# Market risk premium

## An assessment of equity risk premium in India – Determinants and estimation

January 2019

# Foreword

Incwert Advisory Private Limited ("Incwert") is pleased to introduce its paper on risk premium in India. As a valuation specialist firm, we recognize that valuation is a constantly evolving discipline that requires extraordinary inputs derived from practical insights and theoretical advances in the subject.

The changing regulatory environment in India has led to valuation becoming a subject requiring intervention across several areas. Accordingly, it is extremely vital for valuation practitioners to be able to assess the risk in the underlying business appropriately. In this paper, we explore the quantum of equity risk premium which could be considered as appropriate when determining cost of equity while utilizing capital asset pricing model. In addition, this working paper also focuses on the impact that macro-economic factors have on equity risk.

Determining the appropriate equity risk premium is the central theme of any valuation exercise. Especially, with widespread reliance on discounted cash flow as a preeminent method of valuation, it becomes even more important to understand the drivers of equity risk premium, also referred to at times as 'market risk premium'.

In India, valuation experts typically consider 5-10% as a reasonable market risk premium. In this paper we present quantitative analysis to derive the current equity premium under different approaches including historical premium, survey approach, country bond default spread approach, country bond default spread approach adjusted for relative country risk, domestic market volatility relative to a developed market, and implied equity risk premium.

Interestingly, the outcome under each approach is remarkably tight ranged. Based on the analysis our outcome, **we recommend the use of an equity market risk premium of 7.6% to 8.4% as of January 2019.**

This paper is the first of a series that will be issued by Incwert. We trust that you would find these of interest.

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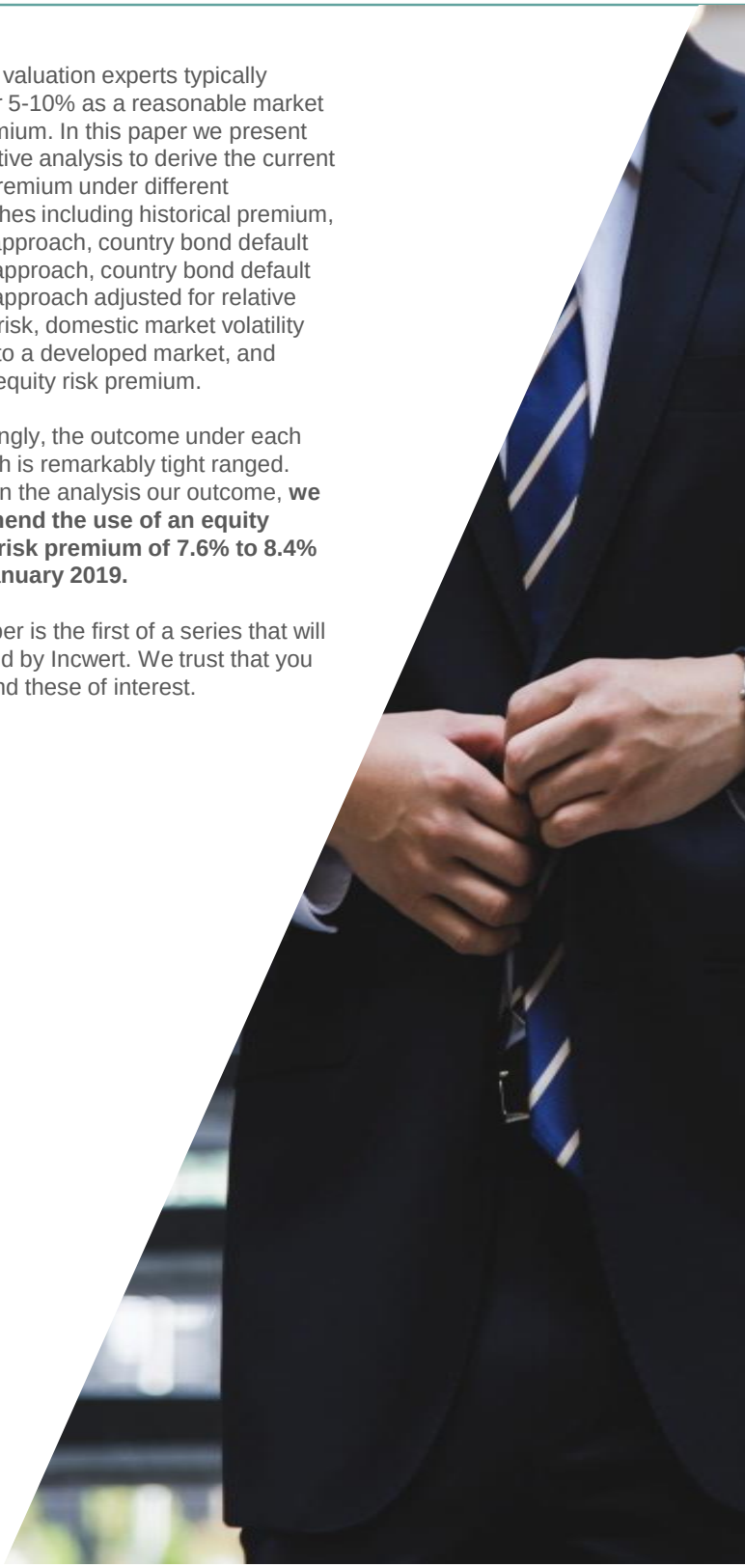
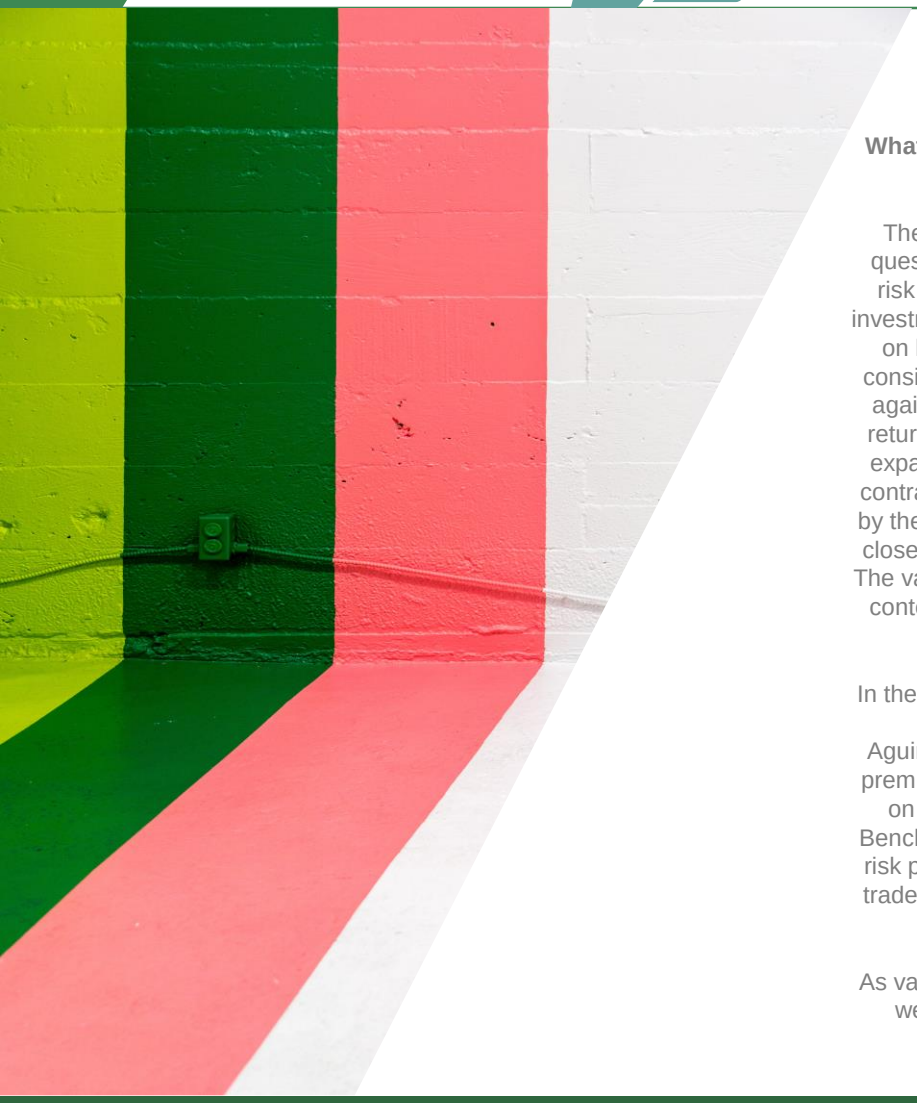
This paper reflects the views of the authors and not necessarily those of Incwert.



# Analysis in brief



**What should be the relevant risk premium in India?**

There is no direct or objective answer to this question, investors may have to ascertain their risk appetite depending on the purpose of the investment. Since strategic investors tend to focus on long term synergistic benefits, they would consider a long term horizon and weigh benefits against their internal hurdle rate or the desired return on investment (RoI) while evaluating any expansion plan or business acquisition. On the contrary, time sensitive investments such that as by the private equity investors appear to be more closely linked to the recent market performance. The valuation expert may particularly focus on the context of the investment while deciding on the equity market risk.

In the graph below, we present the outcome of a) Survey by Pablo Fernandez, Javier Aguirreamalloa and Pablo Linares, b) Historical premium i.e. historical returns earned in the past on Sensex stock relative to risk free rate, c) Benchmark premium based on US market equity risk premium, and d) Implied premium based on traded price of debt, equity or other credit/equity derivatives.

As valuation practitioners and business partners, we trust that you will find these of interest.

**Equity risk premium for Indian market – January 2019**


*Note: The size of the bars reflect the comparable ERP (mean) +/- 5%*
*Source: NSE & BSE website and other publicly available information; Incwert analysis.*

# Contents



# 1. Introduction

## Overview

Determining the right equity risk premium (ERP) is the central theme of any valuation exercise. Especially, with widespread reliance on discounted cash flow as a preeminent method of valuation, it becomes enen more important to understand the drivers of market /equity risk premium.

In India, analysts and valuation experts typically consider 5-10% as a reasonable market premium. However, there is limited availability of reliable quantitative analysis to back these numbers. Through this working paper, an analysis of plausible equity premium under different approaches has been done. Approaches considered are as follows:

- Historical premium,
- Survey approach,
- Country bond default spread approach,
- Country bond default spread approach adjusted for relative country risk,
- Domestic market volatility relative to a developed market, and
- Implied premium approach

Interestingly, the outcome under each approach is remarkably tight ranged. Based on our analysis, we recommend the use of an equity market risk premium of 7.6% to 8.4% as of January 2019. In addition, this working paper also analyses the impact that macro-economic factors have on the equity risk.

## Risk and return relationship

Before we move forward with this discussion, it is important to understand the relationship that risk shares with return on investment. Analysts face this daunting task of determining acceptable level of risk of investment in an asset. Certainly, there is no straight answer to this question. Risk appetite for every individual varies depending on his level of risk aversion, need, comfort and consumption preference. The risk and return trade-off play a very important role in deciding the exposure that an investor is willing to undertake.

## Risk and return relationship (contd.)

Since it is a natural instinct to ask for a higher return on a riskier asset as compared to a safer asset, this leads us to a simple interpretation:

Expected return = risk free rate + risk premium

Despite the simple argument that we have presented above, it is practically difficult to measure the premium that determines the return that compensates for a given risk. Although, theoretical assessment is still possible by applying asset pricing approaches such as capital asset pricing model (CAPM), arbitrage pricing theory and Merton's portfolio problem. Note that the central theme in all the said methods is the same – equity risk premium.

Let us examine the equity risk premium in William Sharpe's CAPM, which despite several modern approaches that are available is still the most popular amongst finance professionals due its simplicity and ease in determining the expected return, a close proxy to real life return expectation.

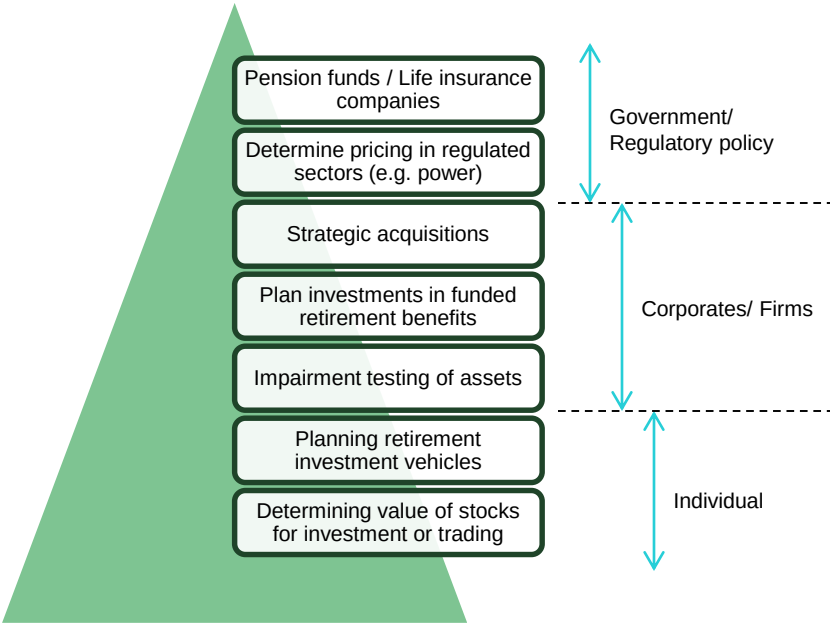
**Capital asset pricing model:**

Expected return $_{asset}$ = risk free rate + $\beta_{asset}$ (equity risk premium $_{market}$)

- where, beta ("β") represents asset's sensitivity to market risk/systematic risk, which is non-diversifiable and
- equity risk premium is the difference between the expected market rate of return on average risk asset and the risk-free rate of return.

The closest substitute of an average risk asset is a market portfolio. In Indian context, it would be a portfolio that comprises all the National Stock Exchange (NSE) traded securities in proportion to their market value. However, real-world evidences suggest that stock prices keep changing and accordingly it is practically not possible to hold a portfolio whose asset weights remain the same at two different points in time. In this paper we have relaxed this assumption by choosing market index (NSE Nifty) as a representative of average risk asset.

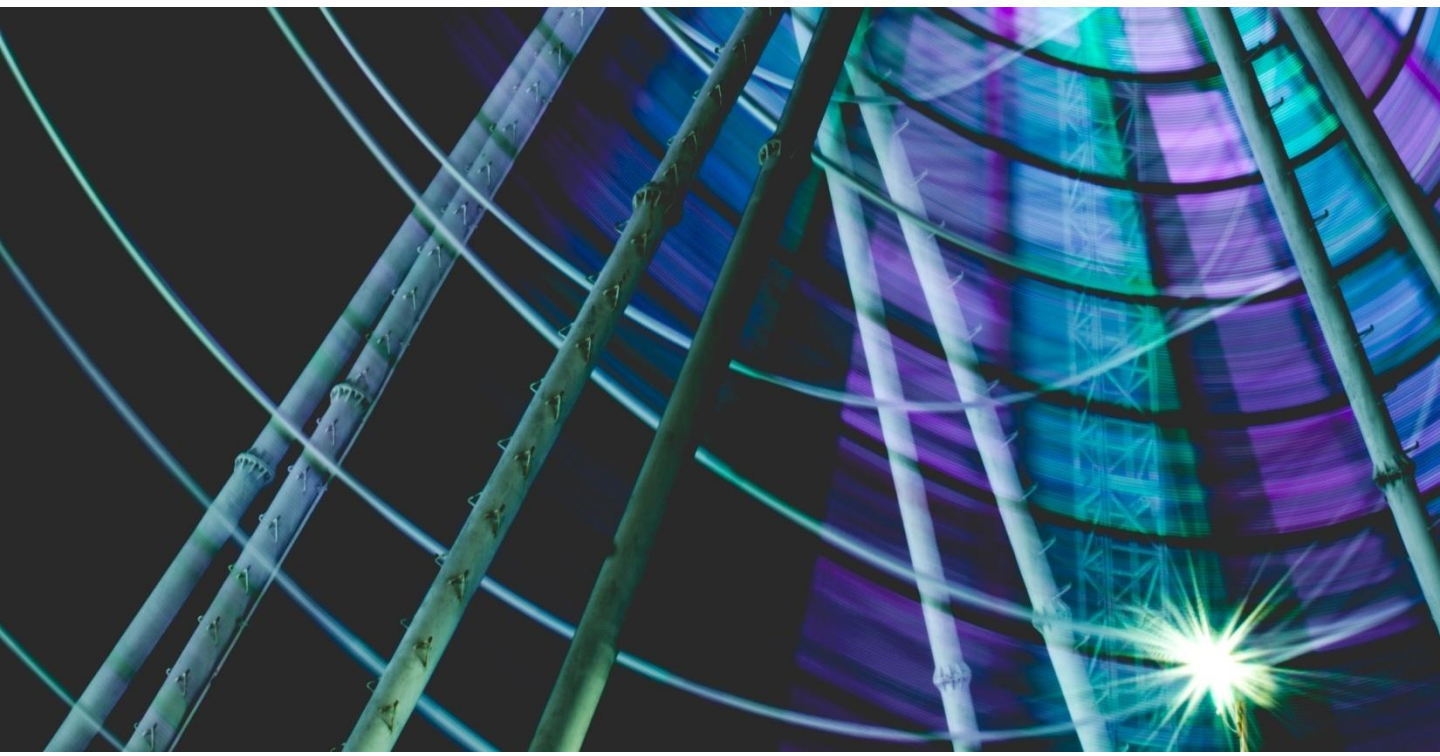
# 1. Introduction – role of risk premium in real-life




### Chalk up the right risk premium in expected return

The theoretical expected return, based on a given risk-free rate and risk premium, which is used by corporate finance professionals and valuation experts to determine the fair value of an asset has far reaching implications. Let's examine a case of an equity analyst who ends up issuing a buy-side rating on a stock that is already overvalued. It is quite possible that he may have wrongly assessed the risk premium to be less than actual and accordingly, would have discounted the earning or cash-flows by a lower than actual expected return.

While it is easy to overlook this one-time error in stock rating, it may be difficult to do so in case of critical regulatory policy or investment decisions such as strategic acquisitions where monetary interests at stake are fairly high.



# 1. Introduction – role of risk premium in real-life

## Government/ Regulatory policy

Pension funds that offer defined benefits would typically invest their moneys into equities to meet their future obligations. The question – how much money should be set aside for such an investment is determined by the pension fund manager's expectation of return from the equity markets.

**Example:**
Pension administrator invested INR 10 million in the year 2018 assuming annualised return of 20% (i.e. risk-free rate of 7% + risk premium of 13%) in a index fund that replicates the portfolio of NSE Nifty. However, actual return delivered by market over next one year is only 12%, thereby resulting in lower fund assets which would be inadequate to meet the fund liability. This is a classic example of overestimating the implicit risk premium and then underinvesting in assets.

In India the National Pension System (2004) is a defined contribution plan which does not offer assured benefits, and allows the individual contributor to decide where to invest his money. The future benefits fluctuate on the basis of earnings.

Tariff for sectors such as power, toll road, railways and other utilities is usually regulated with a view of safeguarding consumer interest and ensuring recovery of charges in a reasonable manner. The regulatory authorities that determine such 'reasonable' prices base them on normative assumptions that such companies should earn a fair rate of return on their investments. To derive fair rate of return they need to determine the right equity risk premium.

**Example:**
In India, Central Electricity Regulator Commission (CERC) considers return on equity (RoE) amongst factors (such as interest on loan, depreciation, operating & maintenance cost, and interest on working capital) as components of fixed charges, and the tariff or the recovery rate is determined accordingly.

CERC (terms and conditions of tariff) Regulation, 2009, had considered pre tax equity return of 15.5% to be reasonable.

**Example:**
Also see that NTPC in its submission to CERC (terms and conditions of tariff) Regulation, 2009, had claimed 21.5% of post-tax rate of return on equity, using Capital Assets Pricing Model.

For calculation, NTPC had considered a risk-free rate of return of 8.5%, applicable to the 10 years Government securities; market premium of 10% and a beta value of 1.0 for power sector. It has also considered 3% additional return to compensate return on equity during construction period.

## Corporate/ Firms

### Strategic decision

Strategic corporate decisions such as mergers & acquisition, setting up of a new project or introduction of new product are usually driven by the idea whether return on such investment is higher than the cost of capital attached to it. In situations where management wrongly estimates the risk premium to be higher than what is warranted, it leads to higher return expectation with lower investment horizon, leading to lower investment in the economy and lower economic growth.

### Retirement benefits

Like Pension funds or life insurance funds, even corporate offer retirement benefits to their employees and so they too have to determine the amount to be set aside to meet the future retirement obligations. The pension benefits can be put at risk, if plan administrators use unrealistically high equity risk premiums, and set aside too little each year.

**Example:**
The high cost of pensions and health care for retirees has long been a burden for American automakers such as Ford and GM, who have now tried to rein in costs by freezing their traditional defined benefit plans.

During 2012, Ford contributed US$3.4 billion to the pension plan, yet the shortfall grew to US$18.7 billion, up from $15.4 billion. During 2013 It is planning to contribute another US$5 billion.[Source: Forbes]

Interestingly, this shortfall was not because the fund was poorly managed, but due to a reduction in 'discount rate' from 4.64% to 3.84%.

### Reporting requirement

Impairment testing under Indian Accounting Standards (Ind AS 36) requires 'value in use' of an asset to be computed by discounting the expected future cash flows from both continuing use of the asset and from its disposal at the end of its life. Herein too management would be required to determine the expected return, which should reflect the time value of money and the risk specific to the asset. Overestimating the risk premium can result in unnecessary diminution in value of the asset and underestimating it will, on the contrary, lead to undue built-up of assets that are nonexistent.

# 1. Introduction – role of risk premium in real-life

### Individual

Like government and corporate, individuals also save and invest in the retirement plans, health insurance plans and other plans such as child security plans. Amount put into such plan is purely guided by the individual's expectation of return on the investments. Being over optimistic about returns (and in effect equity risk premiums) will lead to save too little to meet future needs and to over investment in risky asset classes.

**Example:**
Under national pension scheme, an individual has a choice of three different asset classes:

- E class: Investment would primarily be in Equity market instruments
- G class: Investment would be in government securities like Government of India bonds and State Government bonds
- C class: Investment would be in fixed income securities other than Government Securities

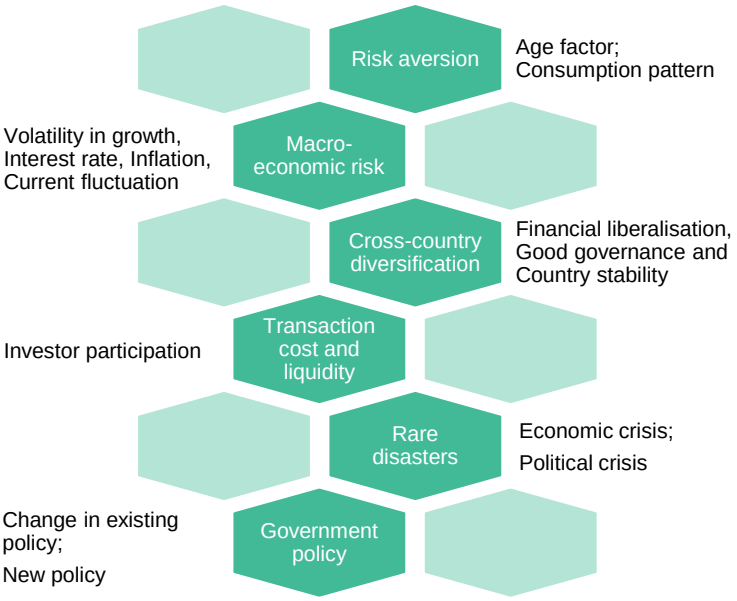
Most fund managers will usually advice (when individual is young i.e. 25-35 years of age) to allocate larger part of your savings to equity and lesser to fixed income instruments. However, as the age gradually move upwards of 35 years, the advice would be to gradually shift the financial risk exposure from equity to fixed income securities.

The choice of allocation in the above instance will be guided by the return expectation and consequently the implicit risk premium.

# 2. Determinants of market risk premium

## Overview

The average equity risk premium differs significantly across geographies. However, what factors impact the premium the most remain unclear – consequently contributing to uncertainty in investment strategy. Before we move further to quantifying the risk premium, let's examine these factors and their share of inter-play in influencing the equity risk premium.




# 2. Determinants of market risk premium

### Risk aversion

Investor risk aversion is perhaps the most critical factor that determines the equity risk premium. Higher uncertainty and volatility in stock market is likely to make investors more risk averse and amplify the equity risk premium.

**Example:**
A person is given two choices – one where he receives a guaranteed sum of INR 5 million and second where there is a potential to earn INR 10 million if in a toss of coin the outcome is 'Heads'.
Despite the theoretical expected return under both the scenarios being INR 5 million, a risk-averse investor will choose the guaranteed sum; risk-neutral investor will be indifferent between the two choices and risk-seeking investor will choose the bet as it offers him the chance to increase his potential earnings.

Factors such as age and consumption preference too determine risk aversion of an investor. *Agnew, Balduzzi, and Sunden (2003) and Holden, VanDerhei, and Quick (2000)* analysed 401(K) data in the US and found that the stock share of the portfolio drops in the old age. Likewise, life-cycle or target-date funds also suggest a decline in asset holdings around retirement.

### Macroeconomic risk

Market factors such as volatility in GDP growth, interest rate fluctuation, inflation, currency fluctuation, deficit in capital and current account, and supply side constraints inhibit investments and lead to both project time and cost overruns. Consequently, the scale of risk aversion and risk premium is likely to be high under such a scenario as opposed to a stable economy where GDP growth, inflation, interest rates and other variables are less volatile.

**Example:**
During 2013, India witnessed one of its biggest financial turmoil in recent times. Earlier than expected tapering of quantitative easing by the US Fed led to reversal of capital flows , following which rupee depreciated from (USD 1~ INR 54) on 01 May to (USD 1~ INR 67) on 31 August;
This phenomena clearly reflected India's vulnerability to global financial markets, which was primarily due to its large current account deficit and dependency on external flows to finance it.

*Martin Lettau, Sydney C. Ludvigsonm and Jessica A. Wachter (The Review of Financial Studies, 2006)* note that one of the prominent reason for decline in equity premium and persistent high stock valuation after the 1999s crisis (Dotcom bubble - burst of Information technology stocks) was the fall in macro-economic risks and by extension a lower volatility in the aggregate economy.

### Cross-country diversification

World economies that have more liberalised trade and capital markets typically see significant capital inflows in the form of foreign direct investments, foreign institutional investments, external commercial borrowings, etc. which results in lower cost of capital (i.e. expected return), compared to restrictive markets.

The stock markets too for these economies tend to be more dynamic and responsive to global news. Consequently, there is an inherent strong relationship between the developed markets and emerging markets that are liberalised.

Whilst in several of the finance literature it is argued that emerging markets tend to integrate with the developed markets as soon as the emerging markets get financially liberalised, certain recent empirical studies e.g. *Claus and Lucey (2012)* "*Equity market integration in the Asia Pacific region: Evidence from discount factors*" examine equity market integration in the Asian Pacific region for the period April-May 2006 and find that financial market liberalisation is a necessary but not sufficient condition for stock market integration.

### Transaction cost and liquidity

There are several researches that point to decline in equity premium following a reduction in cost of market participation and diversification *[Heaton and Luca (1999); Siegel (1999); Calvet, Gonzalez-Eiras, and Sodini (2004)]*. This leads us to an argument that lower transaction cost is likely to augment higher market participation and liquidity. A corollary of this argument is that investors will demand less risk premium today.

# 2. Determinants of market risk premium

### Transaction cost and liquidity (contd.)

High transaction cost keeps wider class of investors out of the market and in turn forces the existing investors to sell at a discount as buyers would then demand higher risk premium for illiquidity in the market.

**Example:**
In India, security transaction is estimated to attract on average a cost of approximately 25-27 basis points (100 basis points is 1%) which includes brokerage, stock exchange transaction charges, depository charges, SEBI turnover fees, securities transaction tax (STT) and stamp duty.
Globally, total cost of transaction (in the year 2012) was estimated to be in the range of 9 basis points to 30 bps of the traded value (Source: Economic times); which suggests that the trading cost in India is at the higher end compared to its peer markets such as Singapore.

In fact, with a view to lift up the investor sentiments, Government of India reduced the STT on certain segments in the 2013 Budget. e.g. in the equity futures segment, STT was brought down to 0.01 per cent from 0.017 per cent with a view to lower transaction cost and improve equity returns.

### Rare disasters

Rare disasters, including international political crisis have a significant impact on world stock market returns. Empirical studies by *Henk Berkman, Ben Jacobsen and John Lee ("Time-varying Rare Disaster Risk and Stock Returns, 2010)* finds that international political crises result in large-negative world stock market returns when they start, lower-than-average world market returns as they continue, and positive world market returns when they end. Consequently, crisis risk is positively correlated to earnings-price ratio and dividend yield.

### Rare disasters (contd.)

**Example:**
Instances of rare disasters could be:
- ✓ The great depression of 1929-30,
- ✓ Asian financial crisis of 1997and
- ✓ U.S. subprime mortgage crisis in 2008-09.

Impact of these crises have not been limited to the domestic market, but have impacted the global markets at large. Investors have witnessed a significant wealth erosion and have struggled emotionally with the market every time after the occurrence of the crisis. E.g. Financial services behemoth - Lehman Brothers filed for Chapter 11 bankruptcy protection on September 15, 2008.
Note that whilst the possibility of occurrence of these events is low, the of risk of default and bankruptcies is significantly high if the event is triggered.

The risk premium in all markets witnessed a significant shift post the global financial crisis of 2008, which saw the collapse of housing and banking sector in the US. Interestingly, due to globalisation most markets now share a close inter-play and which is why the liquidity crisis seems to have manifested itself by affecting other geographies, and by extension contributing to 2011 European sovereign-debt crisis.

### Government policy

Government across geographies play a pivotal role in determining the amount of taxes to be levied, enforcing laws, regulating competition, defining environmental policies, etc. Typically, any change in policy following a change in economic, social and political environment is bound to elicit price reactions in financial market.

*Lubos Pastor and Pietro Veronesi (Uncertainty about Government Policy and Stock Prices, 2011*) argue that stock prices should fall at the announcements of policy changes, on average and that the price fall should be large if uncertainty about government policy is large, and also if the policy change is preceded by a short or shallow economic downturn. In their view, policy changes should increase volatilities and correlations among stocks. The jump in risk premium associated with policy decisions should be positive, on average.

# 2. Determinants of market risk premium

### Government policy (contd.)

Undoubtedly, the uncertainty in

– likelihood of change in the current government policy, or

– impact of any new government policy, if any on the profitability of private sector

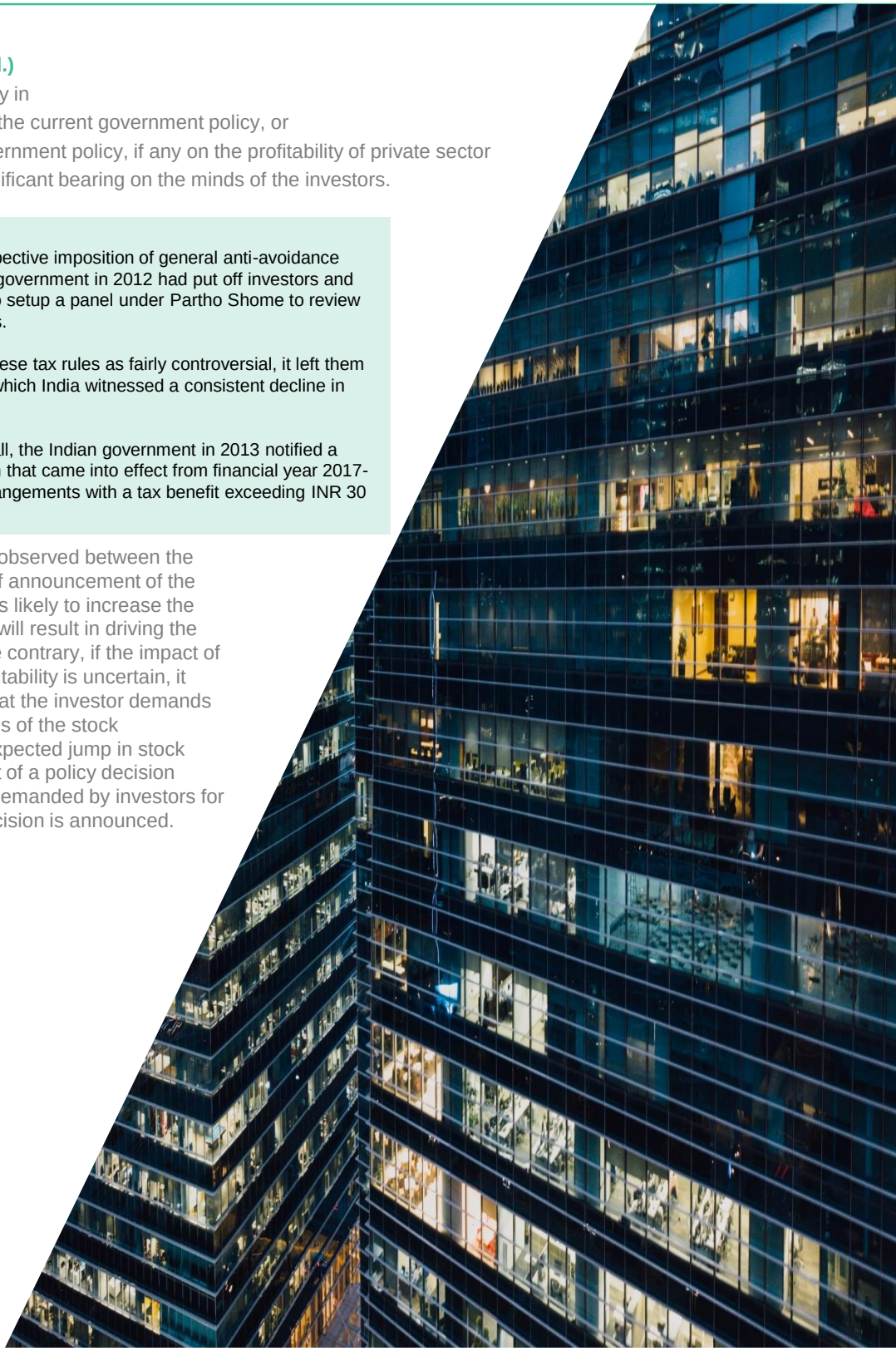
together have the most significant bearing on the minds of the investors.

**Example:**
The announcement of retrospective imposition of general anti-avoidance rules or GAAR by the Indian government in 2012 had put off investors and had forced the government to setup a panel under Partho Shome to review the applicability of these rules.

Since the investors viewed these tax rules as fairly controversial, it left them in a sulking mood, following which India witnessed a consistent decline in the foreign investment.

As a measure to arrest this fall, the Indian government in 2013 notified a much-diluted GAAR provision that came into effect from financial year 2017-18 and apply to business arrangements with a tax benefit exceeding INR 30 million.

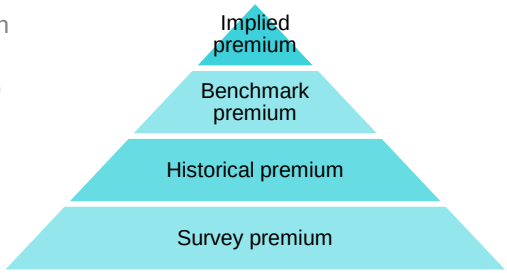
A remarkable correlation is observed between the stock prices and the point of announcement of the policy. If the policy change is likely to increase the firms' expected earnings, it will result in driving the stock price upwards. On the contrary, if the impact of policy change on firms' profitability is uncertain, it increases the implicit risk that the investor demands and in turn pushes the prices of the stock downwards. In effect, the expected jump in stock prices at the announcement of a policy decision captures the risk premium demanded by investors for holding stocks while the decision is announced.



# 3. Estimation of risk premium - overview

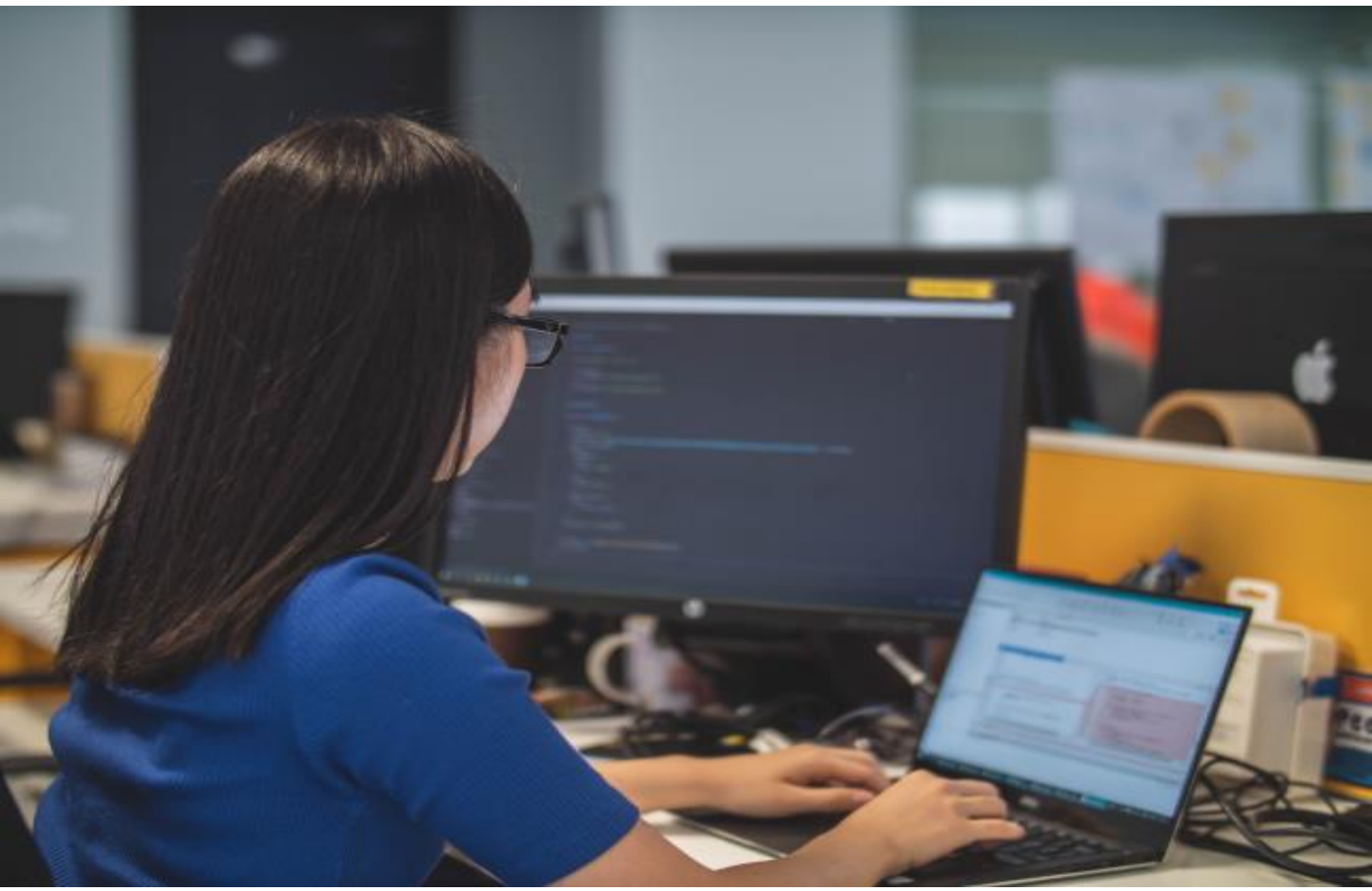
In the following section we have computed the probable market risk premium in India under different approaches which include:

– Outcome of survey by Pablo Fernandez, Javier Aguirreamalloa and Pablo Linares
– Historical premium i.e. historical returns earned in the past on Sensex stock relative to risk free rate
– Benchmark premium based on US market equity risk premium, and
– Implied premium based on traded price of debt, equity or other credit/equity derivatives




The equity risk premium derived under each of these approaches is quite different. A part of the reason for this difference is likely to be on account of lack of data reliability for the historical period in India and changing market characteristics.

The periods when scams were unearthed, market data were biased, significantly skewed and inefficient. E.g. during the financial events covering Harshad Mehta scam of 1992, Ketan Parekh's scam of 2001 and global financial crisis of 2008-09. Which is why the quality and robustness of stock market data in being able to explain the precise market and economic condition and by extension the investors' risk appetite has failed on several counts in the India context and consequently, the return on stock investments over different period starting 1991 have also varied significantly.

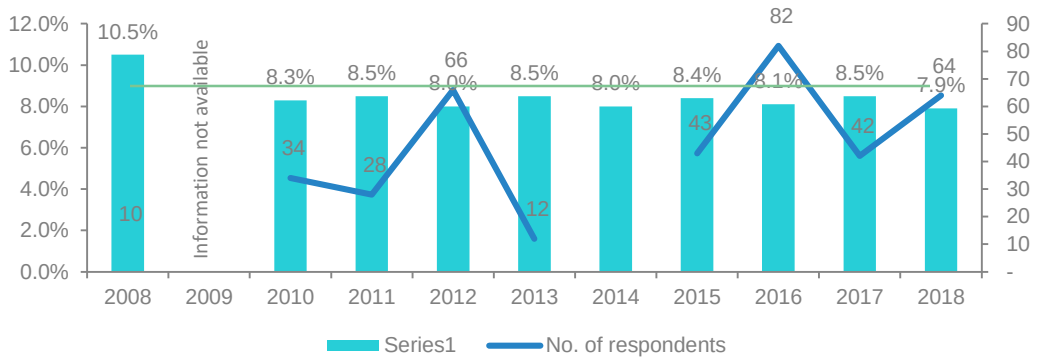


# 3. Estimation of risk premium – survey premium

## Overview

Globally, several research firms survey finance and economics professors, corporate managers, financial analysts, etc. about their expectation of market returns. Whilst this data is widely available in the developed markets such as the US, it is fairly a challenge to get such a data in emerging markets such as India.

In this section, we present the summary of market risk premium in India based on the survey carried out by Pablo Fernandez, Javier Aguirreamalloa and Pablo Linares ('Survey of market risk premium and risk-free rate') for various countries over various time period.




*Note: Survey premium data for India is not available for the year 2009*
*Source: 'Market Risk Premium and Risk Free Rate' in 2008 to 2018 by Pablo Fernandez, Javier Aguirreamalloa and Pablo Linares*

## Analysis of results from the annual survey

Analysis of the table set below suggests that most finance practitioners and investors who participated in the survey assumed the risk in Indian equity to be marginally higher in 2008 compared to the following years when the fallout of US sub-prime crisis was arrested, and Indian market was largely stable.

Interestingly, the average of risk premium in India during 2011 to 2017 has been in the close range of 8 - 8.5% with average standard deviation of 2.4 - 2.9%. Furthermore, given the number of respondents to the survey, the average standard error on the mean value is approximately 0.5% which is fairly low.

### Summary of market risk premium - India

| Year | Number of answers | Mean | Median | St. Dev | max | min | Av-Median | Max-min (range) |
|---|---|---|---|---|---|---|---|---|
| 2008 | 10 | 10.5% | 8.0% | 4.4% | 20.0% | 7.0% | 2.5% | 13.0% |
| 2009 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 2010 | 34 | 8.3% | n/a | n/a | 30.0% | 4.4% | n/a | 25.6% |
| 2011 | 28 | 8.5% | 7.8% | 2.8% | 16.0% | 5.0% | 0.7% | 11.0% |
| 2012 | 66 | 8.0% | 8.0% | 2.4% | 16.0% | 2.3% | 0.0% | 13.7% |
| 2013 | 12 | 8.5% | 8.8% | 2.9% | 13.4% | 3.0% | -0.3% | 10.4% |
| 2014 | n/a | 8.0% | 8.0% | 2.4% | 16.0% | 2.3% | 0.0% | 13.7% |
| 2015 | 43 | 8.4% | 8.3% | 2.5% | 14.0% | 5.0% | 0.1% | 9.0% |
| 2016 | 82 | 8.1% | 8.0% | 2.4% | 16.0% | 2.3% | 0.1% | 13.7% |
| 2017 | 42 | 8.5% | 9.0% | 2.3% | 13.0% | 2.2% | -0.5% | 10.8% |
| 2018 | 64 | 7.9% | 8.3% | 2.1% | 13.7% | 2.3% | -0.4% | 11.4% |

*Source: 'Market Risk Premium and Risk Free Rate' in 2008 to 2018 by Pablo Fernandez, Javier Aguirreamalloa and Pablo Linares*

## Reliability of survey results?

Despite there being several of such studies or surveys being carried out by research firms and given the fact that a level-headed range for equity premium does emerge from these surveys, still the acceptance level of such an approach by finance practitioners is low. Though there is nothing incorrect with the approach that is usually adopted to carry out such survey, rather it is the individual's reasoning that could be potentially inhibited while interpreting the market dynamics. Since most respondents, in order to estimate the risk, rely on recent market environment, their assessment may tend to be myopic with a short-term view as against a long-term view.

# 4. Estimation of risk premium – historical premium

## Overview

Globally, most finance practitioners believe that historical premium is perhaps the best estimate of the current and/or forward risk premium. It is calculated as a difference of average return on stock market and return on risk – free government securities over a very long period. The definition of risk premium under CAPM is largely standard, still the premium considered in practical scenario by banks and investors may be divergent e.g. in India, it is usual to consider risk premium of 5-10%, albeit the actual premium used by an investor could be significantly higher or lower.

This section presents the equity risk premium in India on a historical basis by analysing the data available in the public domain. Our analysis widely relies on the data as available on the recognised stock exchanges (both NSE and BSE) and with Reserve Bank of India (RBI).

The table set below summarises the output under different statistical approaches. Where deemed appropriate, average of numbers has been used as a practical expedient.

## Basis for selection of variable in the risk premium function

Since equity risk premium is computed as excess return earned from investment in stock over the base return from investment in a risk-free security, it leads to the following predicaments:

- Selection of market index (whether S&P BSE Sensex, S&P BSE 100, CNX Nifty, CNX 100, etc.)
- Selection of risk-free security (whether Treasury bond, Treasury bills, etc.)
- Selection of bond/bill maturity period
- Selection of time period (1-year, 5-years, 10-years, etc.)
- Selection of statistical approach – mean (arithmetic/geometric), average, min-max, etc.

The above listed selection criterion bear special importance in the Indian context as the observable historical market data in India has been significantly volatile and subjective.

**India risk premium (arithmetic mean)**

| Period | Stocks - T.Bills | Stocks - T.Bonds |
|---|---|---|
| 1991-2018 | 11.32% | 9.53% |
| *Std. error* | *6.40%* | *6.50%* |
| 1997-2018 | 11.13% | 8.05% |
| *Std. error* | *7.37%* | *7.44%* |
| 2003-2018 | 16.04% | 15.47% |
| *Std. error* | *8.77%* | *8.39%* |

**India risk premium (geometric mean)**

| Period | Stocks - T.Bills | Stocks - T.Bonds |
|---|---|---|
| 1991-2018 | 4.94% | 2.90% |
| 1997-2018 | 5.89% | 3.51% |
| 2003-2018 | 7.55% | 7.95% |

*Note: 1) Yield on Subsidiary General Ledger transactions is not available for the period prior to 1996, as such the weighted average interest rate on central government dated securities and weighted average call money rates have been considered as a proxy for the yield on bonds and treasury bills respectively.*
*Source: BSE Sensex (updated up to 31 December 2018); RBI; Yield of SGL Transactions In Government dated securities for 10 year maturity for the period 1996 and beyond; Yield of SGL Transactions in Treasury Bills for Residual Maturities for the period 1996 and beyond*

# 4. Estimation of risk premium – historical premium

**Basis for selection of variable in the risk premium function (contd.)**

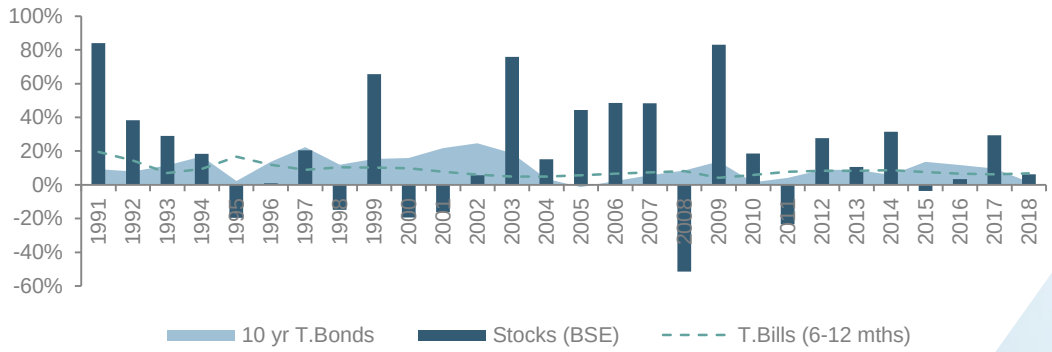
**A) Selection of market index**

- BSE Sensex as a market index is considered capable of reflecting the broader market return expectations. Moreover, since BSE Sensex is a free-float market-weighted stock market index of 30 well-established and financially sound companies listed on Bombay Stock Exchange, it indicates that the returns will be tilted towards larger market cap stocks.
- In the chart set below, the average annual return on stock market has been superimposed against the average annual return on 10-year government dated bond and treasury bills. Given that the observable data available on the BSE website is only for the period staring 1990, the analysis is for a limited period of 28 years.
- Analysis of the chart suggests that the movement in the average annual return on stock is more volatile when compared to treasury bills and bonds, and hence it may be a reasonable argument for an investor to demand a premium over return from G-sec investments.
- In computing the return on equity, the other challenges that are – deciding on whether to analyse monthly, quarterly or annual return? whether to consider closing, opening or average index? In our analysis, as a practical expedient we have considered the closing index as at each calendar year i.e. 31 December. Further, the return on stock has been computed by adding the capital appreciation over one-year period and the dividend income.

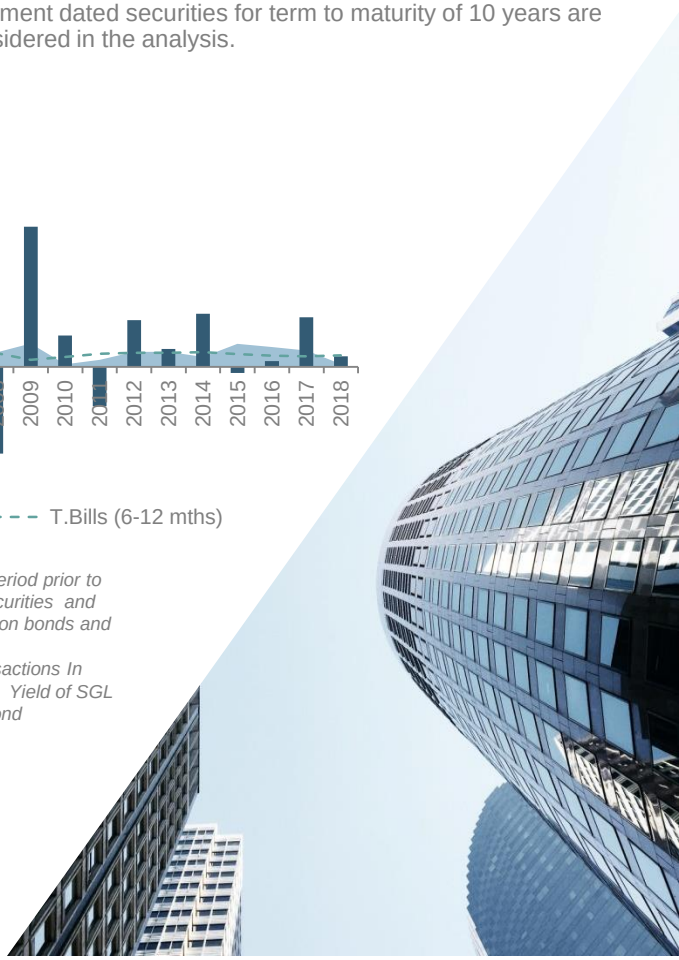
**B) Selection of risk-free security**

- The return on BSE Sensex has been compared to both short-term and long-term risk-free government securities. Whilst monthly data on yield of SGL transactions in government dated securities for term to maturity of 10 years are available, average of trailing 12-month yield has been considered in the analysis.

**Annual return over the period 1991 to 2018**




*Note: 1) Yield on Subsidiary General Ledger transactions is not available for the period prior to 1996, as such the weighted average interest rate on central government dated securities and weighted average call money rates have been considered as a proxy for the yield on bonds and treasury bills respectively.*
*Source: BSE Sensex (updated up to 31 December 2018); RBI; Yield of SGL Transactions In Government dated securities for 10 year maturity for the period 1996 and beyond; Yield of SGL Transactions in Treasury Bills for Residual Maturities for the period 1996 and beyond*



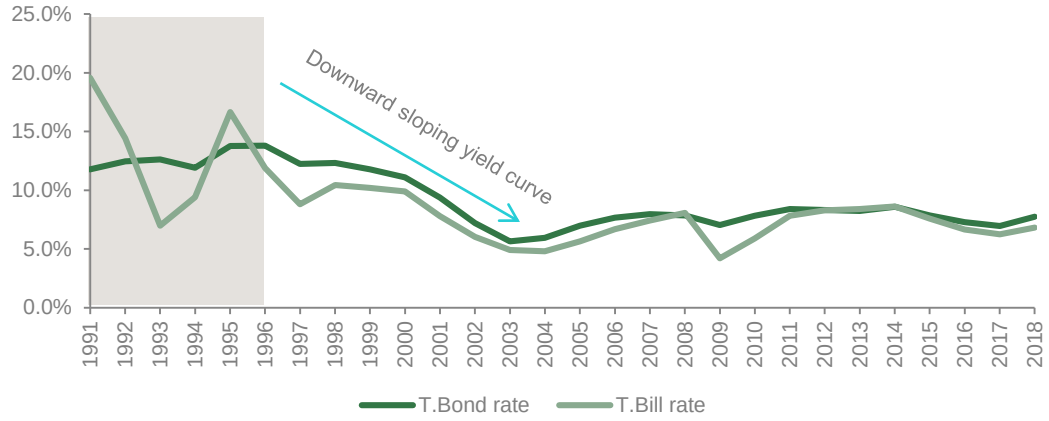
# 4. Estimation of risk premium – historical premium

**Basis for selection of variable in the risk premium function (contd.)**

**B) Selection of risk-free security**

- Observe the yield curve in the graph set below - the 10-year treasury bond curve was downward sloping between 1995 and 2002, causing the total return on bond (i.e. the promised coupon at the start of the year and the bond price change due to interest rate changes) to improve dramatically when compared to the equity returns during that period. Further, risk premium is negative in the period when bond market performed better than the stock market.
- The next compelling question that may arise is – should these years be treated as outliers and ignored while calculating the risk premium. Empirical studies suggest that over a very long period of time, asset prices and yield curve eventually move back towards mean and accordingly, should effect of mean reversion be a valid argument, these years can continue to be included in the analysis.

**Annual yield over the period 1991 to 2018**




*Note: 1) Yield on Subsidiary General Ledger transactions is not available for the period prior to 1996, as such the weighted average interest rate on central government dated securities and weighted average call money rates have been considered as a proxy for the yield on bonds and treasury bills respectively.*
*Source: RBI; Yield of SGL Transactions In Government dated securities for 10 year maturity for the period 1996 and beyond; Yield of SGL Transactions in Treasury Bills for Residual Maturities for the period 1996 and beyond.*

**C) Choice of averaging approaches**

- Empirical studies suggest that there is substantial negative correlation in stock returns, implying that markets reverse themselves over time i.e. years with good return are generally followed by a period of poor returns and vice-versa. *Fama and French* examined five-year returns on stocks from 1941 to 1985 and present evidence of this phenomenon. They found that serial correlation is more negative in five-year returns than in one-year returns and is much more negative for smaller stocks rather than larger stocks.
- Since the stock returns have a negative serial correlation, it is more appropriate to compute a geometric mean as compared to arithmetic mean. However, if the stock returns were uncorrelated over time then arithmetic mean would have been more sensible approach.

# 4. Estimation of risk premium – historical premium

**Summary statistics: Indian stock, treasury bill and bond for the period 1991-2018**

| | Stocks (BSE) | T.Bills | T.Bonds |
|---|---|---|---|
| Mean | 19.90% | 8.58% | 10.37% |
| Standard error | 6.36% | 0.66% | 1.29% |
| Median | 18.49% | 7.81% | 9.46% |
| Max | 84.06% | 19.57% | 24.61% |
| Min | -51.57% | 4.19% | -1.38% |
| 25th percentile | -0.20% | 6.35% | 4.95% |
| 75th percentile | 39.79% | 9.52% | 14.15% |
| Standard deviation | 33.63% | 3.50% | 6.80% |
| Variance | 11.31% | 0.12% | 0.46% |
| Skewness | 0.18 | 1.69 | 0.32 |
| Kurtosis | (0.21) | 3.16 | (0.51) |

**India risk premium (arithmetic mean)**

| Period | Stocks - T.Bills | Stocks - T.Bonds |
|---|---|---|
| 1991-2018 | 11.32% | 9.53% |
| 1997-2018 | 11.13% | 8.05% |
| 2003-2018 | 16.04% | 15.47% |

**India risk premium (geometric mean)**

| Period | Stocks - T.Bills | Stocks - T.Bonds |
|---|---|---|
| 1991-2018 | 4.94% | 2.90% |
| 1997-2018 | 5.89% | 3.51% |
| 2003-2018 | 7.55% | 7.95% |

*Note: 1) Yield on Subsidiary General Ledger transactions is not available for the period prior to 1996, as such the weighted average interest rate on central government dated securities and weighted average call money rates have been considered as a proxy for the yield on bonds and treasury bills respectively.*
*Source: BSE Sensex (updated up to 31 December 2018); RBI; Yield of SGL Transactions In Government dated securities for 10 year maturity for the period 1996 and beyond; Yield of SGL Transactions in Treasury Bills for Residual Maturities for the period 1996 and beyond*

## Conclusion

It is tardy exercise to compute risk premium for emerging markets such as India where availability of robust data is a challenge. Markets may not be sufficiently deep to allow liquidity in transactions, and frequent market frictions have the potential to skew the stock prices thereby leading to large volatility in stock prices and imperfect market information e.g. mid and small cap stock in India witness prolonged period of low activity in trading volume, implying that they may not react instantaneously to the changes in macro-economic factors that otherwise govern the systematic risk.

### Arithmetic mean

Based on our analysis, we observe that the equity market in India has delivered average return of 19.9% over the period 1991 to 2018, which is significantly higher when compared to the average return on treasury bond (10.37%) or bill (8.58%) over the same period. This however comes with the additional burden of higher volatility of 33.7% and quite an extreme range in distribution of stock returns.

The equity risk premium, calculated as a difference between the average returns on stock and the average returns on treasury bill for the period 1991 to 2018 is 11.32%, and similarly the difference between the average returns on stock and average returns on treasury bond over the period 1991 to 2018 is 9.53%.

These estimates are however not free from noises. Given the limited coverage period of 28 years, the standard error contained in these estimates is fairly high. Risk premium over treasury bill and treasury bond forebear high standard error of 6.4% and 6.5% respectively.

### Geometric mean

Now consider a simple change in the basis of averaging from arithmetic mean to geometric mean. The observed equity risk premium undergoes considerable change. For the period 1991 to 2018, the equity premium is now 4.94% and 2.90% over the treasury bill and treasury bond respectively. Given that returns on stock are negatively correlated over time (based on empirical studies), a statistical or valuation expert will have natural biasness towards the geometric average premium. Nevertheless, there are investors who argue for the arithmetic average premium as best estimate of risk premium.

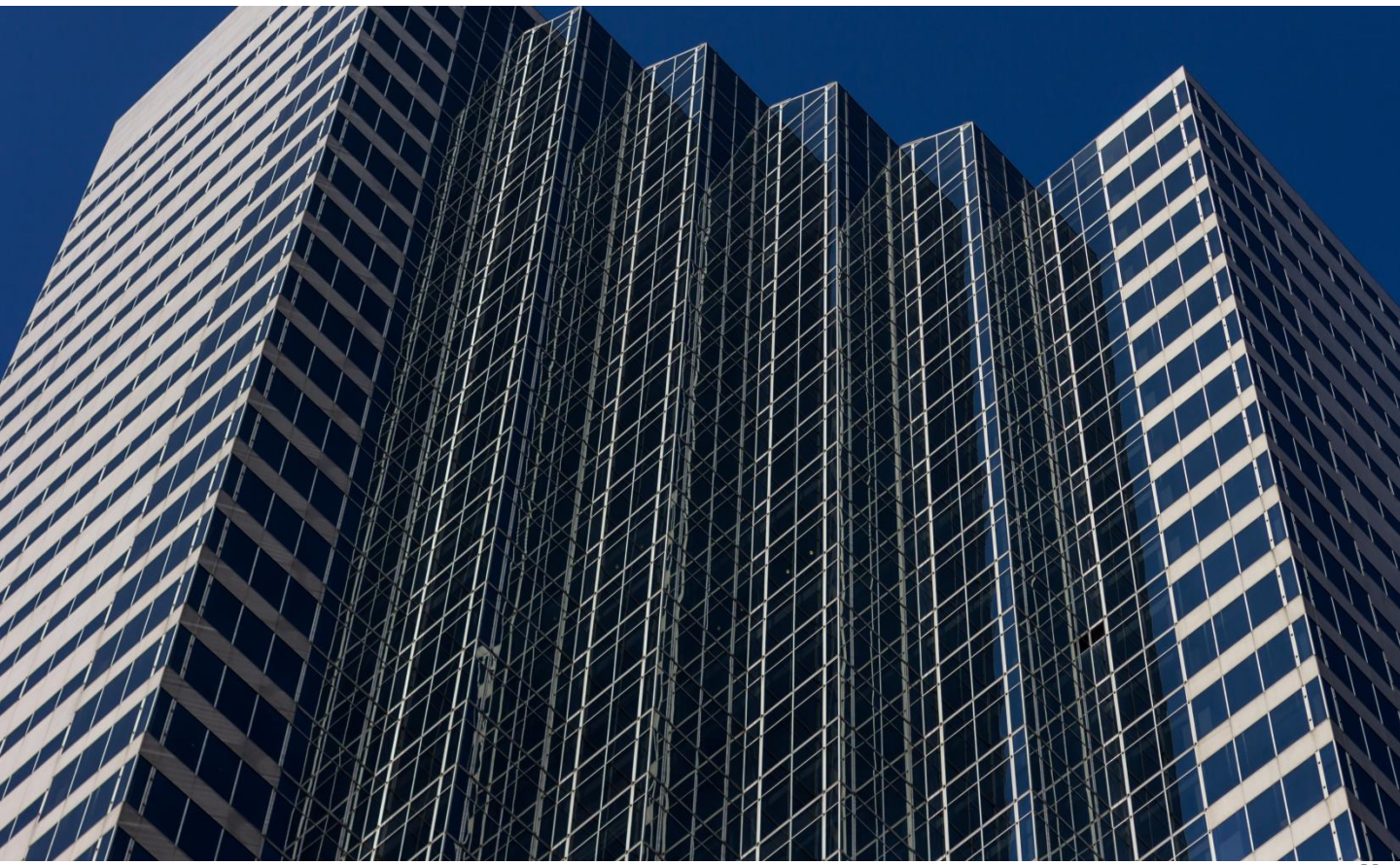
# 4. Estimation of risk premium – historical premium

**Conclusion (contd.)**

Impact of time duration

Further, let us examine the impact on risk premium when we change the time duration. For shorter time durations, the results change remarkably. Risk premium (geometric mean) over the last 15-year period is 7.55% and 7.95% over treasury bills and treasury bonds respectively. This phenomenon can be partly explained by the low index base in 2003 when the investor confidence was low following the 'Ketan Parekh' scam of 2001 that had left several investors in lurch and compelled the index to bottom out by 2003. Subsequent to this, renewed global interest in India as an investment destination led to substantial capital inflows from FIIs and FDIs and pushed the index to all time high just before the US sub-prime financial crisis. These factors together explain the reason for risk premium movement during the last fifteen years.

Historical risk premiums tend to rise when markets are buoyant and investors are less risk averse, and fall as markets collapse and investor fears rise.



# 5. Country risk premium

## Overview

The third approach for calculating equity risk premium, albeit not widely used by valuation experts or analysts, is to build the risk premium by adding country specific risk premium to the base risk premium for a mature market.

$$\text{Risk premium}_{\text{target market}} = \text{Risk premium}_{\text{mature market}} + \text{country risk premium}_{\text{target market}}$$

This approach is based on a premise that data available for emerging markets is often biased and suffer from potential noise due to market illiquidity and intermittent unexpected market movements, and accordingly building up additional risk premium over risk in a mature market sets aside any potential anomalies.

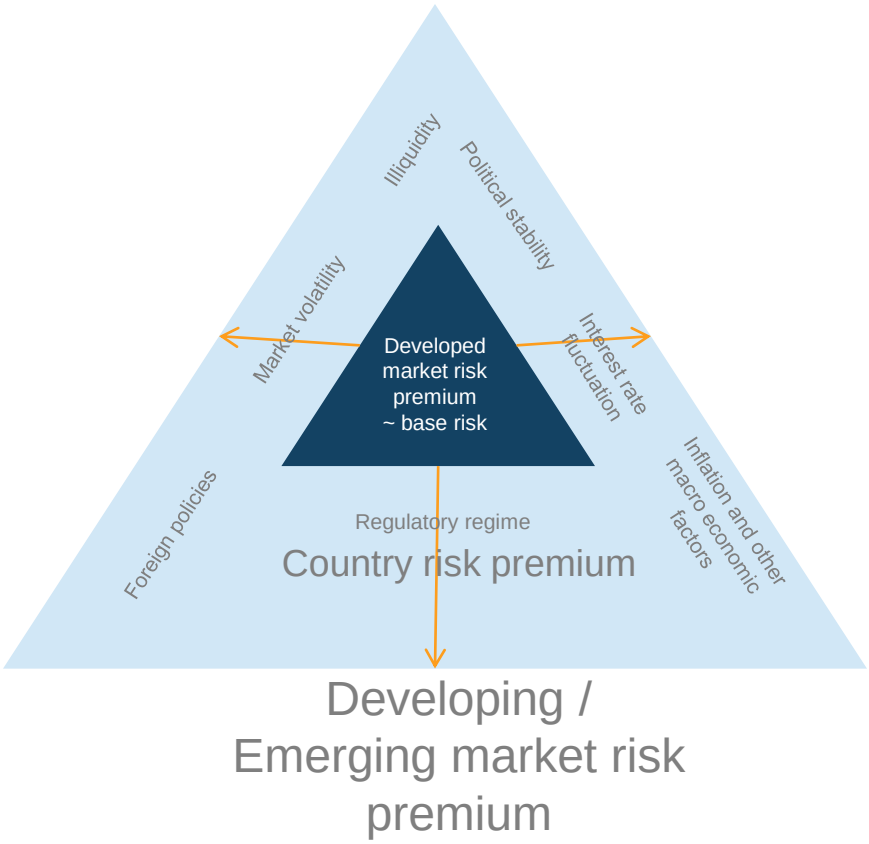
In our calculation, we consider base premium of US equity market to be a good surrogate for mature market risk premium since US has perhaps the longest history of developed equity market. Following variations have been considered while calculation the ERP for India:

– *Sovereign bond default spread approach*: this is a simplistic approach where the credit default spread of India treasury bond over US treasury bond is considered to be an indicative of the country risk premium over the developed market.

– *Sovereign bond default spread adjusted for equity market volatility approach*: this is an advancement of the above approach were the sovereign default spread has been adjusted for India equity market volatility and 10-year G-sec price volatility factor.

– *Domestic market volatility relative to a developed market*: Equity risk of US market is adjusted for the volatility in the US market returns relative to that of India.

Application of each of these approaches is quite insightful but ridden with their own set of problems. Consider the adjustment factor for equity market volatility to the sovereign default spread – this adjustment assumes that country equity and bond market share a linear relationship, albeit it is not quite so in reality.



# 5. Country risk premium

| | INDIA | US |
|---|---|---|
| Sovereign debt ratings | ✓ | ✓ |
| Country risk scores | × | ✓ |
| Market prices | | |
| 1) USD or Euro denominated bond yield spread | × | ✓ |
| 2) Credit default swap spread | × | ✓ |
| 3) Market volatilities | ✓ | ✓ |

### Measures of credit default spread

Out of the several ways of measuring the sovereign or country credit default spread - a) sovereign credit/currency ratings, b) country risk scores and c) observable market data such as yield, credit default swap (CDS) rates, market volatilities, currency volatilities etc., we have considered sovereign ratings for the analysis.

Government of India has till date not raised any funds outside India by issuing foreign currency denominated bonds. This limits us from applying the bond default rate as a measure of country risk. Also, CDS rate which happen to be more frequently traded than the treasury bond, is not available for India.

Therefore, since sovereign ratings for both, the US and India, are publicly available the credit default spread can be computed synthetically by assigning similar default spreads to same class of rating. Also, equity, debt and currency market volatilities have been analysed for determining the adjustment factor.

# 5. Country risk premium – credit default spread approach

### Currency default risk rating

| | Foreign Currency | Local Currency |
|---|---|---|
| Rating - India | Baa2 | Baa2 |
| Default spread (basis points) | 170.0 | 170 |
| US market risk premium (mature market) | 5.1% | 5.1% |
| Total equity risk premium India in USD terms | 6.8% | 6.8% |
| Inflation US | 2.4% | 2.4% |
| Inflation India | 4.1% | 4.1% |
| **Total equity risk premium India in INR terms** | **8.6%** | **8.6%** |

*Note: 1) US market risk premium is as on 01 January 2018;*
*2) Inflation considered is 12 month forecast*

*Source: Moody's; Tradingeconomics.com; Equity Risk Premiums (ERP): Determinants, Estimation and Implications –Aswath Damodaran; Publicly available information; Incwert analysis;*

### Synthetically derived bond default spread (in basis points)

Synthetically derived bond spread

| S&P rating | Country | Issuer | Credit default spreads YTD (as at 26 Dec 2018) | Latest close |
|---|---|---|---|---|
| BBB+ | India | Reliance Industries Limited | 138 | 210 |
| BBB | Philippines | Power Sector Assets and Liabilities Management | 174 | 203 |
| BBB | Thailand | Bangkok Bank Plc | 195 | 231 |
| **Average** | | | **169** | **214** |

*Source: Asianbondsonline.adb.org; Publicly available information; Incwert analysis;*

**Assumption:** Countries with similar default risk have similar sovereign ratings.

**Applicability:** Typical default spreads of other countries can be applied to a country which has same rating.

**Analysis:** Philippines and Thailand Governments US dollar denominated bonds are trading at a default spread of 174 and 195 basis points to US treasury bonds as at December 2018. Similarly, Reliance Industries which is AAA rated in local currency have US dollar denominated bonds which trade at a default spread of 138 basis points. This implies that the average additional 169 basis points that the market participants demanded are for the additional exposure (i.e. country risk) in bonds issued by BBB rated countries/companies. Since countries with similar default risk have institutively similar sovereign ratings. Thus, the synthetic default spread of 169 points (rounded to 170 basis points) can be applied to India while determining its equity risk premium.

### Credit default spread approach

The sovereign credit default spread in case of India has been synthetically derived by comparing it to similar rated economies and their typical default spreads (i.e. US denominated bond's yield for countries that bear Baa2 rating minus the risk-free rate of US).

Ratings by Moody's has been considered for determining sovereign currency rating. Note that the foreign currency rating reflects the ability and willingness of the sovereign to meet all its foreign currency denominated financial obligations on a timely basis.

These ratings reflect the potential risk of default and not the equity risk, yet these have been consider as a conventional yardstick of equity risk since they are affected by several of the factors that drive the equity risk – the 'hard' macroeconomic factors such as the fiscal deficit, currency stability , interest rates and inflation, and the 'soft' issues like the political stability, economic and regulatory environment, etc.

### Equity risk premium - India

Equity risk premium for India is derived by adding CDS of 170 basis points to the base ERP of 5.1% of US market. The resultant equity risk premium for India is 6.8% in US dollar terms. After adjusting for forward inflation factor, the ERP for India is determined to be 8.6% in INR terms.

### Potential shortcomings of this approach

Despite being conventional and easy to apply, this approach has its own shortcomings:

- First, rating agencies often lag markets when it comes to responding to the changes in the underlying default risk. e.g. Greece's rating was not downgraded until the middle of 2011, though their financial problems were visible well before that time.
- Second, the timing of rating is sporadic, and such intermittently issued rating fails to mirror the equity market movements on a continuous basis.
- Third, the ratings agency focus on default risk may obscure other risks that could still affect the equity markets.

### Conclusion

This approach finds favour with analysts who prefer using the typical default spread citing the argument that these spreads tend to be less volatile and more reliable for long-term analysis. Further, the assigned rating is a forward-looking estimate of default probability and therefore should not only be reflective of current performance but also an estimate of future ability and willingness of the sovereign to service the debt.

# 5. Country risk premium – credit default spread adjusted for equity risk

## Currency default risk rating adjusted for equity market risk

| | | Foreign Currency | Local Currency |
|---|---|---|---|
| Rating - India | | Baa2 | Baa2 |
| Default spread (basis points) | (a) | 170 | 170 |
| Multiplier on default spread (see below for details) | (b) | 2.31 | 2.31 |
| Adjusted country risk premium India in USD terms | (a)*(b) | 3.9% | 3.9% |
| US market risk premium ~mature market | | 5.1% | 5.1% |
| **Total equity risk premium India in USD terms** | | **9.0%** | **9.0%** |
| Inflation US | | 2.4% | 2.4% |
| Inflation India | | 4.1% | 4.1% |
| **Total equity risk premium India in INR terms** | | **10.8%** | **10.8%** |

*Note: 1) US market risk premium is as on 01 January 2018;*
*2) Inflation considered is 12 month forecast*
*Source: Moody's, Tradingeconomics.com; Equity Risk Premiums (ERP): Determinants, Estimation and Implications –Aswath Damodaran; Publicly available information; Incwert analysis;*

## Standard deviation (volatility) weekly between January 2017 to December 2018

| Standard deviation in equity returns | Standard deviation in bond prices | Relative standard deviation |
|---|---|---|
| 1.56% (weekly std dev) | 0.67% (weekly std dev) | 2.31 |
| 11.23% (annualised std dev) | 4.86% (annualised std dev) | 2.31 |

*Note: 1) For the purpose of computing bond prices the maximum yield to maturity of 10 year rupee denominated government bond has been considered*
*Source: RBI; Secondary Market Outright Transactions in Government Securities (Face Value); S&P CNX Nifty*

## Default spread adjusted for equity risk

This approach is a step-up of the default spread approach. Since the overall all country equity risk premium is expected to be larger than the country default spread, a certain additional risk could be added to the default spread to make it equal to the country risk premium. To compute the estimated spread multiplier, the analysis considers the volatility in equity returns relative to volatility in bond prices. The default spread is multiplied by the relative volatility to derive the adjusted country risk premium

## Equity risk premium – India

Continuing from the previous section, we see that if the Indian government were to issue dollar denominated sovereign bonds then it is likely to trade with a default spread of approximately 170 basis points over the US treasury bond rate considering the Baa2 rating that India has vis-a-vis Aaa of the US.

The annualised standard deviation in the Indian equity index (NSE Nifty) during the 24 months period ending 31 December 2018 was 11.23%, while the annualised standard deviation in the 10 year government bond was 4.86%. Accordingly, the resultant additional country equity risk premium for India is 3.9%

Equity risk premium for India is derived by adding country risk premium of 3.9% to the base ERP of 5.1% of US market. The resultant equity risk premium for India is 9.0% in US dollar terms. After adjusting for forward inflation factor, the ERP for India is determined to be 10.8% in INR terms.

## Potential measurement problems

The standard deviation of equity returns is a volatile number across time and given that India is still an emerging market, the volatility could move significantly across different time periods. To avoid any such abnormality the calculation considers the recent market performance.

Illiquidity in emerging markets may lead to lower volatility and consequently lower estimation of country equity risk.

This approach presupposes a linear relationship between equity market volatility and bond price volatility where as in reality the situation is quite different.

# 5. Country risk premium - Relative equity market volatility in the US and India

## Relative equity market volatility in the US and India

This approach is based on a premise that imputed risk of different markets can be observed by comparing the volatilities in equity return for each of those markets. Economies with higher risk will usually have higher standard deviation in equity prices or returns.

The relative standard deviation for country X against the other country Y would be computed as follows:

$$\text{Relative Std dev}_x = \frac{\text{Std dev}_x}{\text{Std dev}_y}$$

Further, assuming that equity risk premium and relative standard deviation have a linear relationship, the equity risk premium of country X can be computed as follows:

$$\text{ERP}_x = \text{ERP}_y * \text{Relative Std Dev}_x$$

## Equity risk premium – India

The annualised standard deviation of weekly returns in S&P 500 in two, five and ten years preceding 31 December 2018 have been computed in the table below. Correspondingly the annual standard deviation of weekly returns NSE Nifty for the same period has also been computed. Relative standard deviation has been computed for each such period. Note that daily standard deviations tend to have much more noise and hence computations have been done on weekly returns.

Using the relative standard deviation so derived and the US base equity risk premium of 5.1%, the estimated equity risk for India based on two, five and ten year volatility is 4.3%, 5.5% and 5.8% respectively. After adjusting for forward inflation factor, the ERP for India is determined to be 6.1% to 7.6% in INR terms.

While the volatility in US equity market is nearly the same for two year and five year period preceding 31 December 2018, the volatility in Indian equity market has varied significantly between the two year period (annualised standard deviation of 12%) and ten year period (annualised standard deviation of 18%) possibly due to structural illiquidity in Indian markets post the global financial crisis of 2009 and Euro zone credit crisis of 2011.

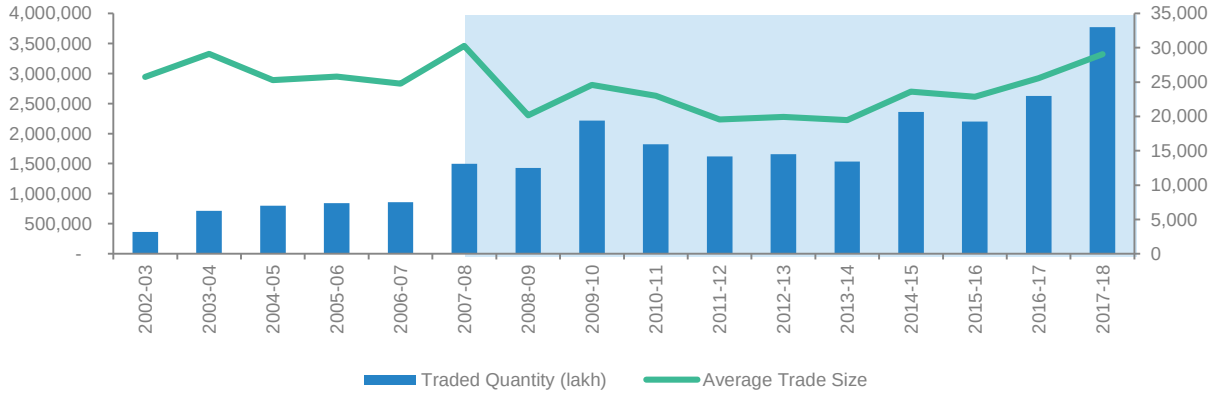
**Relative volatility in the US and India equity markets preceding 31 December 2018**

| | | 2-yr volatility | | 5-yr volatility | | 10-yr volatility | |
|---|---|---|---|---|---|---|---|
| | | US | India | US | India | US | India |
| Weekly volatility in return | | 1.87% | 1.60% | 1.78% | 1.93% | 2.19% | 2.51% |
| Annualised standard deviation | | 13% | 12% | 13% | 14% | 16% | 18% |
| Relative standard deviation $_{India}$ | | | 0.85 | | 1.08 | | 1.15 |
| US/ Mature market risk premium | (a) | 5.1% | | 5.1% | | 5.1% | |
| **Equity risk premium $_{India\ in\ USD\ terms}$** | **(b)** | **4.3%** | | **5.5%** | | **5.8%** | |
| Country risk premium $_{India}$ | (a-b) | -0.7% | | 0.4% | | 0.7% | |
| Inflation US | 2.4% | | | | | | |
| Inflation India | 4.1% | | | | | | |
| **Total equity risk premium $_{India\ in\ INR\ terms}$** | | 6.1% | | 7.3% | | 7.6% | |

*Note: 1) US market risk premium is as on 01 January 2018 based on S&P 500*
*Source: S&P 500 index; NSE Nifty; Tradingeconomics.com; Incwert analysis.*

# 5. Country risk premium - Relative equity market volatility in the US and India

### Cash market segment performance on NSE




*Source: NSE website*

### Equity risk premium – India (contd.)

The Indian market witnessed significantly reduced volatility during the last two years. The trend is however likely to undergo a change with general elections due in 2019, rising oil prices, global trade wars, and increasing interest rates in the US amongst other factors. As such, equity risk premium based on a ten-year period volatility (compared to a shorter duration) could be a fair representative of equity risk premium in India.

### Potential measurement issues

Market structure and liquidity differs widely among markets. Under perfect market scenario emerging markets would ideally be more volatile than the developed markets; However, illiquidity in emerging markets would more often than not result in lower volatility. This market condition will understate the risk premium for illiquid market and overstate the risk for liquid market.

# 6. Implied premium - Gordon's Dividend growth model

## Implied equity risk premium on Sensex as at 31 December 2018

| | | Comments |
|---|---|---|
| Current year index (SENSEX) | (a) | 36068 Closing index |
| Expected dividend yield | (b) | 1.16% Yield on closing index |
| Dividend growth expected | (c) | 14% Historical dividend growth |
| $Dividend_1$ | a*b*(1+c) | 477 |
| Return on equity | | $K_e$ |
| | | |
| $K_e$ | | 15.4% Applying Gordon growth model |
| Risk free rate | | 7.4% Yield on 10Y G-Sec as at 31 Dec 2018 |
| **Implied Equity premium** | | **8.0%** |

*Source: BSE; Incwert analysis.*

## Overview

Implied premium approach makes use of some very basic yet powerful valuation tools to find out the equity premium from the current market conditions, in conjunction with the expected future cash flows. In effect the approach is market neutral and has a high predictive capability.

In this section the market risk premium has been evaluated based on the Gordon's Dividend Discount model which is one of the most well-known model in the genre of valuation.

$$\text{Price}_{\text{Year=0}} = \frac{\text{Dividend expected next year}}{K_{\text{equity}} - \text{Growth}_{\text{dividend income}}}$$

## Restrictive assumptions

This method assumes that dividend will grow constantly at a stable rate in the future. Real life scenario will however be quite different as we can expect the Indian markets to continue to evolve with growth and interest rates tapering gradually to that of a developed market such as the US.

Dividend paid out is assumed to be equivalent to the free cash flows that are available with the company.

Stock buy-backs have not been considered within the calculation of dividend yield.

## Implied equity risk premium - India

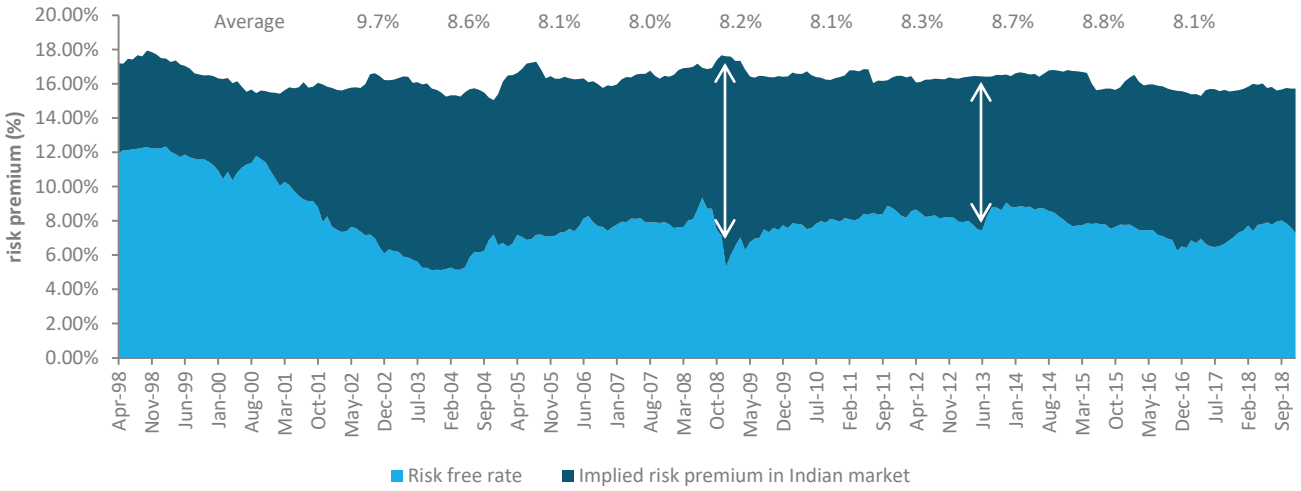
We have used BSE Sensex data to derive the implied equity risk premium. As at 31 December 2018, the BSE Sensex Index closed at 36068, and the average dividend yield on the index was approximately 1.16%.

The sustainable growth in dividend for companies in the index, based on the average annual compounded growth in dividend between 1991 and 2018, is assumed to be 14%. Given the yield on 10-year G-sec bond was 7.4% as at 31 December 2018, the equity risk premium is derived to be 8.0%.

# 6. Implied premium - Time series behaviour of BSE Sensex implied premium

### Implied equity risk premium on BSE Sensex for Indian market

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| Min | 8.7% | 8.1% | 7.3% | 7.4% | 7.5% | 7.7% | 7.8% | 8.5% | 8.3% | 7.6% |
| Max | 11.6% | 9.2% | 8.8% | 8.2% | 9.0% | 8.9% | 9.1% | 9.3% | 9.2% | 8.6% |
| Average | 9.7% | 8.6% | 8.1% | 8.0% | 8.2% | 8.1% | 8.3% | 8.7% | 8.8% | 8.1% |




*Source: BSE; Yield on SGL transactions in government dated securities; Yield on 10 year zero coupon bonds*

### Basis of computation

The Gordan's Dividend Discount model has been utilised to compute the implied equity risk premium over the historical period. BSE Sensex index values, PE ratio and dividend yield on a monthly basis have been used for calculating the cost of equity. Further, the yield on a 10-year government of India bond has been reduced from the cost of equity to derive the implied risk premium for various time periods.

The summary of steps are as follows:

- Earnings and dividend were calculated by applying the PE ratio and dividend yield on the closing index value
- Dividend pay-out as percentage of earnings has been calculated and the balance (retained earnings) is assumed to be reinvested in the business [Reinvestment rate = 1 - pay-out ratio]
- As a practical expedient the return on equity on new investment (RoE) is assumed to be constant 20% p.a. during the period analysed.
- Growth in earnings is estimated based on the reinvestment rate and the RoE i.e. [Growth in earnings = RoE * Reinvestment rate]
- The Cost of equity ($K_e$) is derived by applying the Dividend Discount model.

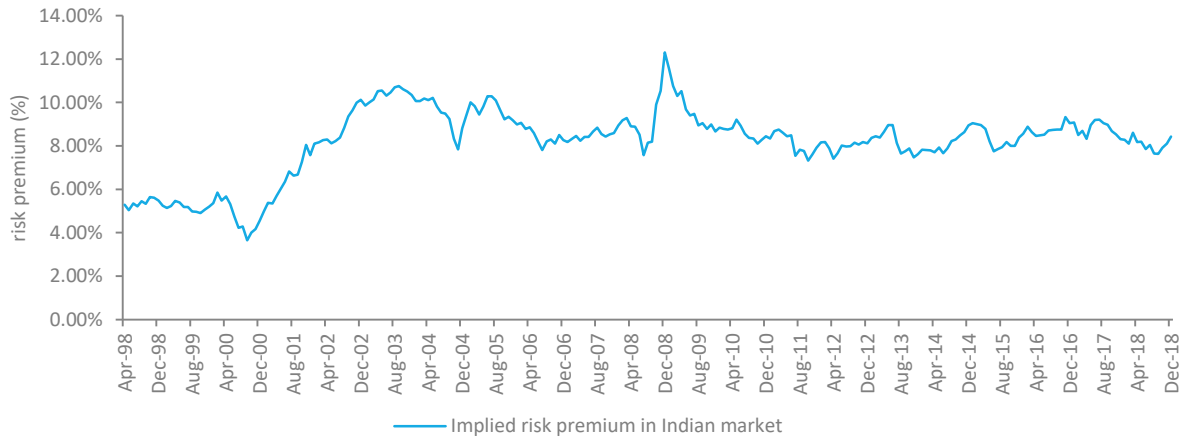
$$\text{Price}_{\text{Year=0}} = \frac{\text{Dividend expected next year}}{K_e - \text{Growth}}$$

$$\text{Or,} \quad K_e - \text{Growth} = \frac{\text{Dividend}_0 (1+ \text{Growth})}{\text{Price}_{\text{Year=0}}}$$

$$\text{Or,} \quad K_e = \text{Dividend yield } (1+ \text{Growth}) + \text{Growth}$$

# 6. Implied premium - Time series behaviour of S&P Sensex implied premium

**Implied equity risk premium on BSE Sensex for Indian market**




*Source: BSE; Yield on SGL transactions in government dated securities; Yield on 10 year zero coupon bonds*

## Observations

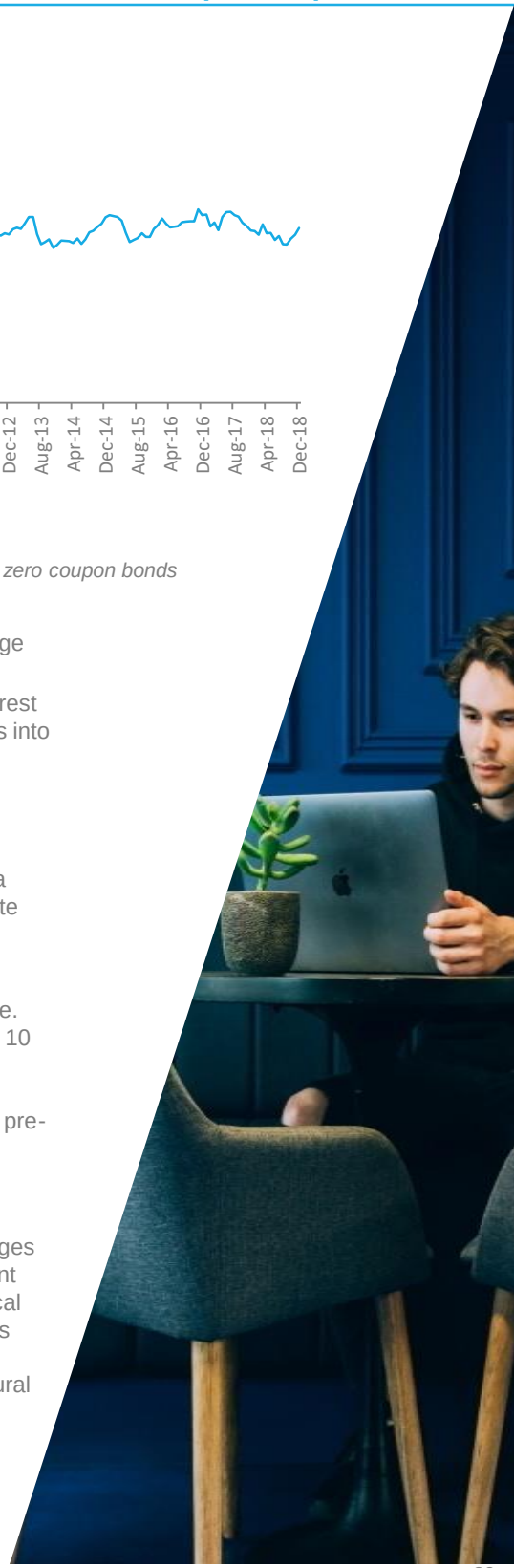
Few interesting observations based on analysis of chart set on the previous page are:

- The implied risk premium changes with the change in index value and interest rate. Other things remaining constant, higher (lower) index value translates into lower (higher) implied equity risk premium.
- Also note that during the last five years (2014 to 2018) the average risk premium in Indian market has largely been range bound with average risk premium being 8.4%.
- The expected cost of equity during the last 20 years has also been within a very close limits of 15%-18% and suggests a strong mean reversion despite significant intra-month movements

The risk premium has expanded since the year 2000. The increase was swift between 2000 and 2003 driven primarily by the downward sloping interest curve. Further while the risk premium has generally shifted downwards during the last 10 years, there is a strong tendency towards mean reversion. Drawing from this argument one can observe that much of the spike in 2008 during the global financial crisis dissipated soon after, as the equity risk premium returned to the pre-crisis levels.

## Conclusion

Looking at the historical trend line, we observe that implied risk premium averages to 8.17% over the last 20-year period. Given that this is fairly close to the current implied risk premium of 8.0% can one consider it appropriate to use the historical averages? Clearly, we have two set of arguments – one that historical averages (actual or implied) are relatively stable compared to current premium which is impacted by the daily volatility. The counter-argument is that sometimes structural shift (impact of which is likely to be for an extended period) in the market may demand a change in the risk premium and accordingly it is more appropriate to consider the current implied risk premium.



# 7. Closing thoughts

## Overview

In this paper we covered four approaches for estimating the equity risk premium and each approach has resulted in a different risk premium. To demystify the interlink among these approaches we tried reasoning the rationale why they behave the way they behave.

This section summarises our closing thought and explains the reasons why these approaches result in different numbers and what range of equity risk premium should one consider appropriate.

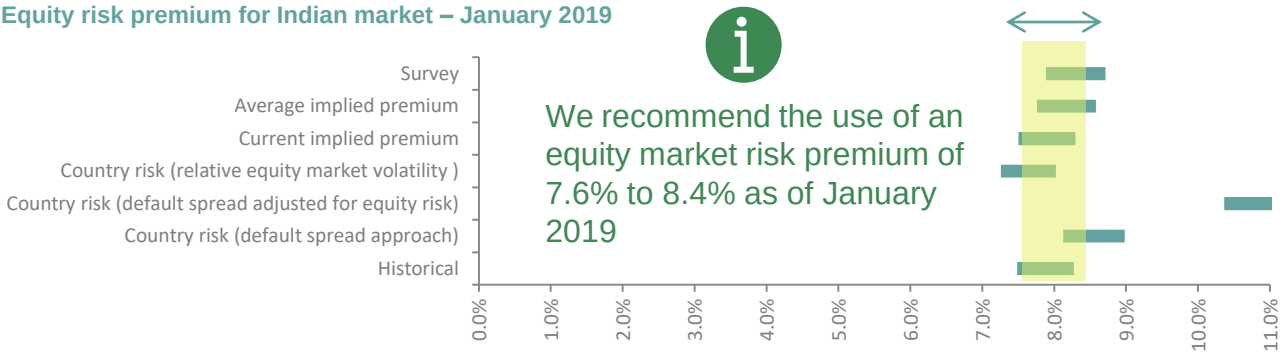
## Reasons why the approaches yield different numbers

The historical premium, average implied premium and country risk vary depending on the choice of period and method of averaging i.e. arithmetic or geometric mean.

Survey premium reflects the expectations of the participants and tends to be influenced by the current market and economic conditions. During slump period, the investor mood tends to be gloomy and the expectation of risk premium is likely to be higher than the historical average. Likewise, during period of boom, investors tend to be overly optimistic on future market performance and so their response is likely to underplay the historical or implied premium.

During extended period of upward market movement, the stock prices increase in conjunction with higher PE ratio and lower dividend yield. This translates into a lower implied risk premium. The historical premium on the contrary will move in the opposite direction as higher stock prices will result in higher historical return on stock over the treasury bond.

### Equity risk premium for Indian market – January 2019




*Note: The size of the bars reflect the comparable ERP (mean) +/- 5%*
*Source: NSE & BSE website and other publicly available information*

### Equity risk premium for Indian market – January 2019

| Approach: | ERP | Comments |
|---|---|---|
| Historical | 7.95% | Geometric average - Stocks over T.Bonds: 2003-2018 |
| Country risk (default spread approach) | 8.55% | Mature market base premium - US (5.1%) |
| Country risk (default spread adjusted for equity risk) | 10.82% | Mature market base premium - US (5.1%); 2 yr std dev considered |
| Country risk (adjusted for relative equity market volatility) | 7.58% | Mature market base premium - US (5.1%); 10 yr volatility considered |
| Current implied premium | 8.03% | Based on BSE Sensex as at 31 December 2018 |
| Average implied premium | 8.17% | Average of implied equity risk premium: 1998 - 2018 |
| Survey | 8.30% | Pablo Fernandez(2018); median estimate; average was 7.9% |

# 7. Closing thoughts

### Reasons why the approaches yield different numbers (contd.)

Substantial change in market fundamentals due to rare disasters has the ability to straight away increase the volatility and weaken investor confidence. The immediate impact of this shift can be seen on the implied risk premium which tends to move upwards. However, the historical risk premium may still not be impacted.

Further, while country default spread extracted from the credit default swap(CDS) rates will immediately reflect the current market and economic conditions by absorbing the volatility into the spread, it may not be the same when the country risk is derived synthetically from the sovereign credit /currency ratings, as rating agencies will take some time before taking into account the structural change in the economy and imputing that risk it in the ratings

Country risk derived by making a reference to domestic market volatility relative to a developed market volatility will vary significantly depending on the choice of length of period, interval and choice of indices. Markets may not be always efficient. Higher perceived risk in stocks will make investors risk averse and translate into lower liquidity and consequently lower volatility. The resultant country risk will then be lower than the implied risk premium or historical risk premium.

### Your choice of an approach, given a scenario

Given that different approaches give different results, what should be an approach of choice? Apparently, this question can vex a mind, but a deep understanding of the market dynamics and economic scenario can help uplift this veil. It is important to understand the context of valuation to choose an appropriate premium.

An implicit assumption in each approach is that the market is efficient. This belief can be looked from three perspectives:

- If the assumption be true, then the best fit approach would be the current implied risk premium as it has the ability to righty reflect the market participants view on risk premium
- situations that cause you to believe market is under/over-priced – look at average implied premium or historical premium as current implied premium may be over/under stated
- When you have no faith in the market, consider falling back on the survey premium or the country risk premium approach

Also consider the predictability power of the approach in rightly estimating the future risk premium. Empirical studies suggest that current implied risk premium is better correlated to the actual risk premium as compared to the historical risk premium. In essence, the historical risk premium should be the last choice in determining the equity risk premium.

### Your choice of an approach, given a scenario (contd.)

Finally, consider the purpose of valuation in deciding your cost of equity and risk premium. Private equity or equity research reports usually target limited time horizon investments. In such circumstances, it is prudent to consider the current implied risk premium as it reflects the current market fundamentals. However, if there are reasons to believe that the market is substantially under/over-priced, then look at the historical averages. On the contrary, strategic investments or cost of equity considered in project financing tend to consider a very long-time horizon making it appropriate to consider average implied risk premium or historical risk premium.

### Conclusion

**In Indian scenario, considering the results under each approach, we recommend the use of an equity market risk premium of 7.6% to 8.4% as of January 2019.**

# Glossary of terms

| | |
|---|---|
| **ERP** | Equity risk premium |
| **CAPM** | Capital Asset Pricing Model |
| **NSE** | National Stock Exchange |
| **BSE** | Bombay Stock Exchange |
| **NSE Nifty** | Index on NSE |
| **BSE Sensex** | Index on BSE |
| **CERC** | Central Electricity Regulator Commission |
| **NTPC** | National Thermal Power Corporation of India |
| **IAS** | Indian Accounting Standards |
| **INR** | Indian Rupee |
| **GDP** | Gross Domestic Product |
| **USD** | US Dollar |
| **STT** | Securities transaction tax |
| **RBI** | Reserve Bank of India |
| **RoI** | Return on Investment |
| **CDS** | Credit Default Swap |
| **Std Dev** | Standard Deviation |
| **Yr** | Year |
| **$K_e$** | Cost of Equity |
| **RoE** | Return on Equity |

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