

STOCK MARKET INDICATORS

(updated to 2 February 2007)

1. Purposes

In the 1960s Mediobanca started systematically recording the prices of shares listed on the Italian market and developed an index with a base date of 2 January 1961. The index was a typical price index and was based on a closed sample. This did not allow any changes to its constituents and therefore did not cover new securities which were floated over the years, a number of which acquired a significant weighting both in terms of capitalisation and trading volume, nor did it take account of non-voting savings shares, which were first quoted in 1976.

When a new index was designed in 1997, it was decided to abandon the closed sample method in favour of indicators covering all listed stocks. Account was also taken of the fact that in 1996 only about half the shares issued by listed companies were available to the public for investment (as a free float) for trading on the Bourse. It was also felt that the growth of Italy's capital market calls for a range of indicators providing more extensive information than mere price movements to assist in making investment decisions, such as the degree of risk, liquidity and free float in any particular security. The risk element, in particular, derives from uncertainty as to returns caused by relative under- or outperformance and price volatility.

2. The new indicators

The foregoing considerations have led to the design of two sets of indicators, one covering shares listed on the Mercato Telematico Azionario, or screen-based equity market (MTA), and the other (starting from 2000 and going up until 19 September 2005)⁽¹⁾ covering those listed on the Nuovo Mercato, or new market (NM). Individual share prices have been aggregated on the basis of weightings determined by reference only to their free floats. The indicators comprise:

- a) **general price indices** resulting from the aggregation of price movements in individual shares. These consist of all-share indices for both markets, and, for the MTA, ordinary share indices covering i) 30 blue chips, ii) 70 medium-size companies, iii) smaller companies, iv) insurance companies, v) banks and vi) industrials, plus a non-voting share index. The criteria governing eligibility by size are set out in Appendix 1;
- b) **market indicators** giving information complementary to that provided by the price indices. These consist of a **turnover indicator**, giving the ratio between shares traded and the free float, a **consistency indicator**, showing the degree to which an individual share underperforms or outperforms the market, and a **price volatility indicator** showing the extent to which individual share prices fluctuate compared to their trend.

The price index is calculated according to Paasche's formula adjusted to take account of corporate actions occurring since the base date.

¹ The first company was listed on the NM on 17 June 1999. On 1 June 2000, 12 companies were listed on this market. On 19 September 2005 the NM was included in the MTAX.

The general index is published daily. Figures based on the calculations are made available on a monthly basis (or by special request) via Internet and the financial press.

The following indices are published on a weekly basis:

MTA

- *All-Share (Mediobanca MTA)*
- *Top 30*
- *Mid-70*
- *Smaller Companies*
- *Insurances*
- *Banks*
- *Industrials*
- *Non-Voting Share*
- *STAR segments*

NM (2)

- *All-Share (Mediobanca NM)*

Each of these ten price indices also has its:

- *Turnover Indicator*
- *Absolute Consistency Indicator*
- *Volatility Indicator*

Figures are also published weekly giving:

- *the Market Capitalisation of Aggregate Free Float*
- *the Aggregate Controlling Stakes (and other shares unavailable for trading) as a percentage of Aggregate Market Capitalisation*

3. Methods of Calculation

The general indices are calculated as average weights of the so-called *official* market prices of each of their constituents, taking 2 January 1996 as the base date for the MTA, with the exception of the STAR segment,³ and 1 June 2000 for the NM. All the indices were rebased on 2 January 2006.

The individual share indices (4) are based on the ratio between the present price of the security and its price at the base date. Consistency over time is provided by utilizing commonly used adjustment factors recommended by Borsa Italiana.

Paasche's formula is first used for calculating the indices, with both the individual share and general indices being adjusted to reflect corporate actions where such actions result in a change to the weightings. Appendix 2 sets out the method of calculation in detail.

When a new security is listed, it is disregarded on the first day of quotation. Starting from the next day, its base is set by determining the ratio between the first quotation and the general index on the previous day. This means that the general index is not affected by this event (5). When a security is delisted, it is removed from the index on the day it is taken off the official list. Where a security is suspended, it is retained in the index at its last price prior to suspension. If the suspension lasts for more than one stock market account (twenty trading sessions), the security is removed from the index, but may be reinstated starting from the date it is readmitted to the official list, using its original base point.

The **weightings** are proportionate to the capitalisation of the free float only, on the assumption that stock held by the shareholders controlling the company is not traded and hence does not influence market prices. The definition of the **free float** given in Appendix 3 is based on CONSOB Resolutions and on the *Regolamento dei mercati organizzati e gestiti dalla Borsa Italiana*. The weightings are adjusted when official notice of a change is given as required by Italian law. This procedure ensures that Mediobanca's Research Department takes an entirely impartial stance to changes in the weightings. Distortions produced by variations in the free float are eliminated by appropriate adjustments to factor K (see Appendix 2).

The general price indices are also calculated on a "total returns" basis, which assumes that dividends are reinvested.

The **turnover indicator** measures how liquid a security is. This indicator is the percentage ratio between the sum of shares which changed hands in the preceding twenty trading sessions and the free float in the same period.

The **consistency** indicator (Appendix 4) measures the risk deriving from the scatter of returns on individual stocks vis-à-vis the market average measured by the general index. It is calculated on two levels, viz.:

- as the **absolute** consistency: this is the standard deviation from the return on individual securities versus that measured by the relevant general index in the last twenty trading sessions (thus measuring recent past performance);
- as a **relative** consistency: this is calculated in the same way as the absolute consistency, but it compares the actual return on individual stocks with the expected return assumed on the basis of movements in the price of such stock versus movements in the general index (thus measuring expected performance).

³ Operative since 2 April 2001.

⁴ For shares not ranking for dividends on a regular basis no individual indices are calculated. Those shares are treated in the same way as shares ranking for dividends on a regular basis.

⁵ The base as so calculated is also used to compile the other general indices. These therefore undergo some distortion, which is eliminated by adjustment factor K (see Appendix 2).

The minimum value of absolute consistency is zero when all securities produced the same return. The minimum value of relative consistency is zero when movements in the prices of individual securities relate precisely to movements in the market index. The further the relative consistency indicator diverges from zero, the weaker the link between the return on individual securities and movements in the average market return.

The **volatility** indicator (see Appendix 5) measures the risk inherent in share price volatility in the last twenty trading sessions. It represents the weighted average of the coefficients of variation (6) in individual share indices. Deviations in individual shares are determined with respect to their trend, which is calculated by linear interpolation. The minimum value of volatility is zero when price movements in individual securities precisely reflect their trend.

The consistency and volatility indicators are based on price indices assuming that dividends are not reinvested.

6 The coefficient of variation is equal to the ratio between the root-mean-square deviation (standard deviation) and the mean.

APPENDIX 1

**SHARE CLASSIFICATION
BASED ON CAPITALISATION OF FREE FLOAT**

Companies listed on the MTA are classified on the basis of the market capitalisation of their free float of ordinary shares into the following three baskets:

- the 30 top companies (or blue chips)
- the next 70 companies (or mid-70)
- smaller companies (all other listed companies from the 101st onward).

The three baskets are reviewed:

- immediately a security is added to or removed from the official list, or becomes the subject of a takeover bid or public tender offer;
- at half-yearly intervals to produce a fresh ranking based on each constituent's capitalisation at the end of June and December;

In both cases the relevant indices will be adjusted to maintain continuity by applying factor K as described in Appendix 2.

In the case of a new listing, the new security will be classified into one of the three baskets. This will be done by comparing its first quotation against the most recent half-yearly review, and adjusting such quotation to reflect changes that have occurred in the interim in the industry sector in which the new security would have been classified had it been listed at the time of that review.

Where a demerger or spin-off gives rise to a new listed security, this will be dealt with in the same way as if it were a new listing. The original company from which the new company was spun off will also be reviewed on the basis of its post-demerger price. In the case of mergers, a similar procedure is adopted. When a security is delisted, the constituents of each basket will be immediately adjusted.

Any change in the constituents of either of the first two baskets will immediately entail a change in the basket or baskets with lower ranking constituents. Such changes will invariably involve an appropriate adjustment, using factor K.

APPENDIX 2

METHOD OF CALCULATING SHARE PRICE INDICES

General index I_t is calculated by aggregating the prices of each security classified within it, by using the following formula:

$$I_t = \sum_{i=1}^n \frac{p_{ti}}{p_{0i} \prod_{j=1}^t c_{ji}} \frac{p_{0i} \prod_{j=1}^t c_{ji} q_{ti}}{\sum_{i=1}^n p_{0i} \prod_{j=1}^t c_{ji} q_{ti}} \prod_{j=1}^t K_j$$

where:

t = time (the day on which the calculation is made);

n = the number of securities in the index;

p_{ti} = the official price of security i at time t ;

q_{ti} = the number of free floating securities i at time t ;

$\prod_{j=1}^t c_{ji}$ is the product of adjustment factors c applied to the base price when the share goes ex-rights (except where this is due to a dividend). Where this does not occur, c_{ji} will be equal to 1;

$\prod_{j=1}^t K_j$ is the product of adjustment factors K that are applied when weightings are changed. In the absence of such changes, K_j will be equal to 1.

Factor c (as determined by Borsa Italiana) will be applied to the base price when any right is detached or special dividend paid in order to maintain the individual share price index consistent over time.

Factor K will be applied to the aggregate price index to eliminate the effects of changes in weighting that occur when:

- there are changes in the number of shares in issue or in their prices due to shares going ex-rights;
- there are changes in the free floats;
- securities are inserted in, or deleted from, the index;
- baskets are reviewed.

Factor K is the ratio between the index on the previous day and a notional index calculated by applying the current weighting structure to the previous day's prices.

The total returns indices are calculated by multiplying the price indices on the dividend payment date by a factor equal to the ratio between the company's capitalisation on the date preceding that date and its capitalisation minus the total dividend then to be paid. For purposes of the calculation, the dividends include tax and are those attributable to the free float only. The method of calculation assumes that all the dividends paid are reinvested not in the stock concerned but in the basket of shares constituting the index on the dividend payment date.

APPENDIX 3

METHOD OF CALCULATING THE FREE FLOAT

The free float is determined by reference to the definition used for admitting securities to the official list. This is set out in the *Regolamento dei mercati organizzati e gestiti dalla Borsa Italiana S.p.A.* (7), in which the free float is defined as being equal to shares in issue less:

- shares constituting a controlling interest as defined in Article 2359 of the Italian Civil Code;
- shares subject to syndicate agreements aimed to limit shares changing hands;
- shares representing an equity interest of over 2%.

Shares held by mutual funds/unit trusts and pension funds, banks and other investors are deemed to be part of the free float, even where such holdings are reflected in the investor companies' accounts as "financial fixed assets", as are shares held by trustees, unless one of the three above conditions applies. Majority interests are aggregated on a group basis. Convertible savings shares and preference shares are deemed to form part of the free float, unless otherwise reported in annual and interim reports and other published information.

Own shares are deemed to be under the control of the majority shareholder and are thus excluded from the free float. Where any shareholder's holding falls below the 2% threshold required to be reported to the authorities, that holding is added to the free float.

Where a company has more than one syndicate agreement, syndicated holdings are added together, so as to avoid duplication in cases where a shareholder is a party to more than one of such agreements.

Where the number of shares syndicated under any such agreement by any one shareholder is lower than the total number of shares held by that shareholder, only the syndicated shares held by that shareholder are excluded from the free float, unless the remaining shares held by it represent an equity interest of over 2%.

The information needed to identify holdings to be excluded from the free float (and changes therein) derives solely from annual and interim reports, and from information required to be reported under Articles 120 (requirement to report acquisition of significant interest) and 122 (partnership agreements) of Decree Law 58/98, as supplemented by CONSOB Resolution 11971/99.

Changes in the free float are made as and when official information about the change is given.

7 Up to 1 January 1998, the free float was defined in rules approved by CONSOB Resolution 4088/89 as amended.

APPENDIX 4

METHOD OF CALCULATING THE CONSISTENCY INDICATORS

As noted earlier, the consistency indicator is calculated on two levels, according to whether the dispersion in yields on individual securities is measured:

a) with respect to the yield recorded by changes in the general index (absolute consistency) using the following formula:

$$DA_t = \sqrt{\sum_{i=1}^n (R_{ti} - R_{tm})^2 w_{ti}}$$

where:

$$R_{ti} = [I_{ti} / I_{(t-19),i}] - 1$$

$$R_{tm} = [I'_t / I'_{(t-19)}] - 1$$

I_{ti} = the price index of security i at time t

I'_t = the general price index at time t

w_{ti} = the weightings used to calculate the price indices

or

b) with respect to theoretic yield calculated by applying the factor represented by the linear relation between movements in the share price and movements in the general index (relative consistency), using the following formula:

$$DR_t = \sqrt{\sum_{i=1}^n (R_{ti} - \beta_{(t-19),i} R_{tm})^2 w_{ti}}$$

where:

$\beta_{(t-19),i}$ = slope of regression of R_i on R_m .

The β factor is calculated by the ordinary least-squares method. In addition:

- yields are calculated over a period of 20 trading sessions;
- the β factor is calculated on a daily basis (t = day on which calculated);
- the findings on which the β factor calculation is based cover returns recorded over intervals of 20 trading sessions, with 24 such intervals prior to day $t-19$ eventually being covered. In order to allow an initial set of values to be calculated from this indicator, calculations were started covering the MTA on 25 November 1996 with 12 findings. The number of covered intervals is progressively increased up to 24 on 22 October 1997.

Indicators for newly listed securities are calculated as soon as findings covering at least twelve twenty-day trading sessions are available. Securities traded on fewer than fifteen days out of any twenty-day session are disregarded.

APPENDIX 5

METHOD OF CALCULATING THE VOLATILITY INDICATOR

The volatility indicator is an indicator of the variability of each individual share index with respect to interpolating linear values defined as:

$$\bar{I}_{it} = a_i + b_i t$$

where:

\bar{I}_{it} = the values of the individual share index from day t-19 to day t as estimated by linear interpolation

a_i , b_i = intercept and slope of the regression line.

Factors a and b are estimated by using the ordinary least-squares method over a period of 20 successive recordings before time t. Once the interpolating straight line has been estimated, the differences between the values recorded from the individual share index and the estimated values are calculated by aggregating them according to the standard root-mean-square formula as follows:

$$\sigma_i = \sqrt{\left\{ \sum_{t=1}^{20} \frac{1}{20} \left[I_{it} - \bar{I}_{it} \right]^2 \right\}}$$

where:

I_{it} = the value of the individual share index covering the i_{th} security as recorded on day t.

The indicator thus calculated, which will be influenced by its size at any given time, is then standardized by dividing it by the average of the index calculated over the same period for which the trend has been calculated, as follows:

$$CV_i = \frac{\sigma_i}{MI_t}$$

MI_t = the arithmetic mean of the last 20 values recorded from the individual share index.

The values as so calculated for each security are finally aggregated into a weighted average using as weights the mean values of the free floats during the 20 days concerned.

As with the consistency indicators, securities traded on fewer than fifteen days out of any twenty-day period are disregarded.