CONSOB

COMMISSIONE NAZIONALE
PER LE SOCIETA' E LA BORSA

ANNUAL REPORT
2003

ROME, 31 MARCH 2004

The investigation of market abuses was aided by a procedure, refined during the year, that picks up the signals of potential anomalies by means of a reference model constructed on some key financial variables and analysis of its behaviour over time (Box 5).

Box 5: The Integrated Automatic System of Market Supervision

A market-abuse detection procedure identifies on a daily basis listed securities that are involved in market manipulation or insider trading. The possible occurrence of market abuse is detected by examining the behaviour over time of financial variables that constitute the elementary data flows available to Consob on securities trading on the financial markets (i.e. prices, quantities and the identity of the traders).

Analysis of the behaviour of the financial variables requires the construction of a reference model for each of them; the model is designed to identify dynamic thresholds the crossing of which triggers an alert. Once the alerts are defined, the market-abuse detection procedure calibrates the reference models by specifying their parameters for predictive purposes and defines an algorithm that permits different alerts to be interpreted jointly.

The financial literature and supervisory experience provide some methodological indications for the analysis of the prices of trades, the quantities traded and the agents that carried out the transactions. To begin with, the prices of trades are analyzed in terms of returns by studying the dynamics of the logarithm of the price; the returns of the securities generally undergo abrupt changes (for example, when inside information is divulged) or else display behaviour contrasting with reversion to the mean (for example, in the presence of manipulation). The presence of anomalous returns is identified through an estimate of returns that can be performed using diffusion processes. Autoregression models are able to capture separately both the mean-reversion component and the momentum-effect components of the returns. Furthermore, the quantities traded by individual agents are examined in terms of daily trading volumes using an autocorrelation technique. Agents' names are studied in relation to the quantities they have traded in a day, with an examination of the market's depth, the presence of dominant agents and the composition of the different trading intermediaries. Lastly, the composition of the market is evaluated in a two-stage analysis focusing first on the degree of concentration of intermediaries, i.e. the number of intermediaries and their respective shares of the volumes traded (so-called static concentration), then on the evolution of the concentration of intermediaries, i.e. the trend of each intermediary's share in the volume of trading in a specific security (so-called dynamic concentration).

On the basis of these indications, four financial variables were constructed: the evolution over time in the volume of trades in the security, the return of the security, static market concentration and dynamic concentration. In particular, the construction of alerts, calibrated through a set of stochastic differential equations, enables the procedure to identify securities involved in potential cases of market abuse in real time.

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2004

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As in 2003, market data were analyzed to detect potential anomalies using the Integrated Automatic System of Market Supervision..

The system operates on the basis of four financial variables: daily returns; daily volumes; static concentration (entropy), which examines the market's structure, checking, among other things, for the presence of dominant positions; and dynamic concentration (dissimilarity), which examines the evolution over time of individual intermediaries' transactions, highlighting their significant variations. Analysis of the performance of these variables (so-called alerters) makes it possible to detect possible anomalies (alerts) whose joint interpretation may provide a signal of potential cases of market abuse (warning).

With regard to static concentration, possible anomalies are indicated by signals generated by three pre-alerters keyed to intermediaries'

purchases, sales and gross transactions. For dynamic concentration, the signals of anomaly are triggered by three pre-alerters keyed to intermediaries' purchases, sales and net transactions.

By means of a series of stochastic differential equations, the system calculates, in every session and for each security, a range within which the individual alerters should move. If an alerter takes on a value outside the expected range, a possible anomaly is signaled. For static concentration and dynamic concentration, the alert is triggered if an anomaly is shown by at least one of the three pre-alerters. By contrast, a warning is triggered when at least three of the four alerters signal an alert.

The functions added to the Integrated Automatic System of Market Supervision in 2004 include the identification of intermediaries and their relative importance in generating anomalies for each of the pre-alerters of static and dynamic concentration. These data are then used as indicators of the behaviour of intermediaries during the examination of the warnings on securities generated by the system on a daily basis.

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ANNUAL REPORT 2005

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COMMISSIONE NAZIONALE
PER LE SOCIETA' E LA BORSA

Chairman
Lamberto CARDIA

Members of the Commission
Enrico CERVONE
Carla RABITTI BEDOGNI
Paolo DI BENEDETTO

Director General
Massimo TEZZON

Box 10

Probabilistic model for the detection of market abuses

For around three years now, Consob has been using a statistical model for the analysis of the market data inherent to the trading of listed shares on the Stock Exchange, which makes it possible to identify potential market abuses.

The model operates on the basis of four financial variables: the returns, the volumes traded daily, an indicator for the static concentration of the market (which amongst other things checks the presence of a dominant position of individual intermediaries,) and a dynamic concentration indicator (which examines the evolution over time of the operations of the individual intermediaries, highlighting any significant changes).

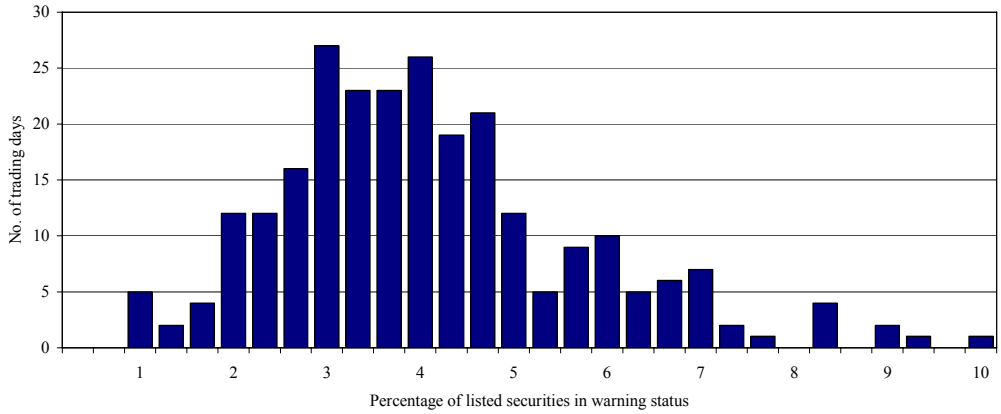
The performance of these variables or "alerters" determine the indication of anomalies whose joint interpretation provides an indication of potential market abuse (warning). In the case in question, with regards to the static concentration, the generation of the alert derives from anomaly signals generated by three pre-alerters which respectively examine the activities of the intermediaries regarding purchases, sale or gross transactions. Likewise, the generation of the alert for the dynamic concentration derives from anomaly signals generated by three pre-alerters which respectively examine the activities of the intermediaries regarding purchases, sale or net transactions.

On the basis of the probabilistic model, during each session and for each security, the system calculates an interval within which the individual alerters should move. If an alerter takes on a value outside the expected range, a possible alert is signalled.

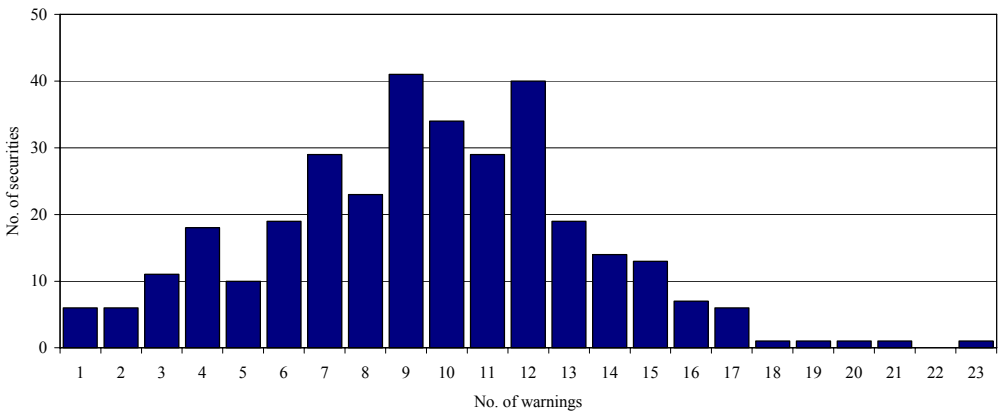
The procedural course followed when handling warnings envisages that steps are taken, in the first instance, to examine the market disclosure available on the security. On conclusion of such analysis, and any other checks, the warning may be considered justified by the market trend or may be traced back to hypothesis worthy of further investigation in relation to violations attributable to alleged market abuse. In the event that the warnings are considered to be symptomatic of a possible market anomaly, specific investigations are launched which may possibly lead to the opening of sanctioning proceedings.

During the three-year period 2003-2005, the system generated around 3,000 warnings a year; this entails that on average each day 4 percent of the securities have gone into warning status. Only on a very limited number of working days did the number of securities under warning status exceed 7 percent of the traded securities; moreover, at least one warning was generated on all the trading days. On average, each security generated around 10 warnings and rarely are more than 20 warnings per security generated in one year; furthermore, all the securities generated at least one warning a year.

Distribution of trading days by number of equity securities which generated a warning in 2005



Distribution of listed equity securities by number of warnings generated in 2005



These figures must be assessed in light of the fact that via the warnings the system detects all the so-called micro-failures of the market, both those induced by inherent phenomena (such as, for example, the dissemination of price-sensitive information), and those generated by market abuses. This implies that the majority of the warnings are attributable to the market disclosure trend, or to particular business cycle situations. Furthermore, during Consob's supervisory experience it emerged that several warnings are generally attributable to a single case of investigation. The warnings which remain after this initial screening must then be further purged of those which required investigations of another kind but which did not involve the opening of an investigation procedure. In conclusion, only part of the warnings which involved the opening of an investigation procedure – having completed the necessary assessments – may establish possible sanctioning.