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Market Risk Premium

1 Introduction

The market risk premium ("MRP") is the amount that an investor expects to earn from an investment in the market above the return that can be earned on a risk free investment. In theory, the market consists of all assets in the economy, but it is not possible to observe and measure the return on all the assets. Therefore, the equities market is commonly used as a proxy as it is the only market where prices are regularly and reliably observable for a broad cross section of the economy.

The MRP is most prominent in the Capital Asset Pricing Model ("CAPM"):

$$E(R_{et}) = R_f + [E(R_{mt}) - R_f] * \beta$$

where

R_{et} = cost of equity capital at time t,

R_f = risk free rate of return,

R_{mt} = market rate of return at time t,

E(.) = indicates the variable is an expectation, and

β = systematic risk parameter.

The MRP in the CAPM is $[E(R_{mt}) - R_{ft}]$ - the amount by which the return on the market is expected to exceed the return on the risk free asset. This is an expectation of investors and therefore is not directly observable. The difficulties in estimating the MRP are well known, and the choice of an appropriate rate is inevitably *ad hoc*. Generally a range of plausible values is identified and the MRP is chosen within the range, most commonly at the midpoint.

The remainder of this paper is set out as follows:

- In section 2 we assess approaches to estimating the market risk premium, and set out our best estimate of the MRP; and
- in section 3 we address the claim by the ACCC that the MRP has been falling in recent years.

2 Estimates of market risk premium

In this section we assess the appropriate MRP in Australia. The two main approaches we consider are:

- use of historical data; and a
- benchmarking approach using international data.

2.1 A historical approach

The generally accepted range among corporate finance professionals in Australia has been 5½% to 7½%.[1] This range is largely favoured because of empirical evidence of the historical, realised MRP in Australia over time periods ranging as far back as 1882. In the absence of additional evidence, the mid-point in this range of 6.5% was often picked as the point estimate. In 1999, Davis presented a range for MRP of between 5% and 8%, and noted that the midpoint of 6.5% "is not unreasonable."[2] This is also consistent with Section 3.2 of Schedule 6.1 of the National Electricity Code, which notes that the market risk premium has averaged 6.6% since 1952.

In recent decisions the ACCC has decided on an MRP of 6%. In its decision "A report on the assessment of Telstra Corporation Limited, Undertaking for the Domestic PSTN Originating and Terminating Access services" (July 2000) it stated (para A4.3.3),

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1 Credit Suisse First Boston reviews a range of papers and submissions in its "Victorian Gas Industry Reform: Weighted Average Cost of Capital for Gascor Successor Entities and Transmission Pipelines Australia," dated 9 April 1998. They state "Market risk premia of 6-7% are commonly applied by practitioners in Australia." They recommend 6.5% "based on industry practice" and cite support for their position.

2 K. Davis, "Comments on the Cost of Capital. A Report prepared for the ACCC," dated April 1999.

"Faced with evidence that the MRP has traditionally lied (sic) within a range of 6 to 7 per cent, and that the MRP may have declined in recent years, the Commission has, on balance, decided to use a premium which lies at the lower end of this range."

The major historical estimates of the MRP in Australia are summarised in table 1 below.

Table 1: Historical estimates of Market Risk Premium

Source	Market risk premium (%)
Officer (1989) (based on 1882-1987)[3]	7.9
Hathaway (1996) (based on 1882-1991)[4]	7.7
Hathaway (1996) (based on 1947-1991)[5]	6.6
NEC (based on 1952-1999)[6]	6.6
AGSM (based on 1964-1995, including October 1987)[7]	6.2
AGSM (based on 1964-1995, excluding October 1987)[8]	8.1

The historic data set out above suggests that a 5.5 to 7.5% range is likely to be conservative, with a range of 6.0 to 8.0% more appropriate. The mid point of this range, just over 7.0% is

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3 R. Officer, "Rates of Return to Shares, Bond Yields and Inflation Rates: An Historical Perspective," in *Share Markets and Portfolio Theory* (2nd ed), 1989 (University of Queensland Press, St Lucia), pp 207-211.

4 N. Hathaway, "Market Risk Premia," unpublished manuscript.

5 Ibid.

6 National Electricity Code, schedule 6.1, section 3.2.

7 IPART, "Regulation of New South Wales Electricity Distribution Networks," section 5.4.2, Table 5.4, December 1999.

8 Ibid.

well above the 6.0% figure that has generally been used by regulators in Australia. If we were to base our estimate of the Australian MRP on historical data, we believe it should be approximately 7%.

In our view, the rate adopted by the regulators is clearly inconsistent with historical data, and is also too low for Australia at this time.

There has been a decline in the *ex-post* MRP in the last decade or so. Table 2, which sets out estimates made by the QCA on MRP for each decade since 1888 shows that the estimate for the last decade is below the historical range outlined above.

Table 2: Estimates of Market risk premium by decade 1888-1997

Period	Mean (%)
1888-1897	6.06
1898-1907	8.87
1908-1917	6.26
1918-1927	11.61
1928-1937	8.40
1938-1947	6.02
1948-1957	7.83
1958-1967	9.60
1968-1977	-0.07
1978-1987	11.82
1988-1997	3.89
	(5.28 if imputation credits are considered with gamma of 0.5)

Source: QCA Working Paper 4, Issues in the Estimation of Queensland Rail's Below Rail Coal Network Expected Rate of Return, December 2000

However, measuring the MRP is extremely sensitive to the period of measurement (eg compare the data for the decade 1978 – 1987 with the subsequent decade in table 2). Accordingly, estimation of MRP requires a data set of at least 20 years and therefore extreme caution should be made in basing regulatory decisions on estimates from short time periods.

Moreover, it will be shown below that a reduction in the *ex post* MRP suggests that the *ex ante* MRP is in fact increasing.

2.2 A benchmark approach

Australia is now an open and international economy. Investment funds move freely into and out of the country and the currency. As of September 2000 non-resident investors owned 37.5% of the value of the Australian Stock Exchange, the largest single shareholder group by far.[9] As of 31 December 2000, non-residents held over 30% of all Commonwealth government securities.[10] The MRP for Australia today and going forward is set in an international market.

The Australian debt and equity markets, until fairly recently, were subject to controls and intervention with little direct influence from international markets. The markets were domestic; foreign investment was not able to flow freely into and out of Australia. In a recent study, Ragunathan found that the Australian stock market was segmented from the world capital markets during the period 1974 to 1983. Over the period 1984 to 1992, Australia was integrated with the world markets. She says:

> *Consistent with expectations, our test indicates that the capital market, segmented prior to deregulation, was integrated in the post-deregulation period.*[11]

The market that existed in Australia prior to deregulation was different to that after deregulation, since market prices (and in turn the MRP) in the pre-deregulation period were significantly affected by government intervention, in particular the restrictions on foreign ownership of shares and exchange rate controls. . This resulted in prices of shares and government bonds being predominantly determined by domestic (rather than international)

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9 Information provided by Australian Stock Exchange. Figures for 19 September 2001

10 Reserve Bank of Australia, "Bulletin Statistical Tables," http://www.rba.gov.au/Statistics/Bulletin/EO3hist.xls

11 V. Ragunathan, "The Effect of Financial Deregulation on Integration: An Australian Perspective," *Journal of Economics and Business*, November 1999, pp 505-514.

supply and demand . Given these circumstances, it is unlikely that the ex-post MRP in this market provides the best estimate of an ex-ante MRP in the current (international) market. [12]

In the absence of sufficient relevant historical information from the current market, we recommend estimating MRP using a benchmarking approach.[13] With this approach, a benchmark country is chosen based upon its having a reliable estimate of MRP available. Then the potential differences between the MRP in that country and the MRP in Australia are evaluated. The benchmark MRP is adjusted for the estimated difference between the two countries to arrive at an estimate of the MRP in Australia.

Using this approach, Australia's MRP can be thought of as being equal to an international benchmark MRP plus a premium for the incremental risks associated with the Australian equity market. We believe the best benchmark country for this exercise is the United States. Contrary to the situation in Australia, the US has been an open economy for virtually all of its existence.

The size of the US equities markets dwarfs every other market in the world. For example, the US equities markets comprise almost 50% of the MSCI.[14] The quantum and quality of evidence and analysis of the US equities markets (and its MRP) exceeds that of all other countries in the world combined. Accordingly, NECG considers that the US equities market should be regarded as the most appropriate benchmark against which to measure risk premiums.

The most common reference for MRP in the US is from Ibbotson Associates, and the most common period is from 1926. For the 75 years 1926 through 2000, the MRP was 9.2%. In a

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12 Although Australian markets have been open to international investment for nearly two decades, that is too short to provide a reliable *ex ante* estimate of MRP. For example, B. Cornell, J. Hirshleifer and E. James ("Estimating the Cost of Equity Capital," *Contemporary Finance Digest*, 1997, p 16) state, "The unfortunate fact is that stock prices are so variable that the risk premium cannot be estimated precisely even with 20 years of data."

13 See R. Bowman ("Estimating the Market Risk Premium," *JASSA*, Spring 2001) for a more extensive discussion of this approach to estimating the MRP.

14 Axiss Australia, The Australian Equity Market (at www.axiss.com.au).

broad based online poll of financial economists, Welch found that the average MRP was 7 to 8% depending on the horizon assumed for the risk-free rate.[15]

In assessing the available literature and evidence, the bounds of a reasonable range for the US MRP are 6% to 9% with a mid-point estimate of 7.5% which is comparable to, but slightly higher than, the mid point of the Australian historical MRP discussed above.

The next step in estimating an MRP for Australia is to consider the relevant differences between Australia and the US. We consider differences in taxation, in equity markets and indices, country risk and estimation time horizons that might cause the Australian *ex ante* MRP to be different from the US MRP.

2.2.1 Taxation

There are many differences in taxation between Australia and the US, notably Australia's dividend imputation system and the US's generally lower tax rates. This is a complex area, but on balance, we do not see a clear case to be made for a difference in favour of either country.

2.2.2 Market differences

The equity markets in the US differ in many ways from the Australian equity market. The Australian market has a larger representation of resource-based companies, which have high levels of systematic risk. The US economy has more high-tech and leading edge companies, but the empirical evidence most commonly used to estimate the US MRP is based upon the Standard & Poor's 500 Index. This index is of a highly diverse set of companies that is not over represented by high-risk companies.

It is well known that small companies earn an average return that is greater than the return estimated using the CAPM.[16] The reasons for this are not all clear, but it is likely to be related

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15 I. Welch, "Views of Financial Economists on the Equity Premium and on Professional Controversies," *Journal of Business*, 2000, pp 501-537.

to some measure of risk that is not captured by the CAPM. The average size of listed companies in Australia is less than in the US. In a recent ranking by *Business Week* (July 9, 2001) of the 1000 largest companies in the world (by market value), Australia had 16 companies, which represented 1% of the market value of the 1000. The US had 485 companies, representing 56% of the total market value. The largest Australian company would have ranked 63rd in the US. Clearly Australia's equity market is significantly smaller and, on that basis alone, would be expected to be higher risk.

The compositions of the two countries' markets are consistent with the MRP in Australia being higher than the US MRP. The question is whether there is a reasonable way to estimate the magnitude of the higher risk in terms of return. An intuitive way to quantify the difference is to think of it in terms of systematic risk. If the firms in the Australian market were listed on an exchange with the S&P 500 firms, the average beta of the Australian firms would be in the range of 1.2-1.5. To convert this to a rate of return, assuming an MRP of 7.5% and applying the beta estimate in excess of one would equal an addition to the benchmark MRP of 1.5 to 3.75%.

2.2.3 Country risk

The incremental risk of a country is often referred to as "country risk". This risk is related to the risk that a government will abruptly alter its policies with respect to investments in the country (including expropriations), shifts in monetary or fiscal policy, regulatory changes, defaults and tax changes. A study by Damodaran based on credit ratings ascribes a premium of 0.65% for Australia over the US.[17]

The literature and empirical evidence support the conclusion that political risk is priced domestically. However, it is likely that the country risk premium is priced in the risk-free

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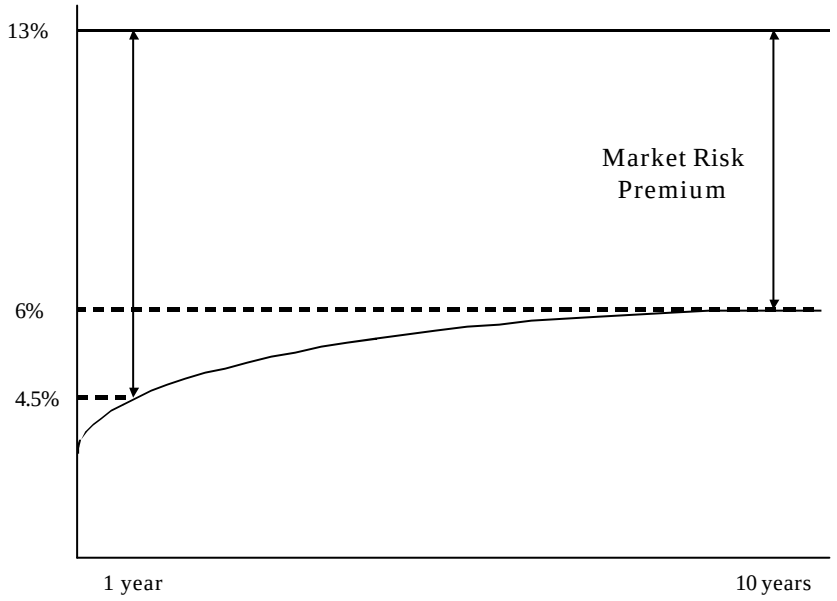
16 Evidence of this is provided for Australia in J. Halliwell, R. Heaney and J. Sawicki, "Size and Book to Market Effects in Australian Share Markets: A Time Series Analysis," *Accounting Research Journal*, 1999, pp 122-137; C. Gaunt, P. Gray and J. McIvor, "The Impact of Share Price on Seasonality and Size Anomalies in Australian Equity Returns," *Accounting and Finance*, March 2000, pp 33-50; and Brealey, R. and Myers, C. Fundamentals of Corporate Finance, 1998

17 See A. Damodaran's website at http://www.stern.nyu.edu/~adamodar/ .

return such that there is no additional premium necessary in the MRP. Our preference is to not add to the benchmark MRP.

2.2.4 Time horizon

Any estimate of an MRP is conditional upon a time horizon. To illustrate this, assume that R_m is 13%, 10-year R_f is 6% and 1-year R_f is 4.5%. This is shown in the figure below.



When the historical measure of MRP is calculated using the 10-year R_f it will be equal to 7%. However, if the estimation is made using the 1-year rate, MRP will equal 8.5%. Obviously it is important to get the appropriate time horizon.

The appropriate time horizon for Australia, including for companies subject to regulation, is generally 10 years. The US evidence on MRP cited above is based upon the difference between equity returns and the returns on short horizon Treasury bills. The MRP estimation

for Australia should be based upon a ten-year risk free rate. For an MRP that reflects a long time horizon the Ibbotson Associates data indicates that there was an average annual return premium of 1.4% over Treasury bills. For a long-horizon MRP estimate such as is appropriate here, this premium should be deducted from the US benchmark MRP.[18]

2.2.5 Summary

To estimate a long-horizon MRP for Australia, the information above is summarised as follows:

- Taxation – no clear adjustment although perhaps a deduction
- Market differences – addition to benchmark of 1.5% to 3.75%
- Country risk – no adjustment although likely an increase
- Time horizon – deduction from benchmark of 1.4%[19]

The above summary indicates an adjustment in the range of 0.1% to 2.35% could be defended. We believe this analysis indicates that a premium over the US MRP of at least 0.3% is necessary.[20] The US MRP is estimated as 7.5% and the premium of 0.3% is added to that.

2.3 Estimate of Market risk premium

The analysis in this section suggests that:

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18 For a short horizon MRP, no adjustment would be necessary.

19 No time horizon adjustment is necessary for a short horizon MRP.

20 There are two separable issues here; the appropriate MRP for the US and the premium over the US MRP that is appropriate for Australia.

- based on historical data, an appropriate range for the MRP is 6.0-8.0% suggesting that the 6.0% adopted by regulators is at the lowest end of a feasible range and that this rate is not supported by the evidence; and
- estimating a benchmarked market risk premium based on international markets suggests that the MRP may be as high as 7.8% on a mid range basis.

Our estimate of the mid point of a benchmarked range is within the range suggested by historical analysis. Given the regulatory precedent for using historic data, and being conservative, we suggest that an appropriate range for the MRP in Australia is 6.0-8.0%, with a mid point of 7.0%.

3 An Argument for a Declining MRP

In this section of the report, we assess the claims of the ACCC that the MRP has been reducing in recent years, which should be reflected in regulatory decisions. In particular, we critique a paper by Dr Tro Kortain, that has attracted the ACCC's attention on this issue.

3.1 Tro Kortian paper

A paper by Dr Tro Kortian, "Australian Sharemarket Valuation and the Equity Premium," argues that "…in a manner very similar to that documented for its US counterpart, the Australian equity premium exhibits a trend decline in the most recent decades." (p 30)

Kortian examines Australian data on equities and bonds over the period 1928 to June 1997. He begins by reporting some equity market statistics for various periods. The first dataset is equity price movements for 15 industrialised countries for the period January 1995 through June 1997. Australia has had the 12th highest price movement of the 15 countries with a return of about 42% over the period. So relative to other major equity markets, Australia has under-performed. Then Australia is compared to the equity price movements in the US and UK over the period January 1984 through June 1997. Again Australia has under-performed, particularly over the last three years. Next the dividend yield and price-earnings ratio of the Australian sharemarket is analysed over the period January 1973 through June 1997. This show that the dividend yield is slightly below the average and the price-earnings ratio is above the average at June 1997. The values at June 1997, compared to the fifteen

industrialised countries, rated Australia second highest in dividend yield (at 3.4%) and eighth highest in price-earnings ratio (at 19). Overall this data indicates Australia is fairly average compared to either its historical average or to other industrialised countries as to dividend yield or price-earnings ratio, but its share price performance has been relatively low.

In the next section of his paper, Kortian applies a dividend discount model framework to value the Australian sharemarket. He is forthright in stating the serious limitation in this approach, both in terms of the model itself and the parameter estimates needed to employ the model. To estimate the equilibrium dividend yield, the model requires estimates of the real long-bond yield, the real dividend growth rate and the MRP. From this analysis, he estimates that the MRP for Australia at June 1997 is about three percent.

The Australian MRP is analysed in the next section of the paper. Over the period 1928 though 1996, the Australian share accumulation index has had an annual, nominal compound[21] return of 10.54%, which compares to a comparable return of 6.45% for the Australian bond accumulation index. It is also shown that the share index has been more volatile than the bond index. Using twenty year moving averages, it is shown that the equity return is always above the bond return, with the difference ranging from 2 to 9%. Also, both moving averages have risen sharply between about 1993 and 1996. The spread between the two moving averages has declined from about 7% in the early 1970s to about 3% at the end of 1996. The moving average also has declined from the late 1980s. Kortian goes on to show that as the period of the moving average shortens, the volatility increases, and at one year equities only outperform bonds 56% of the time. The result that equities appear less risky as the averaging period increases is no surprise and, in fact, is a mathematical artefact of the averaging. Finally, he comments that Australian real equity returns exhibit mean reversion. That is, if a return in one period is different from the mean (i.e., average), the return in the following period is likely to be closer to the mean (i.e., the return will tend to revert to the mean return).

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[21] The compound measurement uses geometric averaging, while the arithmetic average is generally agreed to be more relevant to setting WACC for a company. The geometric average will always be lower than the arithmetic average and generally by about two percent in applications such as here.

In the final empirical section, factors are investigated that are possible explanations for the observed movements in the MRP. Kortian considers four factors: perceptions of declining riskiness of equities, increasing importance of institutional investors, inflation and changing demographics of investors.

Kortian show that there has been a marked increase in the percent of younger workers (35-54 years) in the work force, relative to older workers (55-64 years). He then asserts that younger workers have longer investment horizons, and hence they will consider equity securities as lower risk than older workers. He bases this on his earlier analysis that shows the risk of equities relative to bonds declines as the moving average period increases. He then concludes that MRP should be declining because of the demographic shift to younger workers. He uses this conclusion to support the validity of his empirical evidence on MRP in earlier sections.

The next factor is based on distortions that may have been caused by the 1929 Crash and the Great Depression. He cites an article on US equities[22] that suggests that the high volatility and uncertainty of the depression period created high perceived riskiness of equities that gradually dissipated, leading to a declining MRP in the US. However, Kortian notes that the US analysis has little relevance to Australia, and in fact a similar analysis may support an opposite interpretation. This is because the volatility of the Australian stockmarket shows a clear upward trend from about 1932 until about 1990 (his data only goes to 1996). Even in the period from about 1990 to 1996, volatility is substantially higher than either prior to the depression or up to about mid-1960s.

In considering the effect of inflation, Kortian states that high inflation tends to be associated with high MRP. In other words, the two are positively correlated. He also shows graphically that this has been the case in Australia for the period 1974 through 1996. Since he expects inflation to remain low for the foreseeable future, he believes this is consistent with the low MRP, which he supports.

The final factor that Kortian discusses is the increasing role of institutional investors in the equity market. He provides data to support that institutional investors have an increasing

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22 O. Blanchard, "Movements in the Equity Premium," *Brookings Papers on Economic Activity*, 2, pp 519-543.

share of equities and speculates that their role will continue to increase. He then posits that by their nature, institutional investors have long time horizons. As he stated earlier, he considers that a long time horizon is consistent with a low MRP.

In conclusion, Kortian presents evidence consistent with an ex post low MRP of about 3%. He then discusses factors that could influence MRP and concludes that on balance these factors support a low MRP.

3.2 A Critique of Kortian's analysis

Rather than go through each section of Kortian's paper, we will comment upon four points that are critical to his analysis and conclusions. These comments are also relevant to a broader critique of the body of literature that argues that MRP is declining. However, a comprehensive critique of arguments for a declining MRP is beyond the scope of this section.

The estimation of the MRP is one of the most important issues in financial management. It is also a topic that can seem fairly straightforward, but is actually very complex. Perhaps because of the combination of importance and complexity, an active area of literature in financial economics has developed around the estimation of the MRP. In addition to the paper by Kortian, there are many articles and working papers for other countries, in particular for the US.[23] It is interesting that the empirical research seems to have been fuelled in the US by the high equity returns of the 1990s. The recent downturn in the stock market has moderated the interest in the area, but we agree that this remains a very important issue that warrants discussion.

The areas upon which we will focus in this brief critique are:

1. use of historical data,
2. ex ante v ex post measures,

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[23] For a recent paper arguing that MRP has declined, see E. Fama and K. French, "The Equity Premium," University of Chicago working paper, April 2001. A recent rebuttal to the declining MRP view, see R. Ibbotson and P. Chen, "The Supply of Stock Market Returns," Yale School of Management working paper, June 2001.

3. interpretation of demographic information, and

4. the relevance of the marginal investor.

In closing we will consider recent developments subsequent to Kortian's data and paper.

Our first difficulty with Kortian's analysis is our view expressed above that historical market data in Australia is of questionable relevance to a forward looking MRP. We know that data prior to about fifteen years ago was the result of a domestic market that was subject to periods of government intervention, whilst the current and forward-looking markets are international. We simply do not know whether an analysis that relies upon data going back to 1928 (or even 1974) is useful, but we doubt it. At a minimum, the burden of proof of relevance should be on anyone who wants to use the historical data for forward-looking purposes.

A major problem with the study of MRP revolves around the distinction between *ex post* (i.e., historical) data and *ex ante* (i.e., expectations going forward) data. An example will show how the relationship between the *ex post* and *ex ante* MRPs may be moving in opposite directions.

Assume a simple market that is expected to earn $100,000 of cash flow to distribute to shareholders as a dividend in perpetuity (so we are assuming no growth). If the risk free rate of interest is a constant 3% and the *ex ante* MRP is 7%, the cost of equity capital is 10%.[24] Since the earnings is a perpetuity, the value of the market is the earnings divided by the cost of equity capital:[25]

Value of the market = $100,000 / 10% = $1,000,000

If the parameters of the valuation do not change, the value of the market will not change, and the annual return to the shareholders will be the perpetuity. As time passes the *ex ante* MRP of 7% will also be observed as the *ex post* MRP.

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[24] Since I am assuming this is the market, it is not necessary to know the beta. Alternatively it could be assumed to be a company with a beta of one.

[25] This is the Discounted Dividend Model used by Kortian in his section 3.

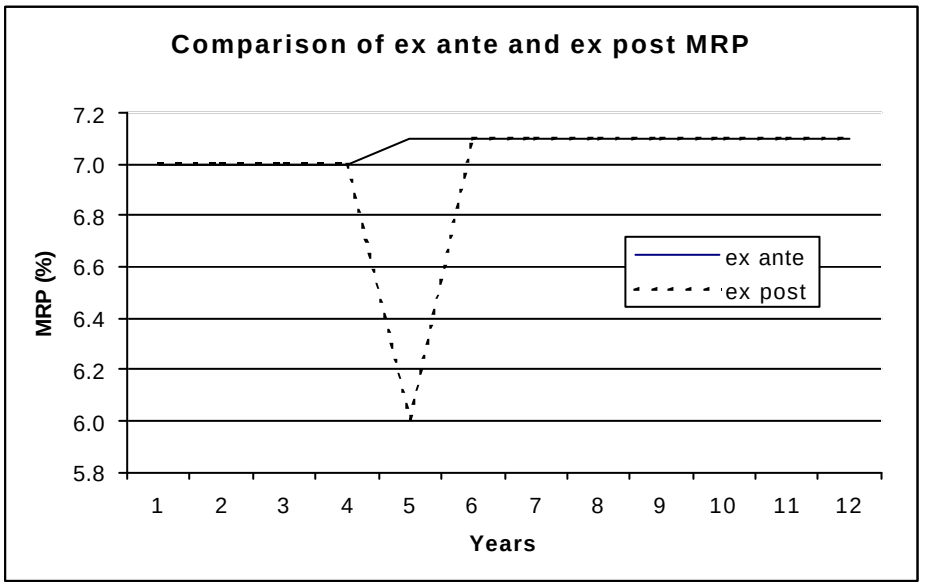
Now assume the *ex ante* MRP increases to 7.1% over the course of a year. By the end of the year the cost of equity capital will be 10.1%, and the value of the market will be

Value of the market = \$100,000 / 10.1% = \$990,099

During this year the shareholders will realise a return by dividend of \$100,000 but a loss of value of the investment of \$9,901 (\$1,000,000 - \$990,099) for a net return of \$90,099 on the investment of \$1,000,000. This gives the shareholder an ex post return in this year of 9.01% and an MRP after deducting the risk free return of 6.01%.

If in the subsequent year the *ex ante* MRP remains at 7.1%, the value of the market will not change and the *ex post* MRP will also be 7.1%.

This example illustrates three important facts about the behaviour of *ex post* and *ex ante* MRP (*ceteris paribus*). First, if the *ex ante* MRP is constant, the *ex post* MRP will also be constant and equal to the *ex ante* MRP. Second, an increase (decrease) in the *ex ante* MRP will result in a decrease (increase) in the *ex post* MRP in the period that the change in expectation occurs. In the period when the *ex ante* MRP is changing, the *ex post* MRP will move in the opposite direction. Third, a small movement in the *ex ante* MRP can cause a much larger impact on the *ex post* MRP. In the example above, an increase of only 0.1% in the *ex ante* MRP results in a decrease in the *ex post* MRP of 0.99% (7% - 6.01%). Fourth, the ex post MRP moves down and then up before settling on the new equilibrium. The ex ante MRP moves directly to the new equilibrium. This can be seen in the graph below.



Taking the third point above, consider a case where the *ex ante* MRP declines gradually from 7% to 4% over a period of ten years. That would seem to be a very gradual change in the MRP. Using the same assumptions as above, the *ex ante* decrease of 3% will decrease cost of equity capital to 7% and increase the value of the market to $1,428,571. The *ex post* MRP over the ten years will be 9.4%. For the *ex ante* MRP to drop from 7% to 4% over ten years, the *ex post* MRP would have to be observed at an average 9.4% over the same ten year period!

Now conversely consider a case where the *ex ante* MRP increases gradually from 7% to 10% over a period of ten years. That is a very gradual change in the MRP, averaging only 0.3% per annum. Using the same assumptions as above, the *ex ante* increase of 3% will increase cost of equity capital to 13% and decrease the value of the market to $769,231. The *ex post* MRP over the ten years will be 5.44%. For the *ex ante* MRP to increase from 7% to 10% over ten years, the *ex post* MRP would have to be observed as decreasing, averaging about 5.44% over the same ten year period.

The point of these illustrations is to put Kortian's figure 4.4 in a context. His data shows the ex post MRP declining over the decade to 1996. However, this is completely consistent with the forward-looking MRP increasing, perhaps substantially. In fact, in the US, the very high returns and *ex post* MRP in the stock market over much of the 1990s was used to support arguments that the *ex ante* MRP was declining. The key point is that a period when the *ex post* MRP departs significantly from the long run average is likely to be a period when the *ex ante* MRP is changing but in the opposite direction.

As we said above, the issue of MRP is complex and the examples above are simplistic. In particular, we have assumed that the expectations of future earnings and dividends are constant and the risk free rate also does not change. These will not often be the case. For example, in the illustration where the ex ante MRP increases from 7% to 10%, the critical rate is the cost of equity, which increases 3%. If the risk free rate itself increased by 3%, the same result would be reached with no change in the MRP.

The third point in Kortian's paper that we will discuss is the implications of changing demographics for the MRP. Specifically, Kortian argues that the shift to a younger working population is consistent with a lower MRP. This argument is founded on the notion that younger workers have longer investment horizons, and the longer the investment horizon, the lower is the risk of equity investments relative to government bonds.

For this discussion it is important to be made clear about what is meant by investors' investment horizon. There is little dispute that investors will primarily be accumulating wealth until retirement. From retirement onward, investors on balance may be disinvesting, particularly those who have not saved enough to live off of the income produced by their accumulated wealth. With this understanding of investment horizon, the younger the person, the longer the investment horizon.

An alternative perspective on investment horizon is the holding period of a specific investment. From this perspective, it is not at all clear that younger investors have longer investment horizons. In fact, although we do not yet have Australian data on this issue, we suspect that the holding period of younger investors is actually shorter than that of older investors. If that is correct, the shifting demographics may support a higher MRP.

The holding period of specific investments may not be the best perspective. It can at least be argued that the best perspective is the holding period of equities versus alternative forms of investment (bonds, property, etc.). However, even from this view, we suspect that younger investors change their asset allocations among asset classes more often than older investors.

Kortian bases his argument of an increasing proportion of younger investors from data from the 1997 ASX Shareownership survey that showed, between 1991 and 1997 an increasing proportion of younger age groups and a reducing proportion of older age groups holding shares. However, the data since 1997 shows a different trend. The ASX's most latest survey (2000) conducted in November 1999, shows that between March 1997 and November 1999 the proportion of the population holding shares increased almost two-fold for all age cohorts, both young and old. Furthermore, in its update to the survey in February 2001 it noted a large decline in the proportion of younger age groups holding shares, while those for the older age groups either remained constant or increased.

This is demonstrated by a comparison of the percentage of the population holding shares between the two data sets:

- 18-24 reduction from 22 to 18%
- 25-34 reduction from 39 to 31%
- 35-44 reduction from 48 to 46%
- 45-54 - no change (46%)
- 55+ - increase from 41 to 42%

In a final point we will make with respect to changing demographics, it is commonly accepted that younger investors will be more willing to accept risk than older investors. It would then seem that a shift to younger investors would be a precursor of an increase in MRP.

There are additional implications of demographic shifts that could be discussed, and again the analysis is complex. In our view, the shift to a younger work force does not provide any clear indication of changes in MRP. We would add that this is an interesting issue and one where further study is warranted.

The fourth point that we wish to make is related to the issue of demographic shifts discussed above. It is accepted by most financial economists that in a competitive market, security prices are set by the marginal investors. Not all investors in a market have a discernable influence on security prices. Even more so, investors that simply buy and hold, with little or no transacting, will not influence security prices. Therefore, it is potentially misleading to discuss the risk preferences or investment horizons of any group of investors. If they are not a part of the marginal investors, they will not be impacting on security prices and hence will not have any relevance to the *ex ante* MRP.