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ISTITUTO DI STUDI E ANALISI ECONOMICA

# **Psychology, consumer sentiment and household expenditures: a disaggregated analysis**

by

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## **ABSTRACT**

The aim of the paper is to assess the role of the Italian Consumer Sentiment Index (CSI) as an autonomous driving force of consumption decisions. We test for the presence of “rule of thumb” consumers as originally proposed by Cambell and Mankiw (1991), using sentiment measures distinguished by working condition of the household. Consumption data are disaggregated according to durability. The role of sentiment results to be stronger for service expenditures. Psychological motives of employees are found to have a particularly significant influence on consumption decisions. Moreover, CSI can not be explained by economic fundamentals alone, capturing also the effects of the political cycle and exceptional circumstances.

**Key Words:** Consumer sentiment, Permanent Income hypothesis, excess sensitivity, psychological approach, heterogeneity of individuals

**JEL Classification:** E21, E32

## **NON TECHNICAL SUMMARY**

Consumer surveys are currently carried out in at least forty-five countries and their outcomes are widely used in the business and financial press and analysed by economists and policy-makers worldwide. In Italy, ISAE (formerly ISCO) realises the consumer survey since 1973, at the beginning on a quarterly basis and then monthly starting from 1982, along the Joint Harmonised Program of the European Commission. According to Katona (1975), the Consumer Sentiment Index (CSI) is supposed to capture psychological motives driving consumption behaviour. In particular, it is expected to represent the household “willingness to buy” and therefore to influence discretionary, infrequent and planned purchases, not strictly necessary for life. In addition, it is supposed to determine consumption patterns especially in the occasion of exceptional circumstances, which are thought to strongly affect household mood.

Empirical research regarding the role of psychological motives on consumption dynamics has been conducted on a fairly aggregated ground. Some authors have instead emphasized that different types of households may be affected differently by macroeconomic shocks, in relation to their socio-demographic characteristics (Souleles, 2004; Carroll, 2004). Along these lines, in this paper we look at CSI disaggregated by household’s working condition (employees, non-farmer self employed and professionals, inactive people such as students, housewives, unemployed and others). We also disaggregate consumption data according to durability, i. e. total consumption, durables, non durables, services.

According to our findings, the ISAE consumer sentiment seems to play a role in explaining consumption patterns of Italian households, even after controlling for disposable income and other macroeconomic variables possibly correlated with consumption behaviour. The influence of sentiment has appeared to be stronger in explaining services expenditures that have gradually acquired the role that was previously of durable goods, as discretionary purchases not strictly necessary for life (expenditures for travel, leisure and for ICT-related services). In addition, the CSI elaborated for dependent workers has a particularly significant impact, confirming that psychological motives have different effects depending on the household socio-economic conditions.

Along these lines, sentiment variability cannot be well explained only by macroeconomic variables, being instead influenced by political and exceptional events (political elections, strikes, wars, international crises). In fact, different political and international shocks are proven to affect households groups differently, resulting more relevant for inactive people and dependent workers.

These categories of households may be possibly considered as those with a lower or medium level of education and therefore they may be expected to react more strongly to “irrational” shocks linked to political and exceptional events. On the other hand, better educated professionals and entrepreneurs are supposed to react less strongly to such shocks, being more influenced by economic fundamentals. This hypothesis should be however checked more carefully in the future, with the elaboration of specific CSI measures linked to the level of education of the household or exploiting the micro-economic nature of the data.

# **MOVENTE PSICOLOGICO, FIDUCIA E SPESA PER CONSUMI: UN'ANALISI DISAGGREGATA**

## **SINTESI**

Lo scopo del lavoro è quello di valutare il ruolo del clima di fiducia dei consumatori come determinante delle decisioni di consumo. Nel paper viene verificata la presenza di consumatori “miopi” così come originariamente proposto da Campbell e Mankiw (1991), utilizzando diverse misure della fiducia, elaborate secondo la condizione lavorativa degli intervistati. I consumi sono disaggregati secondo la loro durata, considerando separatamente le spese per beni non durevoli, durevoli e gli acquisti di servizi. Il ruolo della fiducia risulta essere più forte quando si considera la spesa per servizi come variabile indipendente. Le decisioni di consumo risultano essere influenzate in misura rilevante dalla fiducia degli impiegati. Da ultimo, il clima di fiducia non risulta sufficientemente spiegato dalla sola considerazione delle principali variabili macroeconomiche: esso è anche influenzato, in modo diverso a seconda della misura considerata, da eventi eccezionali legati a *shock* internazionali e al ciclo politico.

Parole chiave: Clima di fiducia, reddito permanente, approccio psicologico, eterogeneità degli individui

Classificazione JEL: E21, E32

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## INTRODUCTION<sup>1</sup>

Consumer surveys are currently carried out in at least forty-five countries and their outcomes are widely used in the business and financial press and analysed by economists and policy-makers worldwide. ISAE (formerly ISCO) realises the survey for Italy since 1973, at the beginning on a quarterly basis and then monthly since 1982. Survey results are often employed to provide short-term forecasts (Parigi and Schlitzer, 1997; Carnazza and Parigi, 2001) and for cyclical analysis (Bovi *et al.* 2000; Golinelli and Parigi, 2004 and 2005). Some authors have also already enquired into the theoretical interpretation of the Italian Consumer Sentiment Index (CSI), finding somewhat mixed results (Locarno and Parigi, 1997). Following the original suggestion of Katona (1975), CSI may indeed capture psychological motives driving consumption behaviour: to be precise, it may represent the household's "willingness to buy" and therefore influence especially discretionary, infrequent and planned purchases, not strictly necessary for life<sup>2</sup>. Furthermore, sentiment should determine consumption patterns especially in the occasion of exceptional circumstances, which are thought to strongly affect household mood<sup>3</sup>.

Generally speaking, empirical research regarding the role of psychological motives on consumption dynamics has been conducted on a fairly aggregated ground, on the assumption that the relationship between sentiment and economic activity is homogenous across all individuals. Recent literature has instead emphasized that estimates may lead to misleading conclusions when only aggregated data are considered. If the agent's information set differs across households (Attanasio and Weber, 1995), aggregation can in fact cause spurious excess sensitivity of consumption to sentiment in testing for the canonical Permanent Income Hypothesis (PIH). In response to these problems, Souleles (2004) uses a micro-data approach, allowing individual's heterogeneity in order to take into account the fact that different types of households may be affected differently by macroeconomic shocks, in relation to their socio-

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1 The paper is the result of a joint effort of the authors; however, sections 1, 4 and 5 may be attributed to Marco Malgarini and sections 2 and 3 to Patrizia Margani.

2 This kind of purchases is usually identified with durable goods; however, it is possible that some service expenditures have gradually acquired similar characteristics (for instance, travel and leisure expenditures, ICT-related expenditures and others).

3 Massive attention has been devoted to the analysis of sentiment indexes in the aftermath of September 11 attacks, see for instance Garner (2002). For a general evaluation on the role of psychological factors on the real economy, see Federal Reserve (2005) and ECB (2005).

demographic characteristics<sup>4</sup>. Souleles finds that CSI effectively helps to forecast US consumption growth, in contrast with the PIH; excess sensitivity seems to be partly determined by the inclusion of social-demographic components, indicating an important role for group-specific shocks, consistent with skill-biased technical change.

Along these lines of research, the aim of the paper is to assess the role of CSI as an autonomous driving force of Italian household consumption growth, controlling for the effect of group-specific shocks. In particular, after a review of the major literature in this field (section 2), in section 3 we evaluate excess sensitivity on a macro level, testing for the role of “rule of thumb” consumers as originally proposed by Cambell and Mankiw in a number of seminal papers (Cambell and Mankiw, 1989; 1990; 1991). In doing so, differently from previous works, we look at CSI disaggregated by household’s working condition (employees, non-farmer self employed and professionals, inactive people such as students, housewives, retired persons and others). Moreover, we also disaggregate consumption data according to durability in order to better test the Katona’s willingness to buy hypothesis. In section 4 we then try to reach a better understanding of the determinants of CSI fluctuations: in particular, we check if group-specific CSI may be explained by macroeconomic factors alone or by a combination of macroeconomic factors and exceptional circumstances (international shocks, political events) that may be thought to influence household behaviour or psychology. A critical appraisal of the results obtained (section 5) concludes the paper.

## **2 CONSUMPTION-SENTIMENT RELATIONSHIP: THE THEORETICAL BACKGROUND**

There is a copious and growing literature on the relationship between sentiment and consumption and on the interpretation of CSI. Originally, some authors (FED, 1955; Adams and Green, 1965; Friends and Adams, 1964; Hymans, 1970; Shapiro, 1972; Lovell, 1975) argued that sentiment may be reasonably well approximated by a set of standard macroeconomic variables, while some others agreed that sentiment may be instead an autonomous factor in forecasting and explaining consumption dynamics (Adams, 1964; Adams and

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4 For a model allowing heterogeneity in inflation expectations formation, see Carroll (2003 and 2004) and Doms and Morin (2004).

Klein, 1972; Mueller, 1963). Katona (1975) emphasized that sentiment is particularly useful in periods characterised by exceptional events, because household expenditures may be considered to depend not only on the “ability”, but also on the “willingness” to buy. According to this approach, consumer attitudes cannot be explained only by their reaction to changes in economic variables, but are also influenced by non-quantitative, non-economic factors - such as political crisis or wars – supposed to have an impact on agent’s psychological mood. Consequently the “willingness to buy” may be an important and independent explanatory factor for spending, especially for discretionary purchases (in particular, durable goods), and in proximity of turning points. Recent empirical investigations confirm the Katona’s hypothesis for the US during the Gulf War (Throop, 1992, Fuhrer, 1993), while Batchelor and Dua (1998) find that the inclusion of sentiment in the consumption function would have helped forecasting the 1991 US downturn, even if they are cautious on the more general value of the indicator in anticipating other significant business cycle episodes. Howrey (2001) shows that the Michigan Consumer Sentiment is characterised by additional forecasting power with respect to other indicators (but not limited to particular period) and similar results are also found by Garner (2002) considering the event of September 11 attacks.

Once a role of sentiment in the consumption function is confirmed by the data, various interpretations may be advanced to explain this finding. A first class of models attributes only an indirect function to sentiment: in this sense CSI may be merely considered as a predictor of current income, in case of failure of some restrictive hypothesis of the PIH - namely capital market efficiency and absence of uncertainty (Carroll *et al.*, 1994; Campbell and Mankiw, 1991; Acemoglu and Scott, 1994) – or considering a substantial number of consumers to be liquidity constrained (Flavin, 1981 and 1985). According to a different view, sentiment has a direct impact on consumption, reflecting the role of habits (Deaton, 1992; Sommer, 2001), precautionary motives (Carroll, 1992; Ludvigton and Michaelides, 2001) or self-fulfilling expectations (Matsusaka and Sbordone, 1995). Explanations along this second approach are various: agents may become addicted to the level of consumption experienced in the past and adjust their expenditure pattern only gradually, responding late to news on the general and personal economic situation. In addition, an increase in uncertainty – as measured by a decline of CSI - may cause a higher perception of the probability of financial distress, leading consumers to save more in liquid assets and less in illiquid ones, postponing expenditures on durables rather than non-durables goods and services (Mishkin, 1978). Finally, expectations about the future level of output can become self-fulfilling, with the result that a decline in sentiment can cause a fall

in output and consumption growth, even after controlling for economic fundamentals. To some extent, this last theoretical justification is related to Katona's psychological approach, in the sense that the unwillingness to buy may be interpreted as a case of coordination failure.

Previous studies have been mostly carried out on a fairly aggregate ground; recent literature has instead pointed to a possible role for group-specific shocks that may hit differently different group of consumers. This may be due to the fact that households pay attention in a different way to macroeconomic news, depending on their level of income, education or in general on their socio-demographic characteristics (Carroll, 2004). As a consequence, from a modelling point of view, differences in the agent's information set (or in the way agents react to the information set) can lead to consistent bias in the empirical estimates of excess sensitivity (Attanasio and Weber, 1995). To solve this problem, Souleles (2004) analyses the consumption-sentiment relationship exploiting the micro-level nature of the data and controlling for household demographic characteristics: he finds that US CSI effectively helps to forecast consumption dynamics, in contrast with the PIH. Moreover, excess sensitivity results to be partly explained by the inclusion of social-demographic components, indicating an important role for group-specific shocks, consistent with skill-biased technical change.

### **3 CONSUMPTION-SENTIMENT RELATIONSHIP: THE ESTIMATES**

Starting from these theoretical considerations, we proceed to test the role of the CSI elaborated by ISAE<sup>5</sup> in predicting consumption of Italian households, trying to control for possible group-specific shocks. In particular, we choose to estimate two alternative equations to evaluate the "excess sensitivity" of consumption to current income and sentiment, along the lines originally suggested by Campbell and Mankiw in a number of seminal articles (Campbell and Mankiw, 1989, 1990 and 1991). Data related to different categories of

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5 A sample of 4.000 consumers – extracted from the universe of the total population aged eighteen or more - is considered each month on the basis of a two-stage sample design. The CSI is calculated as a simple arithmetic average of nine questions, namely those concerning assessments and forecast on personal financial condition and general economic situation, unemployment expectations, convenience and possibility to save, convenience to buy durables and assessments on the family budget. See also Martelli (1998) and Leproux, Malgarini and Margani (2004).

consumption (total consumption, durables, non durables, services) are used as reference series; we also use different CSI measures disaggregated with respect to the working condition of the respondent (employees, non farmer self-employed and professionals, inactive people such as students, housewives, retired persons and others) in order to control for group-specific shocks. The sample period goes from the first quarter, 1980 to the fourth quarter, 2004. The first model takes the following form:

$$\Delta C_t = \lambda \Delta Y_t + v_t - \theta v_{t-1} \quad (1)$$

The dependent variable  $\Delta C_t$  is the q/q change of (the log of) consumption<sup>6</sup> and  $\Delta Y_t$  denotes the rate of growth of disposable income. The parameter  $\lambda$  indicates the fraction of households that are liquidity constrained, following the “rule of thumb” hypothesis (i.e. smoothing consumption with respect to current – not permanent – income) and a  $\lambda$  significantly differs from zero shows evidence of excess of sensitivity, in contrast with the PIH. The MA(1) specification is suggested by Carroll *et al.* (1994)<sup>7</sup> and is retained only when  $\theta$  is statistically significant and its exclusion does not rise first-order serial correlation problems, according to the standard Durbin-Watson test. All the estimates are performed with Instrumental Variables, using a White-Heteroskedasticity consistent Standard Errors & Covariance matrix. The set of instruments should be correlated with the dependent variable, but not with the residuals and the hypothesis is evaluated with the standard over identifying restrictions test (Ludvignton, 1999). After some preliminary estimates, we choose to include as instruments four lags each of the dependent variable, the rate of growth of disposable income and wealth (at constant prices), interest rates and inflation (the latter both considered as proxies of financial market conditions)<sup>8</sup>. The second model adds to equation (1) the sentiment index as an independent variable (and as an instrument):

$$\Delta C_t = \lambda \Delta Y_t + \sum_{i=1}^N \beta_i CSI_{t-i} + v_t - \theta v_{t-1} \quad (2)$$

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6 Berg and Bergstrom (1996) show that the use of annual differences is not suitable in the estimation with instrumental variables.

7  $\Delta Y$  is obviously correlated with the residuals. Therefore, a consistent estimate of  $\lambda$  and  $\beta$ s is obtained using the instrumental variable estimator. In addition, the fact that consumption decisions are made continuously, while data are measured as time-aggregates (quarterly frequencies), implies the need to specify a moving average term in the residuals (Christiano *et al.*, 1991).

8 In the estimations relative to total and durable consumption, we have also included a dummy variable taking into account the 1997 law stimulating the purchase of motor vehicles (so called “rottamazione”). For a full description of data, see the appendix.

We use four lags of the ISAE Consumer Sentiment Index (CSI<sub>t-i</sub>) disaggregated with respect to respondent's working condition, always seasonally adjusted with Tramo-Seats. Departing from the standard Campbell-Mankiw specification, sentiment enters in equation (2) in q/q change: some preliminary analysis have indeed indicated that ISAE Consumer Confidence is characterised by the presence of a unit root and therefore first-differencing the series seems to be the more appropriate choice for including it in this framework<sup>9</sup>. Model (2) provides a test of the hypothesis that sentiment could have an autonomous role in explaining consumption growth, even when income is included among the regressors. In particular, if sentiment provides additional information on consumption dynamics over that contained in the standard macroeconomic variables, consumption expenditures may be considered to be affected not only the "capacity to buy", represented by disposable income, but also by the "willingness to buy", represented by sentiment. In this respect, the influence of sentiment might be expected to be particularly significant for discretionary, infrequent and planned purchases, usually identified with durable goods, as suggested by Katona (1975). However, it is possible that in modern times some service expenditures have gradually acquired similar characteristics (for instance, travel and leisure expenditures, ICT-related expenditures and others), too.

The estimates always pass the over identifying restriction test, confirming the choice of the list of instruments<sup>10</sup>. The Durbin-Watson test does not provide evidence of first-order correlation in the residuals. Excess sensitivity of consumption to current income is confirmed by the data (see Tab. 1): in equation (1),  $\lambda$  appears to be significant at the 95% confidence level for all categories of expenditures but for non durables goods. However, the value of  $\lambda$  for total consumption is equal to 0.26, quite low with respect to what has been found by Carroll *et al.* (1994) and Easaw *et al.* (2003) for US and UK respectively, providing first evidence of a lower role of "rule of thumbers" in the Italian economy<sup>11</sup>. However, its value increases with durability, as expected on

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9 Carroll *et al.* (1994) mentioned the possibility of Consumer Index (CI) being I(1) but stated that the results including first-differenced CI were quite similar to the ones reported in their paper. In the case of the ISAE index, results of standard Dickey Fuller test support the I(1) hypothesis: they are not reported here but are available with the authors upon request.

10 Results of the over-identifying restriction test are available upon request.

11 In the Carroll *et al.* (1994) estimates for the US, the value of  $\lambda$  for total consumption was equal to 0.7, when four lags each of the dependent and independent variable are used as instrument. The value of the parameter slightly increases when the list of instruments includes three lags each of the dependent variable, the growth of real labour income, the change in the unemployment rate, the change in the 3-month Treasury bill rate and the percentage change in the S&P 500 stock price index. More recently, Easaw *et al.* (2003) estimate a  $\lambda$  larger than one for the UK.

the basis of previous estimates for other countries, being of lower magnitude and statistically insignificant for non durables goods and equal to 0.26 for services and to 1.2 for durables.

**Tab. 1 Testing the rule of thumb hypothesis with and without the inclusion of the sentiment index**

Dependent variable	CSI by working condition	$\Sigma B$	Wald	$\lambda$	$t(\lambda)$	$\theta$	$R^2$	DW
<b>Total consumption</b>	Without CSI	/	/	0.262	0.026	0.239	0.153	2.000
	Total	0.0880	0.050	0.171	0.134	0.216	0.208	2.038
	Employees	0.0950	0.024	0.164	0.139	0.203	0.221	2.034
	Self-employed and professionals	0.0895	0.114	0.187	0.108	0.223	0.198	2.045
	Inactives	0.0709	0.086	0.197	0.098	0.213	0.200	2.023
<b>Non durables</b>	Without CSI	/	/	0.152	0.187	0.284	0.086	1.974
	Total	0.0523	0.382	0.127	0.287	0.280	0.087	1.973
	Employees	0.0528	0.335	0.145	0.236	0.270	0.087	1.977
	Self-employed and professionals	0.0465	0.300	0.199	0.144	0.237	0.080	1.898
	Inactives	0.0288	0.668	0.123	0.331	0.288	0.071	1.979
<b>Durables</b>	Without CSI	/	/	1.171	0.026		0.122	1.963
	Total	0.2711	0.226	0.319	0.696	0.128	0.134	2.070
	Employees	0.3239	0.191	0.304	0.696	0.108	0.141	2.069
	Self-employed and professionals	0.2777	0.438	0.314	0.723	0.129	0.110	2.071
	Inactives	0.2521	0.176	0.520	0.461	0.100	0.151	2.066
<b>Services</b>	Without CSI	/	/	0.260	0.058	0.169	0.032	1.988
	Total	0.0879	0.005	0.194	0.184	0.077	0.102	1.986
	Employees	0.0881	0.001	0.192	0.176		0.113	1.863
	Self-employed and professionals	0.0877	0.003	0.208	0.135		0.093	1.835
	Inactives	0.0756	0.001	0.192	0.157		0.099	1.799

Source: authors calculations.

Note: the table reports the  $R^2$  and the Durbin Watson test for the estimation of equation (1) and (2). The values of the  $B$ ,  $\lambda$  and  $\theta$  parameters are also included, together with the p-values for the t-statistic and the Wald test on the joint significance of  $\Sigma B$  and  $\lambda$ . Hypothesis testing was conducted using a White-Heteroskedasticity consistent covariance matrix. The sample goes from the first quarter 1980 to the fourth quarter 2004.



The MA(1) parameter  $\theta$  is always statistically significant but for durable goods; its value is close to 0.25 for total consumption, supporting the hypothesis that the MA(1) structure may be linked to measurement issues instead that to durability<sup>12</sup>. As for the  $R^2$  of the regressions, it varies between 0.03 (for services) and 0.153 (for total consumption), being generally higher for the aggregate estimates than for those performed on more detailed measures of consumers expenditures. These results are in contrast with those provided in Easaw *et al.* (2003) for the UK, in which the highest explanatory power of income was found in the durable goods equation.

Estimation of equation (2) provides evidence of an autonomous role of Italian consumer sentiment in anticipating consumption patterns, even when innovation in income is included in the regression. Indeed, the  $R^2$  of the estimates increases when total sentiment is added to the specification for aggregate consumption, services and, to a lesser extent, durable goods; for the non durables, the  $R^2$  remains roughly unchanged. Carroll *et al.* (1994) obtain similar findings on US data, rejecting the hypothesis that sentiment predicts the growth of spending only through the income channel<sup>13</sup>. The Wald test on the joint-significance of the lags of the q/q change of consumer sentiment shows that CSI is statistically significant at the 5% level once total consumption is considered as independent variable. However, this is not valid for all the categories of consumption: in particular, sentiment seems to play a particularly significant role in explaining services expenditures, while it appears to play no role when non durables and durables are considered as independent variables. Noticeably, estimates of  $\lambda$  decrease considerably and the parameter becomes statistically insignificant when sentiment is included in the regression.

In addition, for total consumption  $R^2$  appears to be larger when working condition-related sentiment measures are included in the regression. The Wald test indicates that the significance of lagged sentiment increases when we consider the index relative to employees, while it is significant only at the 10% level for self-employed and professionals and inactive workers. This result seems to indicate that the sentiment of employees has a relevant role in explaining consumption patterns. Instead, different sentiment measures do not

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12 Ermini (1989) shows that if the MA(1) structure is attributable to a discrete-time aggregation of a continuous process the value of the parameter should be approximately equal to 0.25. On the other hand, Mankiw (1982) shows that change in spending follows an MA(1) process if consumption good is durable.

13 Another hypothesis consistent with an explicative role of sentiment in forecasting consumption is related to the presence of imperfect capital markets. Acemoglu and Scott (1994) do not find evidence supporting this thesis for UK, while Locarno and Parigi (1997) seem to confirm it for Italy, suggesting that confidence may be a proxy of household uncertainty.

contribute to explain non durables and durables expenditures. For services, all the sentiment indicators are statistically significant, only at the 10% level for the sentiment of self-employed and professionals, while the p-value of the Wald test is equal to 0.003 at most for the other measures of confidence.

## **4 INTERPRETING THE ISAE CONSUMER SENTIMENT INDICATOR**

The findings of section 3 suggest that the ISAE consumer sentiment represents an autonomous driving force for Italian household's consumption decision, providing additional information on agent's behaviour not contained in standard quantitative variables such as income or wealth. This section is then devoted to the study of the determinants of sentiment fluctuations. As a starting point, if sentiment has only an indirect role in determining consumption patterns, it will be mainly explained – similarly across sub-groups of individuals - by macroeconomic variables considered as representative of the general economic situation. On the other hand, when sentiment is thought to reflect psychological motives, it might be influenced by exceptional circumstances such as international crisis (wars, international shocks) or socio-political events (political elections, strikes, political crises). These circumstances may also have different effects depending on the household socio-economic conditions.

Some authors have already empirically enquired into the interpretation of the sentiment index: for instance, Locarno and Parigi (1997) found that Italian CSI was significantly explained by socio-economic factors, providing first evidence supporting the original Katona's view. More recently, in a study on eight countries over about thirty years, Golinelli and Parigi (2004) confirm that sentiment is driven by economic as well other factors, but they found that this correlation is not homogenous across countries and may also change over time<sup>14</sup>. Starting from these considerations, we firstly estimate a model including only macroeconomic variables that may be considered to influence household behaviour (eq. 3); we then progressively include the role of political events (eq. 4) and exceptional circumstances (eq. 5), evaluating their impact for each socio-economic group. We start from the estimation of a reduced-form model including macro-economic variables, estimating the following equation:

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14 For instance, the evolution of sentiment seems to be driven especially by inflation and labour market variables in Italy, Germany and France, but not in the Anglo-Saxon countries.

$$\Delta \log(CSI_t) = \alpha_0 + \sum_{i=1}^4 \beta_i \Delta CSI_{t-i} + \sum_{i=1}^4 \gamma_i Z_{t-i} + \varepsilon_t \quad (3)$$

After some preliminary estimates, the set of control variables  $Z_t$  includes four lags of q/q GDP growth<sup>15</sup>, the medium-term interest rate, the (change in) nominal Lira-DM exchange rate and the (change in) debt/GDP ratio<sup>16</sup>; we replicate the estimate for the total and for each working-condition related measures of CSI. The  $R^2$  ranges between 0.22 - for the self-employed and professionals - and 0.33 - for inactive people - denoting that the latter is more sensitive to macroeconomic conditions than the former category of consumers (Tab. 2). However, the  $R^2$  are rather small and therefore a large part of the variability of CSIs is not explained by macroeconomic factors. The sum of the coefficients has the expected sign: CSI is positively affected by GDP growth, being on the other hand depressed by higher interest rates and by a devaluation of the lira/DM nominal exchange rate. Interestingly, CSI is also positively correlated with the debt/GDP ratio that may be considered in this case as a proxy of the current stance of fiscal policies.

The fact that macro variables alone seem to explain only a relatively small proportion of sentiment behaviour may be interpreted as confirming evidence of the role of some psychological motives, possibly linked to political and exceptional events that may affect in a different way different categories of consumers. To check this hypothesis, we start by adding to equation 3 a set of dummy variables representing electoral events that took place in the period considered. In particular, six general elections took place in Italy between 1980 and 2004: in 1983 - second quarter; 1987 - second quarter; 1992 - second quarter; 1994 - first quarter; 1996 - second quarter and 2001 - second quarter, respectively. We consider a vector of dummy variables ( $dpol$ ) composed by 6 different dummies (d8302, d8702, d9202, d9401, d9602, d0102) taking the value of 1 for all the quarters of the electoral year, in the hypothesis that the election may have a psychological effect not only in the very quarter it is held, but also in the period immediately before and after the event. In particular we estimate the following equation:

$$\Delta \log(CSI_t) = \alpha_0 + \sum_{i=1}^4 \beta_i \Delta CSI_{t-i} + \sum_{i=1}^4 \gamma_i Z_{t-i} + \sum_{i=1}^N dpol_{i,t} + \varepsilon_t \quad (4)$$

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15 We use GDP instead of disposable income because it is the measure of economic activity more readily and easily available to the general public and as such supposed to have a more direct impact on household perceptions.

16 We also checked for a role of inflation rate and of the employment-population ratio, which resulted statistically not significant according to the standard Wald test.

The inclusion of *dpol* increases considerably the  $R^2$  of the regression that now ranges between 0.36 and 0.50. The Wald test on the Joint significance of the political dummies confirms the results. Looking at the t-statistics, however, only the dummies for the elections that took place in 1992 (which is also a recession year) and 1994 are statistically significant (the former with negative sign, the latter positive) at the 5% level for all the estimates; the 2001 election is significant for all the categories of consumers but for dependent workers, which, on the other hand, are negatively influenced – together with self-employed and professionals - by the 1987 elections. Inactive people are also positively affected by the 1993 election. These results may be interpreted as an evidence that political events – more specifically, general elections – have a statistically significant impact on consumer sentiment; this effect appears to be stronger for dependent workers and inactive people.

We finally check for sensitiveness of the various CSI measures to exceptional events that took place in the period 1980-2004 and that may be thought to have influenced the psychological mood of Italian consumers. In particular, we concentrate our attention on unexpected – or somehow out-of-the ordinary - national and international events that have had a big impact on the media and may therefore be thought to have an impact on consumer attitudes. Among them, we consider the invasion of Kuwait and the subsequent first Iraqi war, that took place between the third quarter, 1990 and the second quarter 1991 (*diraq1*); the Kosovo war (first and second quarter, 1999, *dkos*) to which Italian military forces participated directly; the terrorist attacks of 9/11 and the subsequent Afghani war (third and fourth quarter, 2001, *d911*); the euro change-over, which had a relevant impact on inflation assessments in Italy for two years, since the first quarter of 2002 to the end of 2003 (*deuro*)<sup>17</sup>. In this respect, we estimate the following equation:

$$\Delta \log(CSI_t) = \alpha_0 + \sum_{i=1}^4 \beta_i \Delta CSI_{t-i} + \sum_{i=1}^4 \gamma_i Z_{t-i} + \sum_{i=1}^N dpol_{i,t} \sum_{i=1}^N dexc_{i,t} + \varepsilon_t \quad (5)$$

where *dexc* is the set of dummy variables taking the value of 1 for each of the periods considered above. In order to increase the degree of freedom of the estimation, in equation (5) we have excluded from *dpol* the dummies that did not result to be statistically significant in the previous estimation.

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17 For a detailed analysis of the impact of the Euro change over on inflation assessment and consumer sentiment, see also Golinelli and Parigi (2005). The deep trough of the Italian CSI in the first quarter 2004 was due to a fall of the index in the months of January and February and therefore it is not attributable to the Madrid bombing of March 11, 2004.

**Tab. 2** **Interpreting the Consumer Sentiment Index**

Independent variables	Aggregate Sentiment Index			Sentiment of employees		
	Equation (3)	Equation (4)	Equation (5)	Equation (3)	Equation (4)	Equation (5)
	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)
<b>Macroeconomic variables</b>						
$\Sigma\text{CSI}_{t-i}$	-0.370 (0.0484)	-0.838 (0.0010)	-0.840 (0.0007)	-0.290 (0.0610)	-0.676 (0.0057)	-0.719 (0.0023)
$\Sigma\text{GDP}_{t-i}$	3.780 (0.0002)	5.485 (0.0000)	4.448 (0.0001)	3.634 (0.0001)	5.089 (0.0000)	4.220 (0.0000)
$\Sigma\text{EXDM}_{t-i}$	0.102 (0.0000)	0.080 (0.0000)	0.042 (0.0002)	0.076 (0.0000)	0.124 (0.0000)	0.083 (0.0000)
$\Sigma\text{INT}_{t-i}$	0.0009 (0.0018)	0.028 (0.0007)	0.005 (0.0001)	0.033 (0.0090)	0.039 (0.0024)	-0.019 (0.0002)
$\Sigma\text{DEBGDP}_{t-i}$	0.183 (0.0232)	0.389 (0.0002)	0.436 (0.0009)	0.084 (0.0365)	0.356 (0.0020)	0.440 (0.0033)
<b>Political events</b>						
D8302		0.016 (0.1135)			0.013 (0.2442)	
D8702		-0.019 (0.0178)	-0.023 (0.0034)		-0.026 (0.0007)	-0.029 (0.0000)
D9202		-0.035 (0.0079)	-0.043 (0.0023)		-0.041 (0.0053)	-0.050 (0.0011)
D9401		0.046 (0.0004)	0.039 (0.0033)		0.040 (0.0014)	0.035 (0.0061)
D9602		0.014 (0.2491)			0.017 (0.1106)	
D0102		0.027 (0.0201)	0.027 (0.0401)		0.019 (0.1412)	
$\Sigma\text{DPOL}$		0.049 (0.0000)	-0.001 (0.0000)		0.023 (0.0000)	-0.045 (0.0000)
<b>Exceptional events</b>						
DIRAQ1			-0.020 (0.0079)			-0.018 (0.0051)
DKOS			-0.027 (0.1217)			-0.031 (0.2445)
D911			-0.012 (0.5161)			0.001 (0.9603)
DEURO			-0.021 (0.0663)			-0.024 (0.0235)
$\Sigma\text{DEXC}$			(0.0262)			-0.073 (0.0075)
<b>R<sup>2</sup></b>	0.317687	0.475072	0.509966	0.316002	0.467383	0.504361

Source: authors calculations.

Note: the table reports, for each working condition-related sentiment measure, the R<sup>2</sup> for the estimation of equations (3)-(5). We also show the sum of the coefficients for the four lags of the macroeconomic variables included in the regressions, together with the p-value of their joint marginal significance (in parenthesis); for the political dummies and for those related to exceptional events, we provide the value of the associated parameter and both the p-value of their joint marginal significance and that on the significance of each particular dummy. Hypothesis testing was conducted using a White-Heteroskedasticity consistent covariance matrix. The sample goes from the first quarter 1980 to the fourth quarter 2004.

*continues* **Tab. 2**      **Interpreting the Consumer Sentiment Index**

Independent variables	Sentiment of Self-employed and professionals			Sentiment of Inactive people		
	Equation (1)	Equation (2)	Equation (3)	Equation (1)	Equation (2)	Equation (3)
	Coeff. (p. value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p. value)	Coeff. (p-value)	Coeff. (p-value)
<b>Macroeconomic variables</b>						
$\Sigma CSI_{t-i}$	-0.422 (0.0731)	-0.922 (0.0025)	-0.898 (0.0074)	-0.561 (0.0402)	-1.018 (0.0011)	-1.025 (0.0033)
$\Sigma GDP_{t-i}$	3.625 (0.0006)	5.387 (0.0000)	4.233 (0.0040)	4.854 (0.0008)	6.463 (0.0000)	5.680 (0.0002)
$\Sigma EXDM_{t-i}$	0.118 (0.0043)	0.128 (0.0003)	0.073 (0.0142)	0.204 (0.0000)	0.057 (0.0000)	-0.144 (0.0000)
$\Sigma INT_{t-i}$	0.004 (0.0094)	0.021 (0.0036)	-0.002 (0.0026)	-0.068 (0.0000)	-0.030 (0.0002)	-0.021 (0.0000)
$\Sigma DEBGDP_{t-i}$	0.162 (0.1995)	0.388 (0.0205)	0.434 (0.0298)	0.423 (0.0097)	0.464 (0.0002)	0.181 (0.0004)
<b>Political events</b>						
D8302		0.016 (0.1597)			0.029 (0.0371)	0.029 (0.0305)
D8702		-0.018 (0.0104)	-0.022 (0.0019)		-0.015 (0.2619)	
D9202		-0.030 (0.0188)	-0.039 (0.0052)		-0.035 (0.0010)	-0.038 (0.0005)
D9401		0.046 (0.0018)	0.040 (0.0130)		0.052 (0.0004)	0.051 (0.0010)
D9602		0.017 (0.2120)			0.007 (0.5621)	
D0102		0.032 (0.0214)	0.030 (0.1099)		0.043 (0.0009)	0.029 (0.0075)
$\Sigma DPOL$		0.064 (0.0000)	0.009 (0.0000)		0.081 (0.0000)	0.070 (0.0000)
<b>Exceptional events</b>						
DIRAQ1			-0.019 (0.0350)			-0.023 (0.0409)
DKOS			-0.022 (0.1303)			-0.037 (0.0017)
D911			-0.011 (0.6417)			0.016 (0.1576)
DEURO			-0.021 (0.0967)			-0.014 (0.4298)
$\Sigma DEXC$			-0.073 (0.1171)			-0.058 (0.0017)
<b>R<sup>2</sup></b>	0.216839	0.360841	0.383187	0.333685	0.504107	0.536019

Source: authors calculations.

Note: the table reports, for each working condition-related sentiment measure, the  $R^2$  for the estimation of equations (3)-(5). We also show the sum of the coefficients for the four lags of the macroeconomic variables included in the regressions, together with the p-value of their joint marginal significance (in parenthesis) ; for the political dummies and for those related to exceptional events, we provide the value of the associated parameter and both the p-value of their joint marginal significance and that on the significance of each particular dummy. Hypothesis testing was conducted using a White-Heteroskedasticity consistent covariance matrix. The sample goes from the first quarter 1980 to the fourth quarter 2004.

Among the events considered in the estimates, the 9-11 attacks do not seem to have had a relevant impact on the confidence of Italian consumers. For the total sentiment equation, only the two dummies for the first Iraqi war and the euro change over are significant at least at the 10% level. Similar results emerge when sentiment measures calculated for dependent and self-employed and professionals are considered: more in particular, both the indexes are influenced by the Iraqi War and the euro change over and the  $R^2$  of the regressions increases respectively to 0.5 and 0.38 (from 0.47 and 0.36 including only macro variables and political events). Finally, the CSI for inactive people results to be strongly influenced by the Kosovo war, but not by the euro change over; the  $R^2$  of the regression increases in this case from 0.5 to 0.54.

## 5 CONCLUSIONS

According to our findings, the ISAE consumer sentiment contributes to explain the consumption patterns of Italian households, even after controlling for the role of disposable income and other macroeconomic variables possibly correlated with consumption behaviour. Disaggregating consumption according to durability, the role of sentiment is stronger in explaining services expenditures; on the other hand, the fact that the significance of CSI is very weak in the case of durables is apparently in contrast with the original view of Katona. However, a possible explanation of this finding is that services expenditures may have gradually acquired the role that was previously of durable goods, as discretionary purchases not strictly necessary for life: for example, expenditures for travel and leisure and, more recently, for ICT-related services (mobile phone-calls, broadband Internet connections and other) may be well influenced by the “willingness to buy”, as it was previously the case for the acquisition of durable goods.

We also find evidence that group-specific sentiment measures have a different impact on consumption: among them, the CSI elaborated for dependent workers has a significant impact, regardless of the type of purchase that is considered as the independent variable. In this sense, it is possible that the “willingness to buy” – or, more generally, psychological motives – influences especially the consumption decisions of the “middle class”, represented by the employees, and to a lesser extent those of poorer people (the inactives, i.e. people retired, or students not yet part of the labour force) and of richer self-

employed and professionals. However, working-condition specific measures of sentiment are only a possible proxy for income-related CSI. This hypothesis should be more carefully tested in the future, elaborating specific sentiment measures for different income classes, currently available only for a too limited time span (since 1990).

Finally, looking at the economic interpretation of the CSI, we have found that macroeconomic variables alone can only explain slightly more than 30% of its variability, in that confirming further that sentiment contains information that cannot be extracted by standard quantitative variables. CSI is proven to be significantly influenced by political and exceptional events that took place in the period considered in the analysis. More specifically, general elections seem to have played a relevant role in determining the sentiment of Italian households, especially at end of the eighties, at the beginning of the nineties and in 2001. On the other hand, shocks linked to exceptional circumstances are particularly significant when they are directly linked to the domestic debate (the euro changeover) and to a lesser extent when they are determined by international events such as the September 2001 terrorist attacks in the United States and the Kosovo war. Moreover, different political and international shocks are proven to affect households groups differently, confirming that the role of psychology may depend on the socio-demographic characteristics of the consumers. The effect of the shocks – as measured by the  $R^2$  of the regression - is indeed higher for inactive people and, to a lesser extent, for dependent workers: these categories of households may be possibly considered as those with a lower or medium level of education and therefore they may react in a “non rational” way to shocks linked to political and exceptional events. On the other hand, it is possible that better educated professionals and entrepreneurs react less strongly to such shocks, being more influenced by economic fundamentals. Also in this case, working-condition specific measures of sentiment are only a possible proxy for education-specific CSIs. This hypothesis should be checked more carefully in the future, with the elaboration of specific CSI measures linked to the level of education of the household or exploiting the micro-economic nature of the data.



## APPENDIX

### Data sources and description

Label	Definition	Source
CSI	Consumer Sentiment Index	ISAE
CONS	Final Consumption Expenditure	National statistical institute (ISTAT)
WEALTH	Household wealth – at constant prices	Bank of Italy
U	Unemployment rate	Bank of Italy on ISTAT data
INT	Medium-term interest rates	Bank of Italy
CPI	Consumer price index	National statistical institute (ISTAT)
Y	Disposable income	Bank of Italy
GDP	Gross Domestic Product	National statistical institute (ISTAT)
EXDM	Nominal Exchange rate Lira-DM	Bank of Italy
DEBGDP	Debt/GDP ratio (Maastricht definition)	Bank of Italy

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