KPMG

# Equity Market Risk Premium - Research Summary

20 July 2016

# Introduction - welcome

If you are reading this, it is likely that you are in regular contact with KPMG on the topic of valuations. The goal of this document is to provide a summary to our business partners about our recent observations and conclusions regarding one of the key valuation parameters, the equity market risk premium.

Based on the analysis conducted, we recommend to use an equity market risk premium of 6.0% as per 30 June 2016.

Please note that this is a summary document only. Should you require more detailed information on the exact methodologies used to derive the equity market risk premium, please do not hesitate to contact us directly at any time.

With regards,

KPMG Valuations in the Netherlands


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# Introduction - valuation and discount rates

## Introduction

The discount rate is an important input parameter to any valuation based on the discounted cash flow methodology ("DCF").

A general DCF model can be expressed by the following formula:

$$\text{Present value} = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \ldots = \sum_{t=1}^{\infty} \frac{CF_t}{(1+k)^t}$$

Where

| | | |
|---|---|---|
| Present value | = | value of the analysed asset (e.g. a company) |
| $CF_t$ | = | cash flow that the asset will generate in period t |
| k | = | asset-specific discount rate |

It is generally true that, all else equal, a higher discount rate will lead to a lower asset value and vice versa.

In this document, we will specifically focus on the derivation of the cost of equity for company valuations. This discount rate can either be directly applied to equity cash flow forecasts of a company or it can be used in conjunction with the cost of debt and a certain financing structure to derive the weighted average cost of capital ("WACC").

## Discount rate derivation

While there are several ways to derive discount rates, the most commonly applied methodology is the 'build-up methodology' based on the Capital Asset Pricing Model ("CAPM"). This methodology builds up the discount rate by summation of several asset-related risk components in order to derive a return at which investors are willing to invest in this asset (e.g. a company).

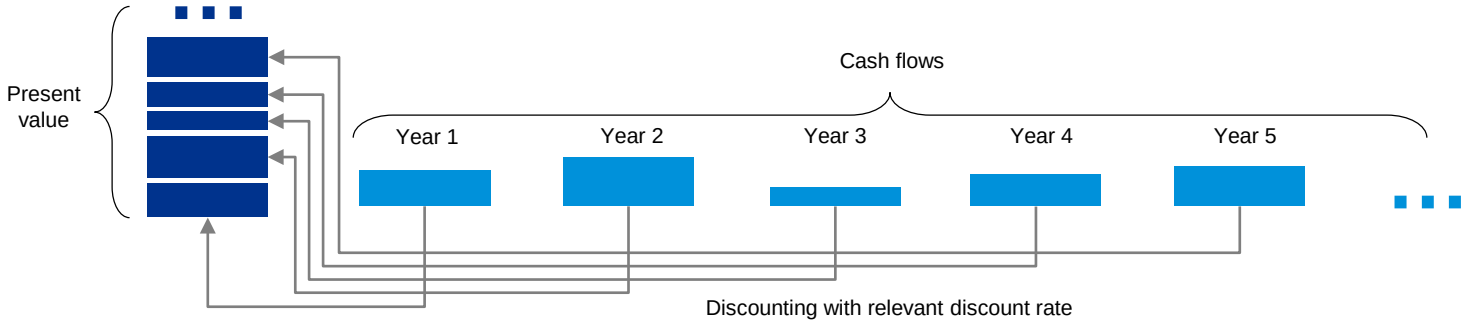
The build-up of the cost of equity ("k") of a company can be expressed as:

$$k = rfr + \beta \times MRP + \alpha$$

Where

| | | |
|---|---|---|
| k | = | required return on equity |
| rfr | = | risk-free rate |
| β | = | a company's systematic risk |
| MRP | = | market or equity risk premium |
| α | = | asset-specific risk factors |

The function and derivation of the individual discount rate parameters are briefly discussed on the following slide.



# Introduction - discount rate parameters

## Risk-free rate

The risk-free rate forms the basis for any discount rate estimation using the build-up methodology. As the name implies, this rate should not take into account any risk factors. Thus, it should only include two general components:

— The time value of money; and

— Inflation.

Since there are no investments that are truly risk-free, the risk-free rate is commonly approximated by reference to the yield on long-term debt instruments issued by presumably financially healthy governments (e.g. AAA-rated government bonds with a maturity of 30 years).

## Beta

Beta measures how the returns of a certain company behave in relation to the returns of the relevant market benchmark.

— A beta greater than 1.0 means that the share price of a company is more volatile than the general market and therefore investors will require a higher return as compensation for this volatility; and

— A beta smaller than 1.0 means that the share price of a company is less volatile than the general market and therefore investors will require a lower return.

It is important to note that for the overall market, beta will by definition always be 1.0, since the sum of all returns of individual stocks equals the overall return of the market, and therefore, the two are perfectly correlated.

## Alpha

Alpha is an asset-specific adjustment factor that may need to be applied for a number of different reasons. If a financial forecast does not account for certain operational risks, it may be appropriate to include a forecast risk premium. Other examples of alpha adjustments are size premia, illiquidity premia, etc.

## Equity market risk premium

The equity market risk premium ("MRP") is the average return that investors require over the risk-free rate for accepting the higher variability in returns that are common for equity investments.

As previously discussed, the beta of the overall market is 1.0. Since alpha only relates to company-specific adjustments, it can be omitted if considering the overall market. As such, the general formula for the cost of equity is simplified if the overall market is considered:

$$k = rfr + \beta \times MRP + \alpha$$

$$k = rfr + 1.0 \times MRP + 0.0$$

$$k = rfr + MRP$$

As the final formula shows, the required return for the overall market is defined entirely by the risk-free rate and the equity market risk premium.

The remainder of this document will focus on movements in the equity market risk premium and the appropriate adjustments to derive valuation outcomes that are in line with other valuation-relevant market observations.

# Development of discount rates

## Recent developments

As stated earlier, the equity market risk premium can be seen as the difference between the implied equity returns and the risk-free rate.

In the upper graph the interest rate movements for a number of highly developed markets are displayed. As can be observed, the interest rates have decreased significantly again the last two quarters, resulting in a historically low yield as per 30 June 2016.

The lower graph shows the movement in the implied equity returns for a number of major equity markets over time. As can be seen, implied equity returns continued their decrease from the previous quarter, with further decrease in growth expectations putting additional pressure on implied returns.

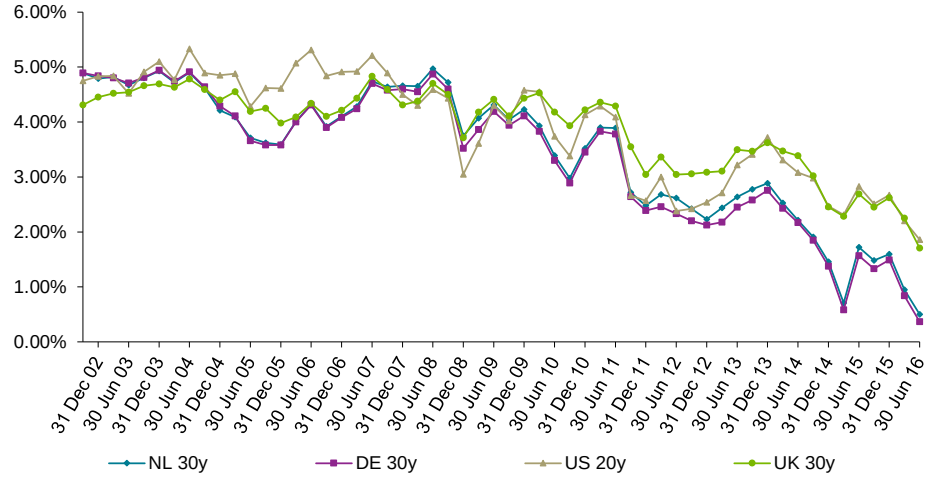
However, the decrease in the implied equity returns was smaller than the decrease in risk free rates, indicating that the market risk premium has increased in the last quarter.

## Comparison to pre-crisis levels

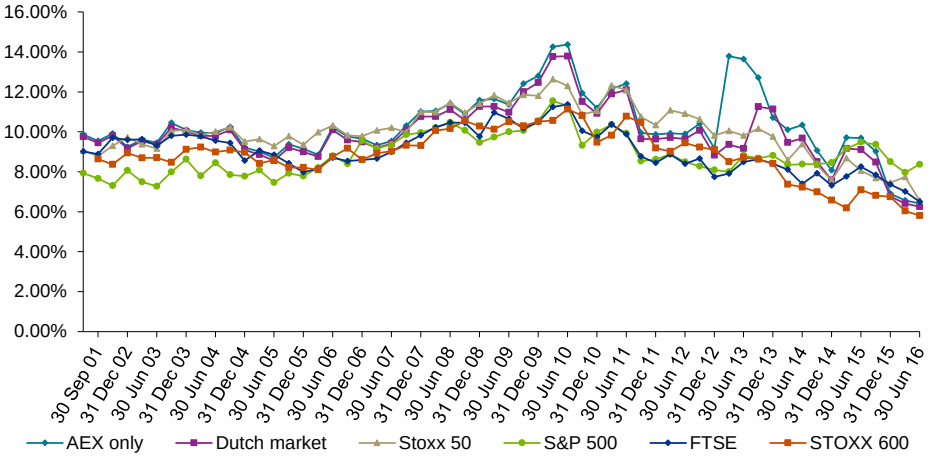
The spread between the implied equity returns and the risk-free rates was comparatively lower in the period before the crisis as compared to more recent times. A possible explanation is that before the crisis the perceived market risk was lower, as demonstrated by relatively more stable expected equity returns and higher government bond yields.

Other evidence for a higher equity market risk premium compared to pre-crisis levels can be found in yields on government bonds having been lower than expected inflation rates at certain points in time. This implies that the risk aversion of investors has increased ('flight to safety'), accepting zero or negative real returns in order to protect against significant capital loss.

### Yield on long-term government bonds




### Implied equity return



# Measurement of the equity market risk premium - methodologies

## Quantification

In order to quantify the change in the equity market risk premium, a number of methodologies can be applied.

## Historical observation methodology

This methodology assumes that the expected equity market risk premium can be derived by studying historical equity returns.

While this methodology is well established and theoretically sound, it does not allow for the incorporation of the most recent market developments:

- Depending on the methodology, annual short-term swings (e.g. 1-3 years) may be insignificant in the long-term (e.g. 30 years); and
- If the expected equity market risk premium increases because investors require a higher return, market data will show lower realised returns, and thus a lower historical equity market risk premium would be derived. For this reason, short-term observations based on historical data only are not conclusive.

So while historical research can be important to derive reasonable equity market risk premium ranges, historical observations are not necessarily a robust methodology to determine changes in the equity market risk premium.

## Implied equity market risk premium methodology

This methodology derives the equity market risk premium by assessing current income, growth expectations and current prices. The general DCF formula discussed earlier can then be used to solve for the implied discount rate that reconciles these parameters.

Deducting the risk-free rate from this implied discount rate will yield an implied equity market risk premium.

This methodology is also well established and theoretically sound, and it does allow for the incorporation of the most recent market developments.

The implied equity market risk premium methodology is to some extent sensitive to input assumptions and careful consideration must be given to:

- The selection of income proxies (e.g. dividends, buy-backs, cash flow);
- The basis of expected growth rates (e.g. macroeconomic considerations, analyst forecasts); and
- The trade-off between outcome stability and current relevance with regards to certain historical inputs (e.g. dividend yield normalisations, payout ratios).

## Other methodologies

There are a number of other prominent methodologies which may lead to additional insights, the most common being:

- The multi-factor model;
- The yield spread build-up; and
- The survey approach.

While each of these methodologies offers some unique advantages, the application of these methodologies involves similar tradeoffs as the ones between the historical and the implied equity market risk premium methodology.

## Methodology KPMG

We deem the implied equity market risk premium methodology the most appropriate methodology in order to derive changes in the equity market risk premium as a result of the financial crisis, because it incorporates recent market developments, expectations, and it can be logically deduced from observable market data.

On the following page we present our findings based on the application of the implied equity market risk premium methodology.

# Equity market risk premium: 6.0%

## Findings

Based on the application of the implied equity risk premium methodology, we have derived market risk premia for several developed markets for the last 15 years.

Since markets fluctuate on a daily basis and there are some differences between market risk premia in different regions, it is difficult to mathematically derive one single point estimate for a universal equity market risk premium for all developed markets.

Similar to the determination of the input parameters, interpretation of the outcomes of the implied equity market risk premium methodology does require an element of professional judgement.

As previously mentioned, the decrease in risk free rates was greater than the decrease in implied equity return, indicating an increase in the equity market risk premium.

## Equity market risk premium KPMG NL

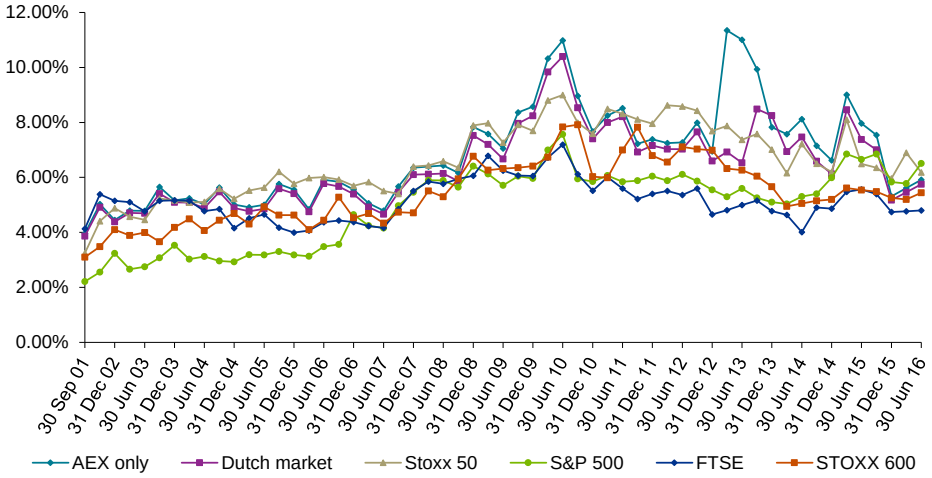
Based on the analyses set out in this report, KPMG Netherlands recommends to use an **equity market risk premium of 6.0%** as per 30 June 2016 (increase of 0.25% from the previous quarter).

We note that our estimation is based on information available as at 30 June 2016. Developments in the financial markets after 30 June 2016 can have an impact on the perceived market risk which is not reflected in the MRP estimate as at 30 June 2016. For instance, the currently observed impact of the potential Brexit may lead to further changes in the perceived risk in the market.

As a general comment, we would like to point out that individual input parameters for a discount rate calculation should never be assessed in isolation.

Furthermore, as mentioned the decrease in implied equity return appears to be accompanied by a decrease in expected growth rates, which should also be taken into account in value analyses.

### Implied equity risk premium




## Cross check

In order to assess the reasonableness of the outcomes of our implied equity market risk premium study, we have considered various other methodologies as previously described. To the extent that these methodologies are valid to derive insights about the current level of the equity market risk premium, these methodologies have confirmed our findings.

The valuation outcomes based on the DCF methodology and a equity market risk premium of 6.0% are in line with outcomes of alternative valuation indicators, such as market and transaction multiples as at 30 June 2016.

# Appendix

| KPMG NL - Historic MRP | |
|---|---|
| | **KPMG estimate** |
| 30 Jun 16 | 6.00% |
| 31 Mar 16 | 5.75% |
| 31 Dec 15 | 6.00% |
| 30 Sep 15 | 6.25% |
| 30 Jun 15 | 6.25% |
| 31 Mar 15 | 6.25% |
| 31 Dec 14 | 6.00% |
| 30 Sep 14 | 6.00% |
| 30 Jun 14 | 6.00% |
| 31 Mar 14 | 6.00% |
| 31 Dec 13 | 6.00% |
| 30 Sep 13 | 6.00% |
| 30 Jun 13 | 6.50% |
| 31 Mar 13 | 6.50% |
| 31 Dec 12 | 6.50% |
| 30 Sep 12 | 6.50% |
| 30 Jun 12 | 6.50% |

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