

## EQUITIES

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## INTRODUCTION

**By Alison Harrington**

When I joined AIA ten years ago most of the information presented about shares was about fundamental analysis, and you had to obtain individual copies of the financial data to be able to make an assessment. The technological changes in the past few years have made detailed fundamental analysis readily available to all interested investors and complex technical analysis presented in such a way that time only needs to be taken to learn how to understand the data, not how to collect and process it. This is changing the world of investing and anyone who thinks they can just buy and hold is going to be left way behind in the growth rate of their portfolio.

AIA is lucky to have investment professionals who respect the skills of our members and AIA members who have spent many hours perfecting their own analysis systems. The three writers in this excellent Equities Bulletin present clearly and comprehensively their knowledge. Enjoy reading the articles and most importantly have fun learning to apply what they are teaching you.

Remember though to always calculate risk and protect your capital.

*Alison Harrington is an AIA Councillor and Coordinator of the AIA Queensland Committee.*

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# THE BASICS OF TECHNICAL ANALYSIS

By Justine Pollard

There is no secret code or holy grail to make it big in the market. There is only the evolution of what works. Whatever works is updated and made better through the years just as the world of trading and technology continues to evolve. From the conventional and seemingly chaotic brokers gathering with their bizarre hand signals on the floor to buy or sell stocks, to now, direct trading through online platforms. Anyone these days can surf and trade international markets from the confines of their own home.

So how do they do it?

Traders can use company balance sheets, profit and loss statement, company's management, list of competitors and other economic data to determine the stocks to own. This analysis is known to traders as fundamental analysis.

And then there is charting or technical analysis. At a cursory level, some traders were put off by the claims of technical analysis. Its strongest critics dubbed technical analysis as black magic questioning the credibility of its precision and evaluation.

With the advent of the internet and highly sophisticated software, charting is not as daunting to master as before. More and more traders are finding technical analysis an ally. There are those that employ charting side-by-side with fundamental analysis. While others solely rely on technical analysis to help them evaluate the shares to buy, sell or hold.

Just some of the advantages of charting include the following:

- Charts show the health of shares by how they are trending. There is no need to worry about news, fundamentals and announcements. Financial markets have already responded to this information well before you read about it in the press. The market moves based on the future rather than on current earnings of a company.
- Charts show the change in the trend of a share well before any relevant information is available to the public. One Tel and HIH, for example, showed clear down trends for many months, even years, before the major fundamental problems were available to the public.
- Charts give an insight into how traders are thinking – the underlying psychology of the market. It is people that make and move markets, not facts and figures. When viewing a chart, traders are given an insight into how people are thinking and who is in control – the buyers or the sellers.
- Charts provide signals of the best time to buy and identify the right time to exit, the most significant part of trading.

Technical analysis also evolves everyday with chartists and analysts finding another so-called magic indicator to add to their charts. There are already hundreds of technical indicators to choose from and this can extremely over-complicate trading. It is always best to stick to the basics of charting. The most significant indicators that have been proven and tested through time are the following:

- Support and resistance lines
- Trends
- Volume
- Moving averages
- Price Gaps
- Key Chart Patterns

Time and again throughout history, technical analysis has proven its reliability as it has shown the health and weakness of shares long before the reality sets in. Take the case of One Tel and HIH Insurance as examples from early 2000.

These were shares recommended by brokers for they were deemed to be cheap and undervalued. However, the charts were very clear in their signals that the shares were unhealthy and a clear technical exit signal was given a year or more before they became insolvent and disappeared off the stock market.

### Weekly chart of HIH Insurance before it disappeared from the stock market



ABC Learning Centres and Babcock Brown were no different when they disappeared during the Global Financial Crisis. Their charts also look the same and it does not matter which one you pick. Below is the chart of ABC Learning Centres which you can also see was clearly falling in price for sometime before, it too, disappeared from the stock market.

## Weekly chart of ABC Learning Centres before it disappeared from the stock market



As you can see from these two charts, they started off as healthy rising shares. Then they broke their uptrend lines, which is a key exit signal for traders of charts. The next key exit signal came once they broke through their strong support levels - which is a price point at which a share is trading above and getting support from for some time.

Once a key support level breaks this is a very unhealthy sign for the share and for technical traders it is another key signal to exit, as it now confirms the share is unhealthy and trending down. As to how far a share will fall once it starts trending down, that we do not know until later down the track. For technical traders it is not a time to be buying and it's time to stay out, until the signs of health appear again, which did not happen in either of these charts.

"Elementary, my dear Watson!", the line from the famous detective Sherlock Holmes to his assistant, is just apt for technical analysis. No more espionage-like ways of gathering information or comprehensive company statistics. The basics are to analyse the trend of the share through its chart. And once you get the hang of it, it is indeed safe to say, "Elementary!"

I will describe trends in more detail in upcoming newsletters.

*Justine Pollard is a sought-after trading mentor and best-selling author of Smart Trading Plans. You can discover more about technical trading and get your free report: 10 Tips to Smarter Trading, by visiting her website - [www.smarttrading.com.au](http://www.smarttrading.com.au).*

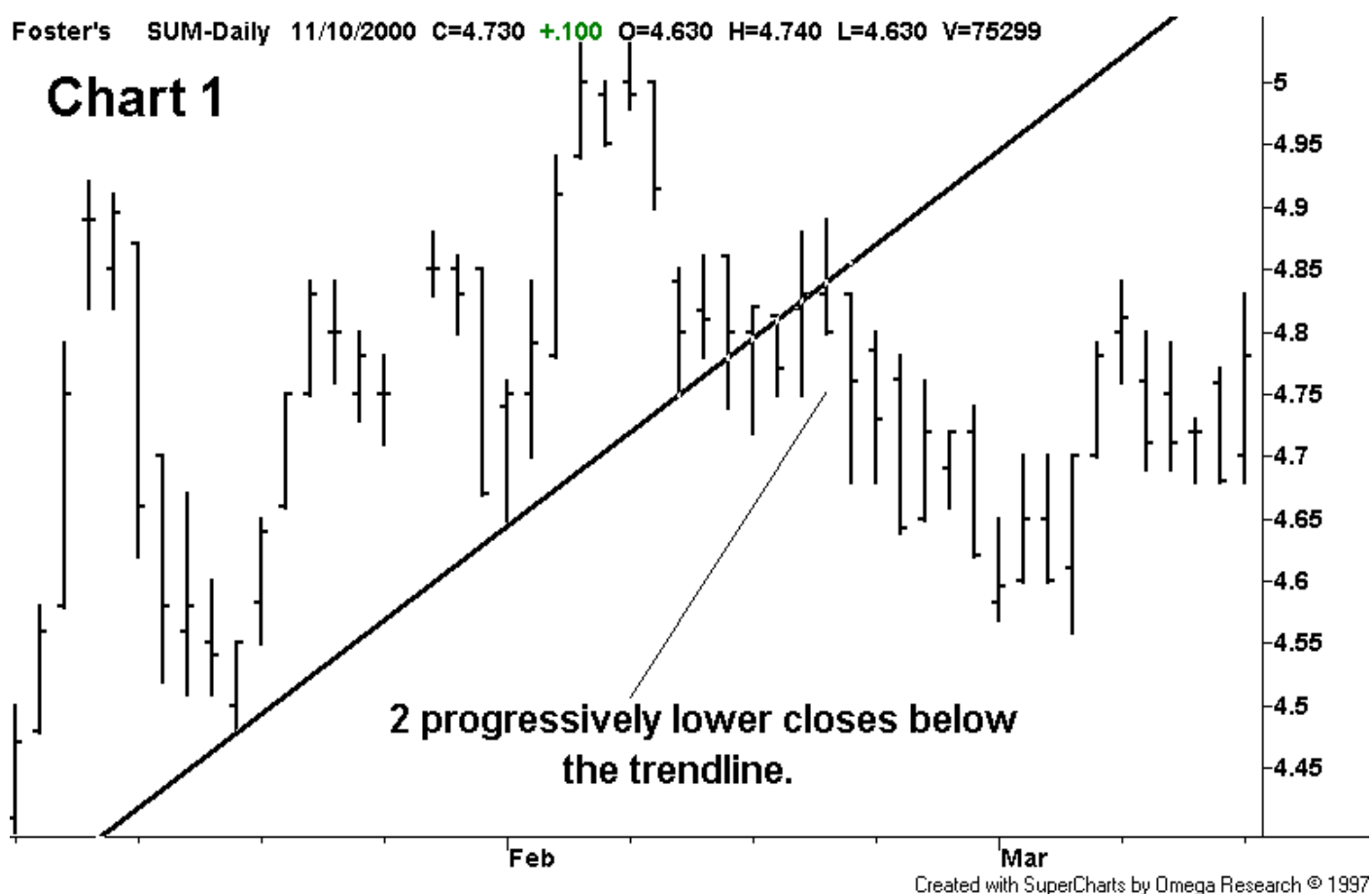
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# TRENDLINE ENTRY AND EXIT

By Alan Hull

When analysing either an upward or downward trend it is common to use trendlines. In an upward trend, a trendline is constructed by drawing a line that touches two or more of the most significant lows. The more often the price activity touches the trendline; the more significant the trend. This line provides support to the price action and, when broken by the price activity, indicates that the trend is weakening or may be over. In a downward trend, a trendline is constructed by drawing a line that touches two or more of the most significant highs. The downward trendline provides resistance to the price activity.

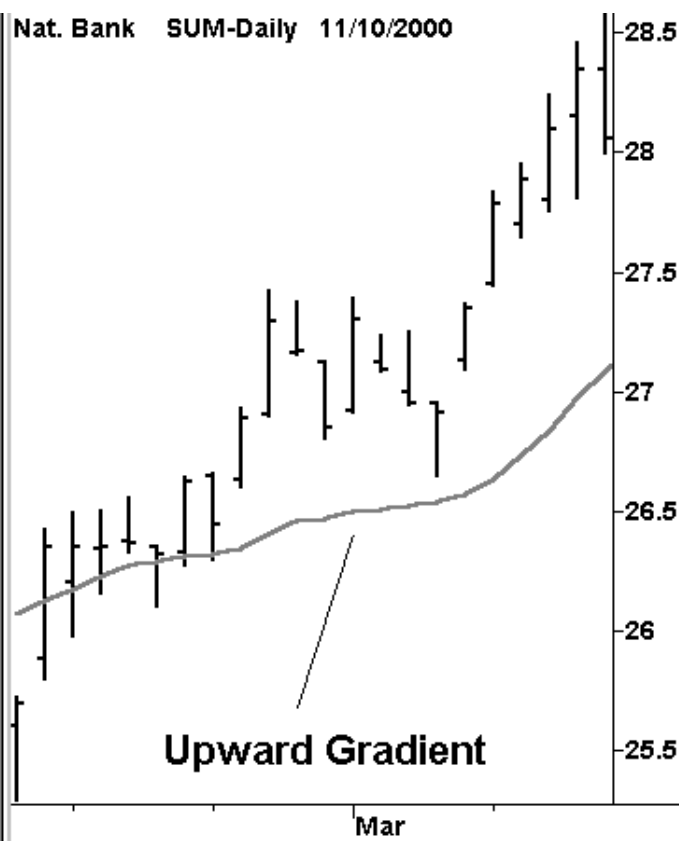
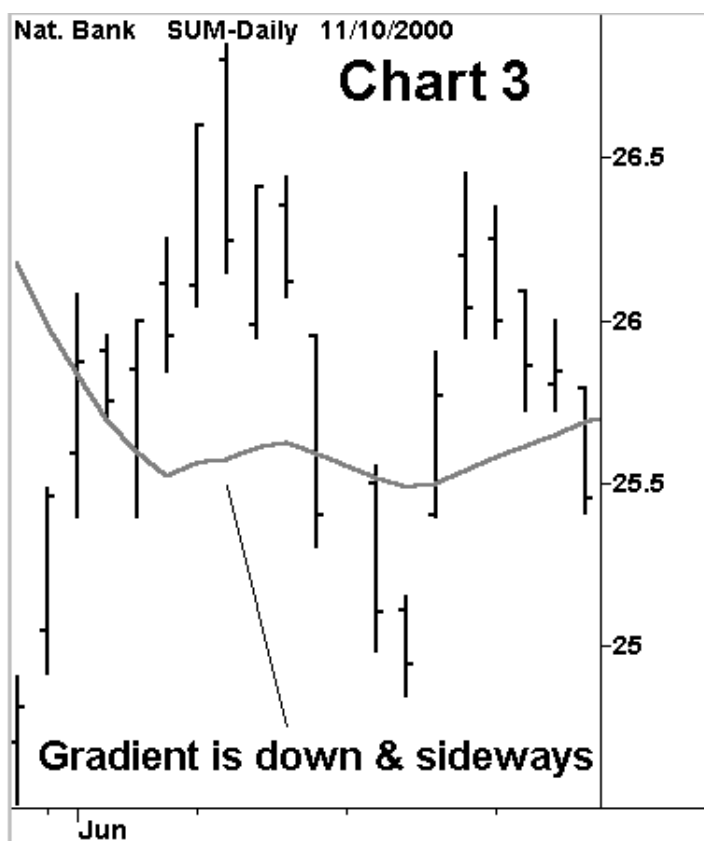
A common method of deciding whether or not an upward trend is broken is to watch for two consecutive closes, below one another, below the trendline. This type of exit signal is shown in 'Chart 1' and works well in this example. If the price activity is moving either sideways or downwards then the trade is no longer profitable and an exit is warranted. Note that the effectiveness of this method is largely due to the chartist's ability to place trendlines.



If price activity breaks out of an upward trend then it may begin to move either sideways or downwards. Similarly, when price activity breaks out of a downward trend it can move either sideways or upwards. However, whilst a breakout from an upward trend does signal an exit, a breakout from a downward trend does not signal an entry. 'Chart 2' is an example of an invalid entry signal given by two consecutive closes higher than one another, above the trendline. A breakout from a downward trend does not necessarily indicate that the price activity is in an upward trend. Before entering the market the trader must determine whether or not the price activity is in an upward trend.



This mistake may seem very obvious when using trendlines but it is a common mistake made when trading with moving averages. A simple, robust and symmetrical trading method is to enter on two consecutive closes above a moving average, a 21 day SMA for instance, and exit on two closes below the moving average. Whilst the exit signal is valid, the entry signal requires further qualification. The moving average must be heading in an upward direction. 'Chart 3' shows an invalid entry and a valid entry; the difference being the direction of the 21 day SMA.



Alan Hull is an author and trader. Send a request to Alan at [enquiries@alanhull.com](mailto:enquiries@alanhull.com) to receive a free pdf module entitled 'Introduction to Technical Analysis'.

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# Market maths: exploring the 'Rule of 72'

By Robert Vagg

Many investors will be familiar with the commonly used 'Rule of 72'. It is a simple rule-of-thumb that allows, via a bit of quick mental arithmetic, an easy means of estimating the time required for an investment to double in value for a given annual growth rate. The *Rule* simply states that a product of **72** will result when the required **time** (in years) is multiplied by the **growth rate**. By way of example, this implies that it would require 6 years for an investment to double at an effective growth rate of 12% pa (since  $6 \times 12 = 72$ ). Conversely, it indicates also that an investment compounding at 6% pa should require 12 years to double. The point where 100% growth has been obtained is significant to an investment, because it is at that point that the original capital may be withdrawn and the investment allowed to grow with no risk of net loss. The *Rule* has many applications, such as in comparing the performance of two alternative investments or in estimating possible future growth in a superannuation fund. This article looks at just how reliable such rules-of-thumb are, and at the relatively simple mathematical basis for their derivation.

## How reliable is the Rule-of-72?

The *Rule* affords a good approximation when applied to time periods or growth rates that might be considered normal for financial markets. That is, growth rates ranging between 5% to 15% pa, or time periods from 5 to 15 years. It provides a time estimate that is accurate to within one month for growth rates between 6.5% and 10% pa, and to within two months for rates between 5.5% and 15.5% pa. The calculation becomes less reliable outside these ranges, particularly for short time periods. As an obvious example, for an investment to double in a single year the effective growth rate required clearly must be 100% and not 72% pa, so the multiple in this case is 100. At the other extreme, for very long time periods the multiple converges to a limit of 69.3. In fact, the multiple is only exactly 72 when a growth rate of 7.847% pa produces doubling in 9.175 years.

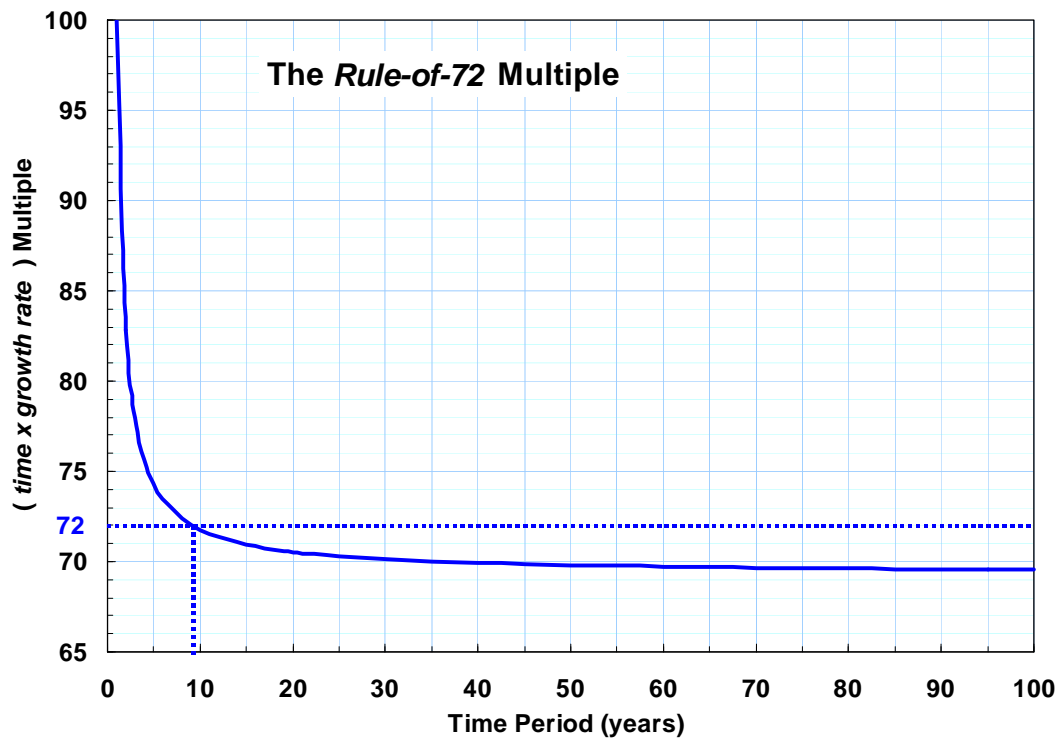
The range of exact multiples calculated for periods ranging from 1 year to 100 years is shown graphically in Figure 1, and some relevant values are listed in Table 1. These show that the value of the multiple falls rapidly when moving from short (high growth) time periods to then flatten and become relatively constant for long periods of low growth. The value of 72 occurs around the point of inflection for the chart, which is shown in more detail in Figure 2. The reason for the variation in these multiple values lies in the nature of compound growth and the distinction between 'effective' and 'nominal' growth rates, where an effective growth rate of 100% pa is achieved by a nominal (continuously compounding) annualised rate of 69.3%. These terms were described in my article on compound growth in the March 2010 issue of the *Equities Bulletin*, which readers might refer to, and further detail is given in the Appendix section below.

**Table 1.** Requirements for 100% growth over different time periods

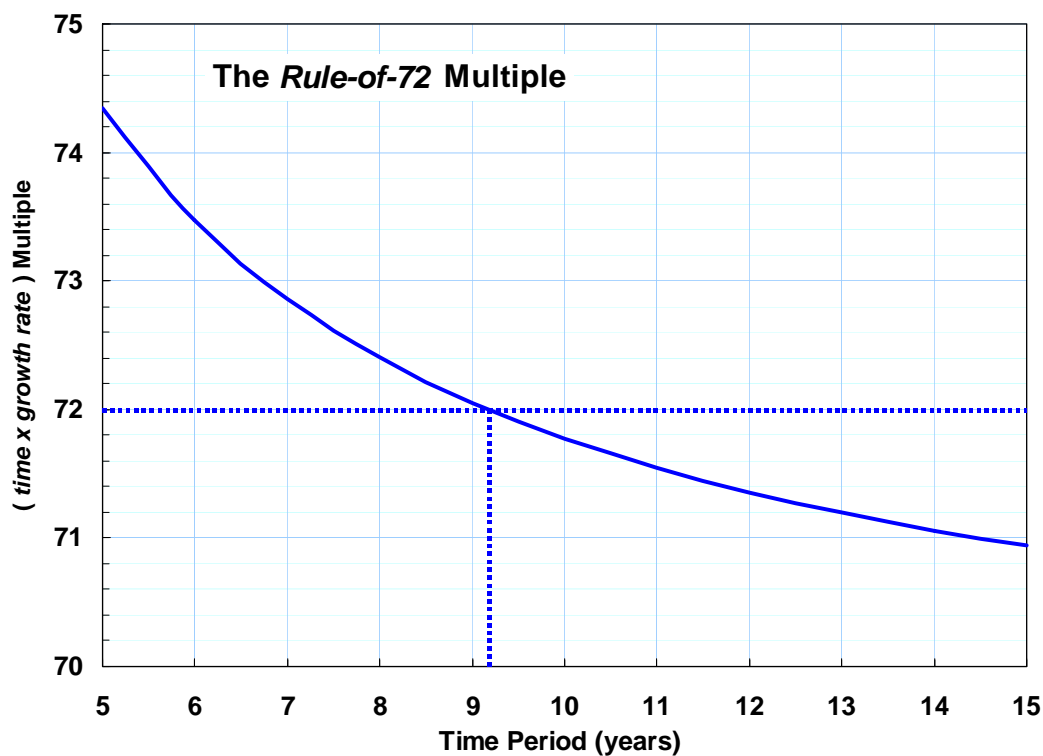
Time Period (years)	Effective Annual Growth Rate	(Time x Rate) Multiple
1	100.00%	100.0
2	41.42%	82.8
3	25.99%	78.0
4	18.92%	75.7
5	14.87%	74.4
6	12.25%	73.5
7	10.41%	72.9
8	9.05%	72.4
9	8.01%	72.0
10	7.18%	71.8
11	6.50%	71.6
12	5.95%	71.4

13	5.48%	71.2
14	5.08%	71.1
15	4.73%	70.9
100	0.70%	69.6

**Figure 1.** Variations in the Rule-of-72 Multiple



**Figure 2.** A closer look at the Rule-of-72 for 'normal' time periods



In its simple application, the *Rule* indicates that 72 years would be required for a rate of 1.00% pa to achieve 100% growth. The exact requirement is 70.0 years at this rate, which likely would be considered close enough, and so in this timeframe it acts as a very useful indicator. Both Table 1 and Figure 2 show that an accurate calculation for 5.0 years would require a multiple of 74.35 to be used, signifying that growth at 14.9% pa applies to this time period. Simply using a value of 72 here would underestimate the growth rate as 14.4% pa. However, it is likely that this degree of accuracy would be considered sufficient for an easily applied rule-of-thumb, and it might be concluded that for time periods greater than 3 years, the *Rule* generally achieves its convenient purpose. Much of the convenience of its use lies in its many whole number factors (1, 2, 3, 4, 6, 8, 9, 12, 18, 36 and 72), which facilitate the quick mental arithmetic of its application.

### Other similar rules-of-thumb

A more optimistic investor might be interested in a similar rule-of-thumb that would allow a quick estimate of the time required for a value to triple (*i.e.* increase by 200%). This could be referred to as the *Rule-of-117*. Alternatively, a *Rule-of-minus-66* would describe the time-growth relationship that sees a declining investment halve in value. For example, an investment reducing at –6% pa would see its value halve in eleven years, a calculation that might be relevant to a superannuation account in pension phase or if wishing to estimate the negative effects of inflation on an asset's real value. This particular time period is generally referred to as the asset's '*half life*', of common usage in science to describe the decay of a radioactive isotope. Relevant values for these two scenarios are listed in Table 2 below. The Table demonstrates, for example, that a share portfolio achieving an effective growth rate of 11.6% pa would show a 200% increase in value over 10 years, and would triple again by the end of a 20-year period.

**Table 2.** Requirements for tripling and halving over different time periods

Time Period (years)	Tripling ( <i>Rule-of-117</i> )		Halving ( <i>Rule-of-minus-66</i> )	
	Effective Annual Growth Rate	(Time x Rate) Multiple	Effective Annual Growth Rate	(Time x Rate) Multiple
1	200.0%	200.0	-50.0%	-50.0
2	73.2%	146.4	-29.3%	-58.6
3	44.2%	132.7	-20.6%	-61.9
4	31.6%	126.4	-15.9%	-63.6
5	24.6%	122.9	-12.9%	-64.7
6	20.1%	120.6	-10.9%	-65.5
7	17.0%	119.0	-9.4%	-66.0
8	14.7%	117.8	-8.3%	-66.4
9	13.0%	116.8	-7.4%	-66.7
10	11.6%	116.2	-6.7%	-67.0
11	10.5%	115.5	-6.1%	-67.2
12	9.6%	115.0	-5.6%	-67.4
13	8.8%	114.6	-5.2%	-67.5
14	8.2%	114.3	-4.8%	-67.6
15	7.6%	114.0	-4.5%	-67.7
100	1.1%	110.5	-0.69%	-69.1

Once again, it may be seen that these multiples change rapidly, and hence the respective *Rules* are less reliable, for shorter time periods. The tripling multiple falls from 200 to flatten out to a limit in the long term of 109.6. The multiple describing halving diverges from an initial value of –50 to level out at a long-term limit of -69.3. As before, these limiting values simply reflect the distinction between the respective nominal and effective growth rates. An effective growth rate of 200% pa corresponds to continuous compound growth at an annualised rate of 109.6%, whereas continuous

erosion at a rate of –69.3% annualised would see an asset's value reduce by exactly 50% over one year. For readers seeking a more detailed mathematical description, these processes are explained further in the Appendix section below.

## Appendix: mathematical background

For a more comprehensive mathematical description of the process of compound growth that is the basis for these rules-of-thumb, readers should consult the first article in this series, entitled “*Market maths: compound growth and the log scale*”, that appeared in the March 2010 issue of the *Equities Bulletin*.

### Deriving a rule-of-thumb

Compound price growth over  $n$  years may be described by the general expression **(a1)**:

$$\begin{aligned} \text{(a1)} \quad P_n &= P_0 (1+E)^n & \text{where } n &= \text{number of years} \\ & & P_0 &= \text{initial price} \\ & & P_n &= \text{price after } n \text{ years} \\ & & \text{and } E &= \text{effective annual growth rate.} \end{aligned}$$

For deriving the rules-of-thumb described in the article above, our interest lies only in the ratio ( $R$ ) of the final and initial prices ( $R = P_n / P_0$ ), which simplifies expression **(a1)** to give:

$$\text{(a2)} \quad R = (1+E)^n .$$

The logarithmic form of this expression is

$$\text{(a3)} \quad \log(R) = n \log(1+E) ,$$

and this may be simplified further to give an expression for the required time period ( $n$ ) as

$$\text{(a4)} \quad n = \log(R) / \log(1+E) .$$

Expression **(a4)** may be used to calculate the exact value for either time ( $n$ ) or growth rate ( $E$ ) for any chosen price ratio ( $R$ ), and hence any desired rule-of-thumb.

As an example, the Australian All Ordinaries Price Index has displayed average growth of 9.1% pa over the last four decades. Use of expression **(a4)** allows us to estimate that, for  $n = 10$  and  $E = 0.091$ , the Index increases by a factor of 2.39 each decade.

### The Rule-of-72

The *Rule-of-72* may be expressed simply as three alternative mathematical formulae:

$$\text{i.e. either } \text{time} \times \text{rate} = 72 \quad \text{or} \quad \text{time} = 72 \div \text{rate} \quad \text{or} \quad \text{rate} = 72 \div \text{time} .$$

For a doubling in price,  $\log(R) = \log(2) = 0.30103$  may be used in expression **(a4)**. Choosing an effective growth rate of 10.0% pa, for example, would mean that the time period  $n$  calculates as

$$n = 0.30103 / \log(1.10) = 0.30103 / 0.0414 = 7.27 \text{ years}$$

to give a (*time x growth*) multiple of 72.7, which compares with the *Rule's* approximation of 72.

For price tripling, the ratio  $R$  is 3 ( $\log(3) = 0.4771$ ), and for halving  $R$  is 0.5 ( $\log(0.5) = -0.30103$ ). These values may be used in similar calculations to that above to derive the exact values given in Tables 1 and 2.

### The distinction between effective and nominal rates of growth

The mathematical descriptions in **(a1)-(a4)**, employing an effective growth rate ( $E$ ), are applicable if the prices achieved are considered only at the end of each year. In practice, price growth on financial markets is essentially continuous. The relevant time interval for price change therefore approaches zero, and continuously compounding growth occurs. In such case, growth is exponential and is better described by application of a nominal growth rate ( $N$ ), as described by the expression **(a5)**:

(a5)  $R = e^{Nn}$  where  $n$  = the growth period expressed in years  
 $N$  = nominal compounding annual growth rate  
and  $e$  = the natural growth base (2.718281828...)<sup>1</sup>.

The inter-relationship between the effective annual growth rate  $E$  and the nominal rate  $N$  is given by the expression (a6):

(a6)  $E = e^N - 1$ .

This expression may be used to demonstrate that an effective growth rate of 100% pa ( $E = 1.00$ ) will be generated by a continuous annualised nominal rate of 69.3% ( $N = 0.693$ ). For a single year, the effective rate only is relevant. However, for a long-term timeframe there are many sequential one-year time periods, which simulates the continuous compounding that relates to the nominal growth rate.

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<sup>1</sup> An explanation of  $e$  (Euler's Number) is given at: [http://en.wikipedia.org/wiki/E\\_\(mathematical\\_constant\)](http://en.wikipedia.org/wiki/E_(mathematical_constant)).

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