RESERVE BANK SHARE PRICE INDEX

The Bank has recently received a number of inquiries relating to its share price index. This note discusses the questions most frequently asked about the index and provides some detail on the compilation of the index.

The conceptual issues relating to sharemarket indices are not addressed here, only the mechanics underlying the Bank's share price index in its present form. It is recognised that the Bank's index has a number of technical shortcomings. It should be noted though that no single index can ever be entirely adequate, conceptually, for all purposes.

The Bank is currently taking part in discussions with the New Zealand Stock Exchange and others on the establishment of one 'authoritative' share price index. If a new index is established as a result, it may replace the present Reserve Bank share price index.

The Reserve Bank share price index in its present form, was introduced on 18 January 1968. Share price indices had been compiled by the Bank prior to this but on a weekly rather than daily basis as is the case at present.

The index is composed of ordinary and ordinary contributory shares of some New Zealand listed companies. Mining and oil exploration companies are not included due to the different structure of their operations compared with other companies and the speculative nature of their shares. The purpose of the index is to provide an objective measure of movements in the prices of a representative range of shares which are caused by changes in market conditions.

The accompanying appendix shows the formulae used in calculating the daily value of the 'all groups' index, and the related group indices. The value of the index for a particular day is found by scaling up or down the previous day's index value according to the change between days in each company's share price multiplied by its current weighting. The weight of each company included in the index is determined by the number of their ordinary shares on issue. Each company's weighting is monitored continuously to take account of any changes and weighting corrections are made as changes occur. The information for these adjustments is obtained from company reports, financial publications, the New Zealand stock exchange, sharebrokers and the general news media.

The index is calculated daily using the highest morning sale from the four stock exchanges in the order of Wellington, Auckland, Christchurch/ Invercargill and Dunedin (i.e. if there is no sale for a company in Wellington the highest price in Auckland will be used; no sale in Wellington or Auckland will result in the highest price in Christchurch/Invercargill being used etc.) If there is no sale in the morning call the company's price in the index from the previous day is used. Information on prices is obtained through Reuters economic service by telex about mid-day each day. The index is usually released by 3 p.m. on the same day.

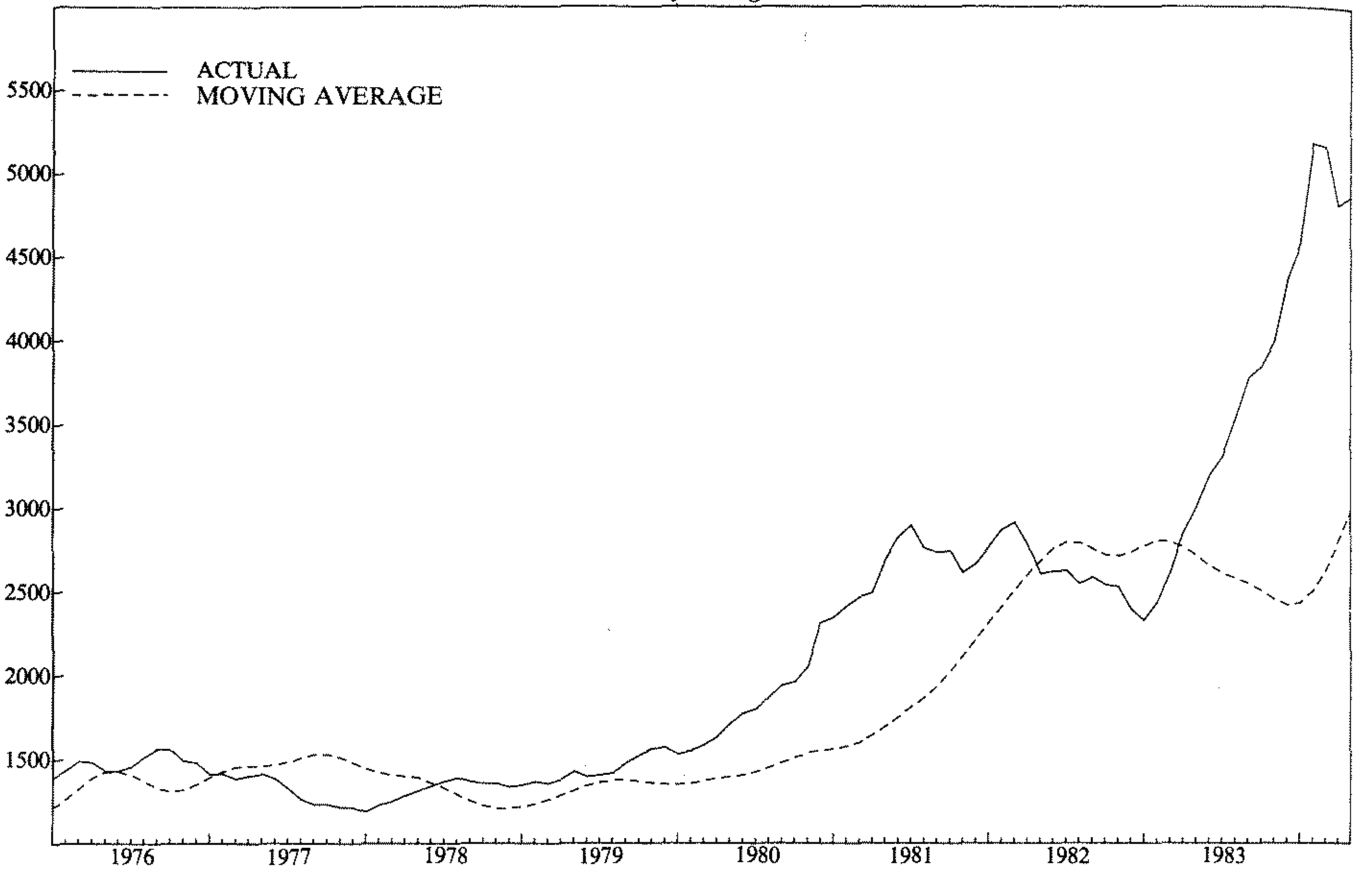
A total of sixty listed companies are at present included in the index. These companies are drawn from both the No.1 and No.2 board company lists of the stock exchange. Sixty was chosen as the number of companies for inclusion taking into account the need to gain reasonable representation across various sectoral groups while keeping the number of companies to a manageable size, an important factor when the index was introduced (prior to computerisation). Companies are included in the index with adequate sectoral representation in mind rather than just taking the sixty largest on the market. The companies included cannot be selected on a random basis due to the small size of the New Zealand share market. Shares of companies in the index must be frequently traded (preferably an average of once a week at a minimum) to ensure that sensitivity to market forces is maintained.

The companies are arranged in industry groups to enable indices to be calculated for separate sectors of the economy. These give an indication of the state of the various economic sectors. Indices are compiled for these individual sectors on a weekly (Thursday) basis. There are nine sector indices — insurance and finance; associated farming; trade and services; food, beverages and tobacco; building and construction; steel and engineering; timber, pulp and paper; textiles and clothing; and other manufacturing. Within the above sectors, sub-indices are computed to derive the respective group indices. A number of companies adequate to provide a representative coverage of the industry is maintained in each group and sub-group. However, this has been difficult in some groups and sub-groups, as companies have changed their structure and takeover and merger activity has intensified. When a company is removed from the stock exchange listings, and therefore removed from the index, every endeavour is made to replace it with a company in the same industry thus maintaining the balance of industry coverage in the overall index.

The Reserve Bank share price index is adjusted for capital changes in a manner which ensures that the capital change does not, of itself, influence the index. This is achieved by a hypothetical price being substituted for the previous day's quoted price in the calculation of the current index level. In the case of a company making a bonus issue its weighting in the index is adjusted on the first day on which the shares trade after going ex bonus. This normally occurs shortly after the issuing of bonus shares to the shareholders. Only if the share price does not alter in proportion with the bonus issue is the index affected. In theory if a company has 1000 shares trading at $5 and then makes a one for four bonus issue the number of shares on issue will increase to 1250 and the price drop to $4. The *market capitalisation* (current share price multiplied by the number of ordinary shares on issue) thus remains at $5,000. Any effective gain in price (i.e. in the above example, a price after the bonus in excess of $4) can be attributed to the market's revised opinion of the company and its shares. Thus, in the calculation of the index for the day on which a bonus issue takes effect, a theoretical price for the previous day of $4 for the company involved is used instead of the recorded price of $5.

A rights (or cash) issue made by a company results in a weighting change when the new shares are issued. However, in the interim an adjustment is made to the company's share price when the rights commence trading to ensure that the issue of the rights does not of itself cause a downward movement in the index. (The price of a company's ordinary shares usually moves downwards after its shares become 'ex rights'.) The previous day's share price of that company is replaced

Reserve Bank Monthly Average Share Price Index



by the current day's price in the calculation of the current index level. This results in that particular company's change in share price having no effect on the index for that day because the company's previous day market capitalisation (its weightings multiplied by its price) from which the current index is calculated, is equated to its current market capitalisation. Conceptually, there are some deficiencies in the present adjustment approach in this area. In terms of its practical effect the differences in a majority of cases would not have a singificant effect. Once the closing date for applications has been reached the rights cease trading and new shares in the company are issued to subscribers to the issue. At that point an adjustment is made to the company's weighting on account of the extra shares in circulation.

Generally such shares are issued at a lower price than the current market price of the company's shares on issue at the time. In many cases the new shares do not initially have the same entitlements to dividends, etc. as existing shares. In these cases they trade at a lower price than the existing shares until such time as they rank equally with existing shares. However, because of the different forms a rights issue can take and the difficulty experienced in ascertaining precisely when the existing shares and new shares rank equally, the company's weighting in the index is changed on application date (i.e. when the new shares are issued) with the price used from that date being that of the existing shares.

The length of time (often up to six months) that it takes for the two shares to reach an equilibrium price is another reason for this practice. This can impart a bias to the index at the time of adjustment, upward if the existing shares continue to trade at a price significantly above the new shares until the latter rank pari passu and downward in cases where the price of the existing shares move down to the level of the new shares. Any initial bias is compensated for by subsequent movements in the share prices until, at the time when the new shares rank equally with existing shares, the two prices become identical at the market determined level.

In the case of a company making a share split the weighting of the company in the index is adjusted when the split is made. There will be no movement in the index unless the market revises its value of the share, as the price will normally adjust in proportion to the split. A company with 1000 shares trading at \$2 with a face value of \$1 which splits its shares into 50c units will in theory end up with 2000 shares trading at \$1. Market capitalisation thus remains at \$2,000.

Where a company makes an ordinary share issue the price of which is payable over time a separate company is set up for the purposes of the index called, for example, 'Company A Contributory'. The weighting of this 'Company' is the number of new shares issued. When the price of the contributory share adjusts to reflect a call paid the same price is applied to the previous day to ensure no movement in the index as a result of the paid call.

Issues of ordinary shares to staff or as consideration for acquisitions or mergers by companies in the index have their weighting changed as soon as the issue of the shares is notified to the stock exchange.

No allowances are made for dividends in the share price index. When a share is cum dividend (the period between dividend announcement and payment) the market will adjust the price upward to reflect the dividend payment foregone by the seller. When the share becomes ex dividend (after the dividend payment) the market often adjusts the price downwards again as no benefit will accrue to a buyer or seller for a period of time. While the dividend factor does affect the index it is a result of market forces and thus consistent with the aims of the index. It must also be remembered that an efficient market adjusts the price for the expected dividend payment over a period of time.

APPENDIX

CALCULATION OF RESERVE BANK SHARE PRICE INDEX

Number of ordinary shares on issue = weight

Σ = sum of

ALL GROUPS INDEX

$$\text{New Index} = \frac{\left[\Sigma\left(\begin{array}{c}\text{New price of each company in index x}\\ \text{Current weight of each company in index}\end{array}\right)\right] \text{ x Old Index}}{\left[\Sigma\left(\begin{array}{c}\text{Old price of each company in index x}\\ \text{Current weight of each company in index}\end{array}\right)\right]}$$

Note: The 'new price' will be the current days morning call price while the old price will be the last recorded price, or a theoretical or current day's price where a rights issue, bonus issue or par value change has taken place on the current day.

GROUP INDEX

$$\text{New Index} = \frac{\left[\Sigma\left(\begin{array}{c}\text{New price of each company in group x}\\ \text{Current weight of each company in group}\end{array}\right)\right] \text{ x Old Group Index}}{\left[\Sigma\left(\begin{array}{c}\text{Old price of each company in group x}\\ \text{Current weight of each company in group}\end{array}\right)\right]}$$

BASE 18 January 1968 = 1000.