What do Italian consumers know about Economic Data? An analysis based on the ISTAT Consumers Survey

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Abstract

Standard theory describes economic decisions as the result of optimising behaviour of well-informed economic agents. However, whether citizens are really well informed on economic data is still highly disputed. In order to investigate on this issue, since 2007 the Italian Consumers survey has incorporated a number of questions on the degree of knowledge about economic data. Surveys results show that the level of knowledge of Italian consumers is relatively low; moreover, knowledge seems to significantly vary across different groups of respondents, depending on individual characteristics and the perceived costs and benefits of acquiring information. Results provide evidence of deviation from the standard approach of full rationality in the information acquisition process: if agents are not always fully rational, delays in information acquisition should be taken into account by policy makers in designing appropriate interventions.

Keywords: Household information acquisition; information and knowledge; consumer confidence; statistical literacy; media exposure

JEL code: C83; D1; D83; H31

PsycINFO Classification code: 2227; 2229; 2240; 2960

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1. Introduction[1]

Economic theory describes policy decisions as the result of optimising behaviour of rational agents; on similar grounds, according to the public choice school, voters are also supposed to be well informed agents who base their decisions on utility maximisation. More generally, mainstream macroeconomics assumes that economic agents rationally elaborate on their full information set in order to form their savings or consumption decisions[2].

However, whether citizens are really well informed and rationally behaved is still highly disputed. Indeed, a number of studies have recently shown that agents are far from being fully informed about key economic variables; among them, Blinder and Kruger (2004) stressed the importance of determining *how* a society knows about statistics. They found that ideology is the strongest determinant in shaping public opinion: given the apparent inclination to use ideology, combined with the difficulty in building knowledge oneself, they find that US citizens tend to follow "ready-made" beliefs that society has chosen for them. According to Curtin (2008) people may be interested in knowing about how inflation affects their shopping trolley, or the unemployment rate in their specific labour market, but are less interested in learning about the performance of the whole country or in aggregated macro indicators which are difficult to apply to their daily life. In such circumstances, private information derived from neighbourhoods or local communities may be better appreciated by some than public information stemming from official sources. Reis (2006, 2009) interprets this kind of finding arguing that costs associated with the acquisition and use of information may generate "rational inattention", with widespread "knowledge inequalities" among the population.

In this respect, official statistics have an increasingly important role in the development of a common knowledge about the state and the evolution of a society: according to Giovannini et al. (2008) the value added of statistics critically depends on what people know about the world they live in. Following this strand of literature, since 2007 the Italian Consumers survey has incorporated once a year a number of questions on the degree of knowledge about economic data[3]. Questions concern knowledge about recent trends in GDP growth, inflation and the unemployment rate; consumers also have to report their opinions on the reliability of economic information and to indicate the main channels they use to acquire them. Finally, since 2009 they also have to report whether they use this kind of information in their decision process.

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[1] The authors wish to thank Annamaria D'Urzo for the elaboration of the aggregate economic knowledge indicators presented in section 4.

[2] See on this Blinder A.S., Krueger, A.B., (2004).

[3] See Fullone et alii (2008) e D'Urzo et alii (2009).

This paper further analyses the results of the survey and is structured as follows: section 2 presents the consumers survey carried out by the Italian statistical institute (ISTAT), while section 3 presents survey results. In section 4 we develop an aggregate indicator of economic knowledge, which in section 5 is put it in relation to socio-economic characteristics and opinions of the respondents. Concluding remarks are presented in Section 6.

2. The ISTAT Consumers survey

2.1 The Sample and the questionnaire

The Institute for cyclical Studies (ISCO) started a survey on Italian consumers in 1973, in the framework of an EU-wide project harmonized by the European Commission; in the period 1999-2010 the survey has been administered by the Institute for Studies and Economic Analyses (ISAE), and since January 2011 is carried out by ISTAT. The survey consists of qualitative questions on the personal situation of the consumer and the country. Questions allow five possible answers, ranging from strongly positive to strongly negative; results are usually expressed as weighted balances of positive and negative replies. The survey is conducted with a Computer Assisted Telephone Interviewing (CATI) system; it is based on a monthly sample of 2.000 Italian consumers, changing each month, for a total of 24.000 persons interviewed per year. The sample is extracted from the public telephone book registers and selected on the basis of a two-stage technique: in the first step, it is stratified according to zone of residence and size of municipalities (see table 1); the second stage is based on the selection of a specific consumer within the household selected in the first step. This selection is based on quota sampling according to gender (48,5% males, 51,5% females). Quota sampling ensures that sample size is always equal to the target, substituting non response with other consumers extracted from the sample; the response rate of the survey, calculated as the ratio among the number of the respondents and that of total monthly contacts, has been equal to roughly 66% in recent years. In order to take into account possible selection biases and changes over time in the households composition and age structure of the sample, in this paper we will use a system of probability and post-stratification weights, based on the work by Fullone and Martelli (2008).

Table 1 - The sample of the consumers' survey

GEOGRAPHICAL AREAS	SIZE OF MUNICIPALITIES							Total
	up to 5,000	5,001 - 10,000	10,001 - 20,000	20,001 - 50,000	50,001 - 100,000	100,001 - 500,00	500,001 +	
North – West	55	22	21	35	17	4	54	207
	2.7%	*1.1%*	*1.0%*	*1.7%*	*0.9%*	*0.2%*	*2.7%*	*10.3%*
North – Centre	73	62	53	54	25	15	46	326
	3.6%	*3.1%*	*2.6%*	*2.7%*	*1.2%*	*0.7%*	*2.3%*	*16.3%*
North – East	68	72	75	50	28	91	-	385
	3.4%	*3.6%*	*3.8%*	*2.5%*	*1.4%*	*4.5%*	-	*19.2%*
Centre	44	41	50	79	49	42	93	397
	2.2%	*2.1%*	*2.5%*	*3.9%*	*2.4%*	*2.1%*	*4.6%*	*19.8%*
South	79	59	76	94	83	41	32	463
	3.9%	*2.9%*	*3.8%*	*4.7%*	*4.2%*	*2.1%*	*1.6%*	*23.2%*
Islands	35	28	29	49	27	32	22	222
	1.7%	*1.4%*	*1.4%*	*2.4%*	*1.3%*	*1.6%*	*1.1%*	*11.1%*
Total	353	284	303	361	229	225	246	2000
	17.6%	*14.2%*	*15.2%*	*18.0%*	*11.4%*	*11.2%*	*12.3%*	*100%*

The first part of the questionnaire provides structural information about the consumer and his/her household, including age, gender, the area of residence, level of education and working status of the respondent (see table 2); the second part gathers consumers opinions on the general economic situation of the country (including questions on unemployment and price dynamics) and on that of the economic conditions of the household and of the individual consumer. Moreover, the survey asks Italian consumers about their income: obtaining a reliable measure of income is usually problematic in surveys administered with our methodology. In order to reduce the probability of missing data, the respondent is asked to assign family income to one out of 22 classes, rather than providing a precise estimate.

Table 2 – Structural information about the individual and the household

information about the individual	Modalities of reply
Gender	Male; Female
Region of residence	20 Italian administrative regions
Size of the municipality of residence	7 classes, see table 1
Relationship with the head of the household	Head of the household; Husband, wife; Son, daughter; Grand Parent; Other relative; Other
Age	18-20 years; 21-29; 30-39; 40-49; 50-59; 60-64; >64
Occupation	Full time; part time; unemployed; Pensioner; Student; Renter; Other (housemaid)
Professional category	Independent worker; agricultural worker; White collar employee; Specialised blue collar; non-specialised blue collar
Open ended / permanent worker	Open ended contract; permanent contract
Education (completed)	University degree; Tertiary education; Secondary education; Primary education; no cycle completed
Information about the household	**Modalities of reply**
Number of people in the household	Number
Of which, perceiving an income	Number
Of which, >64 years of age	Number

Of which, children living in the house
    Total
    <14 years
    >18 years
	Number

Total monthly family income, net of taxes, including capital income and transfers	22 brackets, from <350 euros to >6.000 euros

2.2 The knowledge questionnaire

The first survey on the knowledge of Italian consumers about economic data has been administered in 2007 in close collaboration between the former Institute of Studies and Economic Analyses (ISAE) and the OECD Statistics Department; the survey has become yearly since 2009 and starting from 2011 is administered by ISTAT (see the appendix for the exact wording of the

questionnaire). The main goal is to verify the degree of knowledge of Italian consumers about the recent developments – as registered by official statistics – of key economic variables such as GDP growth, inflation and the unemployment rate. Every question contains three core elements: a brief definition of the key statistical variable, a reference to the agency responsible for its publication and a question about the most recently published figure. Participants may choose to: 1) answer, 2) indicate that they do not know the exact figure, or 3) refuse to answer.

Failure to report official data could imply that participants are not aware of the most recent figure or that they do not know it, possibly because they have not recently heard about it in the media. In this respect, a scarce knowledge of the most recent data associated with a general knowledge of the phenomenon may imply a process of "staggering updates", in which people infrequently update their knowledge because of its high cost and relatively low return. On the other hand, if the consumer has not recently heard about official data releases, he/she may well be considered to be unaware of the existence of such data and of its use. Following Curtin (2008), in order to try to distinguish among these two cases, a follow-up question was introduced in the 2009 and 2012 surveys for each of the previous questions, asking if the consumer has recently heard of a public announcement concerning official statistics on GDP, inflation and the unemployment rate.

The questionnaire also collects answers about the importance of being informed on such issues, asking about the desire to be more informed (if any), and the media channels used to acquire information (possible media considered in the question are the television; radio; internet; newspapers and magazines; scientific publications; contacts with friends and relatives, with experts and politicians). Two further questions ask for an assessment on the quality of the economic information provided by the media and the quality and reliability of official statistics. Indeed, a previous study based on the Eurobarometer survey (Papacostas, 2008) has shown that there is a significant relationship among trust in official statistics and trust in the transparency of political decisions, confirming the important role of sound and accountable statistics in modern democracies. Finally the questionnaire investigates whether the data are used in making strategic decisions about consumption and saving.

3. Aggregate results

According to the "rational inattention" approach, citizens follow more closely available information when they are perceived to be particularly relevant; in this sense, it is possible to assume (Curtin, 2008) that the recent crisis started in 2008 may have generated an increased sensibility to economic data. This hypothesis seems to be broadly confirmed by survey results. Figure 1 presents

the Box-plot distribution of quantitative replies about the subjective knowledge on the statistics of interest; the box represents the answers' distribution around the median value (represented with a continuous line within the box), distinguishing among the answers comprised between the 75th and and 25th percentile (respectively, the upper and lower margin of the box), answers immediately below and above the threshold (answers comprised within the segments above and below the threshold) and outliers, represented as dots.

Figure 1 – Distribution of the answers

GDP
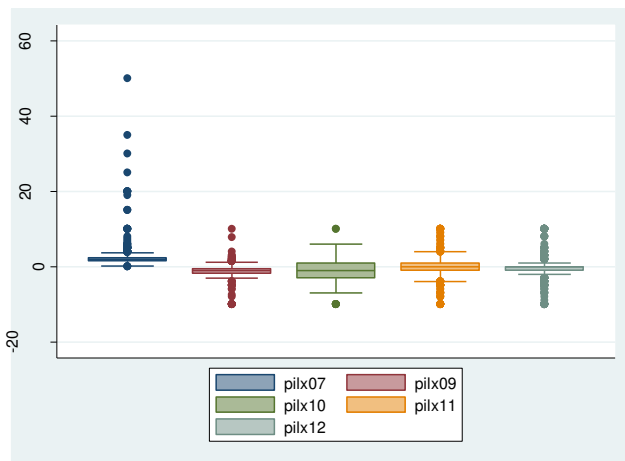
Inflation rate
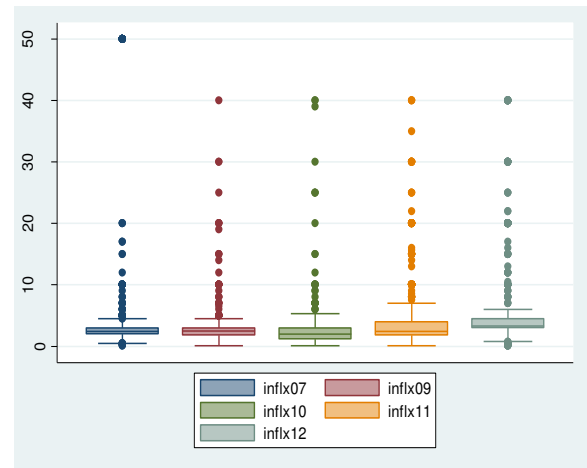
Unemployment

Indeed, public knowledge about GDP and the unemployment rate appears to get better over the years, with a decrease in the number of outliers; moreover, in the case of the answers about GDP growth, in the last two years the 25th and 75th percentiles are much 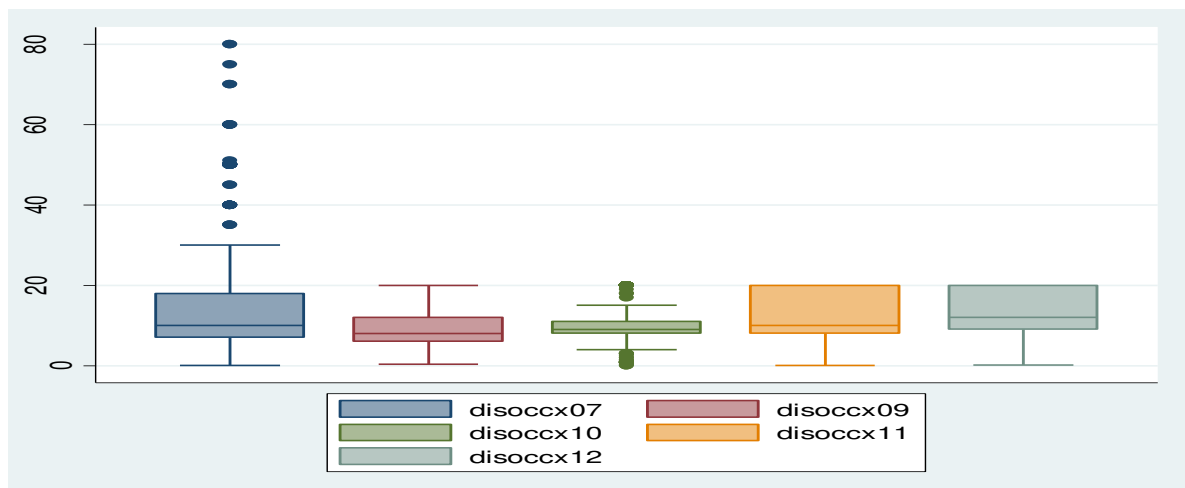closer to each other, a result that may be interpreted as a decrease in the level of uncertainty about this variable. On the other hand, public knowledge about inflation does not seem to have changed much over the years: outliers remain much more frequent than for the other two variables, and the inter-quartile difference remains broadly stable. Indeed, it may be considered that during the crisis attention of the media and the general public was rather focussed on growth and the unemployment rate than on inflation, and in this sense the latter result may still bill interpreted as preliminary evidence of a "rational inattentive" behaviour of Italian consumers during the crisis.

Further evidence in this sense may come from the analysis of aggregate survey results shown in table 3. Response rates vary between a minimum of 17% for the question about inflation in 2010 to a peak of 44% for the question about the unemployment rate in 2012. Looking at the data for the 2009 and 2012 surveys, among the non-respondents those appearing to be inattentive rather than completely unaware of economic data do prevail: indeed, the quote of those reporting to have heard

Table 3 – Knowledge about economic indicators

	GDP					Inflation				
	2007	2009	2010	2011	2012	2007	2009	2010	2011	2012
Response rates	26%	23%	20%	34%	34%	32%	24%	17%	26%	29%
Don't know	72%	73%	79%	64%	65%	66%	74%	73%	62%	64%
of which: I have heard about it, but I do no remember exact figures		43%			42%		49%			43%
I haven't heard about it recently		28%			22%		23%			20%
Don't know		2%			1%		1%			1%
Refuse to answer	3%	4%	1%	3%	2%	2%	3%	9%	12%	7%
Average	2.7	-1.4	-1.0	0.1	-0.4	4.7	3.2	3.5	4.7	5.6
Median value	2.0	-1.0	-1.0	0.0	0.0	2.4	2.5	2.0	2.4	3.3
First quartile	1.5	-1.8	-3.0	-1.0	-1.0	2.0	1.8	1.2	1.8	3.0
Third Quartile	2.4	-0.5	1.0	1.0	0.0	3.0	3.0	3.0	4.0	4.5
Standard deviation	3.7	2.2	3.2	3.0	3.1	8.9	3.5	6.3	6.4	7.1
Official data	1.9 (1)	-1.0 (2)	-5 (3)	1,3 (4)	0,4 (5)	1.8 (6)	1.6 (7)	1.4 (8)	2,4 (9)	3,3 (10)
	Unemployment									
	2007	2009	2010	2011	2012					
Response rates	31%	22%	27%	39%	44%					
Don't know	66%	75%	66%	55%	53%					
of which: I have heard about it, but I do no remember exact figures		50%			42%					
I haven't heard about it recently		24%			11%					
Don't know		1%			1%					
Refuse to answer	3%	3%	7%	6%	3%					
Average	14.6	10.0	10.2	11.8	13.4					
Median value	10.0	8.0	9.0	10.0	12.0					
First quartile	7.0	6.0	8.0	8.0	9.0					
Third Quartile	18.0	12.0	11.0	20.0	20.0					
Standard deviation	13.0	5.7	4.6	6.2	5.7					

(1) 2006, available in March 2007; (2) 2008, available in March 2009; (3) 2009, available in April 2010; (4) 2010, Available in March 2011; (5) 2011, available in March 2012; (6) March 2007; (7) February 2009; (8) March 2010; (9) February 2011; (10) February 2012; (11) III Quarter 2006, available in March 2007; (12) III Quarter 2008, available in

about the data without being able to report the latest figure vary between 42% and 50%, while the share of those not having heard at all about the data recently (i.e. those that we deem not having any knowledge of the statistic at hand) varies between 11% for the unemployment rate in 2012 and 20% for data about GDP growth in 2009.

As shown in fig. 1, the distribution of the replies is often characterised by the presence of relevant outliers: hence, the median value is a better characterisation of the distribution than the mean. On the basis of the median values, Italian consumers show a quite adequate knowledge of GDP growth in years 2006 and 2008, strongly underestimating the severity of the crisis in 2009, and resulting instead remarkably "pessimists" for 2010 and 2011. Median values for replies about the unemployment rate is on the other hand always above actual values; for inflation, median replies are above the actual figures in years 2006-2009, while being broadly in line and coincident with the actual rate respectively in 2010 and 2011.

Tables 4-8 report the results for the others questions comprised in the questionnaire. More specifically, table 4 reports the opinions of respondents about the quality of the public debate about these data, and on the reliability of official statistics (data being available for the period 2010-2012 in the first case, and only for the years 2009 and 2012 in the second).

Table 4 – Quality and reliability of economic information

In your opinion, during the recent economic and financial crisis, the quality and reliability of the information on the economic situation published by the media and the public debate on these issues has been: Good/Sufficient/Bad?				Generally speaking, do you consider that the official statistics we have talked about (Inflation, GDP, Unemployment rate) are reliable?		
	2010	**2011**	**2012**		**2009**	**2012**
Good	8.5	7.2	14.8	Yes	59.4	60.4
Sufficient	32.5	36.1	39.4			
Bad	47.3	43.9	38.4	No	33.9	33.2
Don't know	11.0	10.2	6.5	Don't know	6.7	6.4
Refuse to answer	0.7	2.6	0.8			

Generally speaking, the relative increase in knowledge that has emerged from the analysis of the replies has gone together with a better assessments about the quality of the public debate and of

official statistics in general: however, the share of respondents deeming that the quality and reliability of information published by the media is "good" is still largely below that of those considering it as "bad". On the other hand, a fairly stable 60% of respondents in 2010 and 2012 consider that official statistics about GDP, inflation and unemployment are fairly reliable, and only slightly more than 33% consider them as unreliable.

Table 5 reports the relative importance that the respondents assign to economic information, together with the desire of being more informed. The survey shows an increase of the importance assigned by the respondents to economic data, the share of those deeming they are very or fairly important rising from 71% to 74%, with also a relative increase of those deeming that the data are "very important" with respect to those judging them as "fairly important". Indeed, in 2012 the increased importance of economic information also stimulates the desire to be more informed, expressed by almost half of the sample.

Table 5 – Importance and desire of being informed for Italian citizens

Importance of being informed				
	2007	**2009**	**2011**	**2012**
Very important	Na	23.0	30.4	34.0
Fairly important	Na	48.2	39.4	40.1
Not important, nor unimportant	Na	17.7	14.7	14.8
Relatively not important	Na	4.7	5.0	4.8
Not important at all	Na	5.3	5.6	4.7
Don't know/no opinion	Na	0.9	4.8	1.6
Desire of being more informed				
Yes	51.5	40.7	40.6	46.6
No	43.8	55.6	52.5	51.2
Don't know	4.7	3.7	6.9	2:1

Moreover, as shown in table 6, in the last two years the share of people using ("a lot" or "a bit") this kind of information as a support for relevant decisions concerning consumption and savings behaviour has significantly risen, passing from 7% to over 15%; on the other hand, those not using at all economic information has fallen from 77% of the sample in 2010 to 61% in 2012. Overall, the data seem to suggest that during the crisis the increase importance of economic data has gone hand in hand with a better assessment on the quality of the information, an increased desire to be informed and a growing use of the information for economic decision.

Table 6 - Use of information for strategic decisions

In your private life, do you use the information we have talked about for your economic decisions about financial investments, relevant purchases and others?			
	2010	**2011**	**2012**
A lot	0.9	1.0	2.1
A bit	6.0	14.8	13.2
Not much	10.4	20.2	21.2
Not at all	76.9	56.9	61.1
Don't know	4.6	4.3	1.9
Refuse to answer	1.0	2.7	0.5

Finally, Table 7 contains the results concerning the media mostly used to gather this kind of information: television remains by and large the most important channel to acquire information, being used by almost 90% of the sample. In five years, the importance of the internet has grown from 20% to over 30% (albeit a decrease from 35% in 2011); newspapers and magazines remain very important for almost 40% of the sample. More "private" channels of information as the contacts with friends and relatives are important for around 10% of the sample, a minor share (2% in 2012) using also scientific press in order to acquire information about the economic data.

Table 7 – Information channels

	2007	**2009**	**2010**	**2011**	**2012**
Television	82.7	91.2	86.9	84.9	87.9
Radio	17.2	17.7	16.4	17.2	16.6
Newspapers, magazines	49.4	49.1	47.6	44.2	39.6
Internet	20.6	24.8	31.0	35.9	30.9
Political and opinion leaders	8.2	4.3	5.3	4.5	3.5
Friends and relatives	9.9	7.5	11.1	10.8	9.9
Scientific publications	ND	ND	ND	3.4	1.9
Don't know	3.1	1.0	4.0	1.0	0.7
Refuse to answer	2.0	0.2	0.8	2.4	0.2

4. The Knowledge Score

To assess the overall individual knowledge of statistical data on the basis of the answers to our survey, we adopt the methodology already introduced in Fullone et al. (2008) and D'Urzo et al. (2009). For each question we first calculate the absolute value of the relative error with respect to the official data available at the moment of the interview and then compute the average of the relative errors for the three questions, where a higher score indicates a lower knowledge of economic data:

$$
\text{Mean Absolute Relative Error (MARE)}_i = \frac{\sum_{J=1}^{3} \left| \dfrac{R_{i,j} - ISTAT_j}{ISTAT_j} \right|}{3} \tag{1}
$$

where R_{ij} is the individual i reply to each question j and $ISTAT_i$ is the official data pertaining to question j.

Hence we calculate two different raw scores for each survey: in order to fully exploit the information content of the surveys, the first score is calculated by considering also the *"don't know"* answers and excluding only those refusing to respond. To those answering *"don't know",* we impute a score equal to the maximum value reached by the score of those having answered the question, augmented by a unit: in other words, we "penalise" those answering of not knowing about the statistic under discussion assigning them the maximum error committed by those having indeed provided a reply, augmented by a unit (we only exclude those having replied "don't know" to all the three questions, i.e. the respondent should have answered at least one question to be considered in the score). In this case we have a total of 4.457 observations available for the analysis.

The second score is calculated using also the information provided in the follow-up questions asking whether consumers have publicly heard of such official statistics; in this case, data are available for 2009 and 2012 only. We interpret this evidence as a measure of "rational inattention", i.e. we consider that those not being able to answer but having heard about the indicator of interest are subject to staggered updates, either because of the high cost or because of the low benefit of acquiring information. For this reason, we assign them a score equal to the maximum score available augmented by one; furthermore, we augment the maximum score by two units to those reporting that they have not heard recently about such indicator(s). Those refusing to answer are still excluded from the calculation, reducing the total availability to 1806 observations for the two waves.

In the following, we shall use a linear transformation of individual MAREs, standardising them with respect to the mean and standard deviation of their distribution and calculating two z-scores, having the advantage of holding useful linear mathematical properties:

$$Z\text{-}score_i = (MARE_i - Mean(MARE))/Std(MARE)$$ (2)

5. An econometric model for knowledge

In this section, we address the relationship between knowledge of economic data, socio-demographic characteristics of the respondent, his/her desire and willingness of being informed and the channels used to acquire such information. More specifically, we first look at the propensity to answer the knowledge questions and hence the level of knowledge reached by those having actually replied to at least one of the questions. In the first case our dependent variable is defined as an ordinal categorical variable assuming values comprised between 0 (if the respondent has not answered to any of the three questions) and 3 (in case she has answered all the three questions); the two alternative definition of the z-score reported in (2) are then considered as dependent variable in the second case. More specifically, we use the two following models to estimate the probability of answering to the knowledge question and the knowledge score:

$$\Pr(q_{it} = x \mid z_{it}) = F(\beta' z_{it})$$ (3)
$$K_{ij} = f(z_{it}) + u_i$$ (4)

In (3), variable q_{it} takes values comprised between 0 and 3, F, is the cumulative distribution function assumed to be distributed as a standard normal; in (4), K is the Z-score defined in (2). In both (3) and (4), Z_{it} is the vector of controls: more specifically, we considered information extracted from the standard ISTAT consumers survey concerning gender (M/F), age (4 classes, from <30 years to 65+), zone of residence (North West, North East, Centre and South), number of inhabitants of the city of residence (5 categories from small town with less than 5,000 inhabitants to big cities with more than 500,000 people), employment status (4 categories, employees and self-employed, unemployed and inactive people), level of education (3 classes, ranging from lower intermediate to University level) and income quartiles. When available, we also include in the regressions the desire to be informed, the source of information used for acquiring statistical data and the level of trust in official statistics. We finally add a time dummy in order to test for possible differences in knowledge among the various waves of the survey. We estimate (3) with the Ordered Probit method and (4) with 2Stage Least

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Squares with endogenous variables as instruments. In both cases we use individual probability weights, as described in Fullone and Martelli (2008); unobserved error terms are assumed to be heteroschedastic with robust methods.

5.1. Estimation results: the probability of answering knowledge questions

Table 8 reports estimation results for model (3). The first 4 columns report the results for the whole sample; columns 5-8 the results obtained also using information on quality and use of statistical information (available only since 2010) are used; columns 9-12 those obtained taking into account the importance and desire to be informed (available for the whole sample, but 2010). In the estimation, we normalise with respect to male respondents, being independent workers, in the first income quartile, under 30 years of age, living in the North West with the lowest education attainment, deeming (when these opinions are available) that economic information is not important, of bad quality, not used and that they do not want to be more informed on these issues.

Ordered probit estimations are able to explain around 11% of total variability of individual replies. Considering a confidence level of 5%, probability to reply to the knowledge questions is higher:
  o for independent workers;
  o the higher the level of education and the age of the respondent;
  o the higher the level of income (even if this effect tends to disappear if we also consider information about quality of information and willingness to be informed);
  o for men with respect to women[4];
  o for those living in the North of the country;
  o the higher the number of inhabitants in the city the respondent lives in;
  o for those using other information channels on top of TV

If we add the consideration of opinion variables, the probability to reply to the knowledge questions is also higher for those:
  o using economic information in their decision-making process;
  o deeming important to be informed on these issues;
  o willing to be more informed on these issues.

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[4] For an analysis of the differences in opinions among men and women see for instance Bryan e Venkatu (2001).

Table 8 – Probability to reply, socio-demographics controls and the willingness to be informed

Variables	Whole sample				Waves: 2010, 2011, 2012				Waves: 2007, 2009, 2011 and 2012			
	Coeff	Std	t	P	Coeff	Std	t	p	Coeff	Std	t	p
Socio-demographic variables												
Professional category (control group: independent workers)												
Dependent workers	-0.33	0.07	-4.81	0.00	-0.37	0.10	-3.78	0.00	-0.36	0.07	-4.92	0.00
Unemployed	-0.31	0.13	-2.39	0.02	-0.36	0.18	-2.03	0.04	-0.39	0.14	-2.76	0.01
Inactive	-0.33	0.08	-4.14	0.00	-0.42	0.11	-3.64	0.00	-0.33	0.08	-3.93	0.00
Age (control group:18-29 years)												
30-49 years	0.14	0.08	1.71	0.09	0.16	0.13	1.27	0.20	0.23	0.09	2.70	0.01
50-65 years	0.35	0.08	4.34	0.00	0.42	0.13	3.35	0.00	0.42	0.09	4.97	0.00
> 65 years	0.07	0.09	0.74	0.46	0.25	0.14	1.87	0.06	0.17	0.09	1.76	0.08
Women	-0.53	0.04	-13.25	0.00	-0.52	0.06	-9.25	0.00	-0.53	0.04	-12.12	0.00
Number of inhabitants (control group: < 5000 inhabitants)												
From 5.001 to 20th	0.13	0.06	2.33	0.02	0.13	0.08	1.61	0.11	0.15	0.06	2.43	0.02
From 20 to 100th	0.12	0.06	2.11	0.04	0.10	0.08	1.22	0.22	0.13	0.06	2.03	0.04
From 100 to 500th	0.20	0.07	2.75	0.01	0.18	0.10	1.85	0.07	0.22	0.08	2.77	0.01
> 500th	0.24	0.07	3.20	0.00	0.24	0.10	2.39	0.02	0.22	0.08	2.73	0.01
Area of residence (Control group: north west)												
North East	-0.03	0.06	-0.56	0.57	0.00	0.08	0.03	0.97	-0.02	0.06	-0.35	0.72
Centre	-0.17	0.06	-3.07	0.00	-0.15	0.08	-1.81	0.07	-0.18	0.06	-2.89	0.00
South and Islands	-0.18	0.05	-3.61	0.00	-0.14	0.07	-2.02	0.04	-0.20	0.06	-3.52	0.00
Level of education (Control group: primary school or less)												
Secondary School	0.39	0.05	8.33	0.00	0.29	0.07	4.30	0.00	0.37	0.05	7.33	0.00
University	0.64	0.07	9.17	0.00	0.57	0.10	5.44	0.00	0.61	0.07	8.20	0.00
Income (Control group: first quartile)												
Second quartile	0.06	0.06	1.03	0.31	-0.06	0.08	-0.76	0.45	0.00	0.07	0.05	0.96
Third quartile	0.19	0.06	3.04	0.00	0.14	0.08	1.60	0.11	0.13	0.07	1.93	0.05
Fourth quartile	0.21	0.07	3.11	0.00	0.15	0.09	1.68	0.09	0.18	0.08	2.36	0.02
Information Channels												
TV only	-0.07	0.07	-0.92	0.36	0.10	0.10	1.01	0.31	-0.06	0.08	-0.82	0.42
Radio	0.13	0.05	2.55	0.01	0.19	0.07	2.72	0.01	0.07	0.06	1.18	0.24
Newsp., magazines	0.32	0.04	8.15	0.00	0.28	0.06	4.92	0.00	0.28	0.04	6.30	0.00
Internet	0.26	0.05	5.07	0.00	0.26	0.07	3.68	0.00	0.23	0.06	4.03	0.00
Opinion leaders	0.47	0.08	6.08	0.00	0.41	0.11	3.85	0.00	0.38	0.09	4.25	0.00
Friends, relatives	0.20	0.06	3.03	0.00	0.25	0.08	2.95	0.00	0.15	0.07	2.07	0.04
Reliability, use and desire to be informed												
Quality of information (Control group: bad)												

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Good					0.00	0.09	0.06	0.96				
Sufficient					0.06	0.06	0.99	0.32				
Use of statistical information (Control group: no use)												
Use information					0.54	0.06	9.26	0.00				
Importance of statistical information (control group: not important)												
Important									0.37	0.10	3.76	0.00
Desire of more information (no desire)												
Desire									0.37	0.04	8.30	0.00
Time (2007)												
2009	-0.19	0.05	-3.45	0.00					0.14	0.10	1.44	0.15
2010	-0.30	0.06	-5.10	0.00					(na)			
2011	0.26	0.06	4.47	0.00	0.45	0.07	6.61	0.00	0.61	0.10	6.19	0.00
2012	0.44	0.06	7.66	0.00	0.59	0.07	8.88	0.00	0.75	0.10	7.61	0.00
Number of observations				7198				3920				5845
R^2				0.11				0.12				0.11

No effect is found for the opinion on the quality of the public debate on the media about economic information. Looking at the time dummies, probability of reply is systematically higher in 2011-2012 with respect to the previous years, a possible evidence of an increase in the importance of economic information after the crisis and, more generally, of a greater impact of this kind of data in the public debate and the media in the last few years.

5.2. Estimation results: the knowledge score

In the final step, we looked at the relationship among the quality of the replies and the same control variables used in the previous estimation. Table 9-10 report the results obtained from the 2Stage Least-Squares estimations considering alternatively the two different definition of the knowledge score described in session 4. Once estimating the model for the whole sample, and hence without considering the follow up questions available only in 2009 and 2012, the number of available observations vary between 3.345 and 2.038 (table 9), depending on the availability of the controls used in the analysis. We use the same normalisations adopted in table 8: therefore, the constant term may be interpreted as the average z-score for the control group, the coefficients of the various dummies representing – if significant – the increase/decrease in knowledge associated with the specific characteristic at hand.

Knowledge is higher (i.e. the z-score is lower) for male independent workers, aged 30 or more, having obtained a secondary education or a university degree and using other channels of information

apart from television (however, private information from friends and relatives does not accrue to the average level of knowledge). Also, those willing to be more informed about these issues, and using this kind of information in their decision making process, have a better knowledge than the average. Knowledge is also higher in the last two waves of the survey. On the other hand, no significant differences in the level of knowledge is found according to the number of inhabitants of the municipality and its location, the level of household income and the opinions on the quality of the media debate and the importance assigned to this kind of information. Overall, the regression explains around 15% of the total individual variability of knowledge levels and results seem to be quite robust across different specification of the control variables and over time.

Finally, Table 10 presents the results obtained considering the score calculated including also replies to the follow up question administered in the 2009 and 2011 waves; in this case, only 1.357 observations are available for the estimation and the R^2 of the regression is equal to 0.21. The estimates broadly confirm the evidence already emerged: knowledge increases with age, education and the use of other channel of information than only television; men appear to be better informed with respect to women. The effect of the zone and amplitude of the municipality of residence is not significant, as that of the professional category and income. Moreover, knowledge is higher when the respondent thinks that information is important and wishes to be better informed on these issues.

Table 9 – Individual knowledge, socio-demographics controls and the willingness to be informed

Variables	Whole sample				Waves: 2010, 2011 and 2012				Waves: 2009, 2011 and 2012			
	Coeff	Std	t	p	Coeff	Std	t	p	Coeff	Std	t	p
Constant term	0.36	0.16	2.18	0.03	0.40	0.22	1.82	0.07	0.69	0.21	3.31	0.00
Socio-demographic variables												
Professional category (control group: independent workers)												
Dependent workers	0.20	0.68	2.92	0.00	0.22	0.09	2.51	0.01	0.16	0.07	2.27	0.02
Unemployed	0.31	0.15	2.06	0.04	0.43	0.20	2.16	0.03	0.32	0.15	2.12	0.03
Inactive	0.19	0.08	2.38	0.02	0.23	0.11	2.10	0.04	0.16	0.09	1.91	0.06
Age (control group:18-29 years)												
30-49 years	-0.26	0.09	-2.92	0.00	-0.22	0.13	-1.64	0.10	-0.34	0.09	-3.72	0.00
50-65 years	-0.47	0.09	-5.26	0.00	-0.39	0.13	-3.05	0.00	-0.51	0.09	-5.58	0.00
> 65 years	-0.38	0.10	-3.87	0.00	-0.37	0.14	-2.62	0.01	-0.46	0.10	-4.48	0.00
Women	0.43	0.05	9.25	0.00	0.38	0.06	5.94	0.00	0.46	0.05	9.25	0.00
Number of inhabitants (control group: < 5000 inhabitants)												
From 5.001 to 20th	0.02	0.07	0.24	0.81	0.00	0.09	-0.05	0.96	0.03	0.07	0.47	0.64
From 20 to 100th	0.04	0.07	0.55	0.58	-0.01	0.09	-0.07	0.95	0.06	0.07	0.77	0.44
From 100 to 500th	0.02	0.08	0.29	0.78	0.07	0.10	0.73	0.47	0.03	0.08	0.37	0.71
> 500th	-0.05	0.08	-0.61	0.55	0.08	0.12	0.69	0.49	-0.06	0.09	-0.68	0.50
Area of residence (Control group: north west)												
North East	0.02	0.07	0.32	0.75	0.05	0.09	0.57	0.57	-0.03	0.07	-0.45	0.65
Centre	0.06	0.07	0.99	0.32	0.03	0.09	0.34	0.73	0.08	0.07	1.15	0.25
South and Islands	0.09	0.06	1.57	0.12	0.09	0.08	1.15	0.25	0.07	0.06	1.04	0.30
Level of education (Control group: primary school or less)												
Secondary School	-0.28	0.05	-5.62	0.00	-0.28	0.07	-4.04	0.00	-0.25	0.05	-4.66	0.00
University	-0.47	0.07	-6.86	0.00	-0.58	0.09	-6.18	0.00	-0.40	0.07	-5.63	0.00
Income (Control group: first quartile												
Second quartile	0.14	0.07	1.92	0.06	0.26	0.10	2.74	0.01	0.16	0.08	2.13	0.03
Third quartile	0.05	0.07	0.75	0.45	0.14	0.09	1.50	0.13	0.09	0.08	1.16	0.24
Fourth quartile	0.11	0.08	1.52	0.13	0.22	0.10	2.31	0.02	0.12	0.08	1.53	0.13
Information Channels												
TV only	-0.06	0.07	-0.80	0.42	-0.16	0.09	-1.76	0.08	-0.07	0.08	-0.92	0.36
Radio	-0.05	0.06	-0.89	0.37	-0.05	0.08	-0.67	0.50	0.01	0.06	0.13	0.90
Newsp., magazines	-0.20	0.05	-4.34	0.00	-0.12	0.06	-1.89	0.06	-0.17	0.05	-3.43	0.00
Internet	-0.21	0.05	-3.97	0.00	-0.22	0.07	-3.23	0.00	-0.19	0.06	-3.37	0.00
Opinion leaders	-0.26	0.08	-3.24	0.00	-0.20	0.10	-1.93	0.05	-0.22	0.09	-2.46	0.01
Friends, relatives	0.00	0.07	-0.07	0.95	0.00	0.09	0.03	0.98	0.05	0.08	0.57	0.57

Reliability, use and desire to be informed												
Quality of information (Control group: bad)												
Good					0.06	0.08	0.68	0.50				
Sufficient					-0.01	0.06	-0.11	0.91				
Use of statistical information (Control group: no use)												
Use information					-0.31	0.06	-5.28	0.00				
Importance of statistical information (control group: not important)												
Important									-0.20	0.13	-1.49	0.14
Desire of more information (no desire)												
Desire									-0.25	0.05	-5.31	0.00
Time												
2009	0.01	0.07	0.20	0.84					-0.19	0.13	-1.39	0.16
2010	0.05	0.07	0.73	0.46					na			
2011	-0.11	0.06	-1.76	0.08	-0.09	0.08	-1.16	0.25	-0.31	0.13	-2.38	0.02
2012	-0.17	0.06	-2.60	0.01	-0.15	0.07	-1.95	0.05	-0.34	0.13	-2.59	0.01
N. of observations				3345				2038				2882
R^2				0.14				0.15				0.15

Table 10 – Level of individual knowledge (including rational inattentive behaviour), socio-demographics controls and the willingness to be informed

Variables	Coeff	Std	t	p
Constant term				
Socio-demographic variables				
Professional category (control group: independent workers)				
Dependent workers	0.13	0.10	1.22	0.22
Unemployed	0.47	0.20	2.35	0.02
Inactive	0.20	0.12	1.61	0.11
Age (control group:18-29 years)				
30-49 years	-0.29	0.13	-2.27	0.02
50-65 years	-0.53	0.13	-4.21	0.00
> 65 years	-0.45	0.14	-3.19	0.00
Women	0.46	0.07	6.60	0.00
Number of inhabitants (control group: < 5000 inhabitants)				
From 5.001 to 20.000 in.	0.03	0.10	0.34	0.73
From 20 to 100.000 in.	0.05	0.11	0.45	0.66
From 100 to 500.000 in	0.04	0.12	0.29	0.78
> 500.000 inhabitants	-0.08	0.12	-0.66	0.51
Area of residence (Control group: north west)				
North East	-0.04	0.10	-0.40	0.69
Centre	0.16	0.10	1.70	0.09
South and Islands	0.02	0.09	0.17	0.86
Level of education (Control group: primary school or less)				
Secondary School	-0.27	0.08	-3.55	0.00
University	-0.43	0.10	-4.33	0.00
Income (Control group: first quartile				
Second quartile	0.18	0.11	1.63	0.10
Third quartile	0.14	0.11	1.29	0.20
Fourth quartile	0.19	0.11	1.71	0.09
Information Channels				
TV only	-0.03	0.13	-0.21	0.84
Radio	0.00	0.09	0.00	1.00
Newspapers, magazines	-0.13	0.07	-1.93	0.05
Internet	-0.24	0.08	-2.90	0.00
Opinion and political leaders	-0.40	0.13	-3.18	0.00
Friends, relatives	0.23	0.12	1.90	0.06

Reliability, use and desire to be informed				
Quality of information (Control group: bad)				
Good				
Sufficient				
Use of statistical information (Control group: no use)				
Use information				
Importance of statistical information (control group: not important)				
Important	-0.36	0.09	-4.15	0.00
Desire of more information (no desire)				
Desire	-0.21	0.07	-3.09	0.00
Time				
2012	-0.18	0.07	-2.69	0.01
Number of observations				1357
R^2				0.21

6. Conclusions

Surveys performed since 2007 indicate that the level of knowledge of economic data of Italian consumers is relatively low: response rates are always below the 50% threshold and accuracy of response is seldom assured. Results available from similar survey worldwide (see for instance Curtin, 2008; 2009, and Papacostas, 2008) show that these findings are similar to those emerging on average in EU and the US.

The detailed analysis of the data performed in the paper suggests a high variability of the level of individual knowledge: this finding may be interpreted as a first confirmation of the idea of Carroll (2006), according to which information propagates trough the society as a virus. In this sense, the first exposed to the "contagion" of statistical information would be Italian males, aged 30 or more, with higher education, being independent workers and using other channel than only television to acquire information.

Moreover, according to Reis (2006) and (2009), we can expect that the level of knowledge would also depend upon information costs and benefits, with consumers that may choose to be "rational inattentive" to information if it is acquired at high costs or considered to be of relatively low use in everyday life. Survey results seem to provide confirmation also of this approach: indeed, knowledge is higher for those deeming that economic information is useful in everyday life decisions and for those willing to be more informed on economic issues. On the other hand, no evidence of the

importance of private channel of information (contacts with friends and relatives) emerge from the analysis.

These results may have interesting implications for economic theory, policy makers and statistical producers alike. From a theoretical point of view, the data support both the Carroll and Reis approaches to perceptions formation, in both cases providing evidence of deviation from the standard approach of full rationality. If agents are not always fully rational, possible delays in information acquisition patterns should be taken into account by policy makers in designing appropriate interventions. Results provide also very interesting evidence for official statistical agencies: first of all, it clearly emerges than an increase in the media exposure (as it was the case in the aftermath of the economic crisis) favors an increase in individual knowledge of the data. Moreover, it also emerges that in order to ensure a full translation of information available on the markets in effective knowledge, data should be easily accessible and as close as possible to the demand for information of the general public.

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Appendix 1 – Questions included in the "knowledge questionnaire"

- <u>Unemployment rate</u>: As you may know, every quarter the Italian National Institute of Statistics publishes figures on the unemployment rate in Italy. In other words, every three months ISTAT officially reports the percentage of people unemployed with respect to the active population. Can you please tell us the most recent rate of unemployment published by ISTAT?

- <u>Inflation rate</u>: Another important economic indicator that is published by ISTAT on a monthly basis is the consumer price index, commonly used to calculate the annual inflation rate. Can you please tell us the most recent rate of inflation published by ISTAT?

- <u>GDP growth</u>: ISTAT has recently published figures on all final goods and services produced in Italy in 2008. This figure is known as the Gross Domestic Product (GDP) of the country. Can you please tell us the percentage of change of the Italian GDP recently published by ISTAT?