Self-perceptions and perceptions of peers: their role in understanding expenditure behaviours

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Abstract

In the last decades, the analysis of individual consumption behaviours has been enriched by considering several non-rational features of (i) self-perceptions and (ii) perceptions of peers that can affect people's spending decisions, such as subjective well-being and feelings about different aspects of life, as well as measures of social comparison. However, at our knowledge, no studies have yet considered the two sources of emotionality simultaneously. This study aims to investigate the simultaneous role of these two emotional facets in affecting expenditure behaviours of Italian individuals for the year 2016, considering two measures of own satisfaction, relative quantities of SWB and expenditure, and inequality measures. Our results, controlling for potential sources of endogeneity, reveal a significant role of both aspects in influencing individuals' spending habits.

Keywords Expenditure behaviours · Subjective well-being · Perception of peers · Inequality · Utility measures

JEL Classification D12 · I31 · P46

1 Introduction

For a long time, researchers have considered households and individuals to be rational agents in view of a utilitarian perspective. Conversely, in the last decades, many studies began to look at these agents as emotional people, affected in their economic decisions by feelings, perceptions and subjective well-being (Laros and Steenkamp 2005). The purpose of this study is to address this issue. Indeed, considering this recent and alternative perspective, it is essential for policy makers, national governments and industries to understand how people, and then economic outcomes, are affected by feelings' perceptions and happiness with different aspects of life.

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In the literature of Economic of Happiness, the interest of researchers in understanding how subjective well-being (SWB) influences different life's economic outcomes has increased considerably. One of the motivations behind this new frame of research was found by Lyubomirsky et al. (2005), who observed an increase in happiness levels before and during successful outcome episodes. The empirical evidence of a positive effect of SWB on economic variables has been shown in different frameworks such as personal earnings, productivity, and probability of employment (De Neve, Diener, Tay and Xuereb 2013; De Neve and Oswald 2012; Oswald et al. 2015; Walsh et al. 2018).

In the analysis of individual spending behaviours, Geyskens and Steenkamp (2000), Guven (2012) and Zhu et al. (2020) revealed a significant effect of SWB in affecting consumption expenditures. Specifically, considering Dutch household data, Guven (2012) identifies lower levels of marginal propensity to consume among happier people while Zhu et al. (2020) report an improvement in the expenditures of households living in rural areas through an increase in happiness levels, when these are mediated by income diversification and general enhancements in technology infrastructures. Geyskens and Steenkamp (2000) split SWB into two separate terms: a first one, referring to the immaterial (social and affective) features of life, and a second one, closely related to material aspects (economic conditions). The results of the analysis show that emotionality with economic and social domains largely influences people's consumption decisions.

Aiming at evaluating how economic decisions are affected by feelings, perceptions and subjective well-being, a self-centred point of view may be not sufficient. Economists have long argued that individuals may care about their own income level both in absolute terms and in comparison with others (Clark and Oswald 1996; Luttmer 2005; Solnick and Hemenway 2005). Then, beside the meaningful role given by individuals to self-reported SWB, we consider the comparison with peers as a second aspect related to households and individuals' non-rationality, generating changes in decision patterns. As pointed out by Foy et al. (2014), while authors usually concentrate on the material aspects of social comparison, the emotional outcomes of inequality are a relevant and meaningful topic as well in the analysis of individual behaviours. Indeed, "*people who occupy the lower positions in unequal social structures experience negative, impotent, and unengaged feelings that depress their quality of life*" (Foy et al. 2014, p. 295).

As underlined by Aristotle, "*Man is by nature a social animal; an individual who is unsocial naturally and not accidentally is either beneath our notice or more than human*". More recently, the prospect theory postulated that individual utility measured as level of satisfaction may be influenced by social comparison due to the natural reference point represented by peers (Tversky and Kahneman 1991). In the literature on subjective well-being, individuals appear to be more psychologically satisfied when they feel to overcome the others (Clark, Frijters, and Shields 2008), deriving positive utility from status tied to their rank in the distribution of expenditure, income, or similar measures of well-being.

In the analysis of consumption behaviours, the empirical evidence show that individuals' utility is strongly affected in some way (positively or negatively) by average levels of others and inequalities among individuals belonging to the same relevant reference group. Therefore, individual expenditures come out to be intertwined with the spending habits of others (Harriger-Lin et al. 2020). Referring to the analysis of conspicuous consumption, it can be argued that it exists a significant relationship between expenditure of individuals and average levels, as well as inequality, about the reference group. Despite the general agreement in the literature about this nexus, a general consensus on the magnitudes and signs of the impact of the comparison with peers on individual utility measures has not yet been achieved.

Nevertheless, despite the relevance of different sources of emotionality in the analysis of individuals spending habits, at our knowledge no studies have yet considered perceived self-reported satisfaction levels and perceptions of others simultaneously. Therefore, the main aim of the paper is to test the hypothesis that:

H1 Individual expenditures will be affected not only by the typical individual characteristics (like age, family status etc.) but also by the feeling of own well-being and by perception of others.

In order to test this hypothesis, using data on Italian individual expenditures and satisfaction for the year 2016, we combine various life satisfaction scores to construct two measures of well-being: one related to the satisfaction with economic conditions and the other with the satisfaction with the social sphere. In addition to these two measures, we also take account of utility experienced by the reference group in a twofold reading: average levels and inequality.

Moreover, we further test the possibility that:

H2 One or more utility measures related to peers can affect individual consumption behaviour.

Following Attanasio and Pistaferri (2016), and in contrast with most economists and statisticians who refer to income to depict inequality, we evaluate perceptions of peers focusing on two of the most meaningful aspects detecting individuals' utility, i.e. consumption and satisfaction, as the final goals of people's lives.

In sum, at our knowledge, this is the first paper that investigates the simultaneous role of self-perceptions (measured by satisfaction with economic conditions and satisfaction with the social sphere) and perceptions of peers (using average levels and inequality measures) in affecting expenditure behaviours. Moreover, the second novelty of the paper concerns the possibility that both consumption and satisfaction related to peers can affect individual spending behaviour, allowing to disentangle the economic and social facets of social comparison.

The results of the analysis, controlling for endogeneity using two stage least square estimation procedure, show the meaningful role of both satisfaction metrics and perceived disparities in influencing the spending behaviour of individuals. In particular, the two satisfaction variables and peers' expenditure have a positive impact on individual spending levels. At the same time, individuals appear to be not influenced by the SWB level of peers, while they consider satisfaction inequality as a negative meaningful determinant of expenditures.

Empirical findings from this work can lead to several economic implications. In particular, policy makers should mainly concentrate on the positive effect of self-reported SWB and on the negative impact of SWB inequality on expenditure. These insights suggest the relevance of developing place-based programs (Bernini and Tampieri 2019; 2020) to improve the overall satisfaction level of citizens and to mitigate SWB disparities due to their negative impact on people spending decisions.

2 Satisfaction as predictor of individual expenditures

The relationship between subjective and material well-being is of primary interest in the Economics of Happiness literature, with empirical investigations mainly focused on the effect of economic variables such as unemployment, inflation, income and consumption on happiness (Carver and Grimes 2019; Clark 2017, 2018; Diener et al. 2015; DeLeire and Kalil 2010; Reyes- García et al. 2019; Yeniaras et al. 2016; Verme 2011).

Recently, the reverse effect is receiving increasing attention (Kahneman and Krueger 2006; Guven 2012), which is partly due to the empirical evidence of the effect of SWB on successful economic outcomes. Taking income into consideration, Graham et al. (2004) found that positive expectations and happiness positively affect income levels in future periods. Likewise, in the longitudinal analysis of family incomes in the US, De Neve and Oswald (2012) provided insights on the causal relationship between well-being and income. Their analysis suggests that people showing high levels of happiness experience a significant increase in earnings many years later. Focusing on financial activities and investment preferences, Guven (2011) and Schoemaker (1993) demonstrated relevant differences in risk aversion, distinguishing between happy and unhappy people. In labour market analysis, starting from the fundamental work of Boehm and Lyubomirsky (2008), Walsh et al. (2018) found that happiness comes before success in several cases, considering cross-sectional, longitudinal and experimental data, thereby contributing to an increase in consumption (Graham et al. 2004). De Neve et al. (2013) found that subjective well-being affects individual future self-re-employment and re-entry wages, while Krause (2013) observed that a moderate degree of satisfaction is beneficial to success in business and in life as a whole. Moreover, happy people are more trustful, they tend to participate more in social activities and expand their social network, which may lead them to spend more on gifts (Guven 2011). Referring to expenditures, Zhu et al. (2020) and Guven (2012) have analysed the impact of happiness on consumption levels. The former, using Chinese data, found that higher levels of happiness are associated with an increase in expenditure, while the latter, using the Dutch Household Survey, found that happier people have a lower marginal propensity to consume. Geyskens and Steenkamp (2000) split SWB into social and economic well-being, showing that emotionality with both domains significantly affect people's consumption decisions.

3 Perceptions of others

Starting from early 1900 economists became more and more aware that a deep and comprehensive understanding of market behaviour is not possible without considering the psychological and social aspects that characterise households and individuals' decision processes. Moreover, in the following years, they increasingly acknowledged the relevance of socially-stimulated decisions on consumer demand analysis, as well as the importance of interpersonal effects (Tilman 1992). Focusing on the tendency to consume for status, Veblen generalized and simplified the analysis of socially-complex consumption phenomena (Bronner 1989) and limited his description primarily to ostentatious and visible consumption actions. Sumarwan (2011) found that the consumer purchasing decision process is influenced by individual and environmental differences. In particular, these last refer to the association of several individual characteristics with factors related to reference groups,

environment, and conditions of peers. Although this largely documented systematic correlation between relative economic measures and self-reported satisfaction scores, the heterogeneity and the interpretation of the empirical findings seems to be not always straightforward, and sometimes contradictory. Relative effects still represent a daunting challenge in consumption behaviour analysis, due to the issue of credibly identifying what is perceived by others, of defining what a proper reference norm is, and what visible and invisible features of peers are, in the current social and digital era.

Beside the distance from a specific reference group, inequality is one of the most investigated determinants of utility, generating quite controversial results in empirical studies, including negative effects (e.g. Alesina et al. 2004; Blanchflower and Oswald 2003; Graham and Felton 2006; Verme 2011), weak relationship (e.g. Di Tella and MacCulloch 2008; Reyes- García et al. 2019; Tavor et al. 2018) and positive effects (Clark 2003). However, the general idea is that inequality is not only associated to material aspects, but it can be also considered as a source of negative emotional features such as powerlessness, depression, and stress (Foy et al. 2014).

In recent years, interesting extensions related to income inequality perceptions have been provided by the literature on which aspects are perceived by people as inequal. In this sense, consumption inequality (Aguiar and Bils 2015; Meyer and Sullivan 2013; Heathcote et al. 2010) and satisfaction inequality (Van Praag and Ferrer-i-Carbonell 2011) started receiving growing attention, due to the substantial differences observed in terms of income-based inequalities.

Taking into consideration happiness inequalities, Veenhoven (1990) found that countries characterised by small income differences, major development, equal education chances and higher social security show a more equal happiness distribution. Lam and Liu (2014) for China, Okulicz-Kozaryn and Mazelis (2017) for the USA and Graafland and Lous (2019) for 25 OECD countries, demonstrated the association between socio-economic and happiness inequalities.

Researchers also concentrated on examining how consumption inequalities influences people's spending decisions, finding different and controversial results. In particular, Roychowdhury (2017) and Chai et al. (2019) found that an increase in peer group inequality reduces conspicuous consumption expenditure for Indian and South African households, respectively. On the contrary, Harringer-Lin et al. (2020), using U.S. survey data, demonstrated a positive association between expenditure inequality and household's expenditure share in clothing, jewellery, personal care, vehicles, alcohol, and tobacco and a negative association for the expenditure categories of healthcare, utilities, vehicle maintenance, home furnishings, and charitable donations. Specifically, they underlined that people's reaction to increased expenditure inequality can lead either to emulative behaviours or to the desire to be different from others.

In this paper we investigate the possibility that the living conditions of peers can influence people's expenditure as a result of comparisons with others. More specifically, we consider two different sources of emotionality related to average values and inequalities: consumption expenditure and happiness with overall life.

4 Model and variables

In this study, we model individual expenditure as a function of happiness, average measurements among the reference group, perceived inequalities, and several control variables. The model is formally given by:

$$Expenditure_i = f\left(Happiness_i, Reference_i, Inequality_i, Controls_i\right). \tag{1}$$

As first pointed out by Guven (2012), and then by Zhu et al. (2020), the reversal specification of the satisfaction-consumption function defined by Eq. 1 is not so common in literature. The main components of the equation are represented by the economic outcomes, here identified by individual equivalent expenditure, $Expenditure_i$; the SWB scores, given by $Happiness_i$; a set of average measurements characterising the reference group (identified by $Reference_i$); variables measuring perceived inequalities (i.e. $Inequality_i$) and a set of controls for individual, household and contextual characteristics (i.e. $Controls_i$). As underlined by Guven (2011, 2012) and Zhu et al. (2020), Eq. 1 could imply possible endogenous relationships. Therefore, aiming to control for endogeneity, we use a two stage least square estimator (2SLS) to perform our analysis, as described in the following sections.

Individual Expenditures and Subjective Well-being. Carver and Grimes (2019) depicted the dualism of income and consumption-based measures in defining material well-being. Despite the centenarian interest and the efforts of policy makers to improve classical measures of production and income, e.g. Gross Domestic Product, the authors examined the ability of surveyed income and consumption-based quantities to predict household utility, as defined by SWB measures. Guillen-Royo (2008) suggested how the use of consumption data can reveal fundamental aspects such as materialism, modern hedonism and social comparison.

In this paper, we measure individual equivalent expenditure, excluding unusual expenses, as household monthly expenditures, transformed in individual expenses by using the Carbonaro (1985) equivalence scale. Specifically, these amounts are obtained by using specific equivalence coefficients (related to family size) to equally share the total household's expenditure among the household's components. Indeed, when total consumption expenditures are investigated, the equal sharing represents the most useful transformation, since relevant expenses impact the whole household budget (among others, food, dwelling expenses and services) and concern all the family members.

Referring to subjective well-being, many studies have shown supporting evidence about surveyed life satisfaction scores as meaningful metrics of individual well-being (Helliwell et al. 2013). Empirical investigations mostly refer to self-reported values, collected as survey data, that measure satisfaction with overall life on a scale from 0 to 10 (Clark 2018). Usually, implications related to satisfaction with life domains are derived considering the estimates associated with status variables (e.g. being married, as a positive condition in social well-being, having a high-status job as positive aspect of job satisfaction), without considering the subjective evaluation of different dimensions of life. Decancq et al. (2015) depicted the relevance of the different aspects of life, such as health status, social relationships, job-related variables and environmental aspects in understanding individual overall happiness. Likewise, Easterlin and Sawangfa (2007) focused on the satisfaction scores of people taking four life domains into consideration: finance, family life, work and health.

In this paper, we assume that overall satisfaction is the result of several life domain scores, separable in two different dimensions: the social component and the economic

counterpart. The corresponding measures of satisfaction are derived considering the two terms as latent constructs of several domains of subjective well-being.

Relative measures and Reference norm. The comparison of own individual utility levels with respect to peers represents a fundamental aspect in this framework (Stephany 2017; Reyes-García et al. 2019). In the model proposed for this analysis, we include relative measures of SWB and expenditures, to control for the effect of the comparison with peers on spending behaviours (Attanasio and Pistaferri 2016; Heathcote et al. 2010; Van Praag and Ferrer-i-Carbonell 2011). An adequate identification of the reference group, with respect to objectives and geographic and temporal context, becomes fundamental. The need for a finer spatial detail of reference is evidenced by Oshio and Kobayashi (2011), who depict a relevant difference in the sensitivity of individuals to inequalities in relation to several features. In line with the famous idiom of the English-speaking world, the *keeping-up-with-the-Joneses* effect, the authors slightly improve the spatial detail in measuring inequalities, moving from the national to the prefectural level. Brodeur and Fleche (2019) increase the geographic detail of investigation (to the limit) considering the ZIP code level. People compare themselves and their economic and social conditions to neighbours, friends, and family members, and not to reference groups such as "compatriots" or "not personally-related" individuals (Graafland and Lous 2019). Nonetheless, in a social and digital era, referring solely to a narrow group of people, in geographical proximity and close in affection terms, could appear limiting and misleading.

In this work, the reference norm is obtained distinguishing between two main features identified by regional disparities (Capello 2016; Giarda and Moroni 2018; Lenzi and Perucca 2018; Odoardi and Muratore 2018), here represented by regions and urbanisation level, and a specific individual characteristic given by age classes. Indeed, "*Age inequalities occur throughout the whole age structure*" and "*they occur because age is used as a criterion for assigning people to roles that are differentially rewarded*" (Foner 1988, pp. 178). Age systematically shapes access to resources and life opportunities, and it is a source of inequality "*because social relations associated with it potentially led to long-lasting systematic differences in social opportunities and rewards*" (Western and Tomaszewski 2016). The role of this variable is central in characterising both SWB, as a well-known U-shape function (Helliwell 2003; Blanchflower and Oswald 2008), and the level and the composition of expenditures, as varying along the life cycle (Blundell et al. 1994; Fernadez-Villaverde and Krueger 2007).

Control variables. Following the Economic of Happiness literature, several individual characteristics are included in the regression analysis. In detail, the set of control variables considered in the specification is given by age, gender, education, marital status, urbanisation, macro-areas and the conditions of belonging to alternative, sensitive and vulnerable categories of population: being poor, unemployed and retired.

5 The data

The dataset has been built for 2016 considering two different Italian surveys, both developed by the Italian Office of Statistics (ISTAT): the first, Aspect of Daily Life (ADL), collects data about households' and individuals' living conditions, with a specific focus on satisfaction scores about overall life and several life domains, whereas the second, Household Budget Survey (HBS), quantifies the monthly expenditure habits of Italian households at a fine detail of spending aggregates. The two surveys are combined through the use of

common variables contained in the two datasets (D'Orazio et al. 2006), finally obtaining a synthetic file that provides information about 23,002 Italian citizens for 2016. For a review of similar solutions and empirical applications see Ridder and Moffitt (2007) and references therein. Further details, coherence indicators and descriptive statistics for the final dataset are shown in Appendix 1.

As previously described, a strong point of the ADL survey is represented by the availability of several satisfaction scores about different aspects of life. To use this multidimensional nature in full, we consider two main classes of well-being, representative of perceived satisfaction with the economic conditions and with the social sphere. The two classes introduced in the model are obtained starting from six specific satisfaction scores, measured on a 1–4 scale: relationship with friends (*Friends*), economic condition (*EconomicC*), health status (*Health*), happiness related to leisure time (*FreeTime*), evaluation of available income in relation to needs (*AvailableInc*) and evaluation of the current family economic condition compared to that of the previous year (*PreviousInc,* measured on a 1–5 scale, unlike the other variables). To summarise the information about the six domains, we extracted the two SWB measures through a factor analysis on the polychoric covariance matrix for the considered satisfaction scores (further methodological details on factor analysis are included in Appendix 2). The analysis of the factor loadings reported in Appendix 2 shows a first factor strongly associated to economic aspects (i.e. *EconomicC*, *PreviousInc*, *AvailableInc*) and a second one closely related to the social sphere of life (i.e. *Health*, *FreeTime*, *Friends*). Henceforth, we refer to these two factors as *EconSatisf* and *SocSatisf*, respectively.

Table 1 contains some descriptive statistics for the six life domains satisfactions (identified in the Table by Social Sphere and Economic Sphere), the two variables extracted through the factor analysis (SWB Factors) and the two instruments (Istruments), i.e. presence of green areas in the neighbourhoods (*GreenAreas*) and accesses to health care facilities (*Hospitalization*). A detailed discussion about the choice of the two instruments is reported in the following sections. Finally, in the last two rows on Table 1 we report some statistics about the two utility variables used to measure peers' perceptions, i.e. overall life satisfaction scores and total expenditure. Following the definition used to identify the reference groups, we distinguish between four age classes (defined by *Young* as people aged 18–29; *Middle-Aged* as 30–44; *Adult* as 45–59 and *Senior* as over-60 people), three urbanisation levels (*Metropolis,*[1] as identified by ISTAT (2015), *Urban* as residence areas with more than 50,000 inhabitants, and *Rural* as areas with less than 50,000 inhabitants), and three Italian geographic macro areas (*North*, *Centre* and *South and Islands*, for brevity *South*).

Concentrating on the different age classes, *EconSatisf* reports higher values for seniors (1.65) and lower levels for adults (1.58), while *SocSatisf* tends to decrease with ages, reflecting the pattern of the variables corresponding with these two aspects of life. Specifically, the oldest individuals experience lower levels of *AvailableInc* and *PreviousInc* but they are the most satisfied with their economic condition, while *Middle-Aged* and *Adult* are the least satisfied with their economic status. Moreover, satisfaction with the relationship with relatives and with the leisure time is higher for young people and seniors, while satisfaction with friendships and health tends to decrease with age. Referring to satisfaction

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[1] ISTAT identifies as Metropolis the 12 largest cities of Italy (Torino, Milano, Venezia, Genova, Bologna, Firenze, Roma, Napoli, Bari, Palermo, Catania, Cagliari) balancing physical and administrative characteristics.

Table 1 Descriptive statistics for life domains, overall life SWB and expenditure by variables defining the reference group. (Standard errors in brackets)

	Overall	Age-classes				Urbanisation level			Geographic area		
		Young	Middle-Aged	Adult	Senior	Rural	Urban	Metro	North	Centre	South
N	23,003	6425	4202	3758	8617	14,118	6114	2770	9834	4135	9033
Social Sphere											
Friends	3.03	3.16	3.15	3.02	2.89	3.03	3.04	3.03	3.09	3.03	2.97
	(0.00)	(0.01)	(0.01)	(0.02)	(0.01)	(0.73)	(0.74)	(0.71)	(0.73)	(0.74)	(0.73)
Health	2.92	3.14	3.11	2.94	2.65	2.92	2.92	2.92	2.98	2.91	2.86
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.72)	(0.72)	(0.69)	(0.71)	(0.72)	(0.72)
FreeTime	2.77	2.78	2.77	2.72	2.77	2.77	2.76	2.76	2.87	2.77	2.65
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.79)	(0.81)	(0.78)	(0.79)	(0.79)	(0.79)
Economic sphere											
EconomicCon	2.42	2.40	2.38	2.37	2.48	2.42	2.39	2.46	2.55	2.43	2.27
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.76)	(0.77)	(0.74)	(0.74)	(0.75)	(0.76)
AvailableInc	2.46	2.48	2.47	2.49	2.42	1.54	1.53	1.59	1.62	1.62	1.42
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.64)	(0.64)	(0.62)	(0.6)	(0.61)	(0.68)
PreviousInc	3.37	3.38	3.39	3.39	3.34	1.65	1.60	1.70	1.69	1.65	1.59
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.68)	(0.7)	(0.64)	(0.65)	(0.65)	(0.72)
SWB factors											
SocSatisf	2.83	2.92	2.90	2.79	2.75	2.84	2.83	2.83	2.91	2.82	2.75
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.53)	(0.53)	(0.50)	(0.52)	(0.53)	(0.52)
EconSatisf	1.61	1.59	1.60	1.58	1.65	1.61	1.58	1.66	1.69	1.65	1.51
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.53)	(0.54)	(0.50)	(0.50)	(0.49)	(0.56)
Instruments											
GreenAreas	0.81	0.82	0.81	0.81	0.81	0.84	0.79	0.74	0.92	0.85	0.68
	(0.39)	(0.38)	(0.39)	(0.39)	(0.39)	(0.37)	(0.41)	(0.44)	(0.27)	(0.36)	(0.47)
Hospitalization	0.03	0.02	0.02	0.02	0.05	0.03	0.03	0.03	0.03	0.03	0.03
	(0.18)	(0.14)	(0.15)	(0.14)	(0.23)	(0.18)	(0.17)	(0.18)	(0.18)	(0.18)	(0.17)

Table 1 (continued)

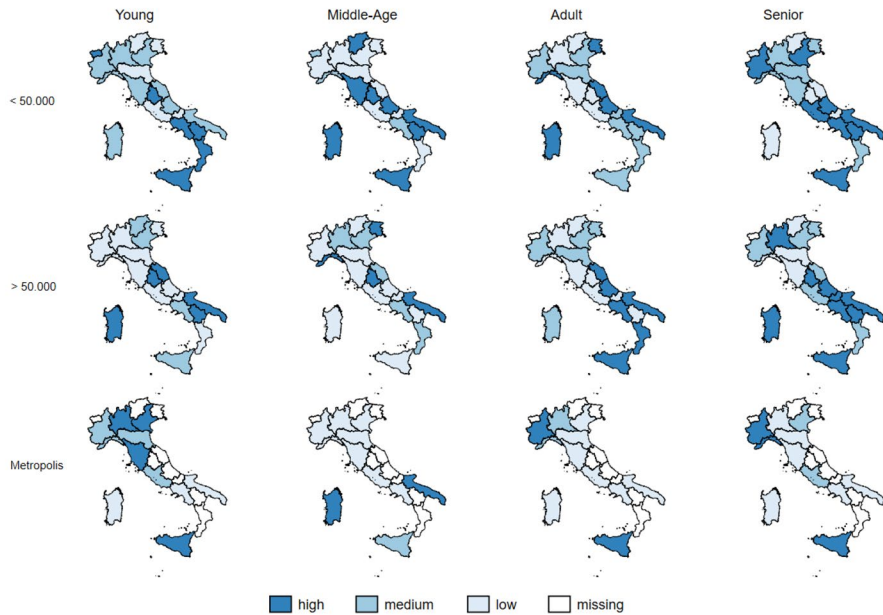|	Age-classes					Urbanisation level			Geographic area		
	Overall	Young	Middle-Aged	Adult	Senior	Rural	Urban	Metro	North	Centre	South
Utility measures											
Overall SWB	7.02	7.16	7.09	6.94	6.95	7.20	7.01	6.99	7.22	6.99	6.86
	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
Expenditure	1452.1	1345.8	1454.7	1563.0	1482.2	1381.9	1464.8	1695.5	1681.7	1477.8	1190.4
	(5.71)	(9.20)	(13.13)	(15.98)	(9.69)	(10.61)	(10.84)	(20.49)	(9.38)	(13.71)	(7.32)

Fig. 1 Well-being inequalities across regions

with relatives, economic condition and leisure time, adults are, on average, the least satisfied compared to the other age classes.

Focusing on the degree of urbanisation, *EconSatisf* reports higher values for people living in metropolis (1.66) while people living in urban areas are the least satisfied with their economic condition (1.58), reflecting the pattern of the variables concerning the economic sphere. Conversely, there are not substantial differences across the three urbanisation levels regarding the social sphere, reporting fairly constant scores across the three areas.

Finally, people living in the North of Italy are the most satisfied both for the economic aspects of life and for the social ones (*EconSatisf* and *SocSatisf* are equal on average to 1.69 and 2.91, respectively), while people living in the South of Italy are the least satisfied overall (*EconSatisf* and *SocSatisf* are 1.51 and 2.75 on average, respectively). In particular, all the variables considered in the analysis follow this pattern across the three Italian macro areas.

Referring to perceptions of others, in the last two rows of Table 1, we report some insights about the behavioural heterogeneity of overall life satisfaction scores and expenditure. This suggests the need to consider in the investigation relative measures for peers' utility, combining the three variables identified to build the reference groups. Moreover, we calculate the Gini index on total individual expenditure to measure spending inequality, while, to obtain a measure of satisfaction-perceived disparities it is necessary to use a suitable metric that takes the categorical nature of the SWB variable into account. Thus, starting from overall life satisfaction scores, measured by ADL as 0–10 scale variables, we consider a Gini impurity index to define SWB inequality (Kalmijn and Veenhoven 2005).
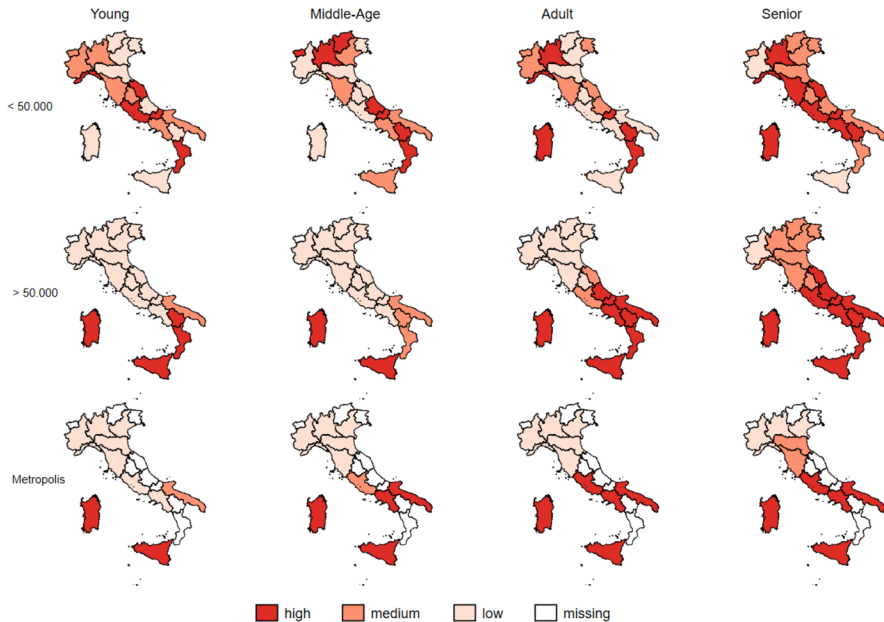
Fig. 2 Consumption expenditure inequalities across regions

In line with the three variables used to identify the reference norm, Fig. 1 shows the distribution of well-being inequality across the 20 Italian regions, directly differentiating for the level of urbanisation and age classes. Moving from the upper-left panel to the lower-right one, in rural and urban areas, well-being inequality is particularly evident in the Centre-South of Italy and it tends to increase at increasing ages, with some exceptions. Conversely, well-being inequalities in metropolitan areas are more evident for younger people living in Northern Italy and in Sicily.

The distribution of expenditure inequality is given in Fig. 2. Individuals living in the urban areas and in metropolises of Central and Southern Italy experience higher levels of consumption inequality compared to people living in the North.

Moreover, in these areas, the magnitude of expenditure inequality increases with age. Concentrating on rural areas, disparities seem to be less evident across the Italian territory, even if seniors continue exhibiting higher inequality levels.

6 Empirical specification

Starting from Eq. 1 the empirical model is given by:

$$\ln\left(Expenditure_i\right) = \alpha + \underbrace{\ln\left(EconSatisf_i\right)\varphi_1 + \ln\left(SocSatisf_i\right)\varphi_2}_{Ownperception}$$

$$+ \underbrace{Satisf\_Ref_i\delta_1 + Satisf\_Ineq_i\theta_1}_{Perceptionofpeers\_Social} + \underbrace{Econ\_Ref_i\delta_2 + Econ\_Ineq_i\theta_2}_{Perceptionofpeers\_Economic} + X_i\boldsymbol{\beta} + \varepsilon_i \tag{2}$$

where $\ln(EconSatisf_i)$ and $\ln(SocSatisf_i)$ are the logarithm of the two factors used to proxy satisfaction with the economic condition and with the social sphere respectively, for individual $i = 1, \dots, N$, and with φ_1 and φ_2 representing the related expenditure elasticities; $Satisf\_Ref_i$ and $Econ\_Ref_i$ are obtained as the average of own overall life satisfaction score and expenditure level observed for the individual specific reference norm, each time excluding the ith observation; $Satisf\_Ineq_i$ and $Econ\_Ineq_i$ are well-being and expenditure inequality, calculated as Gini impurity index and Gini index, respectively. X_i refers to the set of socio-demographic characteristics defined by: the dummy variable *Gender* (with male used as reference group); three dummy variables *Young*, *Middle-Aged* and *Senior* (*Adult* identified as baseline); the dummy variables *HighEdu* identifying individuals with highest level of education (academic and higher degrees); the set of dummies *Married, Divorced* and *Widowed* respectively identifying individuals that are married or in stable relationship, divorced and separated people, and widowed (singles are used as reference group); to capture economic vulnerable conditions we include the dummies *Unemployed* and *Retired* (the first representing both individuals that are looking for first employment and unemployed, and the second variable for retired people), and the dummy *Poor* for people reporting an equivalent expenditure amount below the Italian poverty line; the dummy variables *Rural* and *Metropolis* refer to the different urbanised areas of Italy (where *Urban* is the baseline) and finally, *North* and *South* are two dummies for Italian geographic macro-areas (with *Centre* used as reference group).

As pointed out by Guven (2012), Zhu et al. (2020) and Bernini et al. (2021), individual satisfaction can be a potential source of endogeneity in the analysis of consumption behaviour of people. To take into account this specific issue in the estimation of Eq. 2, a two-stage least square (2SLS) procedure is considered (Krause et al. 2013; Zhu et al. 2020). The approach is organized as follows: in a first step the two endogenous variables (i.e. the two scores of satisfaction) are regressed on the set of controls and on the two corresponding instruments; then, in the second step, the estimated residuals obtained in the first stage are included in the investigation of the outcome variable (i.e. individual expenditures), keeping constant the set of controls. In this analysis we consider as instruments the presence of green areas in the neighbourhood of individual residence, and accesses to health care facilities, capturing individuals' health condition. Considering green areas, since environmental conditions of living residence are related to external factors, in practice, they can theoretically and empirically be considered as relevant and exogenous sources of variance in explaining individual expenditure habits. Moreover, recently, the attention of researchers in evaluating the importance and complexity of the nexus between well-being and the natural environment dimension has strongly increased, finding evidence of a relevant association between these two dimensions (Helne and Hirvilammi 2015; Hopwood et al. 2005; Mace 2014). On the other hand, we can imagine that even if individuals are unsatisfied by the living environment in which their household lives, the absence of green areas in the closest surrounding territory should not impact the level of expenditure in the cross-sectional observation of individual spending.

Table 2 Nested Models

Ln_Expenditure	M1	M2	M3	M4	M5
Ln(EconSatisf)	1.06***	–	–	–	1.05***
Ln(SocSatisf)	0.33*	–	–	–	0.35*
Econ_Ref	–	0.60***	–	0.61***	0.59***
Satisf_Ref	–	–	0.02	0.26	0.08
Econ_Ineq	–	0.28***	–	0.36***	0.36***
Satisf _Ineq	–	–	− 0.72***	− 0.81***	− 0.67***
Res_Ln(EconSatisf)	− 0.94***	–	–	–	− 0.93***
Res_Ln(SocSatisf)	− 0.29	–	–	–	− 0.30
Young	− 0.12***	− 0.00	− 0.07***	− 0.01	− 0.06***
Middle − Aged	− 0.09***	− 0.03***	− 0.06***	− 0.05***	− 0.08***
Senior	− 0.10***	− 0.05***	− 0.05***	− 0.04***	− 0.09***
Gender	− 0.04***	− 0.03***	− 0.03***	− 0.03***	− 0.04***
HighEdu	0.06**	0.23***	0.24***	0.23***	0.06**
Married	− 0.02	0.01	0.01	0.01	− 0.02
Divorced	0.23***	0.07***	0.08***	0.07***	0.23***
Widowed	0.05***	− 0.03**	− 0.03**	− 0.03**	0.05***
Unemployed	− 0.07**	− 0.15***	− 0.15***	− 0.15***	− 0.07**
Retired	0.02*	0.06***	0.06***	0.06***	0.02**
Poor	− 0.55***	− 0.97***	− 0.96***	− 0.96***	− 0.55***
North	0.10***	0.03**	0.12***	0.03**	0.12*
South	0.01	0.03**	− 0.08***	− 0.05**	0.04***
Rural	− 0.06***	0.00	− 0.02***	0.01	− 0.03***
Metropolis	0.03***	0.02**	0.09***	0.02**	0.03**
Constant	6.50***	2.84***	7.76***	2.87***	2.51***

(***: p-value ≤ 0.01; **: ≤ 0.05; *: ≤ 0.1)

As for the access to health care facilities (e.g. hospitals and medical centre), one could argue that, other things equal, it exists a positive association between health status and satisfaction. Indeed, poor health conditions can lead to bad feelings such as distress from unfamiliar surroundings and scare of the unknown, negatively affecting the level of perceived life satisfaction of individuals (De Prophetis et al. 2020). On the other hand, the main characteristic of the Italian health system is represented by mixed public and private services and structures, guaranteeing free hospital admissions, several specialist consultations, lab analyses, and diagnostic procedures. Thus, it can be assumed that economic outcomes are not affected by the need of being hospitalized.

7 Results and discussion

The results of the estimation are collected in Table 2. In particular, M1 includes the estimates obtained starting from Eq. 2, only considering own perception measures, *EconSatisf* and *SocSatisf,* and residuals coming from first stage of 2SLS procedure (see APPENDIX

3 for the first stage estimated models), *Res_Ln(EconSatisf)* and *Res_Ln(SocSatisf)*; in M2 and M3 we investigate the effect of perception of peers separating the two dimensions of utility (*Econ_Ref* and *Econ_Ineq* in M2, and *Satisf_Ref* and *Satisf_Ineq* in M3). Finally, M4 represents the overall model for the inclusion of all metrics regarding perceptions of others, and M5 concerns the comprehensive model specified in Eq. 2.

We evaluate emotionality in individual consumption decisions firstly as the effect of perceived own well-being level on individual expenditure. Specifically, the coefficients associated with *EconSatisf* and *SocSatisf,* representing the expenditure elasticities of the two SWB dimensions are positive and significant both in M1 (1.06 and 0.34, respectively), where they represent the only source of feelings, and in the overall specification of M5 (1.05 and 0.35) where all perceptions are considered. Next, we evaluate the effect related to the comparison with peers on people's consumption behaviour. The coefficients related to perceived expenditure disparities show a positive and significant effect in M2, M4 and M5, both for *Econ_Ref* (0.60 in M2, 0.61 in M4 and 0.59 in M5) and for *Econ_Ineq* (0.28 in M2, 0.36 in M4 and 0.36 in M5). Conversely, SWB disparities negatively influences individual spending only through the inequality index. Indeed, the coefficient associated with *Satisf_Ineq* is negative and significant in M3 (−0.72), in M4 (−0.81) and in M5 (−0.67), while the coefficient associated to *Satisf_Ref* is not significant in all the three models.

Considering our first hypothesis H1, M5 confirms that expenditure behaviours of individuals are related both to own well-being perceptions and by perception of others. The estimates obtained in the last four nested models show the importance of distinguishing between the two utility dimensions due to their significant and opposite role in affecting individual consumption behaviours. These findings depict the relevance of both utility metrics here considered to take perceived conditions of peers into account.

In line with the arguments proposed by Zhu et al. (2020) for the impact of overall life satisfaction on expenditure, individuals reporting higher levels of satisfaction with their economic condition, having adequate economic availability, are more willing to spend money, generating higher levels of consumption expenditure. Concentrating on *SocSatisf*, people who are more satisfied with their relationship with family, with leisure time and health are motivated and encouraged to spend more money in social activities and events, to meet people and to consume, participating "*more in community events, social gatherings, cultural events, local politics and religious events*" (Guven 2011).

To validate the second research hypothesis H2, we distinguish between economic and social features related to peers that can affect individual consumption behaviour.

Focusing on the economic aspects, the positive coefficients of *Econ_Ref* and *Econ_Ineq*, demonstrate a high level of sensitivity of individuals to perceived disparities in spending habits. According to the theory of conspicuous consumptions (Veblen 1899), spending is driven by status-related considerations and the richest people represent the standard to reach. As a consequence, individuals tend to raise their own consumption levels, displaying ostentatious wealth to gain status and reputation in society (Bowles and Park 2005). Thus, individuals' consumption levels increase at increasing consumption inequalities because people try to emulate the living standard of the richer. On the other hand, considering the social component of H2, the estimates associated with perceptions of peer's well-being show that only SWB inequalities among peers negatively affects individual consumption expenditure. This evidence suggests the arising of possible emotions associated with disparities, unfairness, lack of trust and injustice, as the ability of individuals to perceive SWB variability rather than its average level among peers. As consequence, people tend to behave less materialistically, taking on sustainable (McDonald et al. 2006) and anti-consumption attitudes (Whitmarsh et al. 2017). The effect of living in a consumer society,

Table 3 Robustness Check

Ln_Expenditure	Ref1	Ref2	Ref3
Ln(EconSatisf)	0.41 ***	1.06 ***	0.74 ***
Ln(SocSatisf)	0.19	0.33 *	0.30
Econ_Ref	0.71 ***	0.62 ***	0.60 ***
Satisf_Ref	− 0.05	0.04	0.02
Econ_Ineq	0.93 ***	0.53 ***	0.28 ***
Satisf _Ineq	− 0.69 **	0.95	− 0.52 **
Res_Ln(EconSatisf)	− 0.29 **	− 0.94 ***	− 0.62 ***
Res_Ln(SocSatisf)	− 0.17	− 0.28	− 0.26
Young	− 0.11 ***	− 0.04 **	− 0.04 **
Middle-Aged	− 0.09 ***	− 0.06 ***	− 0.05 ***
Senior	− 0.02 *	− 0.08 ***	− 0.05 ***
Gender	− 0.03 ***	− 0.04 ***	− 0.04 ***
HighEdu	− 0.03	0.05 **	0.08 ***
Married	0.02 *	− 0.02 *	0.01 *
Divorced	0.13 ***	0.22 ***	0.17 ***
Widowed	0.06 ***	0.05 ***	0.06 ***
Unemployed	− 0.06 **	0.07 **	0.03
Retired	0.03 ***	0.02 **	− 0.02 *
Poor	− 0.72 ***	− 0.54 ***	− 0.61 ***
North	0.02 *	0.02	0.03 **
South	0.09 ***	0.13 ***	0.09 ***
Rural	− 0.02 **	− 0.03 ***	− 0.04 ***
Metropolis	− 0.01	− 0.04 ***	0.04 ***
Constant	1.74 ***	1.69 ***	2.22 ***

(***: p-value ≤ 0.01; **: ≤ 0.05; *: ≤ 0.1)

characterised by high levels of perceived well-being inequality underlies social–psychological stress and failure in the achievement of a sense of authenticity, generating the self-reduction of expenditure levels as a voluntary action, as a result of a process of self-inquiry (Zavestoski 2002).

Taking into consideration the socio-demographic characteristics and the other controls included in the model, estimates confirm general empirical results shown by the economics of happiness and behavioural expenditure literature (Clark 2018; Guven 2012; Zhu et al. 2020). People's expenditure tends to increase at the highest levels of education, since it is one of the main determinants of improvement in consumer earnings and spending capability (Xiao 2015). Divorcees tend to spend more than the other categories, while *Married* is not significantly different from zero in every estimated model. Economic vulnerable conditions such as being poor and being unemployed have a significant and negative impact on expenditure, as risk-averse categories, while being retired appears to positively affect individuals' spending decisions. In line with findings reported by González (2011), people living in Northern Italy show higher expenditure levels than those living in the South. Moreover, people living in rural areas spend less money than people living in urban areas, while individuals living in a metropolis spend more money compared to people living in other urbanised areas of Italy.

7.1 Robustness checks

Among the possible motivations for the strong heterogeneity in magnitudes and signs of the impact of relative measures and inequalities on individuals' utility, the identification of the reference norm and the aspect of inequality that is perceived by people are fundamental (Stephany 2017; Reyes-García et al. 2019). Thus, we evaluate the robustness of the estimates of Eq. 2 (M5 in Table 2) with respect to different definitions of the reference norm. In particular, we identify the reference groups considering three further categorizations, in line with the set of possible characteristics of social comparison identified by Ferrer-i-Carbonell (2005). In the first one (*Ref1*) we consider region, urbanisation and education levels, defined as a four-levels categorical variable (identifying primary and secondary education, high school education and degree). The second categorisation (*Ref2*) takes the five-levels Italian macro-areas classification (i.e. North-East, North-West, Centre, South and Islands), the urbanisation level and age classes into account. Finally, the third classification (*Ref3*) considers the 20 Italian regions, the occupational sectors of economic activity of individuals as a categorical variable with three levels (i.e. primary, secondary and tertiary sector) and age classes.

Comparing the estimated coefficients in Table 3 with M5 in Table 2, it can be noticed that there are few differences concerning both self-perceived satisfaction scores in *Ref1* and *Ref3* and perceived satisfaction inequality for the social sphere in *Ref2* with respect to M5. In particular, when the educational level of individuals is taken into account (*Ref1*) instead of age and when the occupational sector of activity of individuals is considered instead of urbanisation (*Ref3*), the coefficient related to satisfaction with the social sphere turns out to be not significantly different from zero and the one related to satisfaction with the economic sphere is lower in magnitude in *Ref1* (0.41) and in *Ref3* (0.74) compared to M5 (1.05). Conversely, considering Italian macro-areas instead of regions in defining the reference norm (*Ref2*), the most striking difference with M5 concerns life satisfaction inequality that appears to be not relevant in affecting consumption expenditure levels in favour of a stronger impact of expenditure inequalities (0.54).

8 Conclusion

This study concentrates on the investigation of emotionality features in the expenditure consumption behaviours of individuals. Specifically, we investigate the role of self-perceptions and perceptions of peers in affecting individual expenditure, providing further insights about the role of these two emotional facets. Indeed, despite the relevance of both sources of emotionality in the analysis of individuals spending habits, at our knowledge no studies have yet considered these two topics simultaneously.

In particular, using Italian data about individuals' expenditures and satisfaction for the year 2016, two mains hypothesis have been tested. First, the possibility that expenditure behaviours may be related both to the felling of own well-being and to the comparison with peers, when the latter dimension is evaluated both through average level of the reference norm and through inequality. Close to this aim, we define and test a second hypothesis, concerning the presence of more than one source of perception of others. Specifically, we follow Attanasio and Pistaferri (2016), investigating perception of peers in the final goals of people's lives, i.e. considering consumption expenditure and satisfaction. This twofold

reading of the reference group's utility has never been considered together in the analysis of agent's decision processes.

In order to test these (concatenated) hypotheses, we combine various life satisfaction scores to construct two measures of well-being, one related to satisfaction with economic conditions and the other with satisfaction with the social aspects of life, while perception of others is obtained considering the average level of SWB/expenditure in social reference group (each time excluding the specific individual), and the Gini inequality index.

Results demonstrate a high level of responsiveness of individuals to both SWB metrics and perception of others (H1). Differentiating among the two sources of social comparison (i.e. perceived SWB and consumption expenditure), we find empirical evidence of a bifold and opposite effect of perception of peers' utility on individual expenditure behaviour (H2). In particular, elasticities of expenditure related to economic aspects suggest a sensitivity closely related to perceived materialism. On the other hand, individuals seem to be not affected or not able to detect the true levels of satisfaction of their reference group, but they seem to be more aware and sensitive to satisfaction inequalities, as measure of injustice, unfairness, discrimination and inequity. Indeed, the estimates associated with well-being inequalities have a higher, significant and opposite effect on individual consumption expenditure, as result of a possible negative connection between consumerism and emotion-related goals about social aspects of life, such as "fun and enjoyment" and "family time" (Richins and Dawson 1992; Charles and Carstensen 2007).

Therefore, to stimulate consumption expenditure it is fundamental for policy makers to mitigate SWB disparities through the implementation of sets of actions targeting different age classes and geographical features such as urbanisation levels and regions of residence (Bernini and Tampieri 2019; 2020). The heterogeneity observed in these three dimensions in the analysis of the role of emotionality and perceptions in affecting expenditure is representative of cultural and contextual dissimilarities that distinguish Italy (Capello 2016). Indeed, if in rural and urban areas of Central-Southern Italy SWB inequalities appear to mostly affect people over 45, in metropolises located in Northern Italy young individuals are the most sensitive citizens. Moreover, in line with our findings about the economic sphere, policy makers should concentrate on actions with the goal of reducing individual vulnerability related to labour market conditions, such as youth unemployment and precarious working conditions.

Among the limits and further developments of this analysis, we will consider the investigation of the behavioural spending habits with respect to meaningful expenditure aggregates, i.e. distinguishing between basic consumption, luxury goods, durable and non-durable goods (Aguiar and Bils 2015). Similarly, a panel investigation can reveal fundamental variations in individual expenditure behaviours, depicting possible changes in the habits and sensitivity of individuals over time.

Appendix 1

The dataset has been built for 2016 considering two different Italian surveys, both developed by the Italian Office of Statistics (ISTAT): Aspect of Daily Life (ADL) and Household Budget Survey (HBS). Since the surveys refer to two different samples of individuals, the used data fusion procedure is taken from the statistical matching class of techniques (D'Orazio et al., 2006), and specifically from the micro non-parametric

set of procedures. Thus, we aim to combine the information disjointly collected by ISTAT, using common variables in the two datasets. Operatively, we impute the ADL information about satisfaction scores in HBS, accounting for the distance between individuals. These measures of dissimilarities are calculated on the so-called matching variables, chosen among the common information. The procedure employed in this study, well-known as distance hot deck method (Okner, 1972), is refined considering (i) imputation without replacement, and (ii) referring to several donor classes, i.e. restricting the imputation from a specific donor record to a recipient one with the same gender and living in the same macro areas (North, Centre and South of Italy).

Appendix 1 presents the results of Bhattacharyya coefficient, Hellinger distance, total variation distance and the overlap between the two distributions (D'Orazio et al. 2006), for the imputed target variables (overall and life domains satisfaction). The

Table 4 Comparison of marginal distributions from statistical matching procedure

	Battacharyya	Hellinger	Tvd	Overlap
Sat	0.999997	0.001686	0.001849	0.998151
SatEco	0.999999	0.000609	0.000525	0.999475
SatEnv	0.999999	0.000808	0.000874	0.999126
SatRel	0.999999	0.000915	0.001090	0.998910
SatFri	0.999996	0.001997	0.001890	0.998110
SatHea	0.999975	0.004984	0.005001	0.994999
SatTim	0.999998	0.001411	0.003937	0.998879

Sat: Life Satisfaction, 1–10, from "Very Dissatisfied" to "Very Satisfied"

SatEco: economic condition; SatEnv: environmental condition; SatRel: relationships with relatives; SatFri: relationship with friends; SatTim: leisure time; SatHea: health condition: 1–4, from "Very Dissatisfied" to "Very Satisfied"

Tvd: Total Variation Distance

Table 5 Descriptive Statistics

	Donor (ADL)		Synthetic File	
	mean	sd	mean	sd
Gender	0.53	(0.50)	0.64	(0.48)
Young	0.12	(0.27)	0.28	(0.45)
Middle-Aged	0.23	(0.45)	0.18	(0.39)
Adult	0.32	(0.44)	0.26	(0.37)
Senior	0.37	(0.48)	0.37	(0.48)
Unemployed	0.11	(0.31)	0.13	(0.34)
Retired	0.22	(0.42)	0.23	(0.42)
North	0.42	(0.49)	0.43	(0.49)
Centre	0.18	(0.38)	0.18	(0.38)
South	0.40	(0.49)	0.39	(0.49)
Life Satisfaction	7.03	(1.66)	7.03	(1.58)
Total expenditure	–	–	1452.11	(865.63)

values shown in the Table 4 confirm the good representativeness of the final synthetic dataset and the strong preservation of distributions of imputed variables.

Table 5 shows several descriptive statistics for the ADL sample, as donor dataset, and for the synthetic file obtained through the statistical matching, providing several insights about the preservation of marginal distributions for each variable imputed from the donor dataset to the recipient. Referring to the final dataset, the mean satisfaction score is 7.03, whereas the mean total expenditure is €1,452.11.

Appendix 2

Once assumed that the satisfaction domains variables *Economic conditions, AvailableInc, PreviousInc, Friends, Leisure* and *Health* are ordered measurements of an underlying continuum, a factor analysis is performed using a polychoric correlation matrix (Table 6). The maximum likelihood solution given by Table 7, provides two factors with associated eigenvalue greater than 1, explaining more than 85% of total variance. The final solution and the rotated loadings in Tables 8, 9, 10 confirm the evidence of two resulting latent factors: Factor1, in the paper reported as the variable *EconSatisf*, and defined through the satisfaction domains mainly related to economic and material wellbeing (*Economic conditions, AvailableInc, PreviousInc*); and Factor2, in the paper identified by *SocSatisf*, extracted from the domains referring to relationships with friends (*Friends*), satisfaction with leisure time (*Leisure*) and health conditions (*Health*).

Table 6 Polychoric correlation matrix

	Economic conditions	AvailableInc	PreviousInc	Friends	Leisure	Health
Economic conditions	1.000					
AvailableInc	0.532	1.000				
PreviousInc	0.389	0.563	1.000			
Friends	0.260	0.150	0.112	1.000		
Leisure	0.306	0.166	0.121	0.386	1.000	
Health	0.312	0.178	0.151	0.407	0.376	1.000

Table 7 Factor analysis: Maximum likelihood solution

	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.458	−0.033	0.423	0.423
Factor2	1.491	0.996	0.433	0.856
Factor3	0.495		0.144	1.000

LR test: independent vs. saturated: chi2(15) = 3.0e + 04 Prob > chi2 = 0.000

Log likelihood = −0.0111

Schwarz's (BIC) information criterion = 150.672

Akaike's information criterion = 30.022

Table 8 Maximum likelihood solution with number of factors equal two

	Variance	Difference	Proportion	Cumulative
Factor1	1.555	0.299	0.553	0.553
Factor2	1.256		0.447	1.000

LR test: independent vs. saturated: chi2(15) = 3.0e + 04 Prob > chi2 = 0.0000

LR test: 2 factors vs. saturated: chi2(4) = 89.51 Prob > chi2 = 0.0000

Log likelihood = -44.76136

Schwarz's (BIC) information criterion = 199.999

Akaike's information criterion = 111.523

Table 9 Rotated factor loadings (pattern matrix) and unique variances

	Factor1	Factor2	Uniqueness
Economic conditions	0.575	0.354	0.544
AvailableInc	0.876	0.081	0.226
PreviousInc	0.636	0.072	0.591
Friends	0.108	0.618	0.606
Leisure	0.137	0.595	0.628
Health	0.151	0.619	0.595

Table 10 Factor rotation matrix

	Factor1	Factor2
Factor1	0.937	0.350
Factor2	− 0.350	0.937

Appendix 3

Table 11 shows the estimates of the first stage of 2SLS procedure. The residuals obtained are finally included in the estimation of the model for the analysis of individual expenditures. In particular, for economic satisfaction we consider the presence of green areas in the neighbourhood of individual residence as instrumental variable, while the model for satisfaction with social aspects of life includes the number of hospitalizations and accesses to health care facilities, capturing health condition of individuals.

Table 11 First stage estimates

	EconSatisf	SocSatisf
Young	0.04***	0.05***
Middle-Aged	0.02*	0.04***
Senior	0.05***	− 0.01*
Gender	0.01	0.00
HighEdu	0.16	0.03
Married	0.02	0.00
Divorced	− 0.14	− 0.03
Widowed	− 0.06	− 0.04
Unemployed	− 0.20	0.00
Retired	0.03	0.00
Poor	− 0.38	− 0.02
North	0.01	0.03
South	− 0.08	− 0.03
Rural	0.03	0.00
Metropolis	0.06	0.00
Instrument	0.05	− 0.07
Constant	0.35	1.01

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