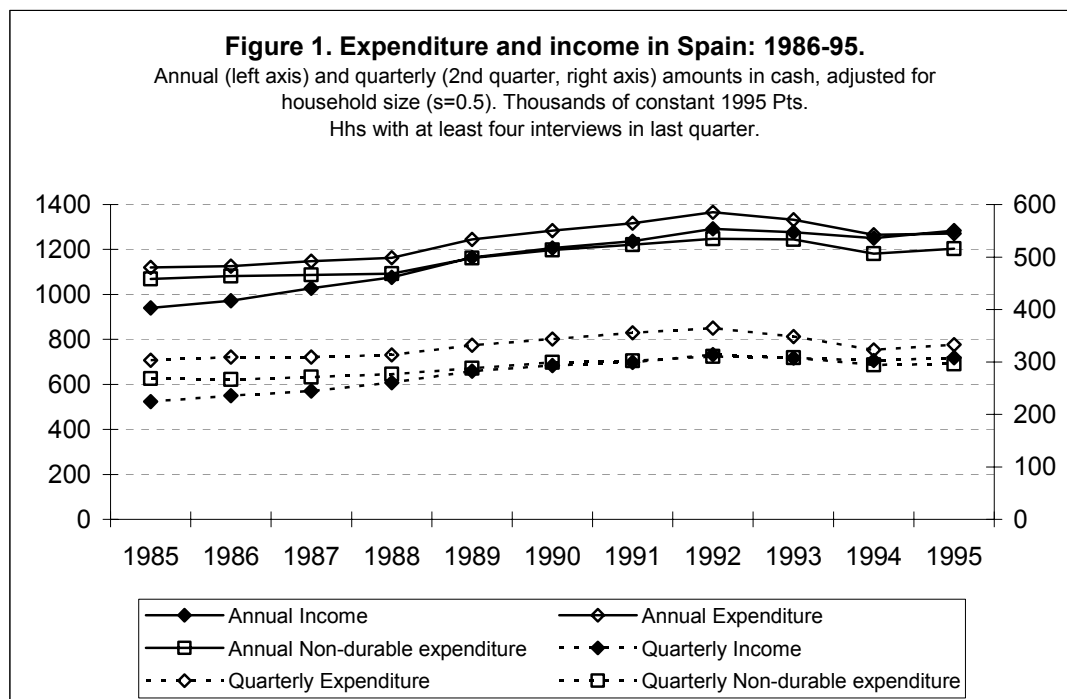
6. Inequality, Poverty and Mobility using both indicators: The results

6.1 Inequality and Poverty using different indicators.

We have analysed the distributions of total monetary income, total monetary expenditure and monetary expenditure in non-durables. First, in Figure 1 we present the evolution in time of the average annual and quarterly amounts of each of these variables in constant pesetas.

As we can observe the evolution is that of a clear increase in average household incomes and expenditures during the period of economic boom (1985 and 1992) and a change of pattern from 1992 onwards as the Spanish economy enters in a period of economic crisis. It is important to note that expenditures averages have a much flatter path compared to incomes while the dissaving pattern (average incomes below average expenditures) observed between 1985 and 1988 starts to dissappear from 1989 onwards. Moreover, in 1995 average incomes equal expenditures including durables. In the same graph we can check if these patterns hold when we consider quarterly information. Analysing the figure we can conclude that the evolution of annual and quarterly income and expenditure is essentially the same.

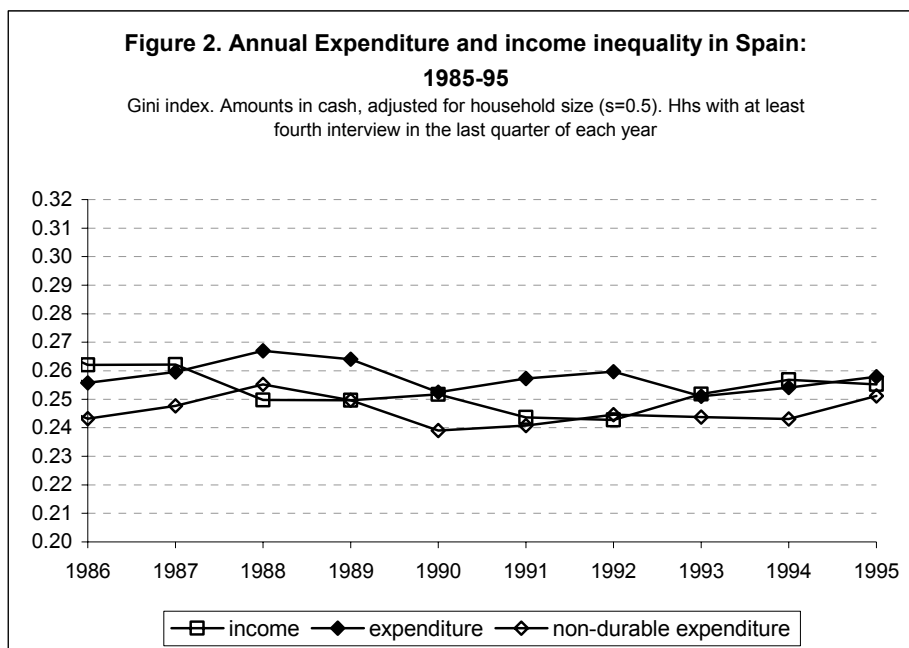[11] We here follow the methodology proposed by Arévalo *et al.* (1995) where durable expenditures are purchases or repairs of vehicles and investment in housing repairs even if some very recent literature on consumption inequality using data on the US such as Krueger and Perri (2003) includes an estimation of service flows of vehicles and housing as part of household non-durable consumption.

Figure 1. Expenditure and income in Spain: 1986-95.
Annual (left axis) and quarterly (2nd quarter, right axis) amounts in cash, adjusted for
household size (s=0.5). Thousands of constant 1995 Pts.
Hhs with at least four interviews in last quarter.

We are now ready to approach a first measurement of how the distribution of incomes and expenditures in Spain has evolved in the period. For this we present Figures 2 and 3 where we resume results on all variables' Gini index for both quarter and annual information.

Both figures show first that, as expected, the levels of income inequality are larger when we limit the information to the quarter, reflecting the sub-annual fluctuations of incomes and expenditures. Secondly, and most importantly, in the case of Spain we can see that consumption expenditures inequality is either equal or above income inequality. More precisely, in line with results for Spain in Del Río and Ruiz-Castillo (1996) and Ayala *et al.* (1993), in most years it is expenditure inequality that is higher than income inequality. However, considering non-durable expenditure inequality instead, we go slightly towards the expected theoretical result and expenditure inequality is either equal or below income inequality. Thirdly, it is interesting to note also that using quarterly information instead, expenditure inequality is always larger than income inequality and the differences in the level of both indices are subtantially larger to the case when we consider annual information.
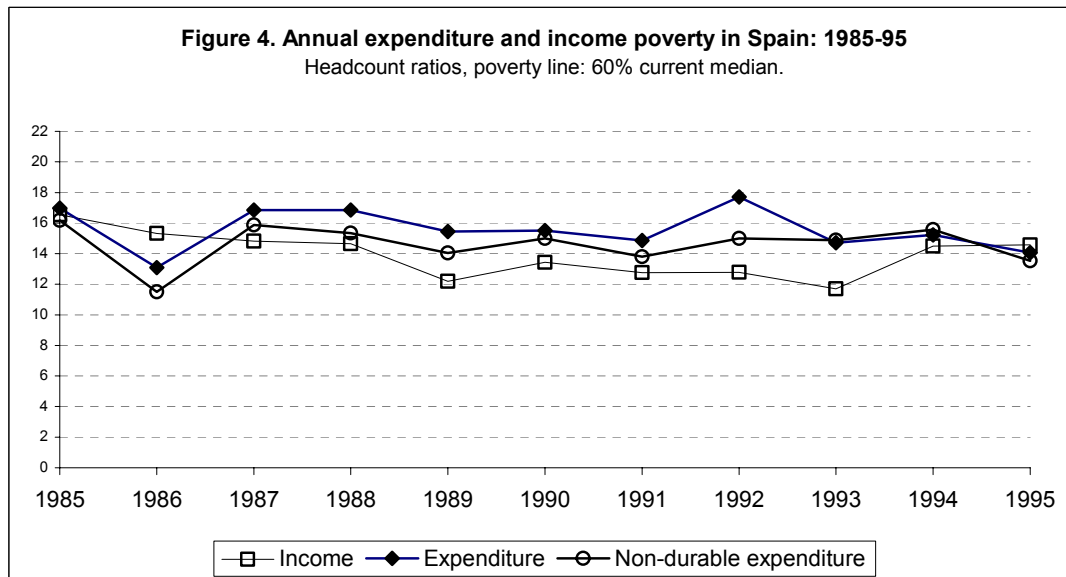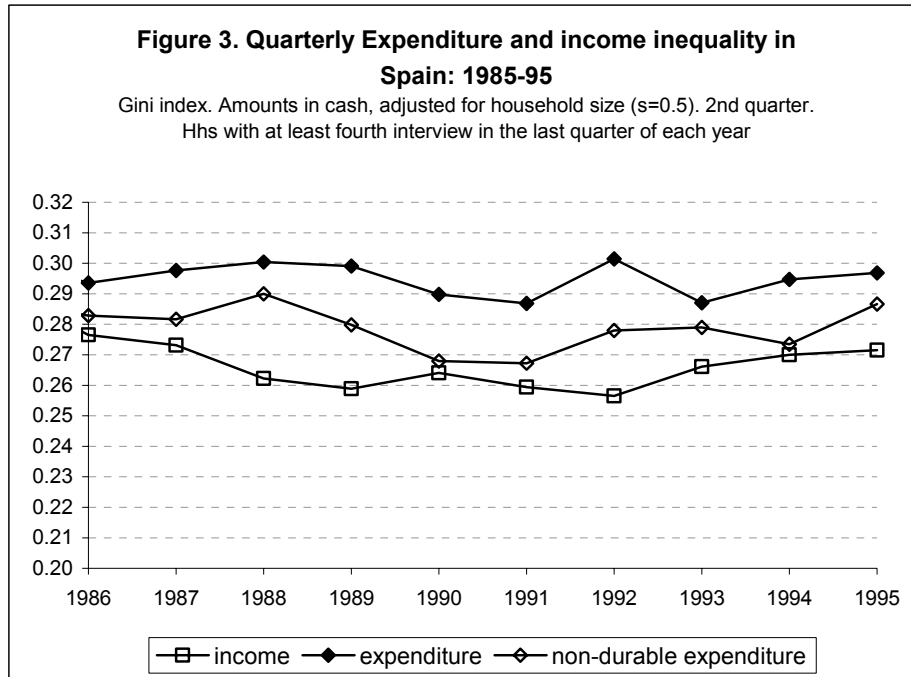
Further, we must underline here that the evolution of expenditure inequality in Spain has been rather different to that of income inequality. While income inequality follows an u-shaped pattern with a decrease between 1986 and 1989, a stable pattern between 1989 and 1992 and a consistent increase from 1992 onwards, expenditure inequality (both total and non-durable expenditure), instead, increased in the initial years (1986-88), decreased from 1988 to 1990-91 and was relatively stable with some slight increase from then onwards.

Figure 2. Annual Expenditure and income inequality in Spain: 1985-95
Gini index. Amounts in cash, adjusted for household size (s=0.5). Hhs with at least fourth interview in the last quarter of each year
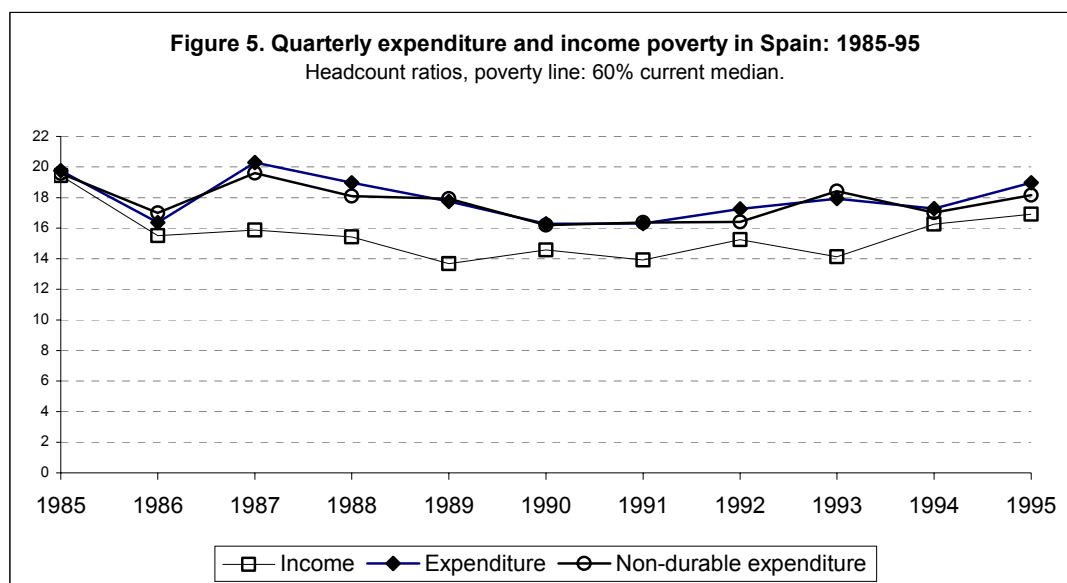
Turning now to the analysis of the different *incidence* of poverty when using income or expenditure as welfare indicators, we construct Figures 4 and 5 where we present results of the Headcount index: percentage of households below a certain level of income or expenditure (poverty line). We use here a relative concept of poverty and draw the line on the 60 percent of the contemporary median. As we can see, the incidence of poverty using expenditure variables is, almost consistently, higher than that when using income. Similarly to the analysis of inequality, the evolution of income poverty incidence follows a u-pattern while consumption expenditures poverty is, first, rather more stable and has a slightly decreasing trend.

The previous result confirms results on poverty in Cantó *et al.* (2002). In fact, in the lines indicated by these authors using income data we here see that, as expected, either income or

expenditure quarterly data detects a higher incidence of poverty compared to using annual information. Thus, households may experience low income or may decide to spend exceptionally less during one quarter of the year but this is often compensated by incomes or expenditures over the usual in other quarters.

Figure 3. Quarterly Expenditure and income inequality in Spain: 1985-95

Gini index. Amounts in cash, adjusted for household size (s=0.5). 2nd quarter.
Hhs with at least fourth interview in the last quarter of each year

Figure 4. Annual expenditure and income poverty in Spain: 1985-95

Headcount ratios, poverty line: 60% current median.

Figure 5. Quarterly expenditure and income poverty in Spain: 1985-95
Headcount ratios, poverty line: 60% current median.

Plotting the complete distribution of incomes and expenditures will give us both detailed picture of the distribution and will explain how changes in the definition of poor may have using each variables. With this purpose we present Figure 6, 7 and 8 where we calculate kernel distribution estimates for annual income, expenditure and non-durable expenditures. The vertical line situates the poverty line. Figures 6 and 7 indicate that expenditures are more concentrated than incomes in the lowest part of the distribution and, therefore, expenditure poverty is significantly more extreme. This is consistent with Slesnick (2001) result on the fact that consumption poor households are less educated, have fewer physical assets and their relative expenditure on necessities is substantially larger than income poor households, this could be the case because consumption expenditures poor are more probably situated in extreme poverty than income poor.

Household monetary income, instead, is more concentrated around the poverty line implying that when using income as welfare indicator results on poverty for Spain are more sensible to changes in the definition of the poverty line. Viewing Figure 8 we confirm that the distribution of durable consumption is extremely similar to that of total consumption expenditures.[12]

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[12] This is even more so if we were to consider the quarterly consumption expenditure distribution.

Figure 6. Income and expenditure *kernel* densities in Spain: 1985-95 pool
variables in logs

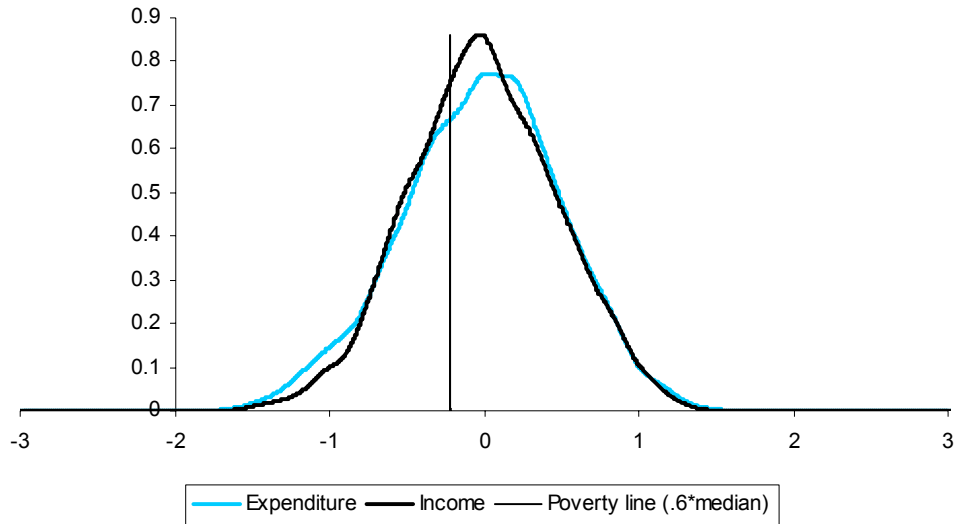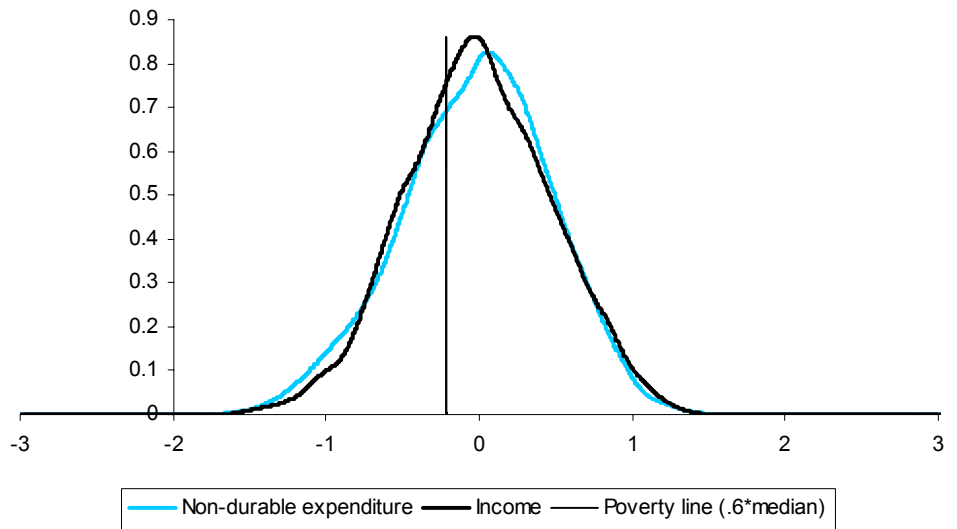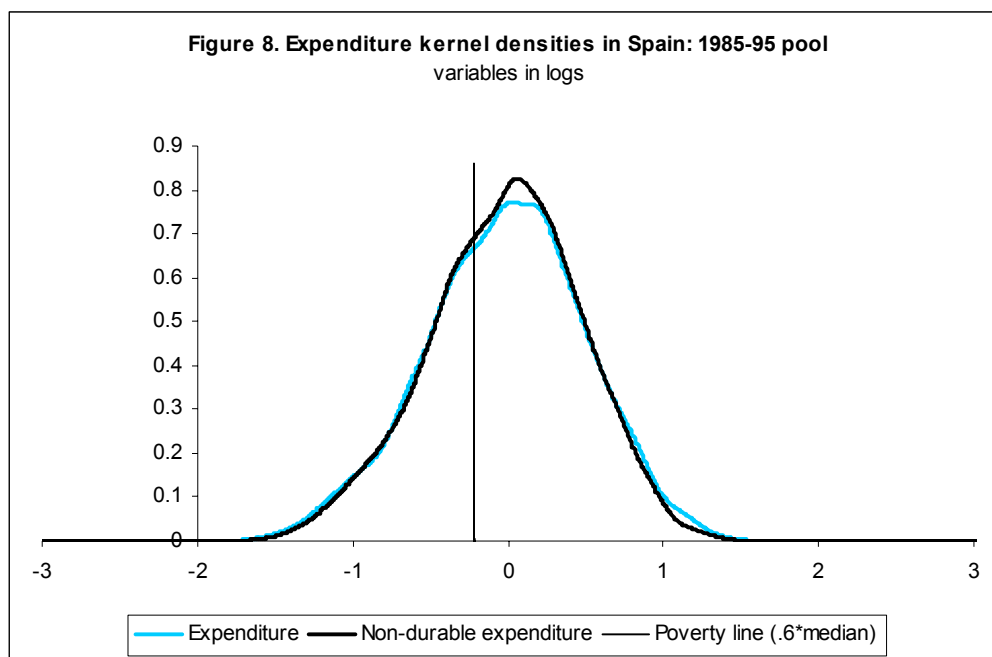Expenditure — Income — Poverty line (.6*median)

Figure 7. Income and expenditure kernel densities in Spain: 1985-95 pool
variables in logs

Non-durable expenditure — Income — Poverty line (.6*median)

Figure 8. Expenditure kernel densities in Spain: 1985-95 pool
variables in logs

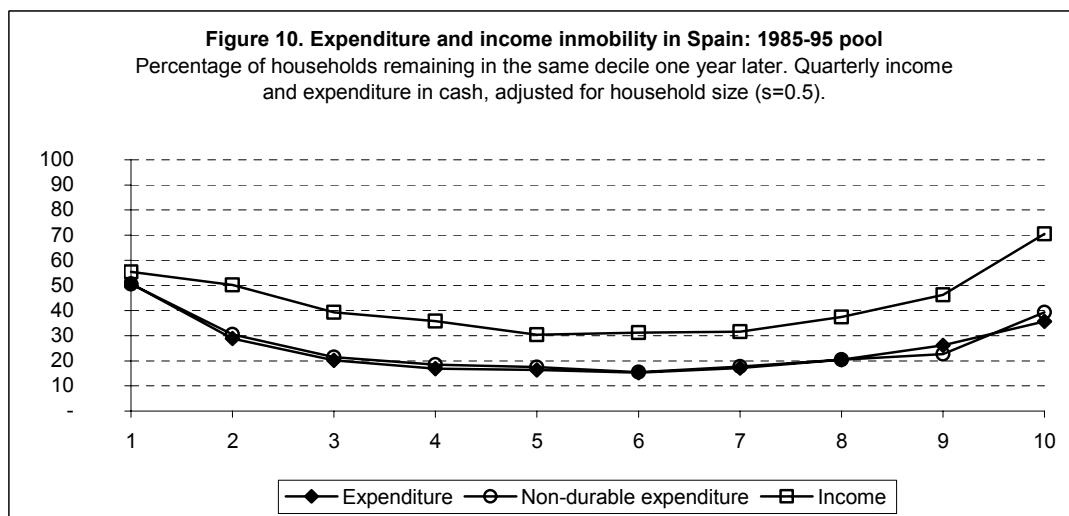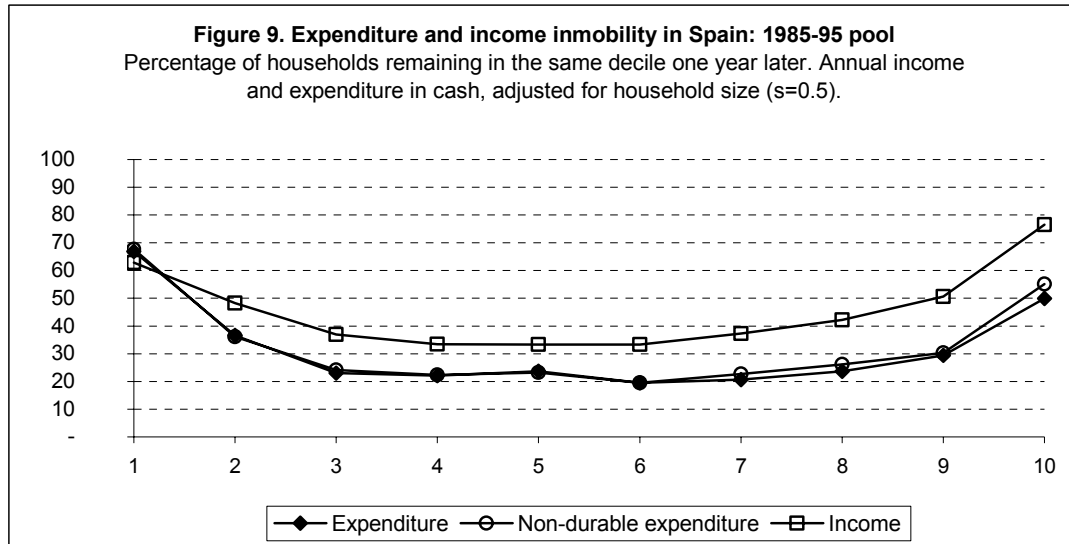Legend: —— Expenditure —— Non-durable expenditure —— Poverty line (.6*median)

6.2 Mobility using different indicators.

A very relevant part of the aims of this work was that of adding evidence on the effects of using expenditures on the analysis of intra-distributional mobility. With this purpose we have calculated different mobility indices, which try to reflect different aspects of the concept. First we compute two indices obtained from transition matrices which will reflect transitions between income or expenditure states. Secondly we calculate an index that reflects the reduction in inequality dimension of mobility as the accounting period is extended: the Shorrocks index of inmobility R. We finally conclude our battery of indices presenting some results using an index that reflects the *origin independence* dimension of mobility: the Hart index.

In Figures 9 and 10 we present the percentage of households remaining in the same decile one year later when we classify households by their corresponding decile. It is clear from both graphs that, as obtained in Cantó (2000), households in the middle of both distributions are more mobile than households in the extremes. Interestingly, and contrary to what one would expect in a life-cycle model, household incomes register less mobility than household expenditures, while household non-durable expenditures do not show a significantly lower level of mobility than total expenditures.

It is easy to observe also that this is not true for households in the first decile. First decile households have an outstanding behaviour both using quarterly and annual information. Further,
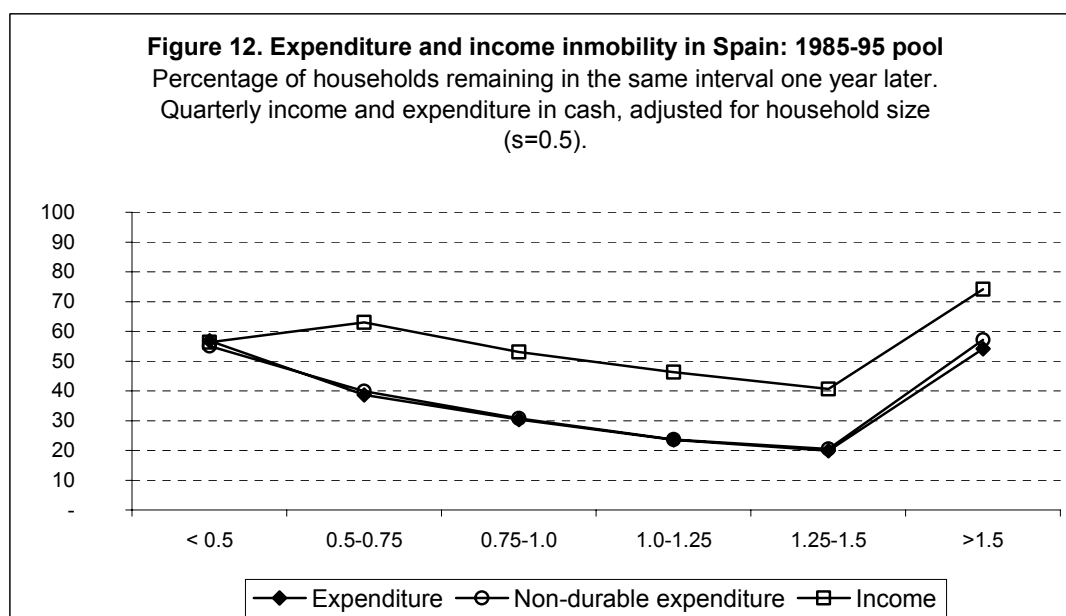
the differences in mobility in low deciles are significantly smaller than over the sixth decile and the difference consistently increases with the deciles. Thus, contrary to what the theory suggests, we find here that, for our data on Spain expenditure is more unstable than income in time, even when we delete some important durable items from consumption.

Figure 9. Expenditure and income inmobility in Spain: 1985-95 pool
Percentage of households remaining in the same decile one year later. Annual income and expenditure in cash, adjusted for household size (s=0.5).

Figure 10. Expenditure and income inmobility in Spain: 1985-95 pool
Percentage of households remaining in the same decile one year later. Quarterly income and expenditure in cash, adjusted for household size (s=0.5).

Thus, it appears as if one would need to furtherly restrict expenditures by considering the deletion of other durable items so that we could approach the right theoretical pattern: less inequality and less mobility than using incomes. And here comes our actual point: this may be an adequate choice for other economic analysis purposes but if we are trying to measure well-being: would we regard it convenient to reduce welfare to the consumption of food, drink, tobacco, energy and little more?

It is important to check, however, if these results hold when we define some other income groups given the limitations of the use of decile matrices in order to analyse transitions. One of the problems of decile transition matrices is that in the middle part of the distribution the limits between deciles are narrow in absolute terms and this clearly means that relatively small changes in household incomes or expenditure may imply a change of decile while this is much more unlikely as one approaches the bottom or the top of any of the two distributions.

With the purpose of checking our previous results we have constructed other transition matrices where groups are defined using percentages of incomes or expenditures medians. Results appear in Figures 11 and 12.

Figure 11. Expenditure and income inmobility in Spain: 1985-95 pool
Percentage of households remaining in the same interval one year later.
Annual income and expenditure in cash, adjusted for household size
(s=0.5).

Figure 12. Expenditure and income inmobility in Spain: 1985-95 pool
Percentage of households remaining in the same interval one year later.
Quarterly income and expenditure in cash, adjusted for household size
(s=0.5).

Here we confirm first, that mobility appears to be lower in the extremes than in the middle in the distribution. Secondly, we also confirm the differentiated behaviour of the extreme poor who, while the rest of households register higher expenditure than income mobility they exhibit the contrary or, at most, a similar level of both variables.

Note however that we also find some differences between the results using these matrices and regular decile matrices. First, our second group, which essentially includes the second and third decile, is now more persistent in incomes than the extreme poor, indicating that households

near the poverty line may be less mobile in incomes those at the very bottom of the distribution. Further, we find that, under these premises, relatively high income and expenditure groups show the highest levels of mobility. Indeed, the new division underlines the fact that those households situated between a 25 and a 50 percent over the value of the median in incomes or expenditures are the most mobile in all distributions, interestingly those households were previously included in the 8th decile group and showed more persistency than mid-distribution decile groups.

Again if we calculate mobility using quarterly income and expenditure we find, as expected, that a quarterly accounting period imposes a higher level of mobility. Interestingly the difference in mobility levels is significantly larger using expenditure than using income.

We have also computed, as indicated earlier, various mobility indices in order to compare the effect on different aspects of mobility when using a different indicator of household well-being.[13] First, we calculate a transition matrix-based index: the Shorrocks-Prais M index which can be expressed as,

$$M = \frac{n - tr(P)}{n - 1},$$

where P is the transition matrix and n is the number of income or expenditure groups in which the distribution is divided (using deciles $n=10$ for example). The index has a limit value of 0 when there is complete inmobility and has no fixed upper-limit, even if given *origin independence* the index should reach the value of 1 (households have equal probability of being situated anywhere in the distribution at the second moment). Further, we compute the Shorrocks R index of mobility which measures the degree at which incomes or expenditures equalize as we increase the accounting period. This index can be expressed as,

$$R = \frac{I(Y)}{\sum_k w_k I(Y_k)} \quad donde \; w_k = \frac{\mu_k}{\mu},$$

where $I(Y)$ is total period income or expenditure inequality and $I(Y_k)$ is subperiod inequality, w_k is weights each period by its contribution to the total mean income or expenditure.

Finally, an index that reflects *origin indipendence* is the Hart index expressed as:

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[13] See the Appendix for details on how to compute mobility indices in the *pool* of observations.

$$M_{HART} = 1 - \rho\left(\log x, \log y\right),$$

where x is income or expenditure in the first sub-period and y is income or expenditure in the second period. This index could be seen as directly associated with income or expenditure volatility and probably also with the idea of "equality of opportunities".

Results including confidence intervals using 1000 replications bootstraps appear in Table 1. All indices confirm the previous results and thus, contrary to the presented theoretical arguments, we find that, for our sample of Spanish households, mobility is significantly larger using expenditure than using income. However, in line with what would be expected, non-durable expenditure es significantly more stable than total expenditure, confirming the infrequency of expenditures on durables. In any case, if we choose to use a quarterly accounting period total and non-durable expenditure mobility results are outstandingly similar.

Table 1. Annual and Quarterly income and expenditure mobility: 1985-95 pool

ÍNDICES ANNUAL	Expenditure			Non-durable Expenditure			Income		
	Estimate	Confidence interval -95%		Estimate	Confidence interval -95%		Estimate	Confidence interval -95%	
		Min	Max		Min	Max		Min	Max
Shorrocks (Gini)	0.050	0.047	0.053	0.041	0.039	0.044	0.029	0.027	0.031
Shorrocks (GE0)	0.105	0.099	0.110	0.091	0.087	0.097	0.081	0.072	0.094
Shorrocks (GE1)	0.099	0.094	0.104	0.083	0.079	0.088	0.065	0.060	0.070
Shorrocks (GE2)	0.106	0.100	0.113	0.086	0.081	0.092	0.061	0.056	0.067
Hart	0.278	0.259	0.306	0.222	0.199	0.258	0.148	0.128	0.181
Shorrocks-Prais M	0.210	0.200	0.221	0.175	0.167	0.185	0.133	0.124	0.143
QUARTERLY									
Shorrocks (Gini)	0.083	0.079	0.087	0.076	0.073	0.080	0.043	0.040	0.046
Shorrocks (GE0)	0.176	0.168	0.185	0.169	0.162	0.178	0.116	0.108	0.124
Shorrocks (GE1)	0.163	0.156	0.171	0.152	0.147	0.160	0.094	0.088	0.101
Shorrocks (GE2)	0.171	0.163	0.179	0.155	0.148	0.163	0.085	0.079	0.091
Hart	0.422	0.402	0.444	0.370	0.353	0.391	0.177	0.165	0.191
Shorrocks-Prais M	0.345	0.330	0.360	0.322	0.309	0.337	0.194	0.183	0.207

Considering the results obtained by Attanasio (1999) we wondered if it was the age of household members that was driving our results given that this author insists in the fact that life-cycle hypothesis would hold for households with middle-age individuals. Dividing the sample into groups defined by the head of household's age we have again calculated all previous mobility indices. Our results appear in Table 2 and indicate that whatever the household head's age mobility is significantly larger using expenditure than using income. Thus, it seems that this result does not directly depend on the household's life-cycle situation but on some other matters.

Table 2. Annual income and expenditure mobility by head of household age: 1985-95 pool

ÍNDICES Head <35 years	Expenditure			Non-durable Expenditure			Income		
	Estimate	Confidence interval -95%		Estimate	Confidence interval -95%		Estimate	Confidence interval -95%	
		Min	Max		Min	Max		Min	Max
Shorrocks (Gini)	0.056	0.049	0.065	0.045	0.039	0.053	0.034	0.027	0.044
Shorrocks (GE0)	0.110	0.096	0.125	0.093	0.080	0.107	0.095	0.076	0.117
Shorrocks (GE1)	0.111	0.097	0.125	0.090	0.077	0.104	0.076	0.060	0.093
Shorrocks (GE2)	0.122	0.106	0.140	0.096	0.082	0.111	0.067	0.052	0.083
Hart	0.299	0.256	0.340	0.223	0.188	0.256	0.134	0.108	0.170
Shorrocks-Prais M	0.225	0.198	0.253	0.180	0.159	0.204	0.147	0.123	0.175
Head 35-55 years									
Shorrocks (Gini)	0.052	0.047	0.057	0.041	0.037	0.045	0.028	0.025	0.032
Shorrocks (GE0)	0.109	0.099	0.118	0.093	0.086	0.101	0.098	0.079	0.130
Shorrocks (GE1)	0.103	0.095	0.111	0.084	0.078	0.091	0.070	0.062	0.080
Shorrocks (GE2)	0.109	0.100	0.119	0.085	0.077	0.093	0.063	0.054	0.076
Hart	0.280	0.254	0.306	0.212	0.188	0.249	0.151	0.114	0.214
Shorrocks-Prais M	0.225	0.208	0.242	0.182	0.168	0.196	0.142	0.127	0.159
Head >55 years									
Shorrocks (Gini)	0.050	0.046	0.054	0.042	0.038	0.046	0.028	0.024	0.032
Shorrocks (GE0)	0.107	0.099	0.114	0.094	0.087	0.102	0.067	0.058	0.078
Shorrocks (GE1)	0.099	0.092	0.107	0.086	0.079	0.093	0.059	0.051	0.067
Shorrocks (GE2)	0.107	0.097	0.118	0.090	0.081	0.101	0.059	0.052	0.069
Hart	0.284	0.249	0.337	0.240	0.200	0.308	0.152	0.121	0.199
Shorrocks-Prais M	0.214	0.199	0.229	0.184	0.170	0.199	0.126	0.113	0.140

6. Conclusions

In this paper we have analysed the effects on empirical analysis of the choice of welfare indicator on the statics and dynamics of the income distribution. With that purpose in mind we undertook the analysis using a longitudinal survey: the Spanish "Encuesta Continua de Presupuestos Familiares" (ECPF), a source with which we have been able both to consider information from sub-annual periods and to reconstruct the household's complete picture on incomes and expenditures over a period of two years.

Our results show that for a sample of Spanish households, contrary to the suggestions of most of the theory, consumption expenditures inequality is either equal or above income inequality. Further, the evolution of expenditure inequality observed in Spain in the 1985-95 period is significantly different to that of income inequality.

The study of poverty shows that the incidence of poverty using expenditure variables is, almost consistently throughout the period, higher than when using income. By plotting both

distributions we conclude that Spanish households classified as consumption poor are more concentrated in the extremes poverty than those classified as income poor. This result is consistent with Slesnick (2001) who detects that consumption poor households in the US are less educated, have fewer physical assets and their relative expenditure on necessities is substantially larger than income poor households.

A very relevant part of the aim of this work has been also that of adding evidence on the effects of using expenditures on the analysis of intra-distributional mobility. Interestingly, and contrary to what one would expect in a life-cycle model, household incomes register less mobility than household expenditures, while household non-durable expenditures do not show a significantly lower level of mobility than total expenditures. This result is confirmed by a large battery of mobility indices and seems to be robust to different head of household's age, implying that the life-cycle moment the household is not decissively driving our results.

A complete evaluation of all our results would appear to suggest that it is only by furtherly restricting expenditures through the deletion of other durable items, that we could approach the right theoretical pattern: less inequality and less mobility using expenditure than income. Our point is: this may be an adequate choice for other economic analysis purposes but if we are trying to measure well-being: would we regard it convenient to reduce welfare to the consumption of food, drink, tobacco, energy and little more?

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APPENDIX ON MOBILITY MEASURES USING THE ECPF

In the calculation of mobility measures our procedure differs slightly from the usual one given that we are using a rotating panel dataset. More precisely, for example, in order to calculate the Shorrock's *R* index in order to measure mobility as *compensating inequality*, where mobility is defined as the degree in which inequality is reduced as we sum up the income that individuals receive in different consecutive periods –two in our case-, we need to compute:

$$R = \frac{I\big[Y(t_0,t_2)\big]}{w_1 I\big[Y(t_0,t_1)\big] + w_2 I\big[Y(t_1,t_2)\big]}$$

where *Y()* is a vector of households' relative income between two moments in time:

$$Y\big(t_{k-1},t_k\big) = \big(Y^1\big(t_{k-1},t_k\big),...,Y^m\big(t_{k-1},t_k\big)\big), \text{ } k=1,2, \text{ and } Y\big(t_0,t_2\big) = \big(Y^1\big(t_0,t_2\big),...,Y^m\big(t_0,t_2\big)\big)$$

Index *R*, compares inequality in two different sub-periods $\big(t_{k-1},t_k\big)$, *k=1, 2,* to that in the complete reference interval $\big(t_0,t_2\big)$. Note that *I(Y)* is any strictly convex inequality index and w_k is weighting inequality levels by the share of aggregate incomes received in each period:

$$w_k = \frac{\mu(t_o,t_k)}{\mu(t_o,t_1) + \mu(t_1,t_2)}, \text{ } k=1, 2.$$

Given that our data consists of a pool of households that were observed during eight consecutive quarters between 1985 and 1995, there are some details we must adjust in order to compute *R* soundly.

For each household *i* in the pool we compute income at 4th interview relative to average income that quarter, and this will be $Y^i\big(t_0,t_1\big)$:

$$Y^i\big(t_0,t_1\big) = \frac{Y^i_{t_i}}{\mu_{t_i}}, \text{ } t_i\text{=quarter at which } i \text{ had its 4}^{th} \text{ interview.}$$

In the same way we compute household income one year later, 8th interview, $Y^i\big(t_1,t_2\big)$:

$$Y^i\big(t_1,t_2\big) = \frac{Y^i_{t_i+4}}{\mu_{t_i+4}},$$

and total income received during both sub-periods:

$$Y^i\big(t_0,t_2\big) = \frac{Y^i_{t_i} + Y^i_{t_i+4}}{\mu_{t_i} + \mu_{t_i+4}}$$

Doing this for all households in the pool we obtain three vectors of relative income: $Y(t_{k-1}, t_k)$, $k=1,2$, and $Y(t_0, t_2)$. The divergence of our procedure with the standard one is that, since households in the pool were interviewed in different years, each household income is constructed as relative to its *contemporary* average and not to the average across the pool. Finally, we compute R weighting sub-period inequalities by the share of incomes in the fourth and eight interviews across the pool:

$$w_1 = \frac{\sum_i Y_{t_i}^i}{\sum_i Y_{t_i}^i + \sum_i Y_{t_i+4}^i} \text{ and } w_2 = \frac{\sum_i Y_{t+4}^i}{\sum_i Y_{t_i}^i + \sum_i Y_{t_i+4}^i}.$$