

# BIt OTES N. 16 - JULY 2006

Portfolio and psychology of high frequency online traders Second report on the Italian market

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Borsa Italiana Spa, Research & Development Editorial Assistant: Silvana Maccari, Borsa Italiana Spa, Research & Development

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# Portfolio and psychology of high frequency online traders Second report on the Italian market

# Barbara Alemanni<sup>a</sup>, Alessandra Franzosi<sup>b</sup> July 2006

#### Abstract

In Italy, online trading is an important and well established phenomenon. This paper investigates the portfolio and psychological traits of Italian high frequency online traders. Our analysis is based upon a telephonic survey conducted with more than 200 online traders. The sample is composed of both active traders, those with at least two trades per month, and heavy traders, those with daily negotiation activity. In this paper, first we investigate the trading and portfolio characteristics of our sampled investors. A measure of portfolio composition and turnover is given, together with trading habits such as the market and frequency of negotiation. The second part of the paper deals with two psychological characteristics of Italian online traders: overconfidence, i.e. the extent to which they overestimate the precision of their information, and self-monitoring, which is a form of social intelligence. Differently from other papers, where overconfidence is assumed by the trading behaviour of investors, we directly investigate the degree of overconfidence of online traders. In our analysis, we give evidence on different manifestations of overconfidence such as: miscalibration, better than average effect, illusion of control and excessive optimism. We also questioned our sampled investors on their degree of social intelligence. Both overconfidence and self-monitoring are then related to portfolio characteristics and trading habits. The paper concludes with an econometric analysis to test how trading habits can be related to socio-demographic and to psychological traits. We observe how overconfidence and good self-monitoring positively affect trading frequency.

Keywords: online trading, psychology, overconfidence, self-monitoring, trading behaviour, portfolio choices JEL: D14, G11, G29

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We would like to thank, for their useful comments, the participants at the Borsa Italiana TOL Expo opening seminar in October 2005 during which preliminary results of our paper have been presented.



# Portafoglio e psicologia dei traders online Secondo rapporto sul mercato italiano

# Barbara Alemanni<sup>a</sup>, Alessandra Franzosi<sup>b</sup> Luglio 2006

#### Abstract

In Italia il trading online è un fenomeno importante e consolidato. Questo paper analizza la struttura del portafoglio e i tratti psicologici dei traders online italiani. L'analisi si basa su una survey effettuata telefonicamente presso più di 200 traders. Il campione è composto sia da traders attivi, coloro che effettuano almeno due scambi al mese, che da heavy traders che hanno un'operatività giornaliera. Il rapporto ne descrive la composizione del portafoglio; per azioni e derivati indica frequenza, motivazioni e mercato di negoziazione. La seconda parte del lavoro si occupa di due tratti psicologici: l'overconfidence, ovvero la misura con cui gli investitori sovrastimano la precisione delle loro informazioni, e il self-monitoring, che è una forma di intelligenza sociale. Diversamente da altri lavori in cui l'overconfidence è assunta alla luce del comportamento di negoziazione degli investitori, noi stimiamo direttamente il grado di overconfidence. Nell'analisi viene data evidenza di diverse modalità in cui l'overconfidence si manifesta: miscalibration, better than average effect, illusion of control e excessive optimism. Inoltre viene misurato il grado di intelligenza sociale degli intervistati. Overconfidence e selfmonitoring sono infine messi in relazione con le caratteristiche del portafoglio e con le abitudini di trading. Un'analisi econometrica segnala come overconfidence e elevato selfmonitoring condizionino positivamente il numero di negoziazioni effettuate dagli intervistati.

*Keywords: online trading*, psicologia, *overconfidence*, *self-monitoring*, comportamenti di *trading*, scelte di portafoglio JEL: D14, G11, G29

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Ringraziamo per gli utili commenti i partecipanti al seminario di aperture della TOL Expo organizzata da Borsa Italiana nell'Ottobre 2005, durante il quale sono stati presentati i risultati preliminari del lavoro.



#### 1. Introduction

Online trading is well established and highly developed in the Italian market. The penetration of e-trading accounts is growing among Italian households. Considering the markets that it manages, Borsa Italiana estimates that about 25% of trades on Italian stocks and 6% of standard contracts traded on equity derivatives are now made via Internet by retail investors. Italy is one of the market places where online trading by retail investors had the possibility to develop preminently. This result has been the effect of a favourable combination of many aspects: the market micro-structure allowing retail investors to access directly to the trading order book (differently with respect to anglo-saxon market environments); the overall high degree of liquidity of the Italian market with an yearly turnover velocity larger than 100% since several years, permitting efficient high frequency activity; a more general attitude of Italian investors to be independent in their saving allocation decisions; the attention paid by the Italian brokers in offering to their customers efficient services of online trading.

Internet has become the sole vehicle for an important group of individual investors. These are high frequency online traders who mix the characteristics of both typical Italian investors and Internet users. Our study is the first of its genre to investigate both trading patterns and behavioural characteristics of this highly dynamic group of investors. High frequency online traders are interesting *per se*, since they proxy a population where Internet has produced its strongest effect. Differently from the majority of retail investors, included those using Internet less frequently, high frequency online traders totally bypass brokers and exercise their trading activity in a manner similar to that of professional investors. As well documented in literature (Barber and Odean (2001a)), placing trade directly, rather than through a broker, can give such investors an exaggerated sense of control over the outcome of their trades. The vast amount of online investment data available will enable investors to confirm their prior beliefs and may lead them to become overconfident in their ability to pick stocks and other securities. Faster feedbacks may focus investors' attention on recent performance.

Based upon a phone survey, our study can provide a very detailed description of markets and securities where high frequency traders tend to concentrate their trading activity; in addition it sheds a light on trading level and characteristics for different type of financial products. Finally, it also provide some references on the highly debated topic (Barber and Odean (2002)) of online trading performances.

Thanks to the survey answers, in our analysis we can use psychometric techniques to test directly two important psychological characteristics of high frequency online traders, overconfidence and self-monitoring. Differently from other papers, where overconfidence is assumed by the trading behaviour of investors, we directly investigate the degree of overconfidence of online traders. In our analysis, we give evidence on different manifestations of overconfidence such as: miscalibration, better than average effect and illusion of control. This is the first paper of its kind able to provide all these metrics on a group of investors, which is commonly assumed to be characterised by



overconfidence. Thanks to our direct examination, we can also investigate the type of relationship among different biases all commonly labelled as overconfidence. Together with the analysis of the cognitive biases, we also questioned our sampled investors on their degree of social intelligence, self-monitoring. Our approach thus allows us to assess the effect of several and distinguished psychological characteristics on trading behaviour independently of other variables.

Our main findings are as follows:

- online traders investments are diversified and their portfolio includes different financial assets. Their preference is in favour of listed instruments: all of them trade stocks (especially domestic) and half of them derivatives. The most traded instruments are Italian blue chip and futures and options. Italian stocks traded are, on average, more than 10 (12 for active and 18 for day and heavy traders). At the top rank are the ones with the highest turnover; mid and small caps are not missing;
- 2) by all indicators, high frequency online traders appear to be overconfident. Splitting the sample between active traders, those trading at least twice a month, and day and heavy traders, those trading daily, the result do not change significantly;
- 3) the various metrics used to assess overconfidence suggest that there are different psychological characteristics involved. Miscalibration, i.e. too narrow confidence intervals, appears to be uncorrelated with both better than average and illusion of control indicators, while these latter are positively correlated;
- self-monitoring is a very specific psychological traits: if on average our sample shows a medium degree of self-monitoring, a high standard deviation suggests a significant variation across different traders. In addition, it appears, while the evidence is not very strong, that investors higher in self-monitoring are also earning more;
- 5) econometric models trying to find determinants of trading frequency suggest a positive role of overconfidence (particularly illusion of control) and self-monitoring. Sociodemographic aspects affecting positively the probability to be a day trader are the fact of being self-employed, retired (age) and living in the Southern regions of Italy. In addition, the number of trades increases among online investors devoting a higher share of their wealth to short term investments and using specialised online brokers. Also high performances, past and expected, are positively correlated with trading frequency.

The next section presents the related literature on the relationship between trading and both online traders' characteristics and psychological traits. Section 3 describes data and methodology, while section 4 illustrates high frequency traders socio-demographic characteristics, their portfolio and trading habits. Section 5 is dedicated to behavioural attitudes and their preliminarily relationship with both portfolio and trading characteristics. Section 6 presents the result of an econometric investigation relating trading frequency with both behavioural and socio-demographic characteristics. Section 7 draws some general conclusions.



#### 2. Related literature

Direct individual investors' participation to financial markets via Internet is a recent phenomenon; it started in the second half of '90s and knew a sudden expansion during the equity market boom of 1999-2000. Nowadays in many countries trades channelled through Internet account for an important share of the total turnover.

These changes in the financial environment boosted academic interest for online investors' behaviour. Papers on this topic are growing in number, following different methodologies and themes.

A first collection describes online traders and their behaviour, shedding light on their specific characteristics with respect to the other retail investors. Demographic features and portfolio structures are analysed through questionnaires or individual accounts data. Psychological traits of the online traders receive a central room; thanks to the high degree of independence in taking their financial decisions, online investors provide an ideal environment for testing behavioural finance theories. As a further step, many authors put these features in relation with the trading activity of online investors (turnover, frequency of trading, diversification and performances), trying to isolate which ones present an explanatory power. Some papers verify if the use of Internet directly cause some observed attitudes.

In general, this literature presents a high degree of heterogeneity, especially about the determinants of the trading behaviour, requiring further efforts for reaching a superior consensus.

#### 2.1 Online traders' characteristics and trading

An overall picture of online traders and their portfolios is available for the Italian, German, Japanese, United States markets and partially for Sweden. Franzosi and Pellizzoni (2004) describe in detail Italian online high frequency traders starting from the results of a phone survey. Online investors are very often men, with a good income level and education and a professional status allowing them to manage their time with flexibility (self-employed). They have a higher financial sophistication and lower risk aversion with respect to the population of Italian shareholders (Franzosi, Grasso and Pellizzoni (2004)). They decide in autonomy. Their portfolios are biased towards listed financial instruments, especially Italian listed stocks; about 50% of them trades also foreign stocks and derivatives.

Dorn and Huberman (2005) provide a portrait of the German online trader<sup>1</sup>. They combine information from individual accounts (January 1995 to May 2000) with the results of a survey. Demographic features are closed to the Italian ones: male, young, well educated, with good income and wealth level. Proxies of sophistication (self-reported and

<sup>(1)</sup> They refer to the customers of an online broker, which is a broker that can process orders by Internet. Investors can post their orders by Internet but also phone, fax or writing.



actual) and of risk tolerance are made available, showing that online investors have on average a good perception of their financial knowledge and are less risk averse. Their portfolios are characterised by high turnover; stocks represent half of their wealth. Also Glaser (2003) and Glaser and Weber (2005) work on a group of online investors of a German online broker; in the first case the analysis is based upon the transactions and the portfolio positions of individual accounts during the period January 1997 to April 2001, while the second paper uses information also from a survey submitted in 2001 by e-mail. As for Dorn and Huberman, German online investors show a high portfolio turnover (30% per month on average); almost all of them trade stocks, with some favour for the technology sector, and 50% trades warrants.

Remaining in Europe, for the Swedish market Anderson (2004) considers all the trades made by the customers of an online broker on Swedish stocks during the period 1999-2002. The average annualized portfolio turnover for each investor is equal to 216%, with a level of 90% for the median investor and of over than 700% for the 20% most active ones. Online investors prefer trading stocks belonging to telecommunication or information technology sectors.

Barber and Odean (2002) describe US investors that in the first part of '90s switched to the online channel as young, men, with high income and a long self-reported investing experience. They prefer investing in small and risky stocks. Finally, in Japan Mizuno and Uchida (2004) by a questionnaire to individual investors find that the probability to use Internet is higher among young men with a short experience as investors. They do not provide any information about portfolios' structure.

Except for Franzosi and Pellizzoni (2004), no works regarding the online traders distinguish them on the trading frequency basis. Some demographic features of day traders (online and not) are present only in Linnainmaa (2003) for the Finnish market. He finds that day traders are men, in late 30s and living in metropolitan areas.

The literature on the determinants of trading behaviour and performances has less uniform results. Authors use many families of explanatory variables, such as demographic feature (sex, age, income and education), risk attitudes, financial sophistication and physiological traits. Results remain very often stand alone for the difficulties in comparisons and for the few papers still available. The last part of this paragraph is dedicated to the role of socio-demographic variables in this field, while behavioural ones are considered in paragraph 2.2 after a description of the metrics that could be used for identifying them.

Franzosi and Pellizzoni (2004) find that the trading frequency of cash instruments and the probability of trading derivatives are positively related to the perceived autonomy and to the financial sophistication of online investors (synthetic indicator calculated as a mix of actual knowledge and experience). Dorn and Huberman (2005) stress the role of self-reported risk aversion for explaining turnover (positive relation) and portfolio diversification (negative relation). Lower portfolio diversification is also linked to scarce experience and little self-perceived financial knowledge. People believing to be more sophisticated than others usually trades more. In Glaser and Weber (2005) trading levels are put in relation with some portfolio and overconfidence measures, available for 215



investors. Portfolio turnover is higher among warrants investors and those who describe their investment strategy as risky.

In Anderson (2004) performances are negatively affected by trading almost entirely by the effect of flat fees, which are related to the portfolio size (for biggest portfolios the effect is smaller). A positive impact is due to diversification, with no relation with the portfolio size; the author suggests that it happens thanks to sophistication reasons.

Interesting, especially for the dataset used, is the paper by Oh, Parwada and Walter (2004) on the Korean equity market. The Korean exchange allows to isolate trades made by online individual investors and by consequence to compare them with that of other families of investors (foreign, institutional, individual investors and securities houses). The analysis is at aggregate level through a VAR methodology. The authors observe among online traders a directionless behaviour in terms of feedbacks; significant positive serial correlation in flows is common to all market participants, suggesting herding behaviour. In terms of information, online traders could improve their attitudes as indicated by the absence of causality from flows to returns and by the fact that the most important fundamental indicator for them is the simple dividend yield.

The nature of the link between the use of the online channel and the specific features noticed among online traders underlies all the literature regarding online investors' behaviour. Some authors suggest a causal relation from Internet to trading behaviour. Barber and Odean (2001a) discuss how the spread of Internet could affect financial markets and the investor behaviour; their idea is that Internet, making available massive and real time information and greater speed of execution at cheaper costs, increases overconfidence among investors with negative effects on performances and an excessive and too speculative turnover. Two papers try to isolate this 'Internet effect' through the analysis of natural experiments. Barber and Odean (2002) study a group of retail investors of a discount broker switching from phone-based transactions to online trading; results show an increase in turnover after the use of Internet, an incorrect identification of speculative trades and an overall negative average effect on performances. Similarly, Choi, Lison and Metrick (2002) observe the behaviour of the subscribers of two 401(k) retirement plans before and after the introduction of the possibility to invest by Internet. Investors using Internet show higher turnover and smaller trades.

Finally, related works are available for the Italian market. KPMG (2005) records two times per year the overall dimension of Italian e-banking and e-trading markets, with an analysis of their major players. An international comparison of the Italian e-banking market and users is in Barbesino, Camerani and Gaudino (2005). It is also possible to capture differential features of online investors with respect to the Italian population; BNL/Centro Einaudi (2005) and Banca d'Italia (2004) regularly submit surveys to the overall population of Italian investors; Franzosi, Grasso and Pellizzoni (2004) describe the Italian retail direct shareholders with a methodology comparable with Franzosi and Pellizzoni (2004).



#### 2.2 Overconfidence measures, self-monitoring and trading

While in the Economics and Finance literature the study of the causes and consequences of overconfidence is rather a new field of research, in the area of cognitive psychology it has been an issue for a long time.

The principal fashion in which overconfidence is labelled is miscalibration, in the form of too narrow confidence intervals. This has been tested through what is normally called a calibration test (e.g. Linchtenstein et al. (1982), Alpert and Raiffa (1982)). When individuals are asked to construct a 90% confidence interval for currently known or expected magnitudes (such as the length of River Nile or the level of a stock index such as the Stoxx50 in one month time), a percentage of individuals usually markedly below 90% produce intervals that bracket the true answer. Or if a single individual is asked a series of such questions, once again it is commonplace for only 40-50% of her intervals to be right. However, in the literature there is an array of other phenomena normally described as overconfidence manifestation: among others better than average effect, illusion of control and overoptimism.

The better than average effect manifests under the form of overestimation of one's ability relative to the others. For example, metrics for this effect have been computed by Svenson (1981) showing that 80% of Texas drivers believe their driving ability is above average. Svenson's finding has been replicated numerous times in various countries and with respect to various IQ - or skill related outcomes other than driving. For example, Cooper et al. (1988) when asking a sample of entrepreneurs about their chances of success, found that 81% answered between 0 and 30% chances of failure (with 33% attaching exactly zero probability to failure). However, when asked the odds of any business like theirs failing, only 39% of them answered between 0 and 30%. On this same field, Taylor and Brown (1988) document that people have unrealistically positive views of the self; in addition, from their survey it appears that depressive people have the most realistic self perceptions. The better than average effect also affects the attribution of causality. Because individuals expect their behaviour to produce success, they attribute outcomes to their actions when they succeed and to bad luck when they fail (Miller and Ross (1975); Feather and Simon (1971)). This self-serving attribution of outcomes reinforces overconfidence.

Illusion of control suggests that people tend to believe they can somehow exercise more control over events than can realistically be possible. For example, Langer (1975) finds evidence for it when she concludes that people strongly prefer lottery tickets they picked themselves as compared to randomly assigned ones. Fleming and Darley (1986) look at dice throwing experiments and find that players tend to believe that they could control the dice's outcome. Closely related to the illusion of control is overoptimism where people believe favourable events to be more likely that what they are. Alpert and Raiffa (1982) and Weistein (1980) find that people think good things happen more often to them that to their peers.

All the above mentioned phenomena have been investigated in the business world and, for example, on their study of professional managers Russo and Shoemaker (1982)



find out that the latter perceive their judgement to be too exact. Similarly, Fenton O'Creevey et al. (1988) measure the illusion of control of traders at London investment banks and the impact on their trading strategies.

Financial theorists have begun to model the impact of investor overconfidence may have on financial markets. Odean (1988), Benos (1998), Kyle and Wang (1997), Daniel, Hirshleifer and Subrahamayan (2001) and Gervais and Odean (2001) all concentrate on the consequences of miscalibration. Although the formulation differs in a number of ways, all are unanimous in predicting that the greater is the level of overconfidence, the greater is the level of trading activity.

On the empirical side, the evidence is normally indirect since it is not obvious who in a group of traders is overconfident and who is not. Barber and Odean (2001b) find that single, young, male investors trade the most frequently and they suggest a relationship between these socio-demographic characteristics and the psychological trait of miscalibration. The empirical link between overconfidence and trading frequency has been studied extensively in other recent researches. Existing studies disagree on which type of overconfidence and trader characteristics affect the trading activity. Deaves, Luedes and Lue (2004) perform an asset market experiment, and find that overconfidence, measured as miscalibration, leads to higher trading frequency. However, in their experiment, these authors do not find a correlation between gender and degree of miscalibration. In another experimental study on miscalibration conducted by Biais at al. (2005), it appears that miscalibrated/overconfident traders are more aggressive in their trading activity and suffer winner's course. However, while there is a relationship between trading activity and gender, miscalibration tends to be uncorrelated to traders' sex. Combining survey responses and trading records of German retail brokerage investors, Dorn and Huberman (2005) produce a different measure of overconfidence that is the illusion of knowledge, in other words the gap between the investor's self-assessed knowledge and her true knowledge about investment, and show that it has no relation with trading activity. Glaser and Weber (2005) surveying 215 online investors and testing them for different measures of overconfidence (miscalibration, better than average effect, illusion of control and overoptimism) find, contrary to the theoretical prediction, that miscalibration does not lead to higher trading frequency, while the latter is associated with better than average effect. Glimblatt and Keloharju (2005), using a dataset of more than 13360 Finnish males, relate a measure of self-confidence with trading activity and find a positive significant relationship.

If cognitive psychology is now commonly used in the interpretation of economic agents' behaviour in financial market, the liaison of social psychology and finance is still in its infancy. In particular, a rather common feature such as self-monitoring, a form of social intelligence, is a psychological trait, which finds remarkable interest in managerial sciences, but very few evidences in the world of finance.

Self-monitoring refers to the ability of people to adapt their self-presentation to the requirements of the environment or situation. It is therefore related to the sensibility for what is considered appropriate or desirable expressive behaviour in different situations and the ability to control and alter this behaviour (Snyder (1974)). People who are high



self-monitors constantly watch other people, what they do and how they respond to the behaviour of others. Such people are hence very self-conscious and like to 'look good' and will hence usually adapt well to differing social situations. People scoring high on this trait can alter their expressive behaviour according to the social requirements while feeling quite different inside. On the other hand, low self-monitors are generally oblivious to how other see them and hence march to their own different drum. People scoring low on this trait do behave more according to their own inner state of mind and their expressive behaviour is more in line with their own feelings and thoughts, without concerning much about what would be appropriate in a social sense. Self-monitoring involves three major and somewhat distinct tendencies (Greenberg and Baron (1990)):

(1) willingness to be the centre of attention, a tendency to behave in outgoing, extraverted ways (closely related to the social skill of emotional expressiveness);

(2) sensitivity to the reactions of others;

(3) ability and willingness to adjust behaviour to induce positive reactions in others.

High self-monitoring could be very useful in jobs which require different roles like managerial jobs, or which require public appearance, like sales jobs. More in general it seems that self-monitoring can enhance an individual's chance to obtain career success in organizations (Kilduff and Krackhardt (1994)). Research with respect to the effect of self-monitoring on managerial career success reveals that high self-monitors achieve more cross-company promotions and obtain more internal promotions than low scorers when they stay with the same employer (Kilduff and Day (1994)).

The application of self-monitoring to trader behaviour is very rare. To our knowledge, only Biais et al. (2005) applied it to their experimental financial market simulation and found that highly self-monitoring participants in an experimental financial market place more profitable orders than others.

Papers	Sample and	Main findings			
-	methodology	Portfolio and trading	Behavioural		
Anderson (2004)	Sweden (April 1999- March 2002); Swedish stocks trades made by 20,799 customers of an online broker.	<ul> <li>200% average annual turnover (90% median and 700% last two deciles).</li> <li>Negative effect of trading on performances, reduced in case of biggest portfolios; positive effects of diversification.</li> </ul>			
Barber and Odean (2002)	Usa (1999-1996); accounts of 1,600 investors of a discount broker.	Switch to Internet implies: - more speculative trading; - increase trading volumes; - decrease performances.	<ul> <li>Self-attribution bias (good past returns) as a reason for switching to Internet.</li> <li>Overconfidence implies higher turnover and lower performances.</li> </ul>		
Choi, Lison and Metrick (2002)	Usa (1997-2000); accounts of more than 60,000 participants to two 401(k) plans.	<ul> <li>Internet implies:</li> <li>increase trading frequency;</li> <li>smaller trades and smaller portfolios, which results in a reduced effect on turnover;</li> <li>no significance differences in performances.</li> </ul>			
Dorn and Huberman (2005)	Germany (1995-2000); 1,345 customers of an online broker; mail and e-mail survey.	<ul> <li>17% monthly portfolio turnover and 2% monthly returns.</li> <li>Domestic assets account for 50% of wealth.</li> </ul>	<ul> <li>Risk tolerance positively related to turnover and negatively to diversification.</li> <li>Self-reported financial knowledge (overconfidence) implies better diversification.</li> </ul>		
Franzosi and Pellizzoni (2004)	Italy (2003); 200 high frequency online traders; phone survey.	<ul> <li>High trading frequency.</li> <li>High portfolio diversification with a preference for Italian stocks; 50% of them trades foreign stocks and derivatives.</li> <li>Trading levels and probability to trade derivatives positively related to financial sophistication and perceived autonomy.</li> </ul>	<ul> <li>Stock trading activity behaviour could be related to information-based familiarity, investing in stocks capable to capture attention (past high performances), disposition effect, selling the winners and holding the losers.</li> </ul>		
Glaser (2003)	Germany (1997-2001); accounts of 3,079 investors of an online broker.	<ul> <li>High trading frequency and portfolio turnover (monthly 30% median for stocks).</li> <li>High portfolio diversification.</li> <li>Sectoral bias in favour of technology stocks.</li> <li>Turnover positively related to risky attitude, warrants investments and negatively to stock portfolio value.</li> </ul>			
Glaser and Weber (2005)	Germany (2001); 215 among Glaser's online investors; e-mail survey.	- As in Glaser (2003)	<ul> <li>Overconfidence metrics: miscalibration, better than average effect, volatility estimates.</li> <li>Positive relation between better than average and trading volumes.</li> <li>No clear relation between calibration and trading volumes.</li> </ul>		
Mitzuno and Huchida (2005)	Japan (2001); mail survey to 1,068 investors of which 50% using Internet.		<ul> <li>Absence of self-attribution bias.</li> <li>Attributes indicating overconfidence: choosing stocks by their own, preference for capital gains, higher risk tolerance, in favour of 401 (k), charts use.</li> </ul>		
Oh, Parwada and Walter (2004)	Korea (2001-2003); Korean Stock Exchange data indicating online traders.	<ul><li>Directionless behaviour.</li><li>Poor information behaviour.</li></ul>	<ul> <li>Herding attitude among online traders is common to other categories of investors.</li> </ul>		

Table 1 - Em	pirical papers of	n online traders'	portfolio and behaviour



#### 3. Data and methodology

The analysis' target is composed by the high frequency online retail traders, defined as investors using Internet at least once every two weeks for their trading activity on financial securities. All the data have been collected through a survey submitted by phone to 203 final investors. Survey methodology and sampling criteria are, with only marginal changes, the same used in a previous report on the Italian online traders (Franzosi and Pellizzoni (2004)); this homogeneity will permit time comparisons.

A minimum level of activity (two trades per week) has been chosen as a lower cut off in order to have a population with a robust practice in financial trading via Internet and capable to show, in this respect, a specific behaviour usually not present among investors that are more basic. In fact, analyses on the Italian retail shareholders show that investors using Internet occasionally to trade do not differentiate in terms of both portfolios' structure and demographic features from investors using channels considered as more traditional (Franzosi, Grasso and Pellizzoni (2004)).

Technically, it means to deal with about the 3.5% of the Italian investors having an e-trading account (table 2); it is a niche phenomenon considering the number of investors involved, with very few traders with a daily activity. KPMG (2005) estimates, at the end of 2004, about 7 millions of e-trading accounts opened in Italy of which only 100-150 thousands with a monthly activity and only 10-15 thousands belonging to day and heavy traders. These population's features made necessary the adoption of suitable survey and sampling criteria, also for obtaining robust results for the day and heavy traders subsample. Due to the difficulties in collecting a sufficient number of high frequency traders using standard sampling techniques regarding the entire Italian population, the survey has been conducted starting from a list of online traders registered on the Borsa Italiana. This choice could introduce a potential selection bias toward people with a good Internet knowledge and highly interested in finance topics, but it could be considered not pervasive because these features are in line with the characteristics of the survey target too.

In terms of sampling, the necessity of having a sufficient number of day and heavy traders interviewed forced us to oversample them with respect to their actual weigh in the population, with a proportion of 50% of interviewees instead of 10%. By consequence, statistics presented in this paper for the whole sample do not represent the Italian population of high frequency online traders. In the meanwhile, numbers concerning the day and heavy traders sub-sample (investor with daily activity) or active online investors (investor without daily activity but with more than two trades each month) are fully representative.

The survey has been realised by phone<sup>2</sup> among 203 online traders during the period June-July 2005: 101 day and heavy and 102 active traders. Interviews have been carried out respecting gender and geographical segmentation of the starting list of online traders,

<sup>(2)</sup> Gfk Eurisko, one of the leading survey companies in the Italian market, has technically conducted the survey.



itself in line with demographical features of the population suggested in other sources (KPMG (2005) or Franzosi, Grasso and Pellizzoni (2004)). Each interview lasted about 30 minutes and covered about 50 questions concerning socio-demographic variables, trading habits in both stocks and derivatives portfolio characteristics, metrics and tests to measure the existence of overconfidence and self-monitoring.

The dataset allows remarkable comparisons with a previous survey realised in December 2003/January 2004 on the same target of investors (Franzosi and Pellizzoni (2004)). The adoption of similar survey tools made the comparability at sub-sample level (day and heavy versus active traders) fully effective<sup>3</sup>.

E-trading accounts population <sup>(1)</sup>			Borsa Italiana sample <sup>(2)</sup>			
Trades per year			Trades per month			
Without trades 1-12	88.0% 8.7%		Less than two	-		
13-50	2.2%	007	At least two	25.0%		
51-200	0.7% 👌 🕇	2.9%	At least one iper week	25.0%	} 50.0%	
More than 200	0.4%		Every day	50.0%		
Breakdown of high freq	uency traders		Breakdown of high frequenc	y traders		
13-50	66.7%		Active traders <sup>(3)</sup>	50.0%		
51-200	22.2%					
More than 200	11.1%		Day and heavy traders $^{(3)}$	50.0%		

#### Table 2 - Online traders by frequency of trading

(1) KPMG (May 2005); e-trading accounts are online accounts with a securities deposit service

(2) Survey among 203 online traders with at least one trade each two weeks

(3) Online traders are considered 'day and heavy' if they usually make a online trade almost every day on at least one security; they are considered 'active traders' with at least two trades per month but not daily

Source: authors' elaborations on Borsa Italiana and Kpmg data

<sup>(3)</sup> In particular, it has been followed the same procedure for collecting the initial list of online traders, the same survey method (200 interviews made by phone) and sampling criteria (day and heavy traders overweighting) and the invariance of some questions wording especially with reference to portfolio and trading behaviour.





# 4. Socio-demographic characteristics, portfolio structure and trading habits

#### 4.1 Demographic features

Demographic features of the analysed sample, segmented by trading frequency between day and heavy and active traders, are shown in table 3. The table provides also a comparison with the Italian population, investors and shareholders (Franzosi, Pellizzoni and Grasso (2004) BNL/Centro Einaudi (2004) and Banca d'Italia (2004) data)<sup>4</sup>. The overall picture is similar to the one already provided for Italy in Franzosi and Pellizzoni (2004) but it is also close to the ones available for Germany, United States or Japan as described in paragraph 2.1.

Italian online traders are a mix between investors and Internet users. They have strong gender specificity: 96.6% are men. The prevalence of men among online traders is common to all the surveys on the same target carried out abroad, even if the frequency in our sample seems to be particularly high (in line only with Glaser's sample for Germany). In Italy, Internet users are very often males (Barbesino, Camerani and Gaudino (2005)) and the financial decision maker at household level is usually the man; furthermore, as suggested by Barber and Odean (2001b), men usually present higher frequency trading with respect to women due to overconfidence reasons.

North West regions have a higher concentration (40.7%) with respect to the Italian population (24.7%), but similarly to the investors (36.7%) and to the shareholders (41.5%). In the meantime, day and heavy traders are more numerous in the South (28.4%) compared to the active ones (9.9%, with a difference statistically significant). About the age distribution, the cohort between 35-44 years is the most numerous (33.3% of day and heavy and 40.5% of active traders). Online traders are younger than the Italian population, but in line with investors and shareholders. Day and heavy are slightly older than active traders (6.4% has more than 64 years).

Online traders belong to the so-called 'affluent segment' of the Italian population. In terms of profession, 43.2% among day and heavy and 25.7% among active traders are self-employed, with respect to 4.5% of the Italian population, 12.0% of the investors and 17.4% of the shareholders. Manager and executive officers are 15.8% among day and heavy and 22.8% of actives (against respectively 1.7%, 4.0% e 7.5%). The percentage of officers is significantly higher among active traders (32.7%). Workers and housekeepers are in general underweighted (2.0% and 0.5%), while retired are in line with investors' statistics for day and heavy traders (13.7% versus 11.1%). The education is high, with 48.8% of sample graduated and 44.8% with a secondary school degree (6.7% and 35.4% at population level). Income and wealth levels are higher than the population ones. Despite the fact that many investors did not declare their income and financial wealth, richer

<sup>(4)</sup> Following BNL/Centro Einaudi (2004) a person could be considered an investor if he is the owner of at least a current account, a time deposit or a government bond.



classes are clearly overrepresented among online traders (table 4). At least 12.8% has a net monthly household income equal or higher than 5 thousands euros, against 2.4% of the Italian population and 3.6% of investors; at least 40.0% has a financial wealth of more than 45 thousands euros, against 4.4% of the Italian population.

	Italian	Investors	Shareholders	(	Online traders		
	population			Total sample	Day and heavy	Active traders	
Gender							
Male	48.7%	70.0%	66.4%	96.6%	98.0%	95.0%	
Female	51.3%	30.0%	33.6%	3.4%	2.0%	5.0%	
Regional location							
North west	24.7%	36.7%	41.5%	40.7%	30.4%	41.6%	
North east	21.9%	21.3%	21.2%	25.7%	25.5%	25.7%	
Centre	20.1%	19.3%	19.1%	22.2%	15.7%	22.8%	
South	33.4%	22.7%	18.2%	11.4%	28.4%*	9.9%*	
Age							
18-34 years	27.3%	21.4%	21.2%	21.7%	19.6%	20.6%	
35-44 years	22.0%	27.4%	31.1%	35.0%	33.3%	40.5%	
45-54 years	18.0%	27.0%	30.1%	24.6%	22.5%	16.7%	
More 55 years	32.7%	24.2%	17.6%	18.2%	23.5%	21.4%	
Not available	-	-	-	0.5%	1.0%	-	
Profession							
Entrepreneur	1 507	3.4%	4.7%	3.0%	3.9%	2.0%	
Self employed	∫ <sup>4.3</sup> / <sub>0</sub>	8.6%	12.7%	34.5%	43.2%*	25.7%*	
Manager	0.7%		5.3%	10.8%	8.8%	12.9%	
Executive officer	1.0%	∫ <sup>4.0</sup> /°	2.2%	8.4%	6.9%	9.9%	
Teacher	2.6%	4.0%	3.9%	3.4%	4.9%	2.0%	
Officer	17.1%	23.8%	25.0%	23.6%	14.7%*	32.7%*	
Shopkeeper, craftsman	9.3%	20.0%	17.2%	2.0%	1.0%	3.0%	
Farmer	0.9%	1.3%	0.7%	-	-	-	
Housekeeper	14.1%	3.5%	5.2%	0.5%	-	1.0%	
Worker	12.6%	14.1%	11.1%	2.0%	1.0%	3.0%	
Retired	22.1%	16.4%	11.1%	9.9%	13.7%	5.9%	
Unemployed	4.6%		0.4%	0.5%	-	1.0%	
Student	10.6%	} 0.0%	0.4%	0.5%	-	1.0%	
Not available	-	-	-	1.0%	2.0%	-	
Education							
University	6.7%	14.9%	22.2%	48.8%	48.0%	49.5%	
Secondary school	35.4%	36.3%	54.1%	44.8%	47.1%	42.6%	
Primary school	55.5%	48.5%	23.7%	6.4%	4.9%	7.9%	
Nothing	2.6%	0.3%	-	-	-	-	
Civil status							
Single	31.1%	18.3%	23.1%	36.0%	32.3%	39.6%	
Married	57.6%	67.8%	65.3%	61.6%	64.7%	58.4%	
Widow, divorced	11.3%	13.7%	11.6%	3.5%	3.0%	2.0%	

#### Table 3 - Online traders' demographic features <sup>(1)</sup>

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions

(1) Italian population, investors and shareholders features are in Franzosi, Grasso and Pellizzoni (2004)



	Italian	Investors	Shareholders	(	Online trader	s
	population			Total sample	Day and heavy	Active traders
Household net mont	hly income (euro	)				
Up to 1.000 1.000-2.500 2.500.5.000 5.000-7.500 More than 7.500 Not available	29.3% 49.8% 18.5% 1.8% 0.6%	12.7% 58.2% 25.5% 3.6%	4.9% 34.8% 23.0% 1.6% 1.5% 34.2%	3.0% 16.7% 31.5% 6.9% 5.9% 36.0%	3.9% 12.7% 34.3% 7.8% 6.9% 34.3%	2.0% 20.8% 28.7% 5.9% 5.0% 37.6%
Household financial	wealth (euro)					
Up to 25.000 25.000-45.000 45.000-55.000 55.000-75.000 More than 75.000 Not available	88.5% 6.1% } 4.4%	   	   	10.3% 9.3% 5.9% 5.0% 27.6% 41.9%	7.8% 9.8% 5.9% 6.8% 28.4% 41.2%	12.9% 8.9% 5.9% 3.0% 26.7% 42.6%

Table 4 - Online	traders'	income and	l financial	wealth <sup>(1)</sup>
------------------	----------	------------	-------------	-----------------------

(1) Italian population, investors and shareholders net monthly income are in Franzosi, Grasso and Pellizzoni (2004); Italian population financial wealth is in Banca d'Italia (2004)

Italian online traders demonstrate a quite extended experience, despite the fact that Italy remained lagged behind for a long time on the use of Internet. On average, they have been trading financial products via Internet for 5 years (table 5). Day and heavy have a profile closed to the actives traders' one; in this sense data do not support the evidence of a positive correlation between experience and frequency of trading. In Germany, investors experience (not only with Internet) is equal to 7 and half years at the survey time as described by Glaser and Weber (2005) or Dorn and Huberman (2005).

From the industry perspective, it is evident that the online trading sector is, after a sudden growth, in a maturity phase with respect to its capability to approach the mass market; only 10% of the sample has approached the online trading activity during the last two years. In the meanwhile, the fact that half of interviewees started their activity after 2000, which is a maximum reached by the stock prices, suggests a good turnover and the capability to attract new customers also during bear market phases. Furthermore, new comers do not represent a simple generational change because they are not concentrated among younger people.

*							
Years of experience	Total sample		Day a	Day and heavy		Active traders	
	%	Cumulative	%	Cumulative	%	Cumulative	
Maturity							
1-2 (during 2004-2005)	10.0%	100.0%	12.0%	100.0%	7.9%	100.0%	
Consolidation							
3 (during 2003)	12.4%	90.0%	8.0%	88.0%	16.8%	93.1%	
4 (during 2002)	23.9%	77.6%	24.0%	80.0%	23.8%	76.3%	
Starting and growth							
5 (during 2001)	27.4%	53.7%	27.0%	56.0%	27.7%	52.5%	
6 (during 2000)	11.4%	26.3%	11.0%	29.0%	11.9%	24.8%	
More than 6 (before 2000)	14.9%	14.9%	18.0%	18.0%	12.9%	12.9%	
Average years of experience		5.1		5.2		5.0	

#### Table 5 - Experience as an online trader



#### 4.2 Investments and portfolio

Both a static and a dynamic concept capture the online traders' investment behaviour. Interviewees were asked to indicate which securities they held at the survey time (static portfolio) and which ones they had been trading during the two years before the survey (investments)<sup>5</sup>. The information about investments provides a more meaningful picture. In fact, for high frequency traders, whose turnover is remarkable, assets held at a certain point in time might provide misleading information of overall trading activity and portfolio holdings.

The portfolio (table 6) and the investments' pattern (table 7) show a good level of diversification with on average four different types of financial products mentioned by the online traders. Italian stocks negotiation is generalised (92.2% of day and heavy and 98.0% of active traders). Important is also the presence of foreign stocks (52.0% and 44.6%) and derivatives (60.4% and 25.7%). At the same time, asset management products (67.5% for the total sample) or pension products (60.6% of the total sample) are not missing. 26.1% of interviewees invested in ETFs<sup>6</sup>, with a similar presence between day and heavy and active traders.

Securities	Total sample	Day and heavy	Active traders
Liquidity	59.6%	61.8%	57.4%
Government bonds	26.6%	26.5%	26.7%
Corporate bonds	40.4%	41.2%	39.6%
Stocks:	92.6%	89.2%	96.0%
- companies listed in Italy	91.6%	88.2%	95.0%
- companies listed abroad	36.0%	36.3%	35.6%
Equity mutual funds	52.2%	45.1%*	59.4%*
Other mutual funds	33.5%	30.4%	36.6%
Individually managed portfolios	9.4%	9.8%	8.9%
Insurance, pension schemes and funds	57.6%	59.8%	55.4%
Derivatives:	28.6%	45.1%*	11.9%*
- Securitised derivatives	14.3%	20.6%*	7.9%*
- Futures and options	19.2%	31.4%*	6.9%*
ETFs	19.7%	20.6%	18.8%
Diversification degree <sup>(2)</sup>	4.60	4.71	4.48
	(2.00)	(2.19)	(1.80)

#### Table 6 - Online traders' portfolio (1)

\* Statistical significance at 10% the difference between day and heavy and active traders proportions

(1) Percentage of interviewees holding each security family at the survey time

(2) Average number (standard deviation) of financial securities families in portfolio

<sup>(5)</sup> Due to the necessity of mantaining the survey feasible by phone, it has not been possible to construct also the effective portfolio weighted by the investors' wealth. In Franzosi, Grasso and Pellizzoni (2004) this information is available thanks to a questionnaire submitted personally.

<sup>(6)</sup> Exchange Traded Funds have been listed at Borsa Italiana since September 2002; at the end of 2005, there were 30 listed ETFs available to investors.



Securities	Total sample		Day an	d heavy	Active	Active traders	
		Online <sup>(2)</sup>		Online <sup>(2)</sup>	С	nline <sup>(2)</sup>	
Liquidity	65.0%		69.6%		60.4%		
Government bonds	42.4%	53.5%	44.1%	53.3%	40.6%	53.7%	
Corporate bonds	51.7%	59.0%	49.0%	60.0%	54.5%	58.2%	
Stocks:	96.6%	97.4%	94.1%	95.8%	99.0%	99.0%	
- companies listed in Italy	95.1%	97.4%	92.2%*	95.7%	98.0%*	99.0%	
- companies listed abroad	48.3%	81.6%	52.0%	83.0%	44.6%	80.0%	
Equity mutual funds	60.6%	45.5%	55.9%	45.6%	65.3%	45.5%	
Other mutual funds	41.9%	36.5%	40.2%	39.0%	43.6%	34.1%	
Individually managed portfolios	13.8%	14.3%	15.7%	18.8%	11.9%	8.3%	
Insurance, pension schemes and funds	60.6%	9.8%	63.7%	12.3%	57.4%	6.9%	
Derivatives:	43.1%	89.7%	60.4%*	93.4%	25.7%*	80.1%	
- Securitised derivatives	28.1%	91.2%	38.2%*	92.3%	17.8%*	88.9%	
- Futures and options	25.6%	88.5%	36.3%*	94.6%*	14.9%*	73.3%*	
ETFS	26.1%	79.2%	25.5%	88.5%	26.7%	70.4%	
Diversification degree (2)	5.59	3.05	5.82	3.28	5.36	2.81	
	(2.38)	(1.90)	(2.59)	(2.07)	(2.13)	(1.68)	

Table 7 - Or	nline traders'	investments	during the	previous	two vea	rs (1)
1				p10110410		

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions

(1) Percentage of interviewees that invested in the security during the two years before the survey

(2) Percentage of interviewees that invested online each security family

(3) Average number (standard deviation) of financial securities families in portfolio or traded in the two yeas before the survey

The comparison with the survey carried out in December 2003/January 2004 shows interesting findings (figure 1). The period between the two surveys is quite various: in 2004 equity markets knew low volatility and price indexes with positive sign only in the second part of the year; the first half of 2005 continued with low volatility but with indexes soaring and with increasing traded volumes. Differences statistically significant in online traders' portfolios and investments are concentrated among ETFs and derivatives. ETFs presence improved for both day and heavy and active traders (+12.0% and +17.2% for investments and +13.8% and +11.7% for portfolio). In the meanwhile derivatives diffusion lowered among active traders especially regarding securitised derivatives (-21.1% of investments). Others changes detectable from the data are an increase in online traders investing in mutual funds or in corporate bonds, but the differences are not statistically significant.

Financial securities with the highest online channel penetration, measured in table 7 as the percentage of online users conditional to the fact of trading a certain asset, are stocks (95.8% for day and heavy and 99.0% for active traders), derivatives (respectively 93.4% and 80.1%) and ETFs (respectively 88.5% and 70.4%). The online channel, when used, becomes exclusive or prevalent. Online penetration by product augmented considerably with respect to the 2003 survey for derivatives, mutual funds and corporate bonds. The phenomenon of exclusiveness or prevalence (box 1), once used the online channel, was present also in 2003.







\*,\*\* Statistical significance at 10% and 5% of the difference between 2005 and 2003 survey

(1) Difference between percentages of interviewees that invested in the security during the two years previous the survey of July 2005 and those during the three years previous the survey of December 2003

(2) Differences of percentages of interviewees helding the security in July 2005 and in December 2003

#### **Box 1 - Channels of negotiation and intermediaries**

Online channel results to be exclusive for almost 50% of traders (52.0% of day and heavy and 44.6% of active traders). Among the other ways for trading securities, the most quoted are going to the branch of the bank or the post office (24.5% of day and heavy and 32.7% of active traders) and using a call centre (19.6% and 19.8%).

	Total sample	Day and heavy	Active traders
Only online	48.3%	52.0%	44.6%
Other channels:	51.7%	48.0%	55.4%
- At the branch of bank, post office	28.6% 4.9%	24.5%	32.7%
- Call center, phone	19.7%	19.6%	19.8%
- Other ways	2.5%	1.0%	4.0%

(1) The question permitted a multiple-choice

#### Number of intermediaries

	Total sample	Day and heavy	Active traders
Only one	68.5%	64.7%	72.3%
Two	24.2%	23.5%	24.8%
Three or more	7.4%	11.8%*	3.0%*

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions



The relationship with the brokers providing Internet services is exclusive and stable. On average, interviewees mention only one online broker; 31.6% quotes two or more brokers, with a higher percentage among day and heavy traders (11.8% of them has three or more brokers); the number of online traders that changed their main online broker during the twelve months before the survey is modest.

Differences between day and heavy and active traders are put on view by classifying online brokers following two criteria: online specialised or not and belonging to the major Italian financial groups or not <sup>(1)</sup>. Brokers specialised in online trading services are more widespread among day and heavy (46.1%) with respect to the active traders (29.7%). Almost two thirds of the interviewees uses online services provided by the main Italian financial groups, with a statistically significant difference in favour of active traders (75.4%) with respect to day and heavy (61.1%). Looking at the main broker the situation is partially different. Differences between day and heavy and active traders persist but the diffusion of brokers not belonging to the main financial groups increases <sup>(2)</sup>.

Type of intermediaries			
	Total sample	Day and heavy	Active traders
Total number of brokers <sup>(1)</sup> : - Only online specialised brokers <sup>(2)</sup> - Both - Only online not specialised brokers	27.9% 18.9% 53.2%	30.6% 23.5% 45.9%*	25.0% 14.1% 60.9%*
<ul> <li>Only online brokers of major Italian financial groups <sup>(3)</sup></li> <li>Both</li> <li>Only other online brokers</li> </ul>	43.2% 20.0% 36.8%	35.7% 25.4% 39.8%*	51.1% } 15.2% } 33.7%*
Main broker: - Online specialised brokers <sup>(2)</sup> - Online not specialised brokers	37.9% 62.1%	46.1%* 53.9%*	29.7%* 70.3%*
- Online brokers of major Italian financial groups <sup>(3)</sup> - Other online brokers	46.4% 53.6%	40.2%* 59.8%*	52.5%* 47.5%*

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions

(1) The question permitted a multiple-choice

(2) The following online specialised brokers have been mentioned: Directa Sim, Fineco, IWBank-Epta Trading, Millennium Sim, Online Sim, Piazza Affari Sim and Twice Sim

(3) The following online brokers belonging to major Italian financial groups have been mentioned: BNL, Capitalia (inclued Fineco), Generali (included Banca Primavera), Fideuram, Gruppo Intesa (Intesa Trade), Monte Paschi (included Banca 121), S.Paolo Imi and Unicredito (included Xelion)

(1) Online brokers are considered specialised if their main activity is providing services for retail online trading, while online brokers is considered part of a major financial group if it is formally linked or if it is the service provided by one of the biggest banking or insurance Italian groups.

(2) For more details about the relation between brokers and online traders, with a mapping of main services or conditions important in the choice of a specific online broker see Franzosi and Pellizzoni (2004). This aspect has not been investigated in the present survey because considered structural and by consequence not subject to sudden changes.



Finally, online traders declare to allocate a certain amount of their financial wealth to short term investments: 39.2% among day and heavy and 28.9% among active traders (the difference is statistically significant).

#### 4.2 Stocks and derivatives holding and trading

Approximately all Italian high frequency online investors trade stocks, in particular domestic. That is the reason why a relevant part of the questionnaire has been dedicated to gather information on stock portfolio's composition and stock trading behaviour (table 8). High frequency traders operate with a broad number of stocks. During the twelve months before the survey, day and heavy traded on average 18 stocks and active traders 12 (the difference is statistically significant); 27.3% of day traders are familiar with more than 20 stocks. These results testify that high frequency traders differentiate remarkably from retail shareholders whose average stock portfolio is composed of only one kind of stock: 51.0% of them hold one company's shares, 23.9% two (Franzosi, Grasso and Pellizzoni (2004)). Furthermore, they are in contrast with the thesis that high frequency traders work with a very small number of stocks, reaching an high degree of specialisation.

The reasonable complexity of equity portfolios appears also from the type of stocks traded. If 90.0% of the interviewees declares to trade Italian blue chip, more than 60% mentions mid and small caps and 30% foreign stocks. By comparison, 2005 trades in the Italian equity market are made for 82.5% on blue chip and 17.5% on mid and small caps (respectively 96.1% and 3.9% in monetary terms).

Additional information has been revealed asking to the online traders for the exact name of traded stocks (not only their perceived classification). This extremely detailed dataset permits interesting analysis. Among interviewees Italian blue chip with high turnover rank highest. Among that the most mentioned are: Telecom Italia (1° place for day and heavy and 2° place for active traders), Enel (respectively 2° and 1° place), Eni (3° and 4° place) and StMicroelectronics (4° and 3° place)<sup>7</sup>. Day and heavy and active traders have a similar stock picking behaviour, as measured by a Spearman correlation index equal to 0.70. Italian online traders do not show any specific favour for technological stocks, contrasting Anderson (2004) and Glaser and Weber (2005) and suggesting how their results could have been related to the specific market time under their analysis.

For the Italian stocks, it has also been possible to provide a riskiness analysis by applying the Value at Risk methodology (VaR) to the online traders' Italian equity portfolio. This exercise could not be considered a measure of the overall equity portfolio riskiness because it does not weight each stock by the individual wealth and it does not take into account foreign stocks. Nevertheless, it could be useful in evaluating population's attitude toward risky investments.

<sup>(7)</sup> The top 10 ranking continuous with Fiat (5° for day and heavy and 10° for active traders), Tim (6° and 6°), Capitalia (7° for day and heavy), Banca Intesa (8° and 8°), Generali (9° and 5°), Fideuram (10° for day and heavy), Unicredito (7° for active traders) and San Paolo IMI (9° for active traders).



All stocks listed on the Italian market have been classified into five different categories, from low to high risk. The risk measure is the VaR (i.e., the return that the worst daily performance would not exceed with a probability of 95%) and the five categories correspond to the quintiles of all Italian stocks ordered by their VaR level<sup>8</sup>.

Italian stocks mentioned by high frequency online traders do not show any clustering in high risky groups, nor for day and heavy nor for active traders. Looking at the interviewees' distribution, 77.2% of them traded low risky stocks, about 50% middle risky and 26.9% higher risky stocks. Looking at the stocks' distribution (weighted for the frequency), 41.1% of them are low risk while 7.4% are high risk (against a benchmark distribution that should weight 20% each category)<sup>9</sup>.

		Total s	sample	Day and he	eavy Ac	tive traders
Number of stocks <sup>(2)</sup>						
1-5			27.7%	18	.2%*	39.6%*
5-10			32.4%	34	.1%	34.1%
11-20			22.3%	25	.0%	22.0%
More than 20			17.6%	27	.3%*	9.9%*
Average number				18*		12*
Average trades value (euro) <sup>(2)</sup>						
Up to 1.000			7.8%	4	.5%	11.0%
1.000 -5.000			54.7%	47	.7%	60.4%
5.000 -10.000			24.6%	26	.1%	23.1%
More than 10.000			13.4%	21	.6%*	5.5%*
Average value				11	.7*	5.3*
Type of stocks <sup>(2)</sup>						
Italian blue chip				89	.1%	91.8%
Italian mid and small caps				65	.2%	60.8%
Foreign stocks				32	.6%	29.9%
Riskiness of Italian stocks <sup>(3)</sup>	% sample	% stocks	% sample	% stocks	% sampl	e % stocks
Low	77.2%	41.1%	80.9%	40.4%	73.7%	42.7%
Middle low	59.1%	22.4%	63.8%	21.9%	54.5%	23.4%
Mid	43.0%	14.3%	52.1%	16.8%	34.3%	11.2%
Middle high	50.8%	14.6%	52.1%	14.3%	49.5%	14.8%
High	26.9%	7.4%	26.6%	6.6%	27.3%	7.9%

#### Table 8 - Online traders' equity portfolio <sup>(1)</sup>

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions

(1) Stocks traded during the twelve months before the survey

(2) Percentages on interviewees that traded stocks (193, of which 94 day and heavy and 99 actives)

(3) Level of stock risk is defined by dividing in quintiles all the Italian stocks ordered by a measure of Value at Risk (VaR). For the sample, percentages are calculated on interviewees that traded stocks (193, of which 94 day and heavy and 99 actives); for the stocks, percentages are calculated on the number of Italian stocks mentioned (144) weighted for the frequency

<sup>(8)</sup> The Value at Risk of each stock has been calculated as  $\mu$ -1.65\* $\sigma$ , where  $\mu$  is the average of daily returns,  $\sigma$  is the variance of daily returns and 1.65 is the 95% confidence interval for returns normally distributed. In particular, the exercise considers daily returns for the year before the survey (1.8.2004-31.7.2005) of all stocks listed on the Italian market at the end of July 2005; excluding stocks suspended, delisted or with few trading days during the reference year.

<sup>(9)</sup> The same exercise on a sample of retail shareholders (Franzosi, Grasso and Pellizzoni (2004)) interviewed at the end of 2003, shows a similar mentioned stocks' distribution (34.7% to low risk and 8.7% to high risk). This comparison could suggest that high frequency traders are not systematically risk takers at least regarding Italian stocks picking.



The average value of a trade is equal to 11.700 euros for day and heavy and 5.300 euros for active traders, with the difference statistically significant<sup>10</sup>: 21.5% of daily traders has an average trade value of more than 10.000 euros (5.5% of active traders). Considering the Italian stock market in 2005, trades on stocks of less than 10.000 euros accounted for 66.4% of total trades and 10.8% of total turnover; those of less than 5.000 euros for 49.4% and 4.8%.

In addition to portfolio characteristics, traders were interviewed on their motivation to trade. The reasons why they buy (table 9), hold (table 10) and sell (table 11) have been investigated. In all cases, both fundamental reasons, such as companies' results, or more technical issues appear quite important for both active and day and heavy traders (43.0% and 42.5% of total sample). If in general, all motivations to trade appear quite reasonable, some of them seem to support behavioural attitude registered in other works. For example, when buying stocks '...for which there are positive rumours', '...with high turnover' traders' behaviour is consistent with a phenomenon documented in literature as 'attention-based buying' (Barber and Odean (2006)). Similarly, when investors sell some securities as they believe to have achieved a return target and, at the same time, hold other securities because they do not accept to lose money, they are affected by a regularity defined 'disposition effect'.

	Total :	Total sample		d heavy	Active trader		
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.	
- Positive companies' results (fundamental analysis)	43.0%	24.9%	44.7%	26.4%	41.4%	23.6%	
- Favourable technical analysis indicators	42.5%	24.6%	48.9%	28.9%	36.4%	20.7%	
- Good company's reputation	17.6%	10.2%	17.0%	10.1%	18.2%	10.3%	
- High dividend yields	15.0%	8.7%	11.7%	6.9%	18.2%	10.3%	
- Stocks with high turnover	10.4%	6.0%	9.6%	5.7%	11.1%	6.3%	
- Past market performance	7.3%	4.2%	4.3%	2.5%	10.1%	5.7%	
- Growing sector	7.3%	4.2%	4.3%	2.5%	10.1%	5.7%	
- Companies for which a good level of information is available	5.2%	3.0%	3.2%	1.9%	7.1%	4.0%	
- Intuition	4.1%	2.4%	5.3%	3.1%	3.0%	1.7%	
- Volatility	4.1%	2.4%	3.2%	1.9%	5.1%	2.9%	
- Stocks with high volatility	3.6%	2.1%	3.2%	1.9%	4.0%	2.3%	
- Stocks for which there are positive rumours	3.6%	2.1%	3.2%	1.9%	4.0%	2.3%	
- Contrarian	2.1%	1.2%	3.2%	1.9%	1.0%	0.6%	
- Stocks with low volatility	1.0%	0.6%	0.0%	0.0%	2.0%	1.1%	
- Sector in which I work	1.0%	0.6%	1.1%	0.6%	1.0%	0.6%	
- Advices from an expert	1.0%	0.6%	1.1%	0.6%	1.0%	0.6%	
- Momentum	1.6%	0.9%	3.2%	1.9%	0.0%	0.0%	
- Others	2.1%	1.2%	2.1%	1.3%	2.0%	1.1%	
Total	172.5%	100.0%	169.1%	100.0%	175.8%	100.0%	

#### Table 9 - Stock buying behaviour <sup>(1)</sup>

(1) The question permitted two answers

<sup>(10)</sup> Italian retail shareholders declared a range of transaction between 2.500 euros (median of the minimum value) and 5.000 euros (median of the maximum value) (Franzosi, Grasso e Pellizzoni (2004)).



#### Table 10 - Stock holding behaviour <sup>(1)</sup>

	Total sample		Day and	d heavy	Active	traders
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.
- Good dividend yields	42.3%	30.0%	43.8%	32.1%	41.0%	28.1%
- Expected prices growth	41.8%	29.6%	47.9%	35.1%	36.0%	24.7%
- Good actual performances	17.3%	12.3%	16.7%	12.2%	18.0%	12.3%
- No needs for liquidity	14.8%	10.5%	11.5%	8.4%	18.0%	12.3%
- Selling would be loosing money	7.1%	5.1%	4.2%	3.1%	10.0%	6.8%
- Holding shares is important for a correct portfolio diversification	7.1%	5.1%	4.2%	3.1%	10.0%	6.8%
- No stock holding right now	5.1%	3.6%	3.1%	2.3%	7.0%	4.8%
- High turnover strategy	3.6%	2.5%	3.1%	2.3%	4.0%	2.7%
- Others	2.0%	1.4%	2.1%	1.5%	2.0%	1.4%
Total	141.3%	100.0%	136.5%	100.0%	146.0%	100.0%

(1) The question permitted a multiple-choice

#### Table 11 - Stock selling behaviour <sup>(1)</sup>

	Total sample		Day and	d heavy	Active	traders	
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.	
- No more high dividend yields	3.1%	2.4%	2.1%	1.7%	4.0%	3.1%	
- Realise gains after growth in prices	53.9%	42.1%	55.3%	43.7%	52.5%	40.6%	
- Avoid further losses after drop in prices	16.6%	13.0%	11.7%	9.2%	21.2%	16.4%	
- Definition of some rules for selling shares	16.1%	12.6%	14.9%	11.8%	17.2%	13.3%	
- Negative technical analysis indicators	14.5%	11.3%	18.1%	14.3%	11.1%	8.6%	
- Negative news about the company	9.8%	7.7%	11.7%	9.2%	8.1%	6.3%	
- Investment in other products	5.7%	4.5%	5.3%	4.2%	6.1%	4.7%	
- Liquidity needs	3.1%	2.4%	2.1%	1.7%	4.0%	3.1%	
- Definitive abandon of stocks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
- Stock liquidity	1.0%	0.8%	1.1%	0.8%	1.0%	0.8%	
- Others	4.1%	3.2%	4.3%	3.4%	4.0%	3.1%	
Total	128.0%	100.0%	126.6%	100.0%	129.3%	100.0%	

(1) The question permitted a multiple-choice

Together with stocks, derivatives are very popular instruments among online traders: 60.4% of day and heavy and 25.7% of actives traders negotiate them (table 12). Only 2.2% among Italian shareholders traded derivatives too. At sample level, the most quoted derivatives are covered warrants and index futures (both 48.8%), followed by single stock options (23.3%), index options (18.6%) and single stock futures (17.4%). The most traded derivatives show a similar ranking: 40.2% covered warrants, 25.6% index futures, 11.0% single stock options. Day and heavy prefer index futures (52.5%) while covered warrants are prevalent among active traders (60.0%).

#### Table 12 - Online traders' derivatives portfolio <sup>(1)</sup>

	Total s	Total sample		Day and heavy		raders
	% sample	e % most	% sample	e % most	% sample	% most
Covered warrants	48.8%	40.2%	44.3%	35.1%	60.0%	52.0%
Certificates	8.1%	3.7%	11.5%	5.3%	-	-
Stock index futures	48.8%	25.6%	52.5%	28.1%	40.0%	20.0%
Single stock futures	17.4%	6.1%	19.7%	7.0%	12.0%	4.0%
Stock index options	18.6%	3.7%	18.0%	3.5%	20.0%	4.0%
Single stock options	23.3%	11.0%	23.0%	8.8%	24.0%	16.0%
Futures on interest rates	16.3%	4.9%	21.3%	5.3%	4.0%	4.0%
Futures on commodities	10.5%	3.7%	13.1%	5.3%	4.0%	-

(1) Derivatives traded during the twelve months before the survey; percentage on interviewees that traded derivatives (86, of which 61 day and heavy and 25 active traders)



Splitting equity derivative contracts considering the underlying (index versus single stock) shows interesting findings (table 13). Among stock index derivatives, the most used contracts are futures (49.4%) and securitised derivatives (31.8%); among single stock based products, securitised derivatives are more important (47.0%) than options (30.3%) or futures (22.7%). Stock index underlyings are S&P/MIB (59.2%), Dax (20.4%) and the US market indexes (S&P500 and Nasdaq at 8.2%); for single stock derivatives the focus is on Italian blue chip (15.2% STMicroelectronics, 13.6% Eni, 12.1% Fiat and 10.6% Enel).

The decision of trading a specific derivative could be affected by the contract or the underlying features. The contract liquidity (3.87 score in a range 1 to 4) and the index volatility (3.63) are the most important for stock index derivatives; the contract liquidity (3.55) and the stock volatility and liquidity (3.60 and 3.50) are stressed for single stock derivatives. In the meanwhile, the platform facilities (3.51 for index derivatives and 3.29 for single stock derivatives) or the trading fees (3.40 and 3.23) appear to play a recognized role.

Stock index derivatives		Single stock derivatives	
Kind of derivatives <sup>(2)</sup>		Kind of derivatives <sup>(2)</sup>	
Securitised derivatives	31.8%	Securitised derivatives	47.0%
Futures	49.4%	Futures	22.7%
Options	18.8%	Options	30.3%
Underlying <sup>(2)</sup>		Underlying <sup>(2)</sup>	
S&P/MIB	59.2%	STMicro	15.2%
Dax	20.4%	Eni	13.6%
S&P 500	8.2%	Fiat	12.1%
Nasdaq	8.2%	Enel	10.6%
		Telecom Italia	7.6%
		Generali	4.5%
Drivers for the choice <sup>(3)</sup>		Drivers for the choice <sup>(3)</sup>	
Index volatility	3.63	Stock volatility	3.60
Index composition	2.10	Stock liquidity	3.50
Minimum value of trade	2.88	Minimum trading lot	2.72
Maintenance margin	2.86	Maintenance margin	2.82
Contract liquidity	3.87	Contract liquidity	3.55
Trading fees	3.40	Trading fees	3.23
Platform facilities	3.51	Platform facilities	3.29

Table 13 - Index versus single stock derivatives	<b>,</b> (1	1	J	)
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(1) Percentages are calculated on interviewees that traded each family of derivatives (66 for index based and 46 for single stock based)

(2) Major underlying mentioned

(3) Average score ranking from 1 (low importance) to 4 (high importance)

In tables 14 to 16 interviewees were asked for providing the reasons for trading or not derivatives. Among investors using derivatives, the main rationale for including them in their portfolio is the possibility to exploit leverage opportunities (57.0%); speculation and hedging purposes follow (22.1% and 14.0%). No differences distinguish day and heavy from active traders. More than half investors trading derivatives does not indicate any difficulties in such activity; when problems are signalled, they are mainly linked to issuer's behaviour (32.4%) and liquidity (24.3%). Lack of knowledge apparently does not affect this population. With respect to 2003 survey, when 61.3% of interviewees indicated problems, derivatives users seem nowadays more confident with these kind of financial instruments.



#### Table 14 - Reasons for trading derivatives <sup>(1)</sup>

	Total s	Total sample		Total sample Day and heavy Activ		Day and heavy		Active traders		
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.				
- To exploit leverage opportunities	57.0%	51.6%	57.4%	51.5%	56.0%	20.6%				
- For speculation	22.1%	20.0%	26.2%	23.5%	12.0%	4.4%				
- For hedging	14.0%	12.6%	13.1%	11.8%	16.0%	5.9%				
- For fun	5.8%	5.3%	4.9%	4.4%	8.0%	2.9%				
- To gain when market is falling	3.5%	3.2%	3.3%	2.9%	4.0%	1.5%				
- For diversification	1.2%	1.1%	1.6%	1.5%	0.0%	0.0%				
- Others	7.0%	6.3%	4.9%	4.4%	12.0%	4.4%				
Total	110.5%	100.0%	111.5%	100.0%	108.0%	100.0%				

(1) The question permitted a multiple-choice; percentage on interviewees that traded derivatives (86, of which 61 day and heavy and 25 active traders)

	Total	Total sample		d heavy	y Active trade	
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.
Not difficulties	57.0%	57.0%	57.4%	57.4%	56.0%	56.0%
Yes difficulties:	43.0%	43.0%	42.6%	42.6%	44.0%	44.0%
<ul> <li>Difficulties with issuer</li> <li>Liquidity problems</li> <li>Security structure too complex</li> <li>Trading software too complex</li> <li>Difficult to follow performance</li> <li>Not clear how they work/</li> </ul>	32.4%	30.0%	38.5%	35.7%	18.2%	16.7%
	24.3%	22.5%	26.9%	25.0%	18.2%	16.7%
	16.2%	15.0%	15.4%	14.3%	18.2%	16.7%
	13.5%	12.5%	15.4%	14.3%	9.1%	8.3%
	5.4%	5.0%	3.8%	3.6%	9.1%	8.3%
	5.4%	5.0%	0.0%	0.0%	18.2%	16.7%
- Other reasons	10.8%	10.0%	7.7%	7.1%	18.2%	16.7%
Total	108.1%	100.0%	107.7%	100.0%	109.1%	100.0%

(1) The question permitted a multiple-choice; percentage on interviewees that traded derivatives (86, of which 61 day and heavy and 25 active traders)

Online traders that do not trade derivatives explain their attitude with two main reasons: not enough competence for trading them (40.0%, strangely more among day and heavy traders even if this difference is not statistically significant) and the fact that they are too risky (36.0%, more among active traders). Also among not users, the comparison with respect to 2003 shows a change in the environment with a continuous improvement of online traders competences; at the end of 2003 the main answer regarded the total absence of information about derivatives (37.6% of 'do not know' with respect to 14.4% in 2005).

Table 16	<u>)</u> -	Reasons	for	not	trading	derivatives	(1)	)
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	Total sample		Day and	d heavy	Active traders	
	% ind.	% ans.	% ind.	% ans.	% ind.	% ans.
- Broadly known, but not competences for trading the	m 40.0%	32.9%	44.4%	35.1%	37.5%	31.6%
- Too risky	36.0%	29.6%	31.1%	24.6%	38.8%	32.6%
- Too much time to follow them	17.6%	14.5%	11.1%	8.8%	21.3%	17.9%
- Do not known	14.4%	11.8%	17.8%	14.0%	12.5%	10.5%
- Not useful for investments goals	4.0%	3.3%	6.7%	5.3%	2.5%	2.1%
- Too high minimum investment	0.8%	0.7%	-		1.3%	1.1%
- Not recommanded by broker	-		-		-	
- Others	8.8%	7.2%	15.6%*	12.3%	5.5%*	4.2%
Total	121.6%	100.0%	126.7%	100.0%	118.8%	100.0%

\* Statistical significance at 10% of the difference between day and heavy and active traders proportions

(1) The question permitted a multiple-choice; percentage on interviewees that do not traded derivatives (125, of which 45 day and heavy and 80 active traders)



#### 4.3 Trading volumes

By construction, high trading frequency characterises our sample. However, the overall picture is the effect of distinct behaviours per type of asset considered. Figure 2 and table 17 provide the actual situation. In this paragraph, we distinguish a sub-set of day and heavy traders, labelling them day and heavy 'star'. We define, homogeneously with the question that capture this information, day and heavy 'star' traders those who trade daily at least one among Italian blue chip or small caps, foreign stocks, securitised derivatives and futures and options.

Among day and heavy 'star' traders, daily trading is concentrated on futures and options (75.1%) and Italian blue chip (66.7%); slightly less on mid and small caps (64.6%) and securitised derivatives (56.4%). Foreign stocks are traded daily only by 26.4% of them. Among major heavy traders, with more than 10 trades per day, 7.1% invests in Italian blue chip, 5.3% in foreign stocks and 6.3% in derivatives. Active traders do not trade daily. Their high frequency activity is concentrated in Italian blue chip while relevant is the percentage that trades each month or less futures and options (47.1%) and securitised derivatives (57.6%).



Figure 2 - Frequency of negotiation for stocks and derivatives <sup>(1)</sup>

(1) Distribution is calculated on interviewees that traded each security during the twelve months previous the survey. Interviewees are defined day and heavy 'star' (D&H\*) if they trade daily at least one stocks or derivatives family



	Italia	an stocks	Foreign	Futures and	Securitised
	Blue chip	Mid&Small caps	stocks	options	derivatives
Total sample					
More than 10 per day	1.8%	1.8%	1.8%	4.1%	2.0%
6/10 times per day	4.2%	3.5%	3.6%	8.2%	6.1%
3/5 times per day	3.0%	1.8%	1.8%	20.4%	2.0%
1/2 times per day	7.7%	10.5%	3.6%	16.3%	8.2%
1 time every 2/3 days	14.3%	11.4%	12.5%	10.2%	8.2%
1 time per week	25.0%	19.3%	19.6%	16.3%	22.4%
1 time every 2 weeks	13.7%	20.2%	28.6%	4.1%	6.1%
1 time per month	21.4%	19.3%	28.6%	4.1%	12.2%
Less than 1 time per month	10.5%	12.3%	1.8%	16.3%	32.7%
Day and heavy 'star'					
More than 10 per day	7.1%	6.5%	5.3%	6.3%	6.3%
6/10 times per day	16.7%	12.9%	10.5%	12.5%	18.8%
3/5 times per day	11.9%	6.5%	5.3%	31.3%	6.3%
1/2 times per day	31.0%	38.7%	5.3%	25.0%	25.0%
1 time every 2/3 days	4.8%	6.5%	21.1%	9.4%	6.3%
1 time per week	7.1%	9.7%	10.5%	9.4%	18.8%
1 time every 2 weeks	7.1%	3.2%	15.8%	0.0%	0.0%
1 time per month	7.1%	3.2%	26.3%	0.0%	6.3%
Less than 1 time per month	7.1%	12.9%	5.3%	6.3%	12.5%
Active 'star' traders					
More than 10 per day	-	-	-	-	-
6/10 times per day	-	-	-	-	-
3/5 times per day	-	-	-	-	-
1/2 times per day	-	-	-	-	-
1 time every 2/3 days	17.5%	13.3%	8.1%	11.8%	9.1%
1 time per week	31.0%	22.9%	24.3%	29.4%	24.2%
1 time every 2 weeks	15.9%	26.5%	35.1%	11.8%	9.1%
1 time per month	26.2%	25.3%	29.7%	11.8%	15.2%
Less than 1 time per month	9.5%	12.0%	0.0%	35.3%	42.4%

#### Table 17 - Frequency of negotiation of stocks and derivatives <sup>(1)</sup>

(1) Distribution is calculated on interviewees that traded each security during the twelve months previous the survey. Interviewees are defined day and heavy 'star' traders if they trade daily at least one stocks or derivatives family

Figure 3 depicts the situation in relative terms, showing also a comparison with 2003 survey (Franzosi and Pellizzoni (2004)). Normalising by the number of trades made on Italian blue chip, day and heavy 'star' traders exhibit a relative higher frequency of trading on futures and options (1.13), almost equivalent for mid and small caps (0.97) and lower for securitised derivatives (0.86) and particularly for foreign stocks (0.34). For the active 'star' traders, Italian blue chip are the most traded; Italian mid and small caps (0.85), futures and options (0.80), securitised derivatives (0.66) and foreign stocks (0.43) follow.

The situation at the end of 2003 differed mainly for the bigger gap existing between Italian stocks and other financial securities. Day and heavy 'star' traded 0.77 futures and options, 0.38 securitised derivatives and 0.31 foreign stocks. The 2005 survey show a situation in which the disparity between stocks and derivatives is in general smaller and in the case of day and heavy 'star' traders inverted if referred to futures and options.

The average number of trades done by day and heavy 'star' is 15 times the active 'star' traders one for blue chip, 17 for mid and small caps, 12 for foreign stocks, 21 for futures and options and 19 for securitised derivatives. The previous survey (Franzosi and



Pellizzoni (2004)) showed an even higher ratio between day and heavy and active traders: 25 times for Italian stocks, 23 foreign stocks, 30 futures and options and 27 securitised derivatives. This result is mainly due to a reduction in day and heavy 'star' traders' activity in 2005.



Figure 3 - Relative frequency of negotiation: a comparison 2005-2003 (1)

(1) Frequency of negation for each security with respect to Italian blue chip (2005) or Italian stocks (2003). Frequency is calculated on interviewees that traded each security during the twelve months before both surveys. Interviewees are defined day and heavy 'star' (D&H\*) if they trade daily at least one stock or derivatives family

Regarding the market on which online traders operate, Borsa Italiana is exclusive or prevalent for almost all products; foreign exchanges are more quoted for stocks (50.0%) and index futures (47.6%). Among day and heavy traders, the foreign markets ranking sees the NYSE at first place followed by CME, NASDAQ and Eurex.

	Only Borsa Italiana	Both	Only foreign markets
Stocks (196)	50.0%	48.5%	1.5%
Covered warrants (42)	88.8%	-	-
Certificates (7)	71.4%	14.3%	4.3%
Index futures (42)	52.4%	35.7%	1.9%
Single stock futures (15)	86.7%	-	13.3%
Index options (16)	68.8%	31.1%	-
Single stock options (20)	75.0%	15.0%	10.0%
Futures on Forex and interest rates (14)	-	-	100.0%
Futures on commodities (9)	-	-	100.0%

#### Table 18 - Trading markets

 Percentages are calculated on interviewees that traded each security during the previous twelve months (number is provided in brackets)



#### 4.4 Performances

Portfolio performances of online and high frequency traders have often been investigated. Switching to Internet seems to bring negative effects on performances through an excessive trading activity (Barber and Odean (2002) and Choi, Lison and Metrick (2004)). Andersen (2004) stresses how high frequency trading negatively affects performances of Swedish online traders mainly for the impact of flat costs; at the same time, they benefit from higher diversification. Literature that takes into account the frequency of negotiation reaches mixed results. Linnainmaa (2003) finds no better performances of Finnish day traders with respect to a control group of other investors. Barber, Lee, Liu and Odean (2004), on a Taiwan Exchange dataset, document that eight over ten day traders lose money in a six-month period, but that traders with strong performance continue to outperform. In the United States, three papers find results more in favour of day traders' activity. Harris and Shultz (1998) analyse Nasdaq's SOES bandits and conclude in favour of a positive profitability; Jordan and Diltz (2003) found 36% of the traders they studied were profitable, with profits strongly correlated with the Nasdag market; Garvey and Murphy (2003) study a proprietary day trading team over a period of three months and show that their trades are consistently profitable.

In our survey, some questions try to capture performances of the Italian online traders (table 19). While results could be conditioned by biases in participants' answers, the situation illustrate that 58.0% of day and heavy and 31.7% of active traders declares past performances in line with the market or higher (between 15% and 30%, taking into account Mibtel performances during the twelve months before the survey). Percentages of those with a performance higher than 30% are equal to 17.6% for day and heavy and to 40% for active traders. 51.5% of active traders declares a performance between 5% and 15%. Expected performances show a very similar situation: Spearman correlation index between past and expected classes of performances is equal to 0.55.

	Past perf	ormances	Expected pe	rformances
	Day and heavy	Active traders	Day and heavy	Active traders
More than 30%	17.6%	4.0%	15.7%	5.0%
Between 15% and 30%	30.4%	27.7%	26.5%	23.8%
Between 5% and 15%	29.4%	51.5%	36.3%	57.4%
Between -5% and 5%	3.9%	5.9%	2.0%	
Between -5% and -15%	2.0%	3.%	1.0%	
Less than -15%	3.9%	1.0%		
Not available	12.7%	6.9%	18.6%	13.9%

#### Table 19 - Past and expected performances <sup>(1)</sup>

(1) Performances are related to the twelve months before (past) and after (expected) the survey



#### **Box 2 - Short term evolution**

Almost all the online traders state that they will continue to trade via Internet in the short term; 46.5% thinks to broad the range of products traded online while 28.5% declares the intent to increase the number of the trades.

Intention to continue online ne	gotiation				
Yes, for sure	78.3%				
Yes, probably	20.2%				
No	1.0%				
If yes, effects on trading levels		If yes, effects on range of product traded			
Increase	28.5%	Increase for sure	10.5%		
Stable	57.5%	Increase probably	26.0%		
Decrease	3.5%	Decrease probably	36.5%		
		Decrease for sure	23.5%		
Not available	10.5%	Not available	3.5%		



## 5. Psychological attitudes

#### 5.1 Design of study on overconfidence and self-monitoring

Survey questions have been designed to capture as many form of overconfidence as possible. Using the same methodology applied by Glaser and Weber (2005), we compute indicators for miscalibration, better than average effect, illusion of control and excessive optimism. More precisely, miscalibration tests (MIS) are conducted with the classical 90% confidence interval questions on general knowledge and financial markets forecasts, so that if the percentage of correct answers which lies outside the confidence interval exceeds 10%, the respondents are considered miscalibrated. Better than average tests have been conducted on questions concerning skills (BTA1) and performances (BTA2) relative to peers; in addition, an average of the two indicators (BTA3) is included. The results have been standardized into the interval [-1,1], where -1 and +1 reflect the perception of respondents to be respectively below and above everybody else, and 0 the perception to be on average. Illusion of control and excessive optimism have been tested via two different methodology. A first approach (IC1) is based upon the answer to a set of questions on luck and skill of the type 'stocks are like lottery tickets', reflecting degree of agreement on the statement; answers have been standardised into the interval [0,1], with 0 showing no illusion of control and 1 maximum illusion of control. In addition, illusion of control (IC2 and IC3) has been computed by comparing past performance on trading portfolio with expected ones (respondent answers) (IC2) and with a market benchmark (IC3). For both IC2 and IC3, lacking the precise performance figures and knowing only the performance ranges as shown in table 19, the results must be interpreted in the following manner: a score equal to 0 points out that respondents believe their past performance will lie in the same class as their expected one (IC2) or is aligned with the benchmark (IC3); a negative (positive) sign indicates that future performance is expected to be higher (lower) that past one and that market benchmark has been higher (lower) that respondents realized performance.

To measure the degree of self-monitoring, Italian online traders have been asked the 18-question test originally developed by Snyder and Gangestad (1986). Respondents were asked to answer true or false for statement such as 'I find it hard to imitate the behaviour of other people'. All answers evidencing self-monitoring received a score of 1 and 0 otherwise. Scores are presented in percentage terms, i.e the percentage of answers pointing towards self-monitoring. It is common practice in social psychology to consider scores above 50% as an evidence of self-monitoring and scores below 50% as an evidence of low or no self-monitoring attitude, or to use the conventional median-split technique, as in Czellar (2003).



#### 5.2. Results of the empirical investigation on overconfidence

Table 20 summarizes descriptive statistics relative to all overconfidence measures computed for the whole sample and distinct between day and heavy and active traders. All indicators are consistent in demonstrating that our sampled Italian online traders are overconfident. No significant difference in overconfidence levels, with the exception of miscalibration, emerges between day and heavy and active traders. However, while the mean degree of all indicators shows that on average traders are overconfident, the high standard deviation indicates that the degree of overconfidence varies remarkably among individuals.

	Bette	Better than average		Illusi	ion of co	Miscalibration		
	BTA1	BTA2	BTA3	IC1	IC2	IC3	MIS	
Total sample								
Mean	0.373	0.352	0.356	0.574	-0.117	-0.628	34.6%	
Median	0.400	0.400	0.400	0.611	0.000	-1.000	33.3%	
Min	-1	-1	-1	0.167	-3	-4	0	
Мах	1	1	1	0.833	3	1	1	
Standard deviation	0.506	0.537	0.490	0.111	0.844	1.040	31.7%	
Day and heavy								
Mean	0.437	0.360	0.389	0.587	-0.115	-0.472	28.6%*	
Median	0.600	0.600	0.475	0.611	0.000	0.000	25.0%	
Min	-0.980	-0.980	-0.980	0.222	-3	-4	0	
Мах	1	1	1	0.833	3	1	1	
Standard deviation	0.547	0.593	0.536	0.110	0.882	1.197	28.0%	
Active traders								
Mean	0.298	0.344	0.317	0.560	-0.119	-0.774	41.4%*	
Median	0.400	0.400	0.400	0.556	0	-1	40.0%	
Min	-1	-1	-1	0.167	-3	-4	0	
Мах	1	1	1	0.722	2	1	1	
Standard deviation	0.448	0.468	0.431	0.111	0.813	0.849	34.5%	
N. respondents	119	115	115	196	162	183	163	

#### Table 20 - Descriptive statistics of overconfidence measures

\* Statistical significance at 5% level of the difference between day and heavy and active traders means

More precisely, our miscalibration results on active traders (41.4%) are similar to prior research. Russo and Shoemaker (1992) find percentages ranging between 42.0% and 64.0%, while Klayman, Soll, Gonzales-Vallejo and Barlas (1999) in their experiment report a percentage of surprises equal to 43.0%. The type of questions asked might explain the remarkably lower level of miscalibration for day and heavy traders. Only financial markets questions could be used to compute miscalibration measures, as the percentage of answers on general knowledge questions was not acceptable (the redemption rate was lower than 30%). Since questions on financial markets required forecasting on very short term (one month ahead), the lower degree of surprises for day and heavy traders can be interpreted as a higher degree of competence on financial markets.

In terms of better than average (BTA3), a mean result of 0.36 shows that Italian online traders strongly believe they are above average. This result is even more pronounced among day and heavy traders whose median answer for BTA1 and BTA2 is



0.60. Our results are well above those found by Glaser and Weber (2005) on German online traders who indicate mean results equals to 0.09 and median answer equals to 0 on a similar test. By looking at the number of respondents who think to be above average, 77.0% of respondents shares that view. This percentage is consistent with several prior research mentioned in paragraph 2.2, such as Svenson's (1981) (80%).

The illusion of control (IC1) indicator is probably the most stable one among our traders, showing the lowest degree of volatility. It shows a considerable level of overconfidence (0.57), higher but not too distant from the one computed by Glaser and Weber (2005) on the German market (0.46).

Table 21 summarizes the major overconfidence measures (BTA3, IC1 and MIS) for traders with different degree of experience, proxied with the number of years of operations via Internet. Our results show no significant difference between less and more experienced traders in terms of overconfidence and are in contrast with the Gervais and Odean (2001) model of overconfidence and learning, which predicts that successful and inexperienced traders are the most likely to be overconfident.

	Less than	Less than 5 years experience			d more of	experience
	BTA3	IC1	MIS	BTA3	IC1	MIS
Mean	0.282	0.570	34.6%	0.414	0.577	34.6%
Median	0.350	0.556	33.3%	0.450	0.611	33.3%
Min	-1.000	0.222	0.0%	-0.800	0.167	0.0%
Мах	1.000	0.833	100.0%	1.000	0.778	100.0%
Standard deviation	0.513	0.110	33.3%	0.466	0.112	30.5%

#### Table 21 - Overconfidence and trading experience <sup>(1)</sup>

(1) Years of experience as an online trader

Table 22 presents pairwise correlation among our seven overconfidence measures. Several interesting findings emerge from the dataset. First, miscalibration (MIS) has no significant correlation with both illusion of control (IC1) and better than average (BTA3) measures, while these two show a positive and statistically significant, although not very high, correlation (0.197). This might suggest that the psychological traits captured by miscalibration are different from those seized by illusion of control and better than average. Second, better than average measures (BTA1 and BTA2) show a positive and highly significant correlation (0.770). In other terms, those people who believe to have skills above average (BTA1) also believe to be able to achieve performances above average (BTA2). Third, illusion of control measures indicate some contrasting results. On one side, IC2 and IC3 show a positive and highly significant correlation (0.666). In such a case, those who declare to achieve performances above the benchmark (IC3) are also thinking to be able to improve their performance in future (IC2). However, since by construction, the more negative IC2 and IC3 measures the higher the illusion of control, while IC1 measure increases with the illusion of control, we should expect a negative correlation between both IC2 and IC3 on one side and IC1 on the other. Our dataset offers the opposite picture, since both IC2 and IC3 show a positive and significant correlation with IC1. The interpretation of such a result is hard to give.



	Illus		ntrol	Miscali-	Bet	ter than a	verage	Self-
	IC1	IC2	IC3	bration	BTA1	BTA2	BTA3	monitoring
IC1	1							
IC2	0.194*							
	(0.014)	1						
IC3	0.262**	0.666*						
	(0.000)	(0.000)	1					
MIS	-0.124	-0.027	-0.077					
	(0.119)	(0.758)	(0.345)	1				
BTA1	0.179	0.094	0.167	-0.102				
	(0.054)	(0.343)	(0.081)	(0.308)	1			
BTA2	0.188*	0.089	0.193*	0.006	0.770**			
	(0.047)	(0.376)	(0.047)	(0.956)	(0.000)	1		
BTA3	0.197*	0.093	0.194*	-0.057	0.937**	0.945**		
	(0.036)	(0.359)	(0.046)	(0.582)	(0.000)	(0.000)	1	
Self-monitoring	0.081	0.087	0.210**	0.057	0.257**	0.265**	0.277**	
	(0.261)	(0.270)	(0.004)	(0.471)	(0.005)	(0.004)	(0.003)	1

Table 22 - Pairwise correlations among overconfidence and self-monitoring measures

\*, \*\* Correlation significant at the 5% and 1% level; p-value into the brackets

#### 5.3 Overconfidence and portfolio characteristics

As explained in paragraph 3, by construction our database is composed uniquely of those who trade frequently (at least two traders per month) frequency traders. However, it can be interesting to discriminate day and heavy 'star' (see definition in 4.3) further. Among those who trade either stocks or derivatives at least once a day, we focus on traders with minimum four trades per day from the rest of the sub-sample. In such a way, we are able to isolate the behaviour of those non professional traders who trade more professionally at least frequency-wise. Additionally, the detailed information regarding Italian stocks traded by interviewees permit, differently from prior studies, to isolate the psychological characteristics of high risk traders. Table 23 and 24 show respectively the result for day and heavy 'star' and for traders overweighting high Value at Risk (VaR) stocks in their portfolios with respect to market average.

	Better than average		Illusi	on of co	Miscalibration		
	BTA1	BTA2	BTA3	IC1	IC2	IC3	MIS
Top frequency traders (1)							
Mean	0.581*	0.551*	0.566*	0.616	0.077	-0.207	34.14%
Median	0.800	0.800	0.800	0.611	0.000	0.000	33.33%
Min	-0.800	-0.800	-0.800	0.333	-3.000	-4.000	0.00%
Max	1.000	1.000	1.000	0.833	2.000	1.000	100.00%
Standard deviation	0.486	0.512	0.470	0.107	0.845	1.236	31.24%
Other day and heavy 'star'							
Mean	0.420	0.266	0.321	0.593	0.000	-0.368	30.09%
Median	0.600	0.500	0.450	0.611	0.000	0.000	25.00%
Min	-0.800	-0.800	-0.800	0.389	-2.000	-4.000	0.00%
Max	1.000	0.960	0.970	0.778	3.000	1.000	100.00%
Standard deviation	0.534	0.660	0.541	0.091	1.069	1.116	33.50%

Table 23 - Day and heavy 'star' and overconfidence measures

\* Statistical significance at 10% level of the difference between top frequency and other very frequency traders

(1) Interviewees are defined day and heavy 'star' if they trade daily either domestic or foreign stocks or derivatives and are defined top frequency traders if they trade four time or more per day

Results presented in table 23 confirm the findings that in general online traders negotiating very frequently are overconfident with regards to all indicators employed. More interestingly, top traders, those with the highest trading frequency, appear on average more overconfident than the rest of the sample<sup>11</sup>.

	Bette	Better than averag		Illusi	ion of co	Miscalibration	
	BTA1	BTA2	BTA3	IC1	IC2	IC3	MIS
Traders with risky portfoli	<b>o</b> <sup>(1)</sup>						
Mean	0.347	0.388	0.359	0.543	-0.250	-0.889	28.19%
Median	0.400	0.400	0.300	0.556	0.000	-1.000	25.00%
Min	-0.400	-0.400	-0.400	0.167	-3.000	-4.000	0.00%
Max	1.000	1.000	1.000	0.722	1.000	1.000	80.00%
Standard deviation	0.445	0.398	0.380	0.137	0.794	1.121	28.86%
Other traders							
Mean	0.360	0.337	0.345	0.583	-0.103	-0.602	34.88%
Median	0.400	0.450	0.400	0.611	0.000	-1.000	33.33%
Min	-1.000	-1.000	-1.000	0.222	-3.000	-4.000	0.00%
Max	1.000	1.000	1.000	0.833	3.000	1.000	100.00%
Standard deviation	0.526	0.564	0.519	0.105	0.888	0.959	32.13%

Table 24 - Portfolio risk and overconfidence measur	•e
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(1) Interviewees are defined high risk if they overweight high Value at Risk (VaR) Italian stocks in their portfolios with respect to market average

Table 24 summarizes the result of overconfidence measures for more risk prone and less risk prone traders. Our results show no significant difference between less and more risk prone traders in terms of overconfidence and are in contrast with other studies, such as Oberlechner (2004), suggesting a relationship between risk-taking and overconfidence.

#### 5.4 Results of the empirical investigation on self-monitoring

Table 25 summarizes descriptive statistics relative to self-monitoring test computed for the whole sample and distinct between day and heavy and active traders.

Table 25 - Descriptive statistics of sen-monitoring tests								
	Total sample	Day and heavy	Active traders					
Mean	45.1%	47.9%	42.3%					
Median	44.4%	50.0%	44.4%					
Min	0.0%	5.6%	0.0%					
Max	100.0%	88.9%	100.0%					
Standard deviation	20.0%	19.3%	20.5%					

Table 25 - Descriptive statistics of self-monitoring tests

The mean degree of self-monitoring in our sample was around 45.1%, with day and heavy traders mean just above the full sample average and active traders mean just below the full sample. However data referring to median, min, max and standard deviation show

<sup>(11)</sup> Unless for the miscalibration measures; however this result can be interpreted as higher financial knowledge.



that the degree of self-monitoring varies significantly across different traders. Further, Cronbach's alpha for the test is 0.73, evidencing a more than acceptable internal consistency of the measure. Our results are very close to those presented in Biais, Hilton, Mazurier, Pouget (2005), which find out on 184 subjects an average degree of self-monitoring equal to 47.0% and a median equal to 44.0%.

In addition, as presented in table 22 self-monitoring attitude does not appear to be correlated with both measures of miscalibration and illusion of control, suggesting that these are distinct psychological traits. A positive and significant correlation appears between self-monitoring and better than average effect and this might lead to the conclusion that those operators with the highest social intelligence (self-monitoring) who are apt to better adapt to other people expectations, believe to be better than those they normally face.

In conclusion, to test if higher self-monitoring leads to a better understanding of other people behaviour in markets and consequently it can impact performances we computed Kendall's tau relating degree of self-monitoring with classes of performance achieved by traders. This is equal to 0.257 and suggests a positive, although low, relationship between social intelligence and performance.



#### 6. Psychology and trading behaviour

The last section of the paper aims to put into relation socio-demographic and behavioural variables with the trading activity, in particular frequency of trading. As indicated in the paragraph devoted to the literature survey, this section shares with many other empirical papers the absence of a fully specified economic model. In spite of this, findings are interesting for shedding light on correlations between variables under analysis.

Trading frequency is measured in three different ways; they all provide the same set of results proofing an internal consistency of the definitions. The first continuous measure is built as sum of the trades regarding Italian blue chip, Italian small caps, foreign stocks, securitised derivatives, futures and options. The second and third proxies are dichotomic and capture the probability of being a day trader as declared by the interviewees and the probability of trading daily at least one security's family among Italian blue chip, Italian small caps, foreign stocks, securitised derivatives, futures and options (i.e. to be a day and heavy 'star' trader).

For the continuous variable 'number of trades' we use an OLS methodology for estimating the model (table 26). For dichotomic variables, we use a logistic regression and provide odds ratios (table 27 and table 28). All standard errors are robust to heteroskedasticity through the Huber-White estimator.

As fully described in paragraph 5, we consider two types of behavioural variables. The first one is overconfidence, declined into illusion of control (IC1, standardised variable from 0 to 1)<sup>12</sup>, better than average (BTA3, standardised variable from -1 to 1) and miscalibration (MIS, standardised variable from 0 to 100%); the second one is self-monitoring (standardised variable from 0 to 100%).

Behavioural attitudes show their good explanatory power on the trading frequency (model I). Among overconfidence variables, illusion of control is positively related to frequency of trading (1% significance). Also the self-monitoring metric shows a positive and significant (10% or 5%) correlation with the number of trades and with the status of day trader. These findings could result in contrast with descriptive statistics: table 20 showed only for miscalibration a significant difference between day and heavy and active traders (negative sign) and table 23 showed that top traders, trading four times or more per day, appear to have a higher and significant better than average effect. Once taking into account standard deviations (highly dispersed) and correlations among behavioural variables, miscalibration reduces its explanatory power<sup>13</sup> and better than average is offset by illusion of control and self-monitoring at which it is significantly correlated (table 22). We conclude in favour of the hypothesis that both overconfidence and self-monitoring positively affect trading frequency; the highest dependent variable variance is captured by using illusion of control as overconfidence metric.

<sup>(12)</sup> As pointed out in paragraph 5, we prefer do not consider IC2 and IC3 as strongly reliable proxies for illusion of control due to their construction weakness.

<sup>(13)</sup> Miscalibration is significant only if regressed alone against day and heavy dummy, with a negative sign as in table 20.



Other papers about online traders indicate a positive relation between overconfidence and turnover. Barber and Odean (2002) suggest that overconfidence could induce higher portfolio's turnover. Glaser and Weber (2005) point out a positive effect of the better than average on trading, while there is no clear effect of calibration measures.

Subsequent models are estimated omitting better than average and miscalibration variables. This choice permits us to recover many observations; further, illusion of control is not correlated with self-monitoring avoiding multicollinearity problems.

The inclusion of other variables confirms model I robustness. Control sociodemographic variables are a first group (model II). Territorial variables for the major Italian areas show a negative sign, very often significant, suggesting a positive role of South (captured by the omitted dummy). Education does not show any significance; sex is in favour of men, confirming Barber and Odean (2001b) conclusions, but the small number of observations suggested do not consider it as a strong result and do not include it into the model. In line with the overweight of over-60s among day traders signalled in the descriptive statistics, trading frequency is higher among retired people (the same effect is captured also by an 'age' variable). Both these results are in line with previous findings in Franzosi and Pellizzoni (2004). Continuing with the professional status, we observe no significance of being managers. The dummy variable regarding self-employed people requires a specific analysis. In fact, multicollinearity between behavioural variables and socio-demographic ones is detected only for self-employed status (0.162 with IC1 and 0.154 with self-monitoring, both significantly different from zero at 5%). As a solution, we orthogonalized the self-employed dummy introducing into the model the residuals of a logit model with self-employed as response variable and IC1 and self-monitoring as explanatory ones. This new variable represents the variance of being self-employed not captured by behavioural attitudes. Model II stresses significance of both behavioural variables and self-employed status, once orthogonalized.

Model III leads into further complexities. An interesting aspect that could be considered is the share of speculative/short-term investments on the total wealth; it could be thought as proxy of a general attitude toward speculative trading. This variable is constructed as an ordered scale equal to 1 if no wealth is dedicated at that type of activity and equal to 5 if it is totally dedicated; once into the model it assumes a positive and significant sign (1%).

Other measures regarding the online channel and the relation with the e-trading industry could be introduced. The exclusive use of Internet as an investment channel does not seem significant in explaining trading frequency as well as years of experience as an online trader (even if the sign is the expected one). By contrary, the use of a specialised broker is positively and significantly related to trading frequency. All these findings confirm descriptive statistics.

Performances, past and expected, could be related to trading frequencies. The questionnaire permits to capture them in an ordinal way (1 equal to more than 30% and 5 minus of -15%); these measures are not punctually precise and they could be affected by the interviewees' attitude in answering to a sensitive question. Further, past and expected performances present a certain degree of persistency: people with high past performances



expect good results also for the future. Despite these caveats, performances seem to be positively linked to trading frequencies; dummy variable capturing interviewees with the highest declared past performances provides better model specification. As in the case of self-employed dummy, also performances (both past and expected) are correlated with behavioural variables: past performances are significantly correlated with illusion of control (-0.262 with 5% significance) and self-monitoring (-0.210, 5%) while the maximum past-performances with self-monitoring (0.1524, 5%) and less with illusion of control (0.100, 20%). Again, it is necessary to orthogonalize this variable with respect to illusion of control and self-monitoring. The residuals into the model maintain explanatory power for performances as well as for behavioural variables.

	I	II	III
Constant	-13.756 ** (5.612)	-21.196*** (8.834)	-70.585*** (20.764)
Illusion of control	26.105*** (8.625)	35.223*** (10.403)	50.492*** (13.546)
Miscalibration	1.226 ( 4.520)		
Better than average	3.858 (3.269)		
Self-monitoring	14.681* (7.690)	18.776*** (7.227)	37.616*** (12.189)
Performances (past max) <sup>(3)</sup>			8.735** (4.192)
Speculative % of wealth			2.662** (1.325)
Specialised brokers			5.018** (2.208)
Experience as online trader			0.846 (0.615)
Self-employed/entrepreneur <sup>[3]</sup>		5.575** (2.287)	5.716** (2.398)
Retired		11.856** (4.635)	9.599* (5.339)
North West		-4.408 (3.524)	-3.552 (3.725)
North East		-6.149* (3.589)	-7.942** (3.894)
Centre		-3.120 (4.217)	-4.989 (4.410)
N. obs. F R <sup>2</sup>	95 3.70*** 12.64%	195 3.69*** 12.87%	173 3.12*** 23.26%

#### Table 26 - Trading frequency: number of trades <sup>(1) (2)</sup>

(1) Models are estimated by OLS methodology; dependent variable is the sum of the trades on Italian blue chip, Italian mid and small caps, foreign stocks, securitised derivatives and futures and options

(2) Standard errors into brackets are calculated by robust variance estimator Huber-White; significance levels are indicated 1% \*\*\*; 5% \*\*; 10% \*

(3) Orthogonalized variables with respect to illusion of control and self-monitoring



	I	II	III
Illusion of control	27.119* (53.632)	100.213*** (166.145)	2360.363*** (5554.880)
Miscalibration	0.812 (0.608		
Better than average	.727665 (0.374)		
Self-monitoring	17.750** (22.190)	10.853*** (9.690)	254.202*** (423.396)
Performances (past max) <sup>(3)</sup>			4.628** (3.158)
Speculative % of wealth			1.446* (0.280)
Specialised brokers			1.307 (0.452)
Experience as online trader			1.115 (0.120)
Self-employed/entrepreneur <sup>(3)</sup>		2.292** (0.767)	2.371** (0.912)
Retired		4.308*** (2.386)	3.143** (1.714)
North West		0.333** (0.162)	0.220*** (0.124)
North East		0.484 (0.253)	0.289** (0.170)
Centre		0.274** (0.148)	0.150** (0.095)
N. obs. Wald chi <sup>2</sup> Pseudo - R <sup>2</sup>	95 8.29* 8.20%	195 20.43*** 10.16%	173 30.82*** 18.07%

# Table 27 - Trading frequency: probability of being a day and heavy trader $^{(1)}$ $^{(2)}$

 Models are estimated by logit methodology and parameters are odds ratios; dependent variable is dicothomic: it takes value 1 if the interviewee has declared to be a day trader, 0 elsewhere

(2) Standard errors into brackets are calculated by robust variance estimator Huber-White; significance levels are indicated 1% \*\*\*; 5% \*\*; 10% \*

(3) Orthogonalized variables with respect to illusion of control and self-monitoring



	I	II	III	
Illusion of control	899.537** (2117.755)	519.208*** (1008.214)	53840.440*** (143263.800)	
Miscalibration	1.487 (1.210)			
Better than average	1.330 (0 .737)			
Self-monitoring	5.772 ( 6.813)	11.030*** (10.663)	750.787*** (1152.081)	
Performances (past max) <sup>(3)</sup>			4.791*** (2.692)	
Speculative % of wealth			1.437 (0.342)	
Specialised brokers			2.416** (1.080	
Experience as online trader			1.145 (0.143)	
Self-employed/entrepreneur <sup>(3)</sup>		2.493** (0.944)	3.744*** (1.729)	
Retired		4.525*** (2.482)	5.407** (3.856)	
North West		0.791 (0.363)	0.982 (0.549)	
North East		0.507 (0.271)	0.316* (0.197)	
Centre		0.914 (0.462)	0.581 (0.366)	
N. obs. Wald chi <sup>2</sup> Pseudo - R <sup>2</sup>	95 11.98** 10.85%	195 21.52*** 9.77%	173 30.85*** 21.84%	

#### Table 28 - Trading frequency: probability of being day and heavy 'star' trader <sup>(1) (2)</sup>

 Models are estimated by logit methodology and parameters are odds ratios; dependent variable is dicothomic: it takes value 1 if the interviewee traded daily at least one security's family among Italian blue chip, Italian mid and small caps, foreign stocks, securitised derivatives, futures and options, 0 elsewhere

(2) Standard errors into brackets are calculated by robust variance estimator Huber-White; significance levels are indicated 1% \*\*\*; 5% \*\*; 10% \*

(3) Orthogonalized variables with respect to illusion of control and self-monitoring



### 7. Conclusions

A remarkable amount of the literature on online traders tends to highlight the negative consequences of the web on trading behaviour and performance. Online traders, who are highly overconfident, churn their portfolios, overweigh risky investments and lose money. In our study, we confirm many of the findings suggested in previous studies. Italian online traders are as overconfident as their peers are in other countries. In addition, the higher their overconfidence, the more frequently they trade.

In spite of this, our analysis presents some original and distinctive conclusions shedding a different light on Internet traders. Though overconfident, in general they appear to behave more rationally than other retail investors. Confronting the data in our paper with those referred to the general investors in shares, Italian online traders have a deeper and more diversified portfolio, of stocks in particular, and they appear to know and use hedging instruments so to reduce the overall risk of the portfolio. In addition, thanks to the effect of diversification, their trading strategies do not look as aggressive as expected. In general, online traders seem rather sophisticated and their portfolio reflects this characteristic. Further, they present a psychological trait called 'self-monitoring', a sort of a social intelligence, permitting them to adapt their behaviour to the financial market environment. Finally, although this information is self-reported and not tested with account data, they do not seem to lose money and on average, they perform as high as the market.

Online traders, although they are retail investors, behave as if they were professional investors. In such a context, our methodology which involves measuring psychological traits and putting them into relation with portfolio characteristics or trading habits could be useful to investigate the impact of psychological variables on other investment or trading characteristics.

By consequence, a further interesting area of research would be to test other psychological or attitudinal variables, such as sensation seeking, self-attribution bias, competence and so on, and correlate them with portfolio characteristics and trading. In particular, it would be interesting to answer the question of what makes (online) traders negotiate different categories of financial instruments. In addition, another important field of research relates to traders overall profile and motivation to trade. In other terms, whether behavioural characteristics are significant in explaining how trading and portfolio construction takes place.



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