These reports related to Dividend Strategies originally published as of the date stamp on each of them, are now presented as a single report within the Investment Strategies series of publications under number 95.

# Dividend Swaps

## Product Note

- **Dividend swaps offer direct exposure to the dividend stream of an underlying asset**, be it either a single stock or an equity index. They are liquid to varying degrees for major equity indices, with Europe having the greatest depth of market.

- **Dividend swaps represent an attractive new asset class**, **particularly those looking for protection against inflation.** Dividend swaps can be used as an alternative to equities, for pension fund managers, insurance companies, and any other liability driven investors.

- The recent **development of the index dividend swap futures market has improved the transparency of the dividend swap market**, and led to greater accessibility, increased flows and liquidity, and reduced counterparty risk.

- **The major use is taking a view on dividend payments**. However, dividend swaps offer a tactical alternative to equity exposure and can be analysed using similar company valuation techniques to those used by equity investors. Dividend swaps can also be used for relative value trades versus other assets, such as credit for example.

- Since dividend payments are made at a specific time, **investors can take more tailored views on equity themes**, such as economic and growth cycles rather than an *average* view embedded within a share price.

- **One of the attractions of dividend swaps is the pull-to-realised effect**. Pull-to-realised is due to the fact that dividend swaps eventually pay out according to actual realised dividends that companies pay. Therefore exiting a dividend trade is less prone to changes in market sentiment.

- In this note we discuss the market, mechanics, long-term economic drivers and uses of dividends swaps.

- Valuation is not the only driver. **Dividend swaps are heavily influenced by the supply/demand of structured product providers**. Consequently, understanding this market is also important when assessing dividend swap value.

- **The mechanics of dividend swaps have some subtleties**. Generally only ordinary dividends qualify. Special dividends and returns of capital may be excluded. **We explain the requirements for qualification as a realised dividend payment.**

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See page 70 for analyst certification and important disclosures, including non-US analyst disclosures.

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# 1. Introduction

**A d*ividend swap* offers straightforward and direct exposure to the dividends paid by an underlying stock or index**. It is a swap contract where the parties agree to exchange a pre-agreed dividend level (the **implied dividend**, or strike) for the actual amount of dividends paid by the stock or index (the **realised dividend**) between two specified dates. The **realised dividend** is the total amount of all qualifying dividends going ex by the underlying equity or index, between the start date (exclusive) and end date (inclusive).

**The buyer of a dividend swap is long dividends** at the pre-agreed level. If the stock or index delivers a higher dividend amount than the fixed leg of the swap, the long dividend position will profit. Conversely, if the stock or index delivers a lower dividend amount, then the long dividend swap position will suffer a corresponding loss. Similarly, the seller of a dividend swap is short dividends.

Unlike many "exotic" equity derivative instruments such as variance swaps or even vanilla options, dividend swaps are linear in their payout. Therefore dividend swaps have no direct convexity issues inherent in many derivative instruments.

**Dividend swaps have a tangible valuation framework** and can be analysed directly from a fundamental economic perspective or using standard equity valuation models. Nonetheless, dividend swap mark-to-market is **heavily influenced by activity in the derivative markets and so awareness of both value and equity derivatives flows is necessary for understanding the dynamics of the dividend swap market**.

Much of the attraction of using dividend swaps relies on the **pull-to-realised** effect. **Pull-to-realised is due to the fact that dividend swaps eventually pay out according to the actual realised dividends that companies pay**. Since final settlement is based upon real underlying company fundamentals (and so economic factors), the exit from a dividend trade is less susceptible to changes in market sentiment. This contrasts to equities, where at any time there may be an impact on valuations from suppressed market conditions or exuberant expectations, which could prevent a timely exit from any trade.

### Market Development

Dividend swaps were first traded in the late 1990's/early 2000's as a way of reducing dividend exposure that had accumulated on structured equity derivatives providers' books. The vast majority of equity structured products are *savings products* and consequently involve the end investor wanting *long* exposure to the equity market at some *future* date. This **end investor demand equates to long equity forward exposure, which consequently leaves investment banks with short equity forward (and therefore long dividend) exposure.**

Moreover as demand mainly came from retail structured products, **the most liquid and long dated dividend exposures are consequently associated with equity indices**, particularly in Europe. However, in the period between 2003 and 2007, single stock basket based products also became popular and so there was increased liquidity in single stock dividend swaps. More recently there has been increased liquidity in index dividend swaps in other regions, for example Nikkei 225 and S&P 500, as structured products use has expanded into global markets.

The short equity forward exposure can be hedged either by buying equity forwards in the market (which only really passes on the dividend risk) or through **replicating the forward position by holding the underlying stocks in a cash-and-carry strategy**. Equity cash-and-carry strategies effectively have two components: the financing leg and the dividend income. The financing leg can be hedged in the interest rate market. The dividend swaps market was created in order to hedge the dividend income component. Fortunately, a clean exposure to dividends is more attractive to many investors than equity forwards, which obscure dividend exposure since they are priced with both a dividend *and* a financing component.

Although equity forward hedging explains the initial creation of the market, dividend swaps have now become an asset class in their own right, and the supply from structured products, though still important, is diminishing in importance since we see sufficient demand from new investors. The ultimate constraint for the growth of the market may be finding equity investors willing to sell or lock in their dividend income (as discussed in section 4.1) to match the demand from those wishing to go long dividends. The potential size of realised dividends in any one year is limited to the "dividend yield" of the total market capitalisation (assuming all dividends for that year are *stripped* and sold separately). Nonetheless **as dividend swaps are cash settled, they have the capacity to grow beyond the physical market** in the same way the CDS market has grown beyond the bounds of the physical bond market.

The recent introduction of **exchange traded futures based on dividend swap payout has also improved the transparency of pricing and increased availability of the product.**

## Mechanics

As a general rule, **100% of ordinary dividends declared by the issuer, either paid as cash or shares are counted as a realised dividend unless the exchange or index sponsor makes a corresponding adjustment to the share price or index**. However specials, dividend paid in shares or exceptionally large dividends may be excluded. We discuss the requirements for qualification in more detail in section 2. A good summary is provided in Figure 2, page 12.

For those who are more technically minded, we show the mathematical details of how dividend exposure arises from equity forwards in section 5.

## Economic and fundament drivers of realised dividends

The fact that **dividends swaps eventually settle based upon the actual realised dividends that companies pay, means that valuation is eventually the overriding important factor**. In section 3 we discuss the fundamental and economic drivers of realised dividends. In the first part we discuss flow drivers and, in particular, the impact of structured products. We then discuss some of the fundamental drivers, concentrating on more macro economic perspectives. We also investigate how implied dividends can be used to replicate the realised dividend growth in final part of this section.

## Uses of dividends swaps

**Gaining clean exposure to dividends is the most obvious benefit of dividend swaps.** However, there are many interesting relative trades that can be done against other assets such as equities, credit or bonds. Furthermore, since dividends are based upon specific future cash flows, nuanced trades can take advantage of economic trends and exposures, such as the timing of recessions, business cycles, inflation exposure, etc. **We provide a detailed analysis of some of the uses of dividend swaps in section 4.**

## Layout of the report

Throughout the report we have used **bounded boxes to highlight key points** about the dividend swap market**. Grey boxes are used to highlight case examples**.

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# 2. Mechanics

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# 2. Mechanics

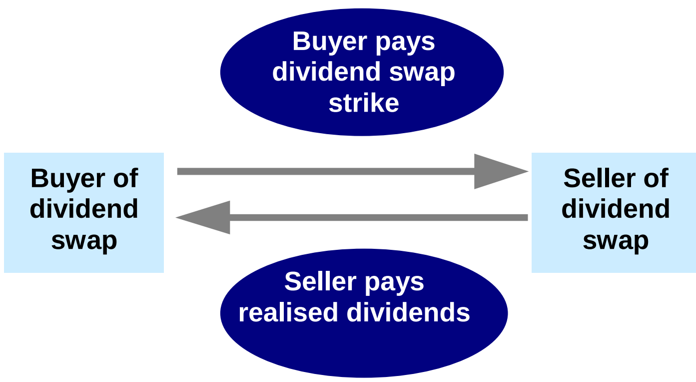
**A *dividend swap* offers direct exposure to the dividends paid by an underlying stock or index**. It is a swap contract where the parties agree to exchange a pre-agreed dividend level (the **implied dividend**, or strike) for the actual amount of dividends paid by the stock or index (the **realised dividend**) between two specified dates.

**Payout of a long divided swap position = Notional x ( Realised dividend - Implied dividend )**

The **realised dividend** is the total amount of all qualifying dividends going ex by the underlying equity or index, between the start (exclusive) and end (inclusive) dates. The definition of a qualifying dividend is explained below. Note that the date of each dividend payment is **determined by the ex-dividend date**, and not the announcement date or payment date.

At the expiry of the dividend swap contract, the respective payments become due. These payments are offset against each other, with the net profit / loss being paid by one party to the other. As with any derivative, initial and variation margin may also be required during the life of the contract. We explain the mechanics and contract specifications of dividend swaps in following sections. Figure 1 illustrates a simple representation of the cash-flows associated with a dividend swap.

Figure 1 : Cash flows associated with a dividend swap




Source: JPMorgan

While OTC dividend swaps have been around since the late 1990s, **dividend swap futures** were introduced by Eurex in June 2008. They are a contract based upon the payment of dividends going ex- in that calendar year (or at least between December expiries). In principle they are equivalent to dividend swaps at expiry and so the price is driven by the same mechanics as the underlying dividend swap. The main difference is that the dividend swap payout is valued at the expiry of the dividend swap and so the interim mark-to-market is the discounted value of this future payment. In contrast, the dividend future has a mark-to-market based on the change of the forward price and has no discounting. This gives futures an equivalent notional size compared to dividends, but a different mark-to-market or risk equivalent size. The risk equivalent size will be bigger than the notional size. Furthermore, the difference in mark-to-market introduces the possibility of a financing adjustment to the price of futures compared to dividend swaps. We discuss these differences in more detail in section 4.3.

## 2.1. Contract Specifications

**A dividend swap has zero value at inception.** The value of the dividend swap may change when dividends are realised, or when expectations of future dividend payments change. The pre-agreed strike is often referred to as the ***implied* dividend** because it is the level of realised dividends required, between the start- and end-dates, for the swap to have zero value at expiry.

The **start- and end-dates** of a dividend swap **usually correspond to a date close to the beginning and end of a calendar year.** However, in order to align with normal exchange expiry schedules, the dates chosen are commonly the third Friday of December. For example, the 2010 dividend swap will include all dividends going ex between 18-Dec-2009 (exclusive) and 17-Dec-2010 (inclusive). The final date is included, since stocks typically go ex-dividend at the open of that day. For OTC trades, start and end dates can be tailored to suit an investors' needs. Since dividend swaps are closely associated with options, contracts can usually be constructed for any standard exchange date or spot trade date.

In contrast to many financial instruments with a term expiry**, dividend swaps are usually quoted directly as forward starting instruments**. For example, a 2015 dividend swap includes *only* dividends payments between the expiries in Dec-2014 and Dec-2015. In contrast a variance or interest rate swap expiring in Dec-2015 will have exposure from the current spot trade date to the final expiry date.

**The notional size of the dividend swap is also necessary to calculate final p/l.** For single stock options this is given by the number of shares. Thus the final p/l at expiry is equal to the absolute difference between the realised and implied dividend multiplied by the number of shares specified in the dividend swap at expiry. For indices, a *value per index point* has to be defined. In OTC contract this is usually equal 1 currency unit per index point. For example, one Euro Stoxx 50 index point of dividend is worth €1 of p/l. This is referred to as 1 **basket** notional size. Thus a trade of 10,000 Euro Stoxx 50 baskets would have exposure of €10,000 per index point. Eurex dividend futures are defined such that 1 index point is worth €100, so that 1 dividend swap future has the equivalent *notional* exposure of 100 OTC baskets.

**Index example p/l**

An investor wishes to take a view that Euro Stoxx 50 dividends through 2008 will be greater than that currently implied. The investor buys 25,000 baskets of the Dec-2008 expiry Euro Stoxx 50 implied dividend swap at a strike of 138ip. At expiry of the dividend swap, the Euro Stoxx 50 has realised 158.58 index points (Table 1).

The p/l at expiry to the long position = €25,000 * ( 158.58 - 138.00 ) = €514,500

A similar trade construction using Eurex Euro Stoxx 50 dividend futures would require 250 Dec-08 futures contracts.

**Single stock example p/l**

An investor thinks the dividend paid by Nokia in 2009 is at risk of being lower than the €0.5 currently being implied. The investor sells a Dec-09 dividend swap based on 2,000,000 shares. Nokia announces a dividend of €0.4 due to go ex-dividend on the 24th April.

Thus p/l at expiry in December to the short position = -2,000,000 * (€0.4-€0.5) = +€200,000

**Margins and collateral**. As in most OTC instruments, dividend swaps usually involve some initial margin upfront as collateral. Dividend swap futures also require initial margin, typically around 5-10% of the initial notional size of the contract.

**Closing out –** Investors wanting to capture realised mark-to-market p/l of an OTC dividend swap generally have two choices. The can either enter into an opposing offsetting contract, potentially with a different counterparty (which introduces counterparty risk), or they can agree with the original counterparty on a level at which to close out the contract. In the above Nokia example, there could be good reason to close out the dividend swap early as the dividend is often announced well before the expiry of the dividend swap and so has little chance of accruing further p/l. Moreover, for a holder of a long dividend position there is risk in that time that the dividend may be cancelled or that the company goes bankrupt before going ex-dividend. As in most OTC contracts *novation* is possible, which allows for a client that has the opposite trade to the original but with a different counterparty to close out the contract fully.

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## 2.2. Realised dividends

Since the payout of a dividend swap is based upon realised dividends that go ex-dividend between two dates, at first glance it seems obvious how to calculate the realised dividend stream of that asset between the start date and expiry. But there are subtleties which can complicate what is defined as a realised dividend for both a stock and an equity index dividend swap.

As a general rule, **100% of ordinary dividends declared by the issuer, either paid as cash or shares, that go ex-dividend between the start (exclusive) and end (inclusive) date are counted as a realised dividend unless the exchange or index sponsor makes a corresponding adjustment to the share price or index level**.

This general rule is applied since dividend swaps are usually constructed to be consistent with dividend handling specified for the underlying forward contracts written on that underlying. Moreover as most forward contracts are traded directly or as a result of either OTC or exchange listed options contracts, options contracts already have specifications dealing with inclusion of dividend payments. Hence dividend swaps usually conform to the same rules.

**Importantly, rules can vary from exchange to exchange and so it is best to clarify dividend treatment in any dividend swap before trading. The listing of futures contracts has meant that exchanges have begun to publish the levels of eligible realised dividends.**

**Normally 100% of ordinary dividends are included**. Contract terms typically specify that realised dividend amounts are calculated as an amount per share in the dividend currency or for an index the aggregated sum of constituent dividends. Dividends are usual counted before any deduction or credit for withholding tax, stamp tax, or any other tax, duties, fees or commissions.

**Cash dividends paid as a result of a return of capital or reduction of par value may or may not be included in full.** The exact treatment of return of capital dividends depends on the index sponsor. STOXX family indices do not include these as eligible dividends, whereas the SMI family of indices do. For single stocks the rules vary from exchange to exchange and may include, exclude or partially include dividends paid as a return of capital.

For example Eurex partially adjusts a par value reduction, assuming any payment greater than the previous years is a special dividend. During the early part of the 2000s a change in Swiss company law allowed for a reduction in the minimum par value of a share. Zurich Financial services decided to reduce its par value from CHF10 to CHF0.1 over a period of three years.

| Ex-Date | Dividend(CHF) | Type | Ordinary | Special |
|---|---|---|---|---|
| 22-May-2002 | 6.12 | Ordinary* | 6.12 | |
| 15-Jul-2003 | 1 | Return of capital | 1 | |
| 30-Jun-2004 | 2.5 | Return of capital | 1 | 1.5 |
| 1-Jul-2005 | 4 | Return of capital | 2.5 | 1.5 |
| 3-Jul-2006 | 2.4 | Return of capital | | 2.4 |
| | 4.6 | Ordinary | 4.6 | |
| 5-Apr-2007 | 11 | Ordinary | 11 | |

* - Adjusted for Oct-2002 rights issue

**Special dividends or extraordinary dividends do not usually count as realised dividends for the purposes of dividend swaps.** In general this is true if the dividend has optionality (scrip), is dilutive to earnings per share or is a return of capital.

For example, the €0.80 *special* scrip dividend due to be paid by GDF Suez in May is not included as an eligible Euro Stoxx 50 dividend, however due to the rules of dividend inclusion any withholding tax paid on this dividend *is* included.

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**Dividends paid in stock may or may not be included**. A good rule of thumb to follow in deciding about inclusion of a stock paid dividend is whether the payment is dilutive to existing shareholders.

For example BBVA Q1 2009 dividend was paid in Treasury stock, which was not considered to be dilutive and so was included. In contrast the 2009 Unicredit dividend which was a *scrip issue* paid in newly issued stock was not included.

**If in doubt contact the exchange or index calculation agent.** As previously stated dividend swaps are generally designed to align with exchange options and forwards. Most exchanges publish exact rules for dealing with most dividend eventualities. In the event of uncertainty, ISDA documentation specifies which party to the agreement can make the final calculation decision.

**Index dividends are aggregated from single stocks**. The calculation of index dividend point is based upon how much the index should theoretically fall after each aggregate single stock dividend goes ex-dividend. Normally an index level is calculated using the following calculation.

$$\textbf{Index Level}\ (t) = \sum_{i=1}^{N} \frac{NOSH_i(t) \times FF_i(t) \times P_i(t)}{Divisor(t)},$$

where $NOSH_i(t)$, $FF_i\ (t)$ and $P_i\ (t)$ are the **N**umber **O**f **SH**ares used in the index calculation (usually equal to the number of shares in issuance), the **F**ree **F**loat adjustment factor and **P**rice of the stock $i$ at time $t$. The term $Divisor(t)$ is the index divisor at time $t$. $N$ is the number of constituent members in the index. This data can usually be obtained from the relevant index sponsor. Thus the index dividend drop on any date is given by

$$\textbf{Dividend Index Points}\ (t) = \sum_{i=1}^{N} \frac{NOSH_i(t) \times FF_i(t) \times D_i(t)}{Divisor(t)},$$

where $D_i\ (t)$ is the dividend for stock $i$ going ex-dividend at time t denominated in the same currency as the index. If the stock dividend is paid in a different currency to that of the index, a FX rate will be needed in order to convert. Some companies declare their dividends in a different currency to the stock price currency, but actually pay the dividend in the same currency using a published FX rate (or may just publish a FX rate to be used). In this case it is the issuer's published FX rate that is used. In cases where no published rate is available, the calculation agent will determine one, typically equal to the value of the FX rate on the ex-dividend date, but valued at the payment date.

In Table 1, we show the eligible dividends paid by the Euro Stoxx 50 members in 2008 and how these are aggregated.

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Table 1 : Example of the Euro Stoxx 50 realised dividend stream through 2008 (Dec-2007 through Dec-2008)

| Name | Ccy | Type | Gross (#1) | Ex-div | Payment | FX (#2) | NOSH (#3) | Free Float (#4) | Divisor (#5) | Index Point (=#1*#2*#3*#4/#5) |
|---|---|---|---|---|---|---|---|---|---|---|
| IBERDROLA | EUR | Ordinary | 0.115 | 2-Jan | 2-Jan | 1 | 4993742040 | 0.7949 | 527569058 | 0.865 |
| BBVA | EUR | Ordinary | 0.152 | 10-Jan | 10-Jan | 1 | 3747969121 | 1 | 527569058 | 1.080 |
| REPSOL YPF | EUR | Ordinary | 0.500 | 15-Jan | 15-Jan | 1 | 1220863463 | 0.659 | 527569058 | 0.763 |
| SIEMENS | EUR | Ordinary | 1.600 | 25-Jan | 25-Jan | 1 | 914203421 | 0.9442 | 527569058 | 2.618 |
| BANCO SANTANDER | EUR | Ordinary | 0.123 | 1-Feb | 1-Feb | 1 | 6254296579 | 1 | 527569058 | 1.457 |
| ARCELORMITTAL | USD | Ordinary | 0.375 | 3-Mar | 17-Mar | 0.659326 | 1448826347 | 0.5696 | 524037583 | 0.389 |
| PHILIPS ELECTRONICS | EUR | Ordinary | 0.700 | 28-Mar | 7-Apr | 1 | 1142826763 | 0.9318 | 524037583 | 1.422 |
| DAIMLER AG | EUR | Ordinary | 2.000 | 10-Apr | 10-Apr | 1 | 1013868596 | 0.9278 | 524037583 | 3.590 |
| BBVA | EUR | Ordinary | 0.277 | 10-Apr | 10-Apr | 1 | 3747969121 | 0.95 | 524037583 | 1.882 |
| CARREFOUR | EUR | Ordinary | 1.080 | 18-Apr | 23-Apr | 1 | 704902716 | 0.7788 | 524037583 | 1.131 |
| RWE | EUR | Ordinary | 3.150 | 18-Apr | 18-Apr | 1 | 523405000 | 0.8391 | 524037583 | 2.640 |
| MUENCHENER RUECKVER | EUR | Ordinary | 5.500 | 18-Apr | 18-Apr | 1 | 217888670 | 0.9382 | 524037583 | 2.146 |
| TELECOM ITALIA | EUR | Ordinary | 0.080 | 21-Apr | 24-Apr | 1 | 13380794192 | 0.764 | 524037583 | 1.561 |
| ING GROEP NV-CVA | EUR | Ordinary | 0.820 | 24-Apr | 5-May | 1 | 2226445299 | 0.9411 | 524037583 | 3.279 |
| AXA | EUR | Ordinary | 1.200 | 24-Apr | 29-Apr | 1 | 2060753492 | 0.8552 | 524037583 | 4.036 |
| AEGON | EUR | Ordinary | 0.320 | 25-Apr | 23-May | 1 | 1636544530 | 0.8279 | 524037583 | 0.827 |
| BASF SE | EUR | Ordinary | 3.900 | 25-Apr | 25-Apr | 1 | 490485000 | 1 | 524037583 | 3.650 |
| L'OREAL | EUR | Ordinary | 1.380 | 25-Apr | 30-Apr | 1 | 610788610 | 0.404 | 524037583 | 0.650 |
| SCHNEIDER ELECTRIC | EUR | Ordinary | 3.300 | 25-Apr | 30-Apr | 1 | 245160670 | 1 | 524037583 | 1.544 |
| VOLKSWAGEN | EUR | Ordinary | 1.800 | 25-Apr | 25-Apr | 1 | 291337267 | 0.4868 | 524037583 | 0.487 |
| BAYER | EUR | Ordinary | 1.350 | 28-Apr | 28-Apr | 1 | 764341920 | 1 | 524037583 | 1.969 |
| E.ON | EUR | Ordinary | 4.100 | 2-May | 2-May | 1 | 667000000 | 0.947 | 524037583 | 4.942 |
| BANCO SANTANDER | EUR | Ordinary | 0.282 | 2-May | 2-May | 1 | 6254296579 | 1 | 524037583 | 3.365 |
| FORTIS | EUR | Ordinary | 0.590 | 2-May | 27-May | 1 | 2366595497 | 1 | 524037583 | 2.664 |
| GROUPE DANONE | EUR | Ordinary | 1.100 | 9-May | 14-May | 1 | 512851460 | 1 | 524037583 | 1.077 |
| NOKIA OYJ | EUR | Ordinary | 0.530 | 9-May | 27-May | 1 | 3932541492 | 1 | 524037583 | 3.977 |
| SUEZ SA | EUR | Ordinary | 1.360 | 9-May | 14-May | 1 | 1307043522 | 0.906 | 524037583 | 3.073 |
| VIVENDI | EUR | Ordinary | 1.300 | 9-May | 14-May | 1 | 1164743220 | 1 | 524037583 | 2.889 |
| RENAULT | EUR | Ordinary | 3.800 | 12-May | 15-May | 1 | 284937118 | 0.6999 | 524037583 | 1.446 |
| TELEFONICA | EUR | Ordinary | 0.400 | 13-May | 13-May | 1 | 4773496485 | 0.876 | 524037583 | 3.192 |
| AIR LIQUIDE | EUR | Ordinary | 2.250 | 14-May | 19-May | 1 | 236024449 | 1 | 524037583 | 1.013 |
| SANOFI-AVENTIS | EUR | Ordinary | 2.070 | 16-May | 21-May | 1 | 1365916644 | 0.7864 | 524037583 | 4.243 |
| DEUTSCHE TELEKOM | EUR | Ordinary | 0.780 | 16-May | 16-May | 1 | 4361319993 | 0.68 | 524037583 | 4.414 |
| UNICREDIT | EUR | Ordinary | 0.260 | 19-May | 22-May | 1 | 13343857457 | 1 | 524037583 | 6.621 |
| ENI | EUR | Ordinary | 0.700 | 19-May | 22-May | 1 | 4005358876 | 0.6089 | 524037583 | 3.258 |
| ASSICURAZIONI GENERALI | EUR | Ordinary | 0.900 | 19-May | 22-May | 1 | 1409664045 | 0.8278 | 524037583 | 2.004 |
| INTESA SANPAOLO | EUR | Ordinary | 0.380 | 19-May | 22-May | 1 | 11849332367 | 0.755 | 524037583 | 6.487 |
| UNILEVER | EUR | Ordinary | 0.500 | 19-May | 19-Jun | 1 | 1714727700 | 0.921 | 524037583 | 1.507 |
| TOTAL | EUR | Ordinary | 1.070 | 20-May | 23-May | 1 | 2395532097 | 0.8823 | 524037583 | 4.316 |
| LVMH | EUR | Ordinary | 1.250 | 20-May | 23-May | 1 | 489937410 | 0.5258 | 524037583 | 0.614 |
| ALLIANZ SE | EUR | Ordinary | 5.500 | 22-May | 22-May | 1 | 452350000 | 1 | 524037583 | 4.748 |
| DEUTSCHE BOERSE | EUR | Ordinary | 2.100 | 22-May | 22-May | 1 | 200000000 | 1 | 524037583 | 0.801 |
| VINCI | EUR | Ordinary | 1.050 | 23-May | 19-Jun | 1 | 486986306 | 1 | 524037583 | 0.976 |
| BNP PARIBAS | EUR | Ordinary | 3.350 | 26-May | 29-May | 1 | 905695445 | 0.942 | 524037583 | 5.454 |
| CREDIT AGRICOLE | EUR | Ordinary | 1.200 | 27-May | 30-May | 1 | 1669756872 | 0.4591 | 524037583 | 1.755 |
| FRANCE TELECOM | EUR | Ordinary | 1.300 | 29-May | 3-Jun | 1 | 2614348911 | 0.7266 | 524037583 | 4.712 |
| DEUTSCHE BANK | EUR | Ordinary | 4.500 | 30-May | 30-May | 1 | 530400100 | 0.9447 | 524037583 | 4.303 |
| ARCELORMITTAL | USD | Ordinary | 0.375 | 2-Jun | 16-Jun | 0.644828 | 1448826347 | 0.5696 | 524037583 | 0.381 |
| SOCIETE GENERALE | EUR | Ordinary | 0.900 | 3-Jun | 6-Jun | 1 | 583236761 | 1 | 524037583 | 1.002 |
| SAP | EUR | Ordinary | 0.500 | 4-Jun | 4-Jun | 1 | 1246258408 | 0.7114 | 524037583 | 0.846 |
| SAINT-GOBAIN | EUR | Ordinary | 2.050 | 16-Jun | 19-Jun | 1 | 374240752 | 0.8345 | 524037583 | 1.222 |
| ENEL | EUR | Ordinary | 0.290 | 23-Jun | 26-Jun | 1 | 6185454653 | 0.6875 | 520961635 | 2.367 |
| IBERDROLA | EUR | Ordinary | 0.156 | 1-Jul | 1-Jul | 1 | 4993742040 | 0.7846 | 520961635 | 1.173 |
| REPSOL YPF | EUR | Ordinary | 0.500 | 9-Jul | 9-Jul | 1 | 1220863463 | 0.648 | 520961635 | 0.759 |
| BBVA | EUR | Ordinary | 0.167 | 10-Jul | 10-Jul | 1 | 3747969121 | 0.95 | 520961635 | 1.141 |
| BANCO SANTANDER | EUR | Ordinary | 0.135 | 1-Aug | 1-Aug | 1 | 6254296579 | 1 | 521867746 | 1.620 |
| AEGON | EUR | Ordinary | 0.300 | 8-Aug | 15-Sep | 1 | 1636544530 | 0.8081 | 521867746 | 0.760 |
| ING GROEP | EUR | Ordinary | 0.740 | 14-Aug | 21-Aug | 1 | 2226445299 | 0.9151 | 521867746 | 2.889 |
| ARCELORMITTAL | USD | Ordinary | 0.375 | 2-Sep | 15-Sep | 0.683948 | 1448826347 | 0.5696 | 521867746 | 0.406 |
| FRANCE TELECOM | EUR | Ordinary | 0.600 | 8-Sep | 11-Sep | 1 | 2614348911 | 0.7266 | 521867746 | 2.184 |
| ENI | EUR | Ordinary | 0.650 | 22-Sep | 25-Sep | 1 | 4005358876 | 0.6084 | 520703202 | 3.042 |
| BBVA | EUR | Ordinary | 0.167 | 10-Oct | 10-Oct | 1 | 3747969121 | 0.95 | 520703202 | 1.142 |
| BANCO SANTANDER | EUR | Ordinary | 0.135 | 3-Nov | 1-Nov | 1 | 6254296579 | 1 | 513545305 | 1.646 |
| UNILEVER | EUR | Ordinary | 0.260 | 5-Nov | 3-Dec | 1 | 1714727700 | 0.9056 | 513545305 | 0.786 |
| TELEFONICA | EUR | Ordinary | 0.500 | 12-Nov | 12-Nov | 1 | 4704996485 | 0.8742 | 516476101 | 3.982 |
| TOTAL | EUR | Ordinary | 1.140 | 14-Nov | 19-Nov | 1 | 2371402408 | 0.8901 | 516476101 | 4.659 |
| GDF SUEZ | EUR | Ordinary | 0.800 | 24-Nov | 27-Nov | 1 | 2191532680 | 0.59 | 516476101 | 2.003 |
| ENEL | EUR | Ordinary | 0.200 | 24-Nov | 27-Nov | 1 | 6185727733 | 0.6778 | 516476101 | 1.624 |
| LVMH | EUR | Ordinary | 0.350 | 27-Nov | 2-Dec | 1 | 489941110 | 0.5258 | 516476101 | 0.175 |
| ARCELORMITTAL | USD | Ordinary | 0.375 | 2-Dec | 15-Dec | 0.793147 | 1448826347 | 0.5188 | 516476101 | 0.433 |
| VINCI | EUR | Ordinary | 0.520 | 15-Dec | 18-Dec | 1 | 493632532 | 1 | 516476101 | 0.497 |
| 2008 Total | | | | | | | | | | 158.576 |

Source: J.P. Morgan

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We show an example, using data in Table 1, of how an index dividend is calculated from an individual stock dividend, using the March dividend of ArcelorMittal (sixth line on Table 1).

ArcelorMittal pays a **$0.375** dividend going ex-dividend on 3-March-2008. What is this worth in Euro Stoxx 50 dividend points? Firstly the dividend is denominated in $ and the index is in €. Thus we need to calculate what the dividend payment per share is worth in €. The FX rate published by issuer at that time was 1.5167 $/€ or 0.659326 €/$. Hence the dividend per share, in €, is worth:

$D_i(t)$ = 0.659326 x 0.375 = **€0.247247**.

The number of shares on that date that ArcelorMittal had in issue was **1,448,826,347** and the free float (as decided by STOXX) was **56.96%** of the shares The limited free float is based upon the fact that 43.04% are held by a single owner and deemed not to be freely tradable. The Euro Stoxx 50 index divisor on the ex-dividend date was equal to **524,037,583**. Consequently the dividend in Euro Stoxx 50 index points is worth:

Dividend Index Points = 0.247247 x 1,448,826,347 x 0.5696 / 524,037,583 = **0.389** (rounded to 3 d.p.)

Obviously all the dividend multiplying factors can and do vary over time. For example, the divisor varies throughout the year in Table 1. The free float can change, for example the Iberdrola free float was 0.7949 in January 2008, but 0.7846 in July 2008. The number of shares can also change. If a share change results from a corporate action which has material impact, the change is usually reflected immediately on the ex date of the action (see later section *Corporate Actions*). Otherwise the number of shares is reviewed quarterly to reflect actions such as buy-backs or scrip dividends. For example, in 2008, Telefonica was assumed to have had 4,773,496,485 shares in May, but 4,704,996,485 in November.

More importantly, dividend swaps are only really available on indices which are defined as a price return index. The DAX for example is a Total Return index so does not pay any dividend.

The treatment of taxation can also be important and the definition of the tax treatment in the dividend swap specification may result in the implied dividend strike trading at a premium or discount.

Moreover, different index providers have different rules on inclusion of dividend payments. We provide some useful links to the websites listing the rules for the most widely used indices in the Appendices.

In Table 1 the €0.38 dividend paid by Intesa SanPaolo dividend was included in full from the Euro Stoxx. However the MIB calculation limits ordinary dividends to a maximum of 8% of the current share price. Hence only €0.3487 was included as an *ordinary* dividend (i.e. eligible as a realised dividend payment) in the S&P/MIB index, with the remaining €0.0313 treated as a special and adjusted in the price.

In the following figure, we summarize the decision tree that should be used in decide whether any particular stock dividend is included as a realised dividend in a dividend swap.

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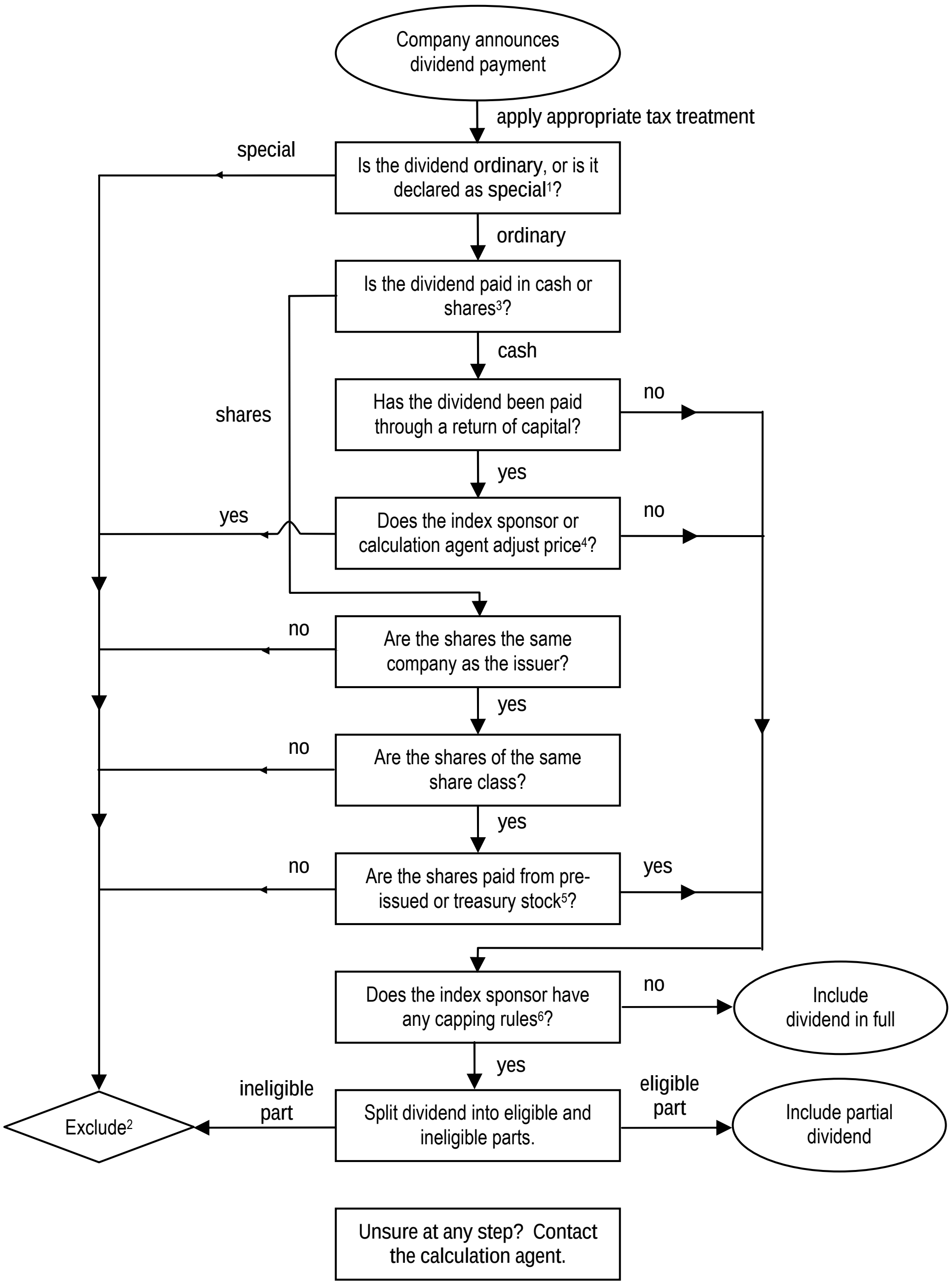
Figure 2 : Flow chart showing the dividend inclusion decision tree for a constituent member stock – once included the dividend aggregation formula can be applied to that dividend




1. Dividends are usually declared extraordinary or *special* by the issuer. Dividends may also be declared special if they are outside the scope of the ordinary distribution or paid from non-operating income.
2. If the excluded dividend is undertaken net of withholding tax, the withholding tax credit on that dividend may be included as if it were an *ordinary* dividend distribution by the index sponsor.
3. Scrip dividends which have the option to either receive cash or newly issued shares are usually included at the cash amount.
4. Return of capital through an ordinary dividend treatment is one dividend treatment which may vary across indices.
5. Ordinary dividends paid from treasury stock will require a cash equivalent amount.
6. Some index provider cap or exclude dividend payments based on their absolute yield on ex-dividend date.

Source: J.P. Morgan

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## 2.3. Corporate Actions

As with all forward contracts, corporate actions complicate calculation. However many exchanges already have rules for dealing with corporate actions for both their index and single stock options contracts for corporate actions such as stock splits, rights issues, spin-off etc. We recommend that investors should familiarise themselves with the relevant handling of corporate actions, which are available for exchanges. We provide some useful links to the websites listing the rules for the most widely used indices in the Appendices.

Dividend swaps usually follow the same rules. For example, a 2 for 1 stock split would usually involve doubling the number of shares and halving the dividend swap strike specified in the original dividend swap.

In 2008 BASF undertook a 2 for 1 stock split. A 2009 dividend swap transacted before that date with a strike of €4 for 25,000 shares would become a 2009 dividend swap with a strike of €2 for 50,000 shares.

**Mergers and Take-overs**. The most contentious issues surrounding the effect of corporate actions on dividend swaps involve the impact of mergers and take-over events. Normally unless the cash component is greater than 67% of the deal, a substitution rule is applied. When a company is taken over as a full cash deal, most exchanges (but not all) adopt a "Fair-Value" method of settling options contracts, normally settled at the time the bid becomes unconditional. The "Fair-Value" method will involve the exchange posting a future dividend schedule which can be used to settle the dividend swap. Generally the implied dividend forecasts are supplied using an external provider, such as MarkIt for example.

In 2007 Numico was purchased by Group Danone in return for Cash. Since the deal involved a cash transaction the exchange had to Fair Value settle all options contracts. Euronext Amsterdam published a circular with the following dividend stream, along with interest rates and volatility surfaces to use in the Fair-Value calculation. The forward dividend stream is shown below:

| Ex-Date | Dividend(€) |
|---|---|
| 29-April-2008 | 0.263 |
| 29-April-2009 | 0.335 |
| 28-April-2010 | 0.408 |
| 28-April-2011 | 0.564 |

This stream can be used to settle the dividend swap contract. In comparison, Numico had paid the following dividends in the previous two years.

| Ex-Date | Dividend(€) |
|---|---|
| 5-May-2006 | 0.1 |
| 27-April-2007 | 0.2 |

## 2.4. Other risks to consider

**Index reconstitution.** Obviously the constituents of an index can change at any time. Sometimes this may be a result of a take-over, but it can also be as a result of a periodic index review or some other rule eliminating members following a rapid weight change. There are two ways that index reconstitution can affect index dividend swaps.

1) **Replacement stocks may have a different dividend yield or weight than the original constituent stock**, thus affecting the total index dividends paid. In practice, the relative uniformity of dividend yields across the largest companies in Europe has partially mitigated this risk for the Euro Stoxx 50 index, since stocks being removed from the index are usually replaced by stocks with a similar dividend yield. Moreover, the stocks that are most normally affected by replacement already have a small weight and so their replacement often has limited effect. For indices with a larger number of members, such as the S&P and FTSE, the risk from replacement is also fairly small.

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**2) There is a timing issue: a stock may be replaced before it pays a dividend with a stock that has already paid its dividend for that year**. In this case, total realised index dividends will be reduced. When Royal Dutch / Shell first announced their unification, the timing of the merger was crucial to the 2005 Euro Stoxx realised dividends, due to the proximity of the main European dividend season. Another example was the removal of relatively high-yielding Telecom Italia Mobiles and Royal Dutch from the Euro Stoxx 50 in 2006, which had a negative impact of 3.5 index points on total index dividends in that year.

**Ex-dividend timing issues.** Unlike bond coupon payments, which have a pre-specific cash flow schedule, even **ordinary dividend payment schedules are not guaranteed in size, timing or frequency**. For example, a company may delay or bring forward the ex-dividend date which may mean excluding or including that dividend from being included in a particular dividend swap. Generally the slippage of dividends has the biggest impact on dividends swaps that are due to expiry close to the main dividend paying season (i.e. June expiry). The impact is generally more of an issue for futures contracts or options which are more short dated in nature. Indeed, futures, rather than dividend swaps, can be thought of as the way the most very short-dated dividends are traded.

Moreover, companies can change the **frequency of their dividend payments**, which in general involves increasing the frequency and decreasing the absolute size of the dividend payment. For example, a company can shift from an annual to a semi-annual dividend. This can impact dividends both negatively and positively. Usually the risk associated with change frequency is greater for the seller of a dividend swap, due to the fact that companies tend to pay their last lower frequency dividend and *then* announce a change of frequency. Consequently, there may be an unexpected extra dividend payment in that particular period of time.

In 2004 Total moved from paying an annual to a semi-annual dividend. This meant that in the 2004 calendar year Total paid (or went ex) an extra interim dividend than would have been expected.

| **Ex-Date** | **Dividend(€)** | **Type** | **Financial Year** |
|---|---|---|---|
| 17-May-2002 | 3.80 | Annual | 2001 |
| 16-May-2003 | 4.10 | Annual | 2002 |
| 24-May-2004 | 4.70 | Annual | 2003 |
| 24-Nov-2004 | 2.40 | Interim | 2004 |
| 24-May-2005 | 3 | Final | 2004 |
| 24-Nov-2005 | 3 | Interim | 2005 |
| 18-May-2006 | 3.48 | Final | 2005 |

| **Calendar Year** | **Dividend(€)** | **Financial Year** | **Dividend(EUR)** |
|---|---|---|---|
| 2002 | 3.80 | 2001 | 3.80 |
| 2003 | 4.10 | 2002 | 4.1 |
| **2004** | **7.1** | 2003 | 4.7 |
| 2005 | 6 | 2004 | 5.4 |

The extra interim payment meant a "wind-fall" for the holder of a long 2004 dividend swap position on Total. It is not the financial year dividend that matters, but the aggregate of the dividends being paid in that year. This benefit also extended to long Euro Stoxx dividend positions as Total was a constituent of the index at that time.

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## 2.5. Example of a Dividend Swap term sheet

# Dividend Swap on SX5E

### TERMS AND CONDITIONS OF 1 ANNUAL DIVIDEND SWAP

| | |
|---|---|
| Index: | Dow Jones Euro Stoxx 50<br>(Bloomberg: SX5E) |
| Trade Date: | |
| Maturity: | 17 December 2010 |
| Counterparty: | ***** |
| Size: | # Baskets is: 100,000 |

**Fix Leg:**

Fix leg payer: Counterparty

Rate: On each Annual Payment Date, a EUR amount defined as:

$$\#\,Basket \times FixLeg$$

| | Period :<br>Start Date / End Date<br>(Excluding/Including) | Payment Date | Fix Leg |
|---|---|---|---|
| 2010 | 18-Dec-2009<br>17-Dec-2010 | 21-Dec-2010 | **xxx.xx** |

**Dividend Leg:**

Dividend leg payer: JPMorgan

Amount: On each Annual Payment Date:

$$\#\,Basket \times \text{Dividend\_Points}_i$$

*Where:*

$$\text{Dividend\_Points}_i = \sum_i \sum_t \frac{n_{i_t} \times f_{i_t} \times d_{i_t}}{D_t}$$

- *t* means each weekday (each a "Relevant Day$_t$") in the Valuation Period.
- *i* means, in respect of each Relevant Day$_t$, each share (each a "Share$_i$") that is comprised in the Index on that Relevant Day$_t$.
- #Basket is the Number of Baskets.
- $f_{i_t}$ is the free float factor of the share $_i$, as determined by Stoxx Ltd ("the Sponsor"), the business day preceding each Relevant Day$_t$;
- $n_{i_t}$ is the total number of Shares$_i$ outstanding as determined by the Sponsor on the business day preceding each Relevant Day$_t$;
- $d_{i_t}$ means, in respect of each Share$_i$ and a Relevant Day$_t$:

- (a) if an Ex-Dividend Date in respect of such $Share_i$ falls on such Relevant $Day_t$, an amount equal to the Relevant Dividend in respect of such $Share_i$ and such Relevant $Day_t$; and
- (b) otherwise, an amount equal to zero (0).

- $D_t$ is the divisor factor used in the Index calculation the business day preceding each Relevant Day as determined by the Sponsor.

- Relevant Dividend:
  In respect of a $Share_i$ and a Relevant $Day_t$, an amount per such $Share_i$ in the Settlement Currency (as determined by the Calculation Agent) equal to one hundred (100) per cent. of any Qualifying Dividend whose Ex-Dividend Date falls on such Relevant $Day_t$, before any deduction or credit for, or on account of, any withholding tax, stamp tax, or any other tax, duties, fees or commissions deductible by, or on behalf of, such Issuer in respect of such dividend.

- Qualifying Dividend:
  In respect of a $Share_i$: the sum of:
  (i) 100% of the portion of any and all cash dividends declared by the Issuer (whether, regular, ordinary, special, extraordinary or otherwise) in respect of which the Index Sponsor does not make a corresponding adjustment to the Index (with no deduction for or on account of any tax credit, withholding tax, stamp tax, or any other taxes, duties, fees or commissions deductible by, or on behalf of, the Issuer in respect of such dividends); and

  (ii) 100% of the portion of the cash value of any and all stock dividends declared by the Issuer (or, if no such cash value is declared by the relevant Issuer, the cash value of such stock dividend as determined by the Calculation Agent) in respect of which the Index Sponsor does not make a corresponding adjustment to the Index.

  For the avoidance of doubt, if the Index sponsor makes an adjustment to the Index in respect of a portion of a dividend, such adjustment shall be deemed a "corresponding adjustment to the Index" under (i) and (ii) above in respect of only that portion of such dividend. The pro rata portion of such dividend with respect to which the Index Sponsor does not make an adjustment to the Index shall be a Qualifying Dividend."

- For each $Share_i$ and for each Relevant $Day_t$ calculation will have to reflect the weighting of the $Share_i$ in the Index on the business day preceding each Relevant $Day_t$;.

| | |
|---|---|
| Open days convention: | Target (Modified Following) |
| Documentation: | ISDA |
| Up-front Collateral: | EUR |

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# 3. Analysing Drivers

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# 3. Analysing drivers of implied dividends

The analysis of dividends requires essentially the same tools as those used to understand other asset classes. In particular, the analysis of equities often involves first predicting dividends (or cash-flow) and then the company is valued using models such as a dividend discount model (DDM) or discounted cash flows (DCF), for example. In that aspect analysing dividend expectations can be seen as already a by-product of many, if not all, equity valuation models.

However, all asset prices are principally driven by two effects: **the economic valuation of the asset and the price discovery process**. For liquid asset classes, such as equities, the primary driver is the consideration of the value of the asset, and the actual mechanism for how that valuation is reflected in its actual price is of secondary importance and often ignored. Though recent price patterns in indices, recent mean reversion in the S&P, and unusually single stock behaviour, Volkswagen in 2008 for example, show that in certain circumstances price dynamics can be a more important feature. In asset classes which are less liquid or where fundamental valuation is difficult, such as commodities, price may be influenced more heavily by supply/demand imbalances; therefore valuation can be of secondary importance.

For **implied dividends both valuation and supply/demand factors have a relevant impact on the price and volatility**. The price discovery process is important, **because much of the supply and consequently price movements of dividend swap liquidity are influenced by the issuance of structured products**. These products can often be relatively price insensitive in nature and so the direction of this flow can be more important than the underlying valuation. However, somewhat ironically, whilst the interim pricing of dividend swaps are heavily influenced by flow forces, the expiry of dividend swaps into actual realised dividends creates a **pull-to-realised** effect. This pull-to-realised is due to the fact that the dividend swap eventually pays out according to the actual realised dividends that companies pay.

The fact that **dividends swaps eventually settle to the actual realised dividends that companies pay, means that valuation is eventually the overriding important factor**. This contrasts to equities, where at any time there may be an impact on valuations from suppressed market conditions or exuberant expectations, which could prevent a timely exit from any trade.

To fully understand the price behaviour of implied dividends it is important to understand *both* the driving forces of flow and the underlying fundamental value. In this section we discuss both these drivers. In the first section we discuss flow drivers and, in particular, the impact of structured products and why they will always tend to suppress overall levels. We then discuss some of the fundamental drivers, concentrating particularly on some of the more macro perspectives.

## 3.1. Structured Products and Dividend Swaps

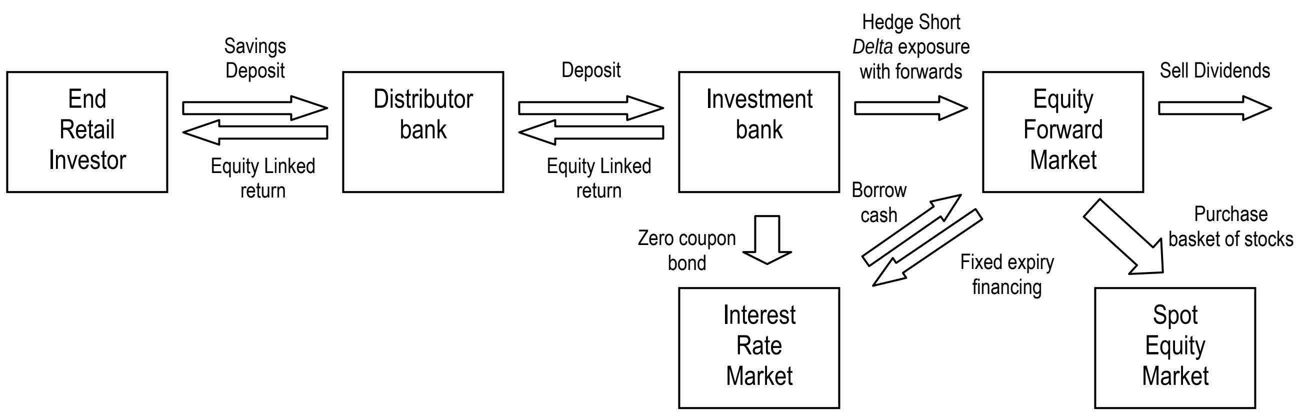
We have previously mentioned the influence of retail structured products on dividend swap price dynamics without detailing the exact mechanism. In this section we discuss this process in more detail. We believe that the current setup of the structured product market remains biased such that the direction of this flow will continue.

The starting point is to consider the basic setup of the equity linked structured products market. Equity linked retail structured products are almost entirely dominated by savings related products, unlike fixed income where there are both savings (fixed rate bonds) and lending (fixed rate mortgages) style of products. This bias is important as savers who are interested in investing in equity linked products are already likely to have formed a *bullish* view on equities and, thus, generally want to use structured products as a tailored form of access to the asset class. In contrast if investors are *bearish* on the equity market they are unlikely to be tempted into equity linked products in the first place (for bearish structured products) and will tend to invest in cash or bond-based savings products instead. This is not to say that these bearish equity products (short ETFs and normally non-directional structures such as range-notes structures are available for example) do not exist; merely pointing out **the psychology of the end investor is generally biased towards bullish structured products**.

Bullish exposure through options embedded in equity-linked structured products is basically realised in two ways, either by buying calls or selling puts. Typical structures with embedded calls are capital guarantees and bonus certificates. Those with embedded puts are reverse convertibles, auto-callables and variations of annual review certificates. However, both calls and puts ultimately leave the end investor with some long exposure to the underlying (simply put, any product where benefit is gained only if the market rallies leaves the investor with long exposure).

**The end investors' long equity market exposure, though, is actually through forwards and not through spot,** since the investor only receives the equity-linked return at some future date (i.e. at maturity of the structured product). **As a result, investment banks are left with short forward positions which are basically equivalent to a short spot and long dividend exposure (***see section 5***). This is ultimately hedged by buying spot and selling the future dividend stream**.

Figure 3: How the structured products market biases a steady stream of dividend selling. Long equity forwards is equivalent to selling implied dividends.




Source: J.P. Morgan

The easiest way to see this bias for selling pressure on dividends is through a specific example. In fact one of the best examples to use is one of the oldest, simplest and most widely used: **the capital guaranteed savings note**. Since most of this product has been issued based on equity indices, it also explains why most of the liquidity is in dividend swaps on equity indices and why there are also fairly long dated exposures (~5 years). A capital guaranteed savings bond is a product which involves an investment over a fairly long dated fixed term, usually 3-7 years with a final payout at maturity equal (or linked) to the return on the underlying index over the period, but the investor is guaranteed at the end of the product to receive back at least their initial investment.

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The usual text book construct for a capital guarantee is to invest the majority of the investor deposit in a zero coupon bond such that it returns the initial capital at expiry of the product. The difference between the initial capital and the price of the zero coupon bond is used to purchase an at-the-money (ATM) call option, which gives the upside equity exposure (see Figure 3). Thus, for this **overall structure to be constructed it can be seen that the investor forgoes interest on their deposit in order to purchase the ATM call on the index**.

There is however another way to construct this product. Take the investor's capital and purchase the underlying index (or the basket of stocks) and simultaneously buy an ATM put option. Rather than pay upfront premium for the put, agree to pay for the put with the future dividend payment of the stocks. Thus, for this **overall structure to be constructed it can be seen that the investor forgoes future dividend payments in order to purchase an ATM put used to protect the portfolio**.

Since the investment bank has provided this put option in return for receiving the future dividend payments of the index, **they are exposed to the risk that realised dividends may be less than originally anticipated (*implied*).** Thus, it turns out that bullish directional products leave investment banks with a long dividend exposure. At first the exposure is fairly small compared to the size of the notional of the product (in line with the dividend yield), but as more structured product is issued the dividend risk becomes significant. The need to hedge or **recycle** this risk leads to a fairly constant bias to sell future implied dividends.

This simple example is illustrative of how investment banks obtain their implied dividend exposure. In the *technical section* we further discuss the actual technicalities of how forward exposure arises through long call/short put positions.

**How can investment banks hedge this dividend exposure?** The simplest way is to buy equity forwards, but equity forwards contain exposure to both interest rates and can obscure the sensitivity to dividends. So, nearly a decade ago, JPMorgan created the dividend swap, which allowed investment banks to sell on their dividend exposure in a clear and transparent format.

In conclusion, since most of the end investor product tends to have bullish exposure to the equity market, we can infer that there is natural bias for flow in the dividend swap market towards selling implied dividends (either by buying forwards or selling dividends). **This is an important feature of the market as in times of illiquidity there is almost always likely to be downwards pressure of implied dividend levels**.

Nonetheless whilst flow is an important consideration, ultimately the payout of a dividend swap is driven by fundamental considerations. Hence **this dynamic between interim flow pressure and final valuation can give rise to real opportunity for investors willing to warehouse the risk over time**. To discuss this we need to look at some of the important drivers behind the fundamental valuation of dividend payments.

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## 3.2. Fundamental Drivers

Realised dividend payments made by companies are ultimately driven by two factors. The first is **whether the company has generated any cash to pay a dividend or its earnings** (or has the potential to return capital, though less important given their exclusion from dividend swap payouts in general) and secondly **whether that company wishes to pay any of the cash back to shareholders**.

To begin our analysis it is useful to study the income statement of a generic company as this gives us some insight into why many macro- and micro- economic factors can be essential drivers behind company dividend payments.

Table 2 : The income (profit & loss) statement highlights many of the drivers of dividend payments

| Income statement Item | Factors or Decisions |
|---|---|
| | **Macro-economic factors such as GDP growth, inflation and position in the business cycle** all influence a company's earnings potential. Company specific factors such as **competitive advantage (high margin) and stage in the company's life cycle (growth or value stock)** are important considerations. Free cash flow is an arguably more important measure for dividends (and debt holders). |
| **EBITDA** | **Depreciation and Amortisation.** Although this is a cash flow item, Capital Expenditure (CAPEX) past or present is also an important consideration. For example some companies may have to maintain a high level of capital expenditure (Oil & Gas companies for example) which could in turn limit the potential to pay dividends. Companies with more flexible CAPEX spending could have greater flexibility in paying their dividends. |
| **EBIT (Operating Profit)** | Interest payments on outstanding debt can influence the overall levels of distribution. This introduces **interest-rates**, **credit spreads** and **balance sheet leverage** as drivers of dividend payment, since all these factors will affect overall cash-flow. |
| **EBT (Profit after interest payments)** | **Corporate taxation** can obviously affect the overall level of earnings that can be assigned to shareholders. Taxation is a crucial factor affecting the optimal capital structure of a company, as dividends are liable for tax whereas interest is not. |
| **EPS (Earnings per share)** | **Dividend Payout Ratio**<br>How much does the management payout to shareholders as dividend? This is obviously influenced by all of the above factors. Management's **belief in the potential growth of the company's business** or **conservative cash and balance sheet management** are factors. **Political pressure or the influence of a majority shareholder** can also be a factor in the payout ratio.<br>**Personal taxation policy** can also have an impact. Withholding tax and different treatments of income and **capital gains can influence payout ratios if shareholders can exert enough influence**.<br>For example different withholding tax treatments of the dividends can give rises to different implied dividend streams for cross border joint listings (for example, Royal Dutch Shell A and B shares).<br>In the US, previously favourable treatment of capital gains compared to income has meant generally lower payout ratios. |
| **DPS (Dividend per Share)** | |

Source: J.P. Morgan

Beginning from the top of the income statement (Table 2), the primary starting point for analyzing dividends is driven by whether the company has generated sufficient cash to pay a dividend and then there is a decision made by management as to whether it will distribute any of that cash as a dividend. We refer to these factors as the "**ability**" of the company to pay a dividend and the "**willingness**" of company management to do so. Both factors are dependent on company specific and broader based economic considerations.

A framework for analyzing the "**ability**" of a company to maintain or increase its dividend payments is driven largely by the amount of free cash flow the company it produces. Any analysis should probably include considerations of:

**Cash and cash equivalents:** Does the company physically have enough cash to actually pay the dividend? **Cash flow yield** (for example, EBITDA)**:** Is the company consistently generating enough cash to continue to pay the dividend?

**Sales growth:** Are revenues likely to be maintained, decline, or is there potential for growth? Without sales growth, there is unlikely to be a sustainable growth in dividend.

**Costs:** Are costs under control, or are factors outside of management control inhibiting opportunities to manage margins? For example, are commodity prices increasing, or are there any other signs of input cost inflation. Are unit labour costs increasing? Or, on the other hand, is there potential for cost cutting? In a deteriorating economic environment, are cost-cutting initiatives likely to be sufficient to offset declining revenues?

**Profit margin growth:** Balancing the factors above, what is the outlook for margins? For a detailed study on the outlook for profit margins of global corporates, we recommend the reader to a piece by our global asset allocation research team's "Global Issues" note: *"Profit Margins to Fall", Nikolaos Panigirtzoglou and Joseph Lupton, 21st April 2008*. The conclusions of their research was that profit margins, proxied by the share of profits in GDP, had risen steadily to record highs for 25 years (up to the beginning of 2008) and that profit margins were likely to fall over a period of years. Much of the analysis remains relevant for valuing likely dividend payments.

**Dividend coverage:** Is the proportion of earnings that is being paid out as a dividend sustainable? Payout ratios (dividend-per-share / earnings-per-share) above 100%, or dividends for companies with negative earnings are not sustainable.

**Leverage:** How much risk is there that a small change in underlying conditions / sales / asset value will lead to the dividend becoming unsustainable? How much operating leverage? Is the balance sheet robust? Is the Asset/ Equity ratio sustainable? **Interest coverage:** How much room is there to pay earnings after all interest payments are made?

A framework for analyzing the "**willingness**" of management to maintain or increase their company's dividend payments should include considerations of:

**Shareholder structure:** Are there any controlling shareholders who depend on the cash they receive from the company in the form of dividends? Is there a concentration of a particular kind of investor (investment style, region, etc.) and what are the preferences of these investors? Do they require dividend payments to meet income targets? Are those investors likely to put pressure on management to maintain/increase dividend payments?

**Stated dividend policy:** Does the company have an explicit dividend target or policy? Has the company committed to pay a certain amount, or a fixed proportion of earnings? Does management provide long-term guidance on their intentions for dividend payments? Are senior executives' compensation linked to the payment of dividends?

**Dividend track record:** What is the track record of the present management? Has the policy remained consistent, and have targets generally been met? How does the current dividend payment payout ratio compare to historical distributions?

Usually, company management tries to state a clear and consistent policy on dividends, and they are more willing to increase dividends when times are good, in order to send a positive signal about future prospects to shareholders, than they are willing to cut dividends, even during more difficult times. This management behaviour improves the upside/ downside balance for investors in dividends. When companies are enjoying strong earnings growth, there may be room for upside surprises on dividends. By contrast, downside risk for dividends is relatively muted, given management's reluctance to send a negative signal about their company's future prospects by cutting dividends.

**Company cycle position:** A new company is unlikely to pay a dividend while it remains in its growth phase. However once the company matures dividends payments become more likely as the company turns cash generative. A good example of a company maturing is Microsoft over the last 30 years - which has gone from private start-up in 1975, to listed company in 1986, to dividend payer in 2003. This can also be further extended to indices such as the Nasdaq, where constituents companies have become more likely to pay dividends as they have matured.

**Capital Gains versus Distribution:** Companies may decide to specify a target capital gain through retained earnings rather than distributing dividends. There are many possible reasons for this, such as capital preservation and future uncertainty for example. Another factor behind the willingness to pay dividends can be **withholding taxes** versus **capital gains taxes**. If there is a significant tax advantage for shareholders to receive earnings via one route, they may push management (actively or passively) to pursue a certain dividend policy. For example, in the US where capital gains tax was significantly lower than dividend withholding tax, it was no surprise to see payout ratios lower than Europe where the tax differential was less.

Analyzing these factors of specific companies requires some effort and a detailed analysis for each company. We consider this beyond the scope of this report, however, JPMorgan strategists have produced both fundamentally driven research (*see Focus on Dividends, Matejka et al, 23rd March 2009*) and quantitative screens (for example, *Dividend Vulnerability – Identifying stocks that could potentially be prone to a dividend cut*, *Matthew Burgess*, *4th March 2009*). Indeed, since dividend swaps for single stocks are mainly limited to fairly short dated maturities, they should be analyzed in the context of the fundamental drivers that are likely to be specific to each stock.

Nonetheless, information from single stocks dividend expectation can be aggregated to provide a useful bottom-up valuation for index dividends. The aggregation is undertaken using the method described in section 2.2. However, some care must be taken since these are dividend forecasts and we do not know exactly the composition or stock weighting on a forward basis. The usual approach is to use the current parameters, but if a stock-split or composition change is known ahead of time this can be adjusted for.

It is often found that the exact aggregation has limited impact of the absolute level of index dividends and many of the specific company effects are averaged out. Thus, while a bottom-up approach is exceptionally useful (particularly for short-dated maturities) a more top-down macro-economic analysis is also useful. Moreover, since index dividend swaps are available for fairly long dated maturities they will be strongly influenced by wider macro-economic themes, since specific company stories are unlikely to remain valid throughout the duration of the contract. Over the next few sub-sections we concentrate on some of these drivers which we consider to be most important. Since a critical part of a dividend payment decision is whether a company is able to pay a dividend in the first place, an analysis of aggregate earnings and their economic drivers is a key point of any dividend analysis.

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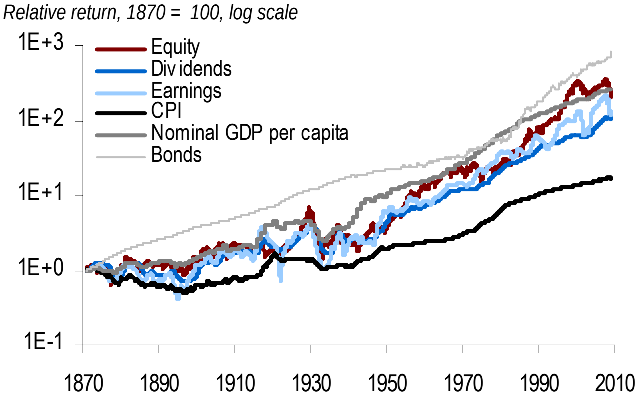
## 3.3. Dividend relationship with GDP, inflation, earnings and equity returns

Over a long period of time equity returns have historically been closely related to nominal GDP (Figure 4). In Figure 4 it is observed there indeed appears to be a relationship and moreover this relationship also extends to earnings and dividends. **But is this relationship real or coincidence**?

Figure 4: Equity index returns, earnings and dividends are linked to the level of nominal GDP per capita

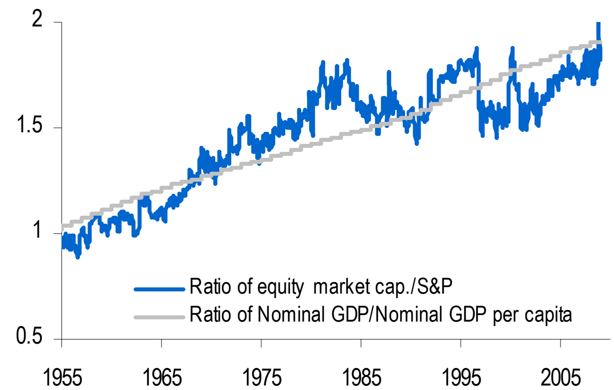
*Relative return, 1870 = 100, log scale*




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller

Figure 5: Equity markets grow in line with nominal GDP, but equity indices grow more in line with nominal GDP per capita.

*Ratio*




Source: J.P. Morgan, BEA, Fed, DataStream. The ratio of GDP basically measures population growth

To show why there should be a theoretical relationship between dividends, earnings and equity value and nominal GDP we use an illustration of a simple company. We start by considering the impact of inflation in the example below.

Table 3: A simple company example to illustrate the impact of inflation on equity value

1) A new product is invented and a company is formed to produce and sell this product.

2) The company issues 100 shares at $1 each and uses the proceeds to build a factory. The balance sheet of this company has $100 of assets (the factory) and liabilities of $100 (the equity).

3) After a year the company is successful and has generated $100 of sales revenue and has $90 of costs. Net revenue is $10 = $100 – 90 or $0.1 per share (EPS).

4) The dividend payout is taken to be 50% of earnings, so the dividend payment is $5 or $0.05 per share (DPS).

5) Assume inflation in the second year is 10% for goods produce, sales *and* asset values.

6) Sales should rise by 10% to $110, but costs also rise to $99. Consequently earnings rise to $11 = $110 - $99 (or $1.1 EPS). Keeping the same dividend payout ratio has the total dividend of $5.5 or $0.055 DPS. If we assume that the value of our factory has also risen then the "book value" of our equity should have risen by 10%. Hence 10% inflation should naturally lead to 10% earnings and dividend growth. If asset inflation is the same as price inflation, equity book value should also rise in line with inflation.

So at the very least equity value, earnings and dividends should at least keep in line with inflation. **But why do we observe that equity returns have generally exceeded inflation?** This question is answered by noting in our simple company example that we have ignored retained earnings and gains in productivity. The impact of retained earnings can be seen below in Table 4 by expanding our previous illustration above (Table 3).

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Table 4: Retained earnings are important to equity growth.

| |
|---|
| 5) Since dividend payout was only $5 in the first year. The other $5 is kept as *retained earnings* and is included as an asset on the balance sheet. Thus the equity value should naturally rise as a consequence, even without inflation.<br><br>6) An extra return can be made on retained earnings in the following year which can be added to next year's earning (if invested wisely!). Thus next year's earnings should exceed the natural uplift given through inflation. |

Gains in productive are generally thought to arise in two ways: labour and capital productivity. We start first with labour productivity. Suppose in the above example, that in the second year, the workers in the factory are incentivised to work harder (or replaced). They produce 10% extra goods. In return costs are likely to have increased to pay for the more productive workers. The impact on earnings from the expansion will be similar to that from inflation (Table 5).

Table 5: Labour Productivity gains help earnings growth, assumes labour shares some of the gains

| |
|---|
| 5) Inflation is 10% and we increase our sales and costs by an extra 10% (inflation and expansion).<br><br>6) Sales will now rise to $120, but costs rise to $108, leaving net revenue at $12. Applying the 50% payout ratio leads to a dividend of $6. |

Next we consider capital productivity. Alternatively the company could have implemented a new production process that increases the physical productivity of the machinery employed. This could have resulted from an improvement in the use of the machinery, or inventory management of orders allowing for more to be produced at a lower marginal cost. These measures may result in higher sales without necessarily a commensurate rise in costs (Table 6).

Table 6: Capital Productivity gains, assumes labour does not share the gains

| |
|---|
| 5) Inflation is 10% and we increase our sales only by an extra 10% (inflation and productivity).<br><br>6) Sales will now rise to $120, but costs only rise to $99, leaving net revenue at $21. Applying the 50% payout ratio leads to a dividend of $10.5. |

Hence capital (in particular) and labour productivity can have a significant increase on earnings, dividends and equity value. These effects are referred to as the value-added parts of the production process. Indeed, economists aggregate all these stages of *value added* in the production process of all companies within the GDP figure definition (or at least one definition of GDP). Hence, by an almost circular argument (since both are really a reflection of the same output) it should be no surprise to see that over the long run there indeed is a strong linkage between GDP growth and equity markets. However this does not answer *whether nominal GDP should outgrow inflation* or *whether productivity gains are only possible in an inflationary environment.* These questions *are* important in deciding whether dividends (and equities) should always be biased to grow faster than CPI in particular. However, we believe these questions are beyond the scope of this report, since we only wanted to **show that equity and dividends should and have shown a strong link to GDP growth and inflation.**

**Why do indices grow more in line with GDP per capita?** In our simple examples we have shown that almost by definition equity markets should grow in line with GDP over the long run. However in Figure 4 we have shown that the Dow Jones Industrial Average Index has actually grown more in line with nominal GDP per capita and so has underperformed nominal GDP growth. This is actually a bit of a sleight of hand and is more due to how equity indices are calculated. We can illustrate this reasoning again through our company example (Table 7).

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Table 7: Impact of population gains are not always taken into account by equity indices

1) At the previous stage 3 of our company example (Table 3), suppose the original factory is running at full capacity and that the population doubles overnight (very unlikely, but useful for illustration!).

2) To take advantage of the population growth the company needs to build a second factory. To raise the funds, the company decides to raise another $100 via the equity market. Suppose we can do this by selling another 100 shares at $1 each.

3) We now have two factories, that after 10% inflation in the second year will generate sales of $220 and have costs of $198 (double that of previous stage 6). Net earnings for the company (and hence GDP) have increased to $22. However the earnings per share remain at $0.11. Hence, population growth should increase overall GDP but may have little impact on the per share earnings.

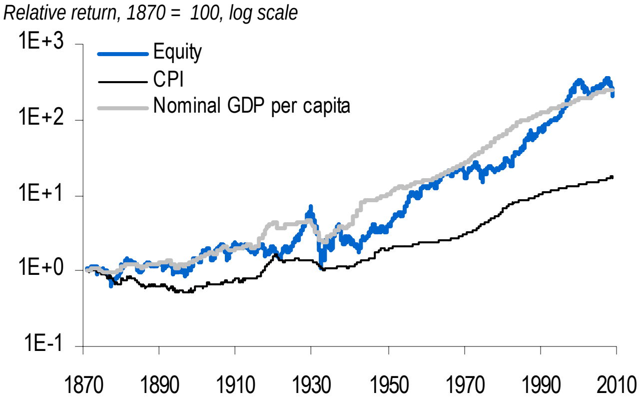
4) Population growth in not reflected in equity indices. Equity indices are generally assumed to represent the achievable return of an initially invested $100, not the total equity market capitalisation. So when a company does a rights issue, the index is adjusted for the increased number of shares. At Stage 2, suppose an equity index (with only one stock in it) is constructed to equal 100 at that time. The divisor is then equal to 1. After the rights issue, to ensure continuity of the index level the divisor is increased to 2. Nonetheless, the total market capitalization of the equity doubles from $100 to $200. **Hence, there is no impact on the index, despite the capital raising and resultant doubling in market capitalisation.**

If this example is relevant then we should show that the equity market capitalization should grow faster (if the population is growing!) than an equity index which reflects that market, and that the ratio of the two should be related to the gain in population. Indeed Figure 5 shows there has been a fairly strong relationship between the two over the last 50 years.

Finally it is worth pointing out that per capita economic growth is generally created by two factors - an increase in production input and also an increase in productivity. We have shown that productivity gains are included in equity indices, but they may miss some of the production input factor. This factor is generated by the creation of a new product and may occur only during a privately held phase of the company life cycle. Hence equity market may underperform GDP growth if a large amount of this process occurs outside the publicly traded sector.

Figure 6: US Equity markets returns have shown large deviations compared to GDP ...

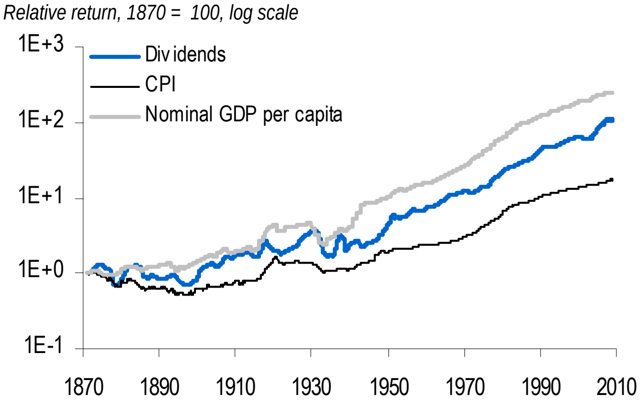
*Relative return, 1870 = 100, log scale*




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller

Figure 7: ... whereas US dividends have shown much smoother growth over time

*Relative return, 1870 = 100, log scale*




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller

So we have good justification **that equity indices, earnings and dividends should track nominal GDP per capita over the long run**, but at any point of time there is significant divergence between equity markets and GDP. The primary reason for this is that equities are exposed to changes in market risk aversion. As shown in Figure 4 the biggest differences in performance were observed in WWII and in the 1970s and during the market bubble in 2000.

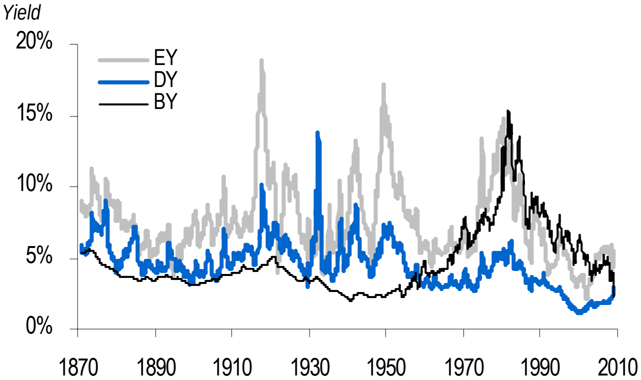
Our simple company illustration also highlights why there should be divergences. In the inflation impact example (Table 3) we assume that sales, costs and asset inflation cycles are all concurrent. This is very unlikely to be correct due to lead-lag times in the economy and consequently there is likely to be some noise in the relationship over time. However these temporal relationships are often mean reverting in order to keep the overall economy in balance so that the long term relationships hold. Furthermore we have ignored depreciation in asset value which in turn can affect equity value (the machinery in the factory is likely to wear, making it less valuable). The interplay between sales and cost (margin) can also depend upon labour supply, which can be driven by business and demographic cycles. This in turn means that dividend payments can be exposed to cycles in corporate profit margins. The limited impact of population growth on equity indices also depends on the company running at full capacity. Since most companies run at below maximum capacity there is likely to be some noise in the relationship observed in Figure 5. Furthermore we have ignored the fact that more efficient capital structures typically involve funding from a mixture of debt and equity. This leverage cycle, in turn, has historically been cyclical and can have substantial impact on equity market returns.

## 3.4. Dividend, earnings and bond yields

We have shown that equity, earnings and dividends are linked to GDP over the long term. While beyond the scope of this report, it is worth mentioning the relative value relationship between dividend, bonds and equities. This is because many investors looking at dividends for the first time are likely to ask the question – **how do I value dividends with respect to the underlying market level?** In reality we believe the question that investors should really ask is the reverse: How do I value the market with respect to dividends? Equities can be valued as the discounted sum of all future dividends, but how much should I pay for this future dividend stream at any point in time? This is the problem faced by an equity investor every day and we have already discussed some of the factors that can obscure this valuation. We know that dividends in theory and in practice are linked to inflation and/or economic growth.

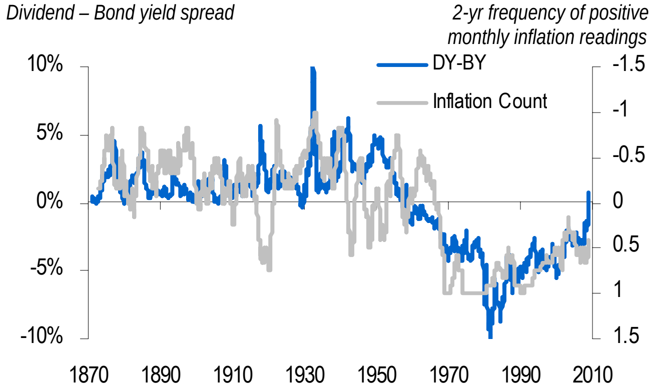
Indeed much time and effort has been focused on this question recently. Over the last few years, earnings yields (EY), and more recently dividend yields (DY) have traded above long bond yields (BY). However, the spread between bond and dividend yields appears to be largely driven by inflation expectations. If expectations are for constant and positive inflation then dividend yields typically trade below bond yields. If inflation has been volatile, or even negative, then dividend yields tend to trade above bond yields to reflect the higher credit risk of the equity exposure (Figure 9).

Figure 8: Earnings and dividend yields compared to bond yields have been in two regimes ....




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller.

Figure 9: ... the spread between dividend yield and bond yields have been driven by inflation expectations



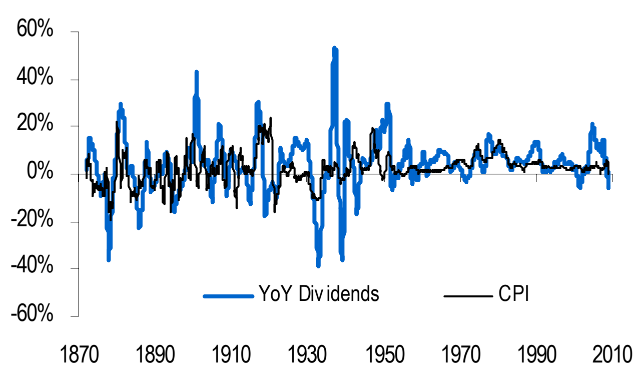

Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller.

Nonetheless, the relationship between dividend yields and bond yields has effectively seen two regimes during the period for which data is available. Pre-1950 dividend yields were higher than bond yields (Figure 7). During this period inflation and GDP was volatile, as central banks were not particularly active in managing economies and many currencies were based upon a gold standard (Figure 10). In this regime, investors did not expect (or actually got much!) capital gain from equity and so demanded to have a higher dividend yield to compensate for the additional risk of holding equities compared to bonds.

However in the late 1940s central banks became more active with policy (Bretton Woods was in 1944) and implemented aims to target moderate GDP growth and mildly positive inflation. Furthermore there was the demographic advantage of the baby boom, which may have contributed to an environment where strong growth was possible without stoking inflation. Another factor to consider was the shift in the mindset of asset managers that has become know as the "**Cult of Equity**". One of the most notable figures during this period was George Ross Goobey who ran the Imperial Tobacco pension fund. He bucked the convention of investing in Gilts and invested heavily in equities, recognizing that equities, though they carried substantial risk, offered inflation and growth protection.

Figure 10: More stable inflation/GDP has in turn led to more stable dividend growth ...

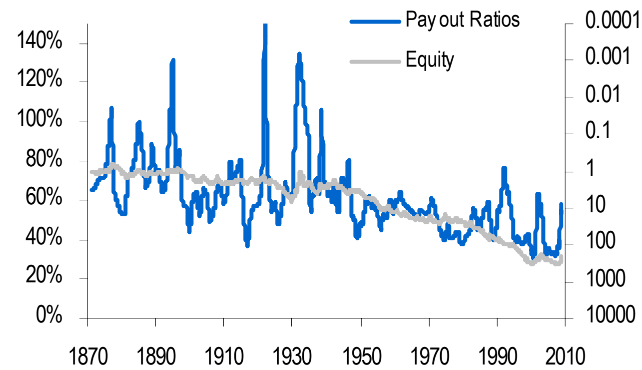
*Y-o-Y return*




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller.

Figure 11: ... but at the expense of a decreasing payout ratio

*Payout ratio* *Dow Jones, log inverse scale*




Source: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller.

The other noticeable feature of the post 1950 period, which is relevant for dividend investing, is that there has been a trend for payout ratios to fall. Since we have shown that equity capital gains should benefit from increased retained earnings, it is perhaps no surprise to see that a fall in payout ratios was coincident with a period of good capital gains. The "cult-of-equity" approach may have contributed to this decline, but also taxation (which until 2003 in the US saw capital gains taxed at a lower rate than dividends) may have had an influence.

**Is the causality between the economy and equity markets uncertain?** The usual approach for economists to take has been that more controlled inflation and GDP growth led to the subsequent strong growth in equity markets. However, it could be argued that stronger equity markets themselves have been a factor, as it has encouraged investors to commit capital for longer term investment, which in turn has helped GDP growth. Understanding this causality has an impact on the outlook for dividends. If central banks are going to maintain a controlled inflation/GDP (as in post-1950) environment and that this is *the* driving factor, then investors could perhaps expect the stability in dividend growth to continue. However, if investors begin to demand a higher payout ratio and have higher risk aversion, then it is possible we may enter into a regime where GDP growth and dividends become more volatile as they were in the pre-1950s period.

Going forward, if investors do change the mindset of equity investing towards one which is based more on yield rather than capital gain, then there would be scope for the capital versus dividend growth trend to reverse, **which may favour dividend investing over equity.** However, historical data suggests that there is a trade-off. In this environment, it would be more likely that dividend growth would become more volatile.

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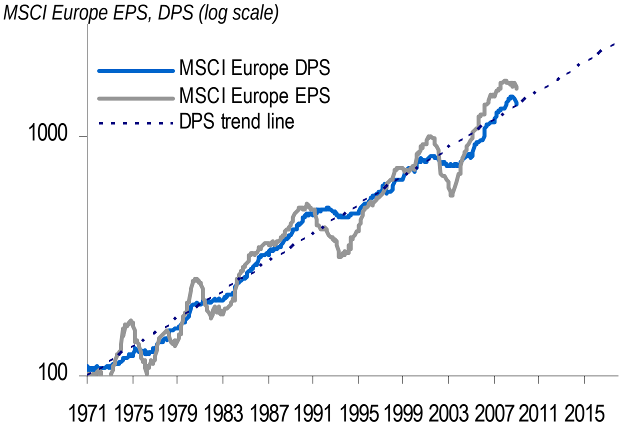
## 3.5. Business and dividend cycles

While the general trend of equity markets (GDP and inflation) has been up over the last few years, growth is not particularly constant and definitely cyclical in nature (Figure 4, Figure 12 and Figure 13).

**What drives these cycles?** Indeed many of the factors we used in section 3.3 to illustrate the GDP dependence are cyclical in nature. Moreover, the cyclical nature of earnings and dividend growth has not only been confined to US equity markets. In anything the cyclicality in earnings has been stronger in European indices.

Figure 12: European equity markets have also experienced upwards but cyclical growth

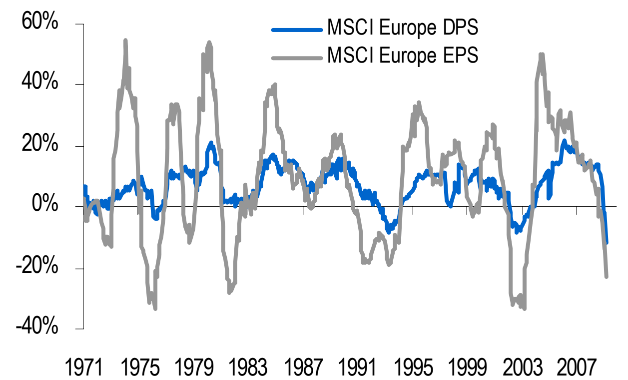
*MSCI Europe EPS, DPS (log scale)*




Source: J.P. Morgan, DataStream

Figure 13: Dividend and earnings are cyclical. Dividends tend to lag earnings and tend to be less volatile.

*MSCI Europe Growth (% yoy)*

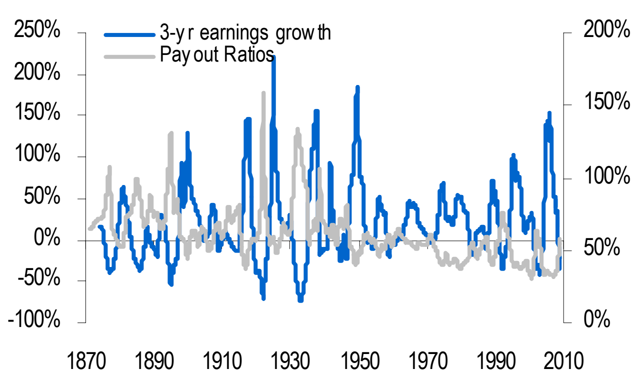



Source: J.P. Morgan, DataStream

In also noticeable that dividend growth tends to be a muted version of earnings growth, typically showing lower volatility (Figure 13). This is because historically the management of companies has typically targeted a stable dividend policy and (within reason) is willing to adjust payout ratios in order to smooth the variability of dividend payments. This manifests itself in the fact that the payout ratio has shown a strong anti-correlation to earning growth (Figure 14 and Figure 15) - with payout ratios rising when earnings growth weakens and vice-versa. While, there is nothing mechanical that should predict this anti-correlation, it is the preference for company management to only pay sustainable dividends which acts to create this relationship.

Figure 14: Payout ratios appear anti-correlated to earnings growth ...

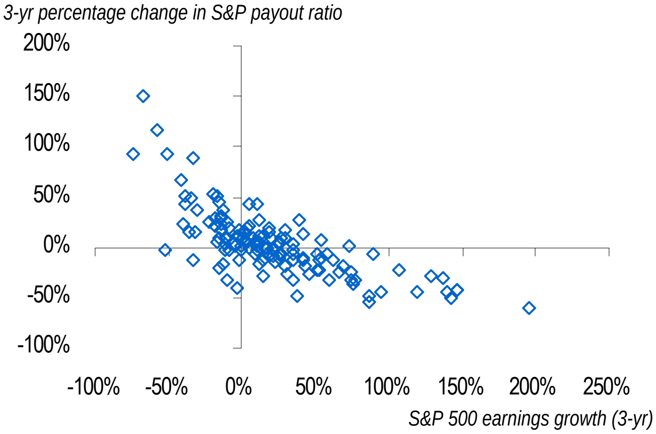
*S&P 500 earnings growth (3-yr)* *S&P payout ratio*




Source: J.P. Morgan, S&P, Robert Shiller.

Figure 15: ... which is highlighted in their regression

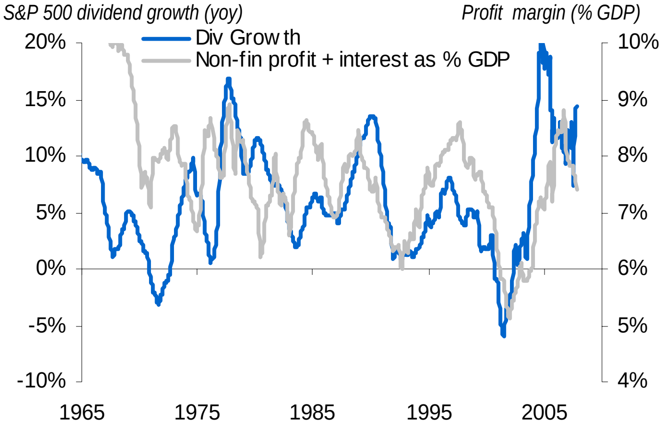
*3-yr percentage change in S&P payout ratio*




Source: J.P. Morgan, S&P, Robert Shiller.

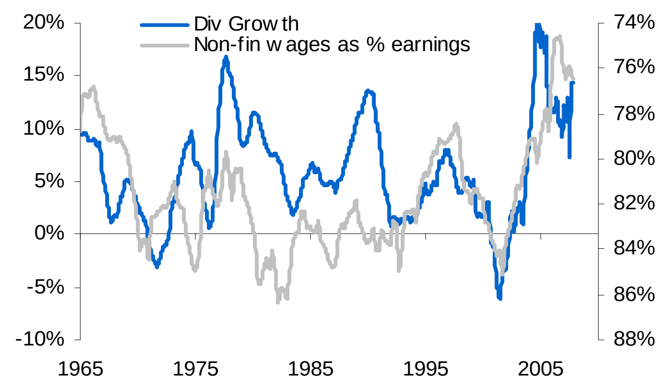
In our simple company example in section 3.3 we had sales and costs as inputs (Table 3), both of which have cyclical behaviour (Figure 16 and Figure 17).

Figure 16: Profit margin cycles




Source: BEA, DataStream.

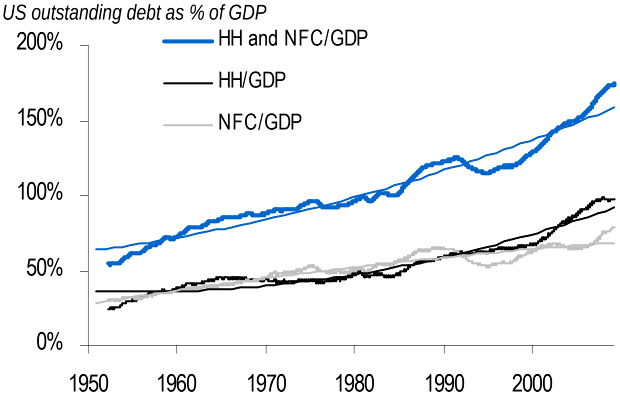
Figure 17: Labour costs cycles




Source: BEA, DataStream

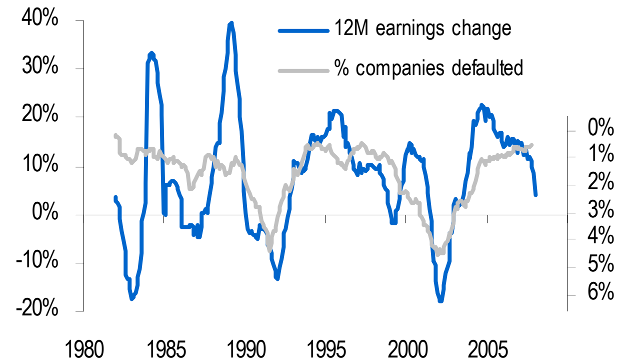
**We also previously ignored the impact of debt and leverage on equity market returns**. Over the last fifty years, leverage has been very cyclical (Figure 18) and has been correlated to earnings and hence dividend cycles. In turn leverage cycles are likely to lead to default cycles which are well correlated to earnings cycles (Figure 19). The strong relationship between credit and earnings cycles gives rise to potential relative value trading between the two asset classes.

Figure 18: Leverage cycles show a pattern of cyclical growth




Source: BEA, DataStream.

Figure 19: Credit default and earnings cycles are harmonised




*dividend growth (yoy)*

Source: S&P, DataStream.

A study of how S&P dividends have grown following a local low point in dividend growth, suggests a 10-year dividend expansion cycle. Using data on S&P dividend payments since 1902, we have looked at how dividend growth has evolved for each ten year period, starting in 1902, 1912, 1922, etc. These years were each taken as a cyclical starting point and, in many cases, were years in which index dividends had fallen in absolute terms from the previous year, and can therefore be considered as a reasonable base to start from.

This simple analysis suggests that the dividend growth cycle follows a **general trend of accelerating growth in the first 3-4 years; followed by steady growth in the following 2-3 years; and decelerating growth in the final years of the cycle** (see Figure 20 and Figure 21). Clearly this it not going to be a perfect predictor of cycles, but it at least provides a useful indication for how dividend cycles can develop and evolve.

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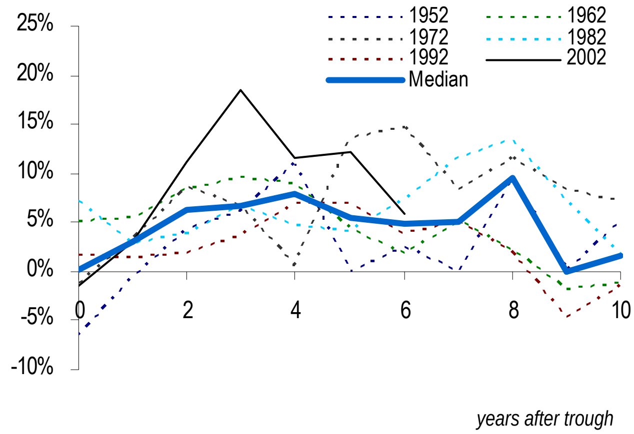
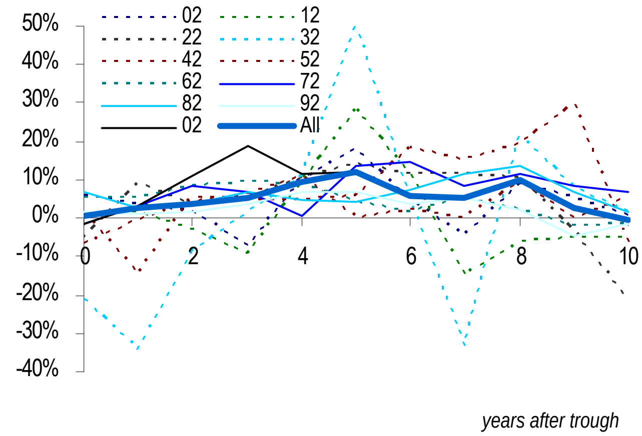
Figure 20: S&P 10-year dividend growth cycles, since 1952
*S&P 500 dividend growth (yoy)*




Source: J.P. Morgan, S&P, Robert Shiller, DataStream.

Figure 21: ... S&P 10-year dividend growth cycles since 1902
*S&P 500 dividend growth (yoy)*

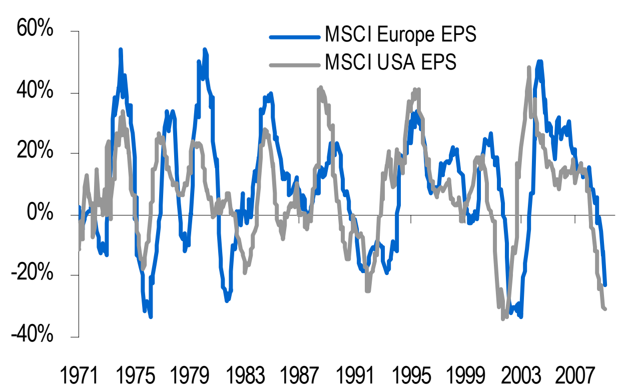



Source: J.P. Morgan, S&P, Robert Shiller, DataStream.

While dividend growth does appear to be cyclical, it is worth noting that dividend growth has been positive on average, and has been more stable since about 1950. Year-on-year dividend growth for the S&P has averaged 4.9%, based on monthly data going back to 1902, with about two thirds of monthly observations in a range of 0% to +10%.

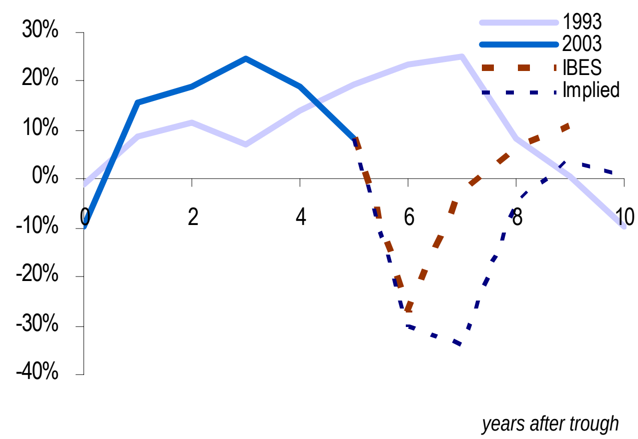
**Extending the analysis of S&P dividend cycles to Europe**. Earnings growth in Europe usually lags earnings growth in the US by about 2 – 3 quarters (Figure 22), so we assume that dividend growth in Europe also lags dividend growth in the US by around 2-3 quarters, and track two European dividend growth cycles, beginning in 1993. Dividend growth in the Euro Stoxx 50 during 1993-2003 followed a similar pattern of expansion compared to that of the typical S&P dividend cycle (see Figure 21). Since 2003, which we estimate to be the beginning of the current dividend cycle in Europe, dividend growth accelerated for the first three years, remained strong in the fourth (2007) and fifth (2008), but turned sharply lower in 2009. There is a wide range of expectations for the likely progression of dividends from 2009 onwards, as shown by the divergence between analysts consensus estimates (IBES), and the current *implied* dividend swap levels for 2010 – 2013.

Figure 22: Earnings growth in Europe tends to lag US earnings growth by about 2-3 quarters
*Earnings growth (%yoy)*




Source: J.P. Morgan, DataStream.

Figure 23: Euro Stoxx 50 dividend cycles since 1993
*Euro Stoxx 50 dividend growth (yoy)*




Source: J.P. Morgan, IBES, DataStream. .

However, the payout ratio in Europe is currently well below average, and this may provide some cushion for dividends, in the case of falling earnings. Note that payout ratios in Europe spiked in the early nineties and in 2002-2003, a time when earnings fell dramatically, and this is evidence of companies increasing payout ratios to smooth dividends.

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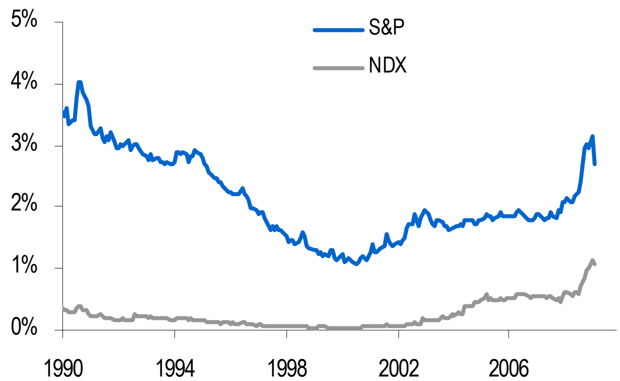
**Another underlying cycle that must be taken into account is the company or product life cycle**. This is a concept that is often neglected in analyses of expected dividend payments. It is well know that products go through four broad stages – development, growth, maturity and decline. Obviously in the first stage, the product consumes cash, but turns cash generative in the second and third stages. This can become important as companies are only likely to pay dividends once their underlying products become cash generative and when the benefit of distributing this cash is greater than any investment opportunities within the company. A good example of this company behaviour is Microsoft, which only began to pay dividends in 2003, despite being in existence since 1975 and a public company since 1986.

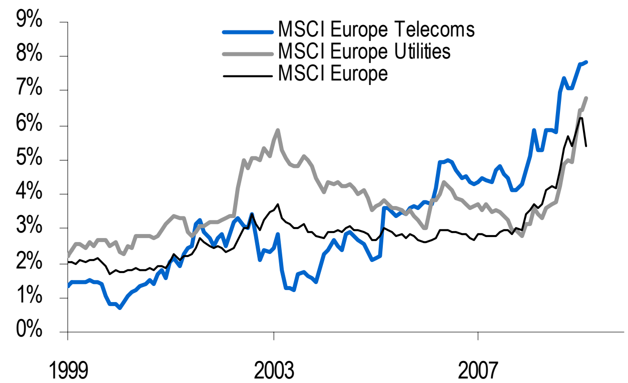
However the company cycle lifetime is also important in analyzing index dividends. For example, the Nasdaq was originally dominated by growth stocks, some of which are now maturing. Consequently there has been a big increase in the dividend yield from nearly zero in 2000, to around 1% over the last few years (Figure 24).

Figure 24: The Nasdaq dividend yield has risen in line with the S&P
*Dividend yield (%)*




Source: J.P. Morgan, DataStream.

Figure 25: European sector dividend cycles since 1993
*Dividend yield (%)*




Source: J.P. Morgan, DataStream. .

Also some sectors which originally cut dividends can consequently be very cash generative as they de-lever their balance sheets and reduce capital expenditure. An example of such a sector is Telecoms post-2003, which have gone from low to high dividend yielding stocks (Figure 25). In contrast sectors can go through periods where their dividend yields fall with respect to the market, such as Utilities in the period 2003 through 2007 (Figure 25).

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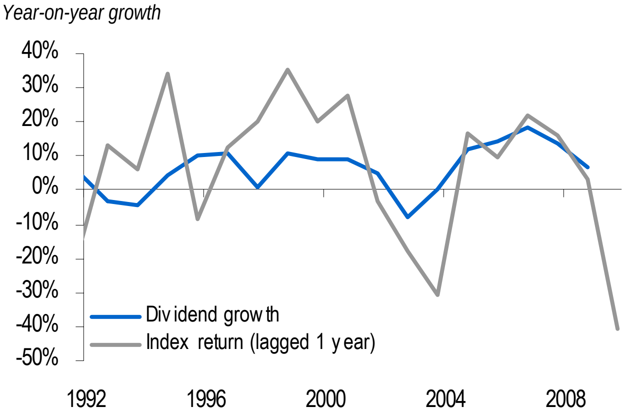
### 3.6. Realised dividends lag earnings and equity

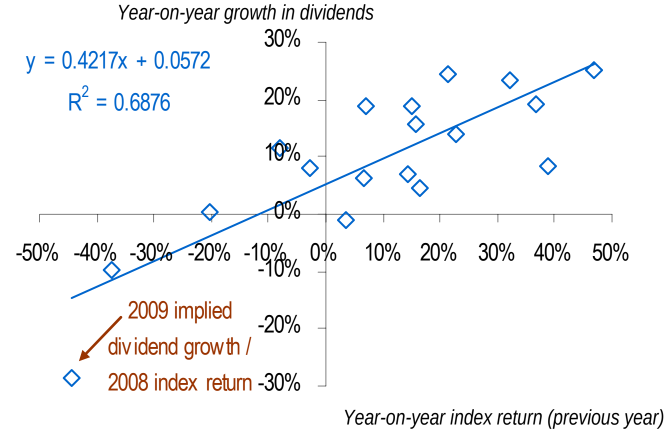
**Realised dividends tend to lag both the equity market and reported earnings.** Much of this lag is optical, as there is some lag time when company report earnings and a further lag when the dividends go ex. For example a large majority of companies in Europe report full year earnings in March, but pay dividends in April-May. However, when making an assessment of the value of **implied dividends** it is worth noting that they are likely to react coincidentally when underlying equity markets move. Realised dividends have shown a strong relationship to the index return in the previous year. This can largely be explained by the fact that equity prices respond to expectations about earnings, and consequently reflect changes in earnings expectations immediately, while dividend changes, corresponding to the earnings changes, lag the change in the index (Figure 26).

Figure 26: European realised dividend growth has historically shown a strong relationship to the index return in the previous year




Source: J.P. Morgan. Based on MSCI annual data since 1991.

Figure 27: Regression of European dividend growth versus the index return in the previous year




Source: J.P. Morgan. Based on Euro Stoxx 50 annual data since 1991.

However not all the lag is due to optics. Dividends do tend to lag earnings, as companies generally do not pass through all profit increases immediately to shareholders, and similarly do not cut dividends immediately following a short-term period of weaker earnings. Companies tend to smooth dividends by changing the proportion of earnings that they pay as dividends (the "payout ratio", or dividend per share / earnings per share).

**The regression of dividend growth versus the previous year's index appreciation is illuminating, as it captures many of the characteristics of dividend returns over the last 16 years that we have observed.** In particular:

- Dividend payments tend to be a reflection of a company's financial performance in the previous year, as dividends are generally paid based on the previous year's earnings (and are largely independent of current year earnings, unless the company runs into cash flow problems, for example). On the other hand, the equity market usually discounts expectations about a company's present performance in the current year, and hence dividend growth is likely to lag index appreciation by about a year.
- Dividends tend to grow more slowly and more steadily than company earnings (given the reluctance of management to cut their dividends, and send a negative signal about future prospects to shareholders). This is reflected in the fact that the y-intercept is above zero.
- This bias towards positive growth in dividends also acts as a cushion against downward revisions in earnings estimates when market sentiment becomes more bearish and explains why the downside risk for dividends has tended to be more limited than that for the equity market.

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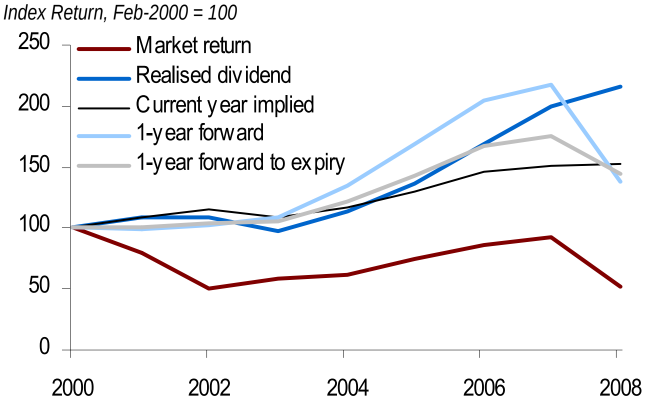
### 3.7. Implied dividends - turning theory into reality

The above sub-sections are useful for a discussion about some of the macro- and micro- economic factors to analyze before making a dividend investment decision. However this analysis has been undertaken only on realised dividends and the issue remains that **trading realised dividend growth is not actually possible.** In contrast, year-on-year equity returns are tradable. Equity returns are tradable, because the instrument (the equity) traded in one year is exactly the same instrument in the following year. For dividends (or earnings) this is not the case, since the dividends (and earnings) earned in one calendar year are not the same as those in the following year – they are effectively a different financial instrument.

Nonetheless, if we could trade next year's dividends at the same level as the current year's dividends, then we could replicate a position in yearly dividend payments, as in this case the return from trading this one-year forward dividend swap will be equal to the year-on-year realised dividend growth. **Using Euro Stoxx 50 implied dividend swap levels since 2001, we can review how the returns from holding implied dividend positions have compared to the year-on-year changes in realised dividends.**

Figure 28: Rolling maturity dividend returns have had similar returns to the equity market for longer forward maturities...

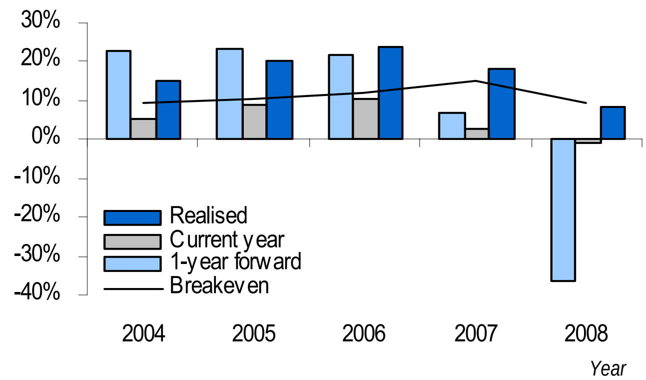
*Index Return, Feb-2000 = 100*




Source: J.P. Morgan.

Figure 29: ... current year implied dividend returns have underperformed realised dividends due to high breakeven

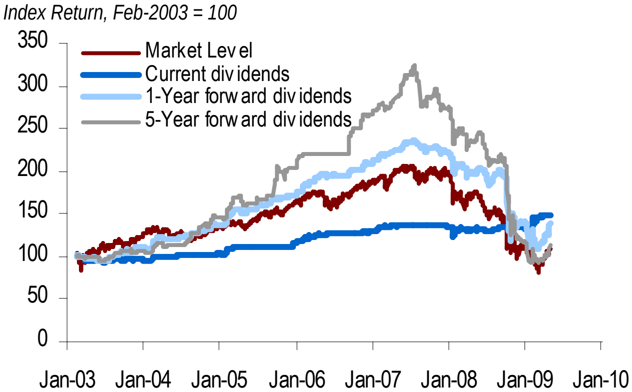
*Annual dividend return*




Source: J.P. Morgan.

Figure 30: Rolling maturity dividend returns have had similar returns to the equity market for longer forward maturities...

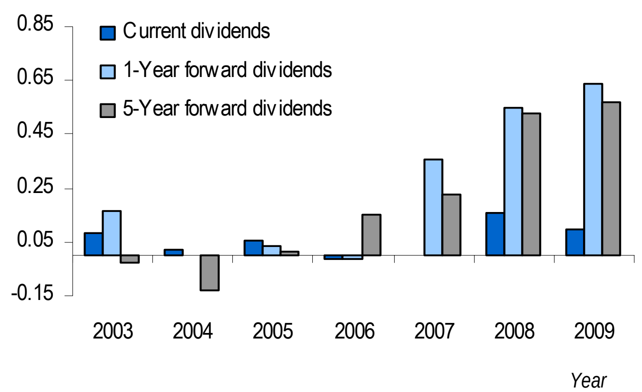
*Index Return, Feb-2003 = 100*




Source: J.P. Morgan.

Figure 31: ... with a gradual increase in the correlation of equity market and implied dividend returns

*Correlation of weekly dividend and market returns*




Source: J.P. Morgan.

In Figure 28 we show the returns from holding different implied dividend strategies and compare them to the market return and the return that could be expected from a theoretical holding of realised dividends. The three hypothetical implied dividend strategies are detailed below:

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**Realised dividend** – Here we assume that we can hold a dividend swap at the previous year's level realised dividends and hold until expiry. For example on 1-Jan-2008 we go long the 2008 dividend swap, but struck at the level of 2007 realised dividends and holding until the end of the dividend swap.

**Current year implied** – In this strategy we hold the current year's implied dividend swap until expiry. For example on 1-Jan-2008 we go long the 2008 dividend swap and hold until the expiry of the dividend swap. This strategy has underperformed the theoretical realised dividend position. The reason for this is that the market has generally priced in a level of dividend growth (around 10%) for the first year over the last five years (Figure 28) and so consequently the return has only been equal to the realised dividend growth – minus the breakeven growth at the start of the year.

**1-year forward** – Here we hold the 1-year forward implied dividend swap and hold it until it becomes the front year. For example, on 1-Jan-2008 we go long the 2009 dividend swap and hold until 1-Jan-2009, when would roll into the 2010 dividend swap. This strategy initially outperformed realised dividends, but more recently has become more correlated to the underlying market returns. To a certain extent, this is to be expected as in the previous section (section 3.6) we showed that realised dividend growth is correlated to equity market returns from the previous year. Thus the returns show that the current 1-year forward dividend swap will reflect the equity market returns as the market anticipates this change in realised dividends. Perhaps more importantly, the correlation of longer maturity forward dividends has gradually increased as the dividend market has matured (Figure 30).

**1-year forward to expiry –** In this scenario we hold a 1-year forward dividend swap until expiry. For example, on 1-Jan-2008 we go long the 2009 dividend swap and hold it until expiry. To get a continuous strategy we need to overlap two strategies which roll on alternate years. This strategy has tracked realised dividends more closely than the other strategies (Figure 29), but has broken down to some degree recently, as the correlation of dividend and market returns has increased.

However, the final strategy does highlight that holding long maturity dividend swaps until expiry may offer great potential to track the returns on realised dividend. Indeed, it is observed that **as the holding period increases then both the absolute average and standard deviation of the tracking error of holding an implied dividend swap compared to the realised growth over that period decreases**. That is, a five-year forward implied dividend swap is much more likely to reflect the growth in realised dividends over the next five years compared to a one-year forward implied dividend swap aiming to reflect the realised dividend growth over *one* year. The reason for this is due to the historical dynamics of the dividend curve.

**Typically most of the implied dividend curve dynamics occur at the front of the curve**. Table 8 demonstrates that the variability of the *implied* year-on-year growth is greatest for the one year forward implied dividend and that the variability of year-on-year-growth, for maturities greater than one year, tends to be quite consistent. Thus the curve shape tends to have most of the "expected growth" priced in the first maturity and has priced consistently fairly flat thereafter. This means that any tracking error compared to realised dividend growth will mainly be concentrated to the first year forward maturity. Consequently for later maturities, this tracking error tends to be small compared to the absolute changes in dividends, as any error is effectively averaged out over the whole maturity of the dividend swap.

Table 8 : Average Euro Stoxx 50 implied dividend term structure details

| Forward Maturity | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Average year-on-year implied growth | -2.2% | 0.3% | 0.5% | 0.0% | -0.2% |
| Std. Dev. year-on-year implied growth | 11.6% | 3.3% | 2.5% | 2.5% | 3.0% |
| Average annualised implied growth from spot | -2.2% | -1.1% | -0.6% | -0.5% | -0.5% |
| Std. dev. annualised implied growth from spot | 11.6% | 7.4% | 5.3% | 4.1% | 3.3% |
| Tracking Error implied v realised | 7.7% | 5.6% | 5.2% | 2.9% | 1.3% |

Source: J.P. Morgan; Data since 2003

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Therefore, in order to track realised growth, **investors are better off trading longer dated dividend swaps and holding them until expiry**. Nonetheless, the returns we have shown in Table 9 are not the full story for most investors. This is because we have measured dividend returns as the percentage return compared to the implied dividend strike. However a dividend swap is what is referred to as unfunded instrument. It is merely an exchange of cash flows at a future date, based upon a specified number of shares. Nonetheless, a long dividend swap position has limited downside, equal to the implied dividend strike, which can be considered the capital at risk when purchasing dividend swaps (in the same way that an equity investment can go to zero). Using this approach, a *funded* instrument can be created and we discuss this in the next section.

Table 9 : Annualised dividend returns over a 1-year holding period

| Year-End | 1-Yr Realised Dividend Growth | Return on 1-yr fwd dividend | Tracking Error |
|---|---|---|---|
| 2001 | 8.16% | 8.27% | 0.11% |
| 2002 | 0.38% | 6.68% | 6.31% |
| 2003 | -9.90% | -5.64% | 4.26% |
| 2004 | 15.86% | 7.97% | -7.88% |
| 2005 | 20.05% | 10.80% | -9.24% |
| 2006 | 24.00% | 12.27% | -11.73% |
| 2007 | 18.20% | 3.58% | -14.62% |
| 2008 | 8.20% | 0.63% | -7.57% |
| Average error | | | -5.05% |
| Std. dev. error | | | 7.66% |

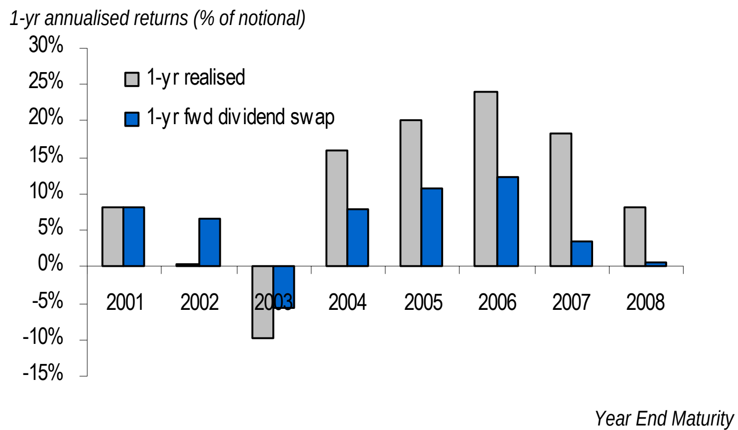



Table 10 : Annualised Dividend returns over a 3-year holding period

| Year-End | 3-Yr realised dividend growth | Return on 3-yr fwd dividend | Tracking Error |
|---|---|---|---|
| 2003 | -0.73% | 2.73% | 3.46% |
| 2004 | 1.57% | 7.53% | 5.96% |
| 2005 | 7.81% | 14.00% | 6.19% |
| 2006 | 19.92% | 21.78% | 1.86% |
| 2007 | 20.73% | 18.20% | -2.52% |
| 2008 | 16.62% | 9.56% | -7.06% |
| Average error | | | 1.31% |
| Std. dev. error | | | 5.20% |

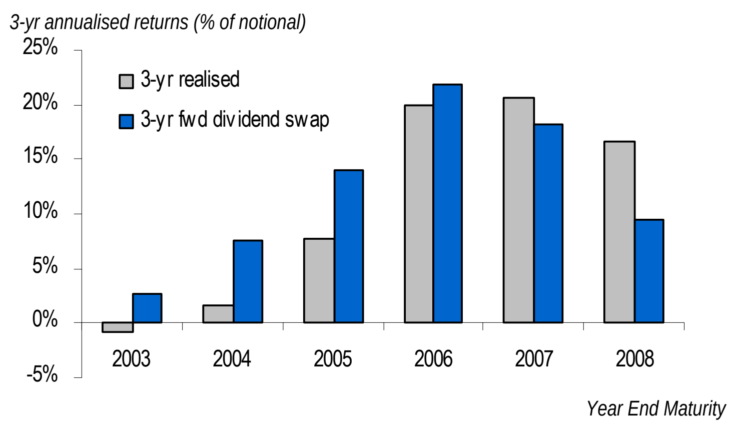
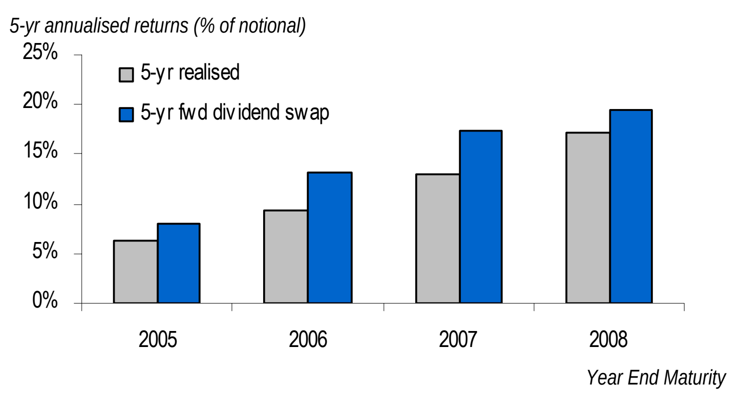



Table 11 : Annualised Dividend returns over a 5-year holding period

| Year-End | 5-Yr realised dividend growth | Return on 5-yr fwd dividend | Tracking Error |
|---|---|---|---|
| 2005 | 6.35% | 8.04% | 1.69% |
| 2006 | 9.30% | 13.10% | 3.80% |
| 2007 | 12.93% | 17.30% | 4.37% |
| 2008 | 17.14% | 19.46% | 2.31% |
| Average error | | | 3.04% |
| Std. dev. error | | | 1.25% |




Source: J.P. Morgan

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# 4. Uses of Dividend Swaps

# 4. Uses of dividend swaps

We have shown some of the macro-economic factors that drive both implied and realised dividend levels of both single stocks and indices. In this section we discuss potential uses for dividend swaps either as opportunistic trading strategies or as structural or systematic investments in a well balanced portfolio.

In the first section it is convenient to discuss how dividend swaps, which are “unfunded" swaps, can be converted into investable dividend products. These products can provide an attractive *alternative* to vanilla bonds, equities, hybrids or convertibles. Moreover, a side-effect of creating investable products highlights that the **implied dividend strike is actually the *dividend-risk-premium* adjusted market prediction of dividends**. This fact should be taken into account when discussing all dividend trading strategies.

In part two we highlight dividend swap futures as another way of trading dividend swaps and discuss the relevant difference between futures and OTC swaps.

Dividend swaps can obviously be used **opportunistically to capture any perceived mispricing between the current implied levels and those that are expected to be realised**. Indeed, over the last few years this has probably been the major use of dividend swaps, especially those based on single stocks where the maturity is fairly short dated.

In section four, we have shown that realised dividends have some attractive features when compared to equities and bonds, potentially tracking inflation and GDP with lower risk than those two asset classes. Thus we also believe that (particularly index) dividend swaps can be used as a **structural alternative to equity and bond exposures** for linked liability driven investments and we discuss this use in the fourth part of this section.

Much of the attraction of using dividend swaps depends on the **pull-to-realised** effect, discussed in section 3. This pull-to-realised is due to the fact that dividend swaps eventually pay out according to the actual realised dividends that companies pay. Since final settlement is based upon real underlying company fundamentals (and so economic factors), the exit from a dividend trade is less susceptible to changes in market sentiment. This contrasts to equities, where at any time there may be an impact on valuations from suppressed market conditions or exuberant expectations, which could prevent a timely exit from any trade.

Finally in the last part, we discuss the historical volatility of dividends swaps and also the correlation of their returns to the underlying equity market.

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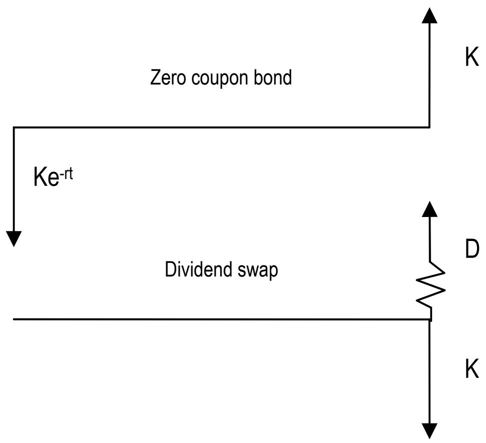
## 4.1. Creating investable dividend products

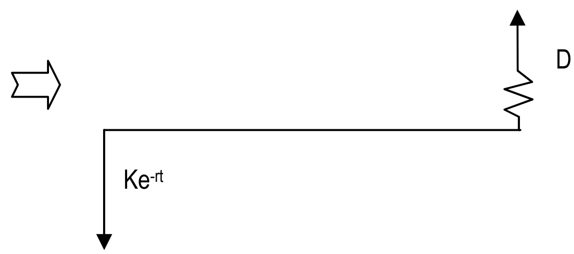
**Dividend swaps are referred to as "unfunded" instruments**, since only an exchange of cash flows occurs at expiry. Therefore the trading of dividend swaps does not require employment of capital except initial margin. We can combine a dividend swap with an investment into a zero-coupon bond with the same maturity as the dividend swap to create a "funded" dividend instrument (Figure 32 and Figure 33). This instrument will then be comparable to other "funded" financial instruments such as cash, bonds or equities.

Figure 32: Creating an investable dividend instrument with a zero coupon bond and dividend swap with the same maturity...




Source: J.P. Morgan.

Figure 33: ... means that the future dividend payment can effectively be purchased today at the discounted value of the implied strike : $Ke^{-rt}$




Source: J.P. Morgan

For example, suppose the dividend swap payable in a future calendar year and whose expiry is at $T$ is currently trading at the implied level of $K$. Suppose we enter into a long dividend swap position, then if the actual realised dividend is $D$ at expiry, there is a cash flow of $D$-$K$ at that time. If the (instantaneous) zero-coupon risk free rate to expiry is $r$, then an investment of $Ke^{-rt}$ invested now, will return $K$ at expiry (Figure 32). Hence the combined value of the zero-coupon bond and dividend-swap investment at expiry is just $D$ – **equal to the actual dividend paid**. This dividend can be purchased today at the present value of the implied dividend strike K (Figure 33).

By creating a "funded" instrument, we can effectively buy or sell a specific dividend cash flow at any point in the future (liquidity permitting). **Any future dividend (liquidity permitting) can be purchased risk-free at the present value of the implied dividend strike.** Hence the implied dividend strike is referred to as the market expectation of the dividend under a risk-neutral measure.

The process of creating separate dividends has been compared to the ability to *strip* coupons and principal from government bonds in the STRIPS market. In the STRIPS market, investment banks spilt the coupon and principal components of government bonds and sell them on separately. In the same way dividends can be detached from the equity they are associated with using dividend swaps. Importantly, as in the STRIPS where the underlying issuer is the US government, in the dividend swap market it is *not* the issuer of the dividend that undertakes the stripping, but a third party arranger.

Assuming we purchase the dividend at $Ke^{-rt}$ , the return at expiry on the initial dividend investment is equal to:

$\frac{(D-Ke^{-rt})}{Ke^{-rt}}$, which can be written as: $\frac{(D-K)}{K}+\frac{D}{K}(e^{rt}-1)\approx\frac{(D-K)}{K}+\frac{D}{K}rt$.

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This shows that the return on any **dividend position will be a combination of the percentage change in the level of implied dividend + interest earned over the holding period.** This highlights the fact that *implied* dividends are not the actual market prediction of dividend payments, but the dividend-risk-premium adjustment of the predicted dividend. We show this using the theory of Capital Asset Pricing Model of risky assets (CAPM). The above equation shows that the **return from holding a funded dividend position is equal to dividend return plus a risk-free return**. CAPM informs us that an investor should receive an excess return above the risk free rate for holding a risky asset. Indeed why would an investor wish to overlay the (risk-free) zero coupon bond position with a (risky) dividend swap in the first place unless they expected an excess return. In mathematical terms we can write this as:

$$\mathrm{E}_d\left[\frac{D-K}{K}\right] = d(t)t \approx (e^{d(t)t}-1)$$

where $\mathrm{E}_d[]$ denotes the markets required dividend return to compensate for the risk of holding dividends and $d(t)$ is the dividend-risk-premium for holding dividend risk at maturity $t$. We can rearrange this equation to give:

$$K = \mathrm{E}_d\left[D\right]e^{-d(t)t}$$

**Hence, the implied dividend is equal to the dividend-risk premium adjusted prediction of the future dividend payment**.

We can now look at the scenario where dividends are predicted to grow at a constant instantaneous growth rate of g. In this case we can write the predicted dividend as:

$$\mathrm{E}_d[D_t] = D_0 e^{gt},$$

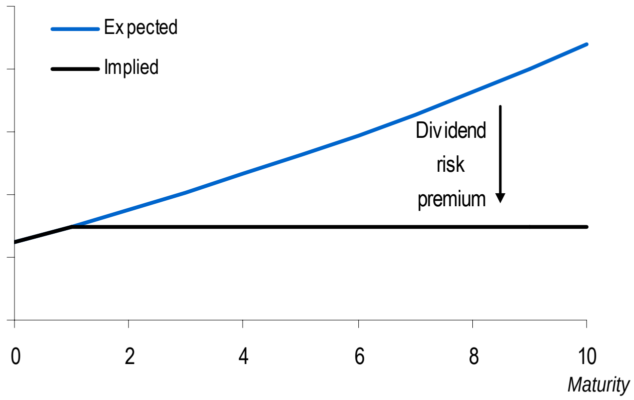
We can substitute this expression into the relationship which equates how each implied dividend should be priced in comparison to the market prediction for dividends to get:

$$K_t = D_0 e^{(g-d)t}.$$

This states that longer term growth rates for implied dividend payments should grow at an annual rate of ***(g-d)*** and *not* at ***g*** which is the actual market prediction for future dividend growth. This is important fact, because it is likely that if dividend growth is predicted by the market to be positive, then the implied dividend growth should be lower, as any predicted dividend growth should be offset by the dividend risk premium (Figure 34). We can obtain a good estimate for the implied dividend growth by observing the actual curve slope and could use the growth priced in between 5-year and 1-year maturities as an estimate (Figure 35). We will denote this observed growth by ***G*** which should in turn be equal to ***(g-d).***

Figure 34: Implied dividends are the dividend risk premium adjusted expected dividends

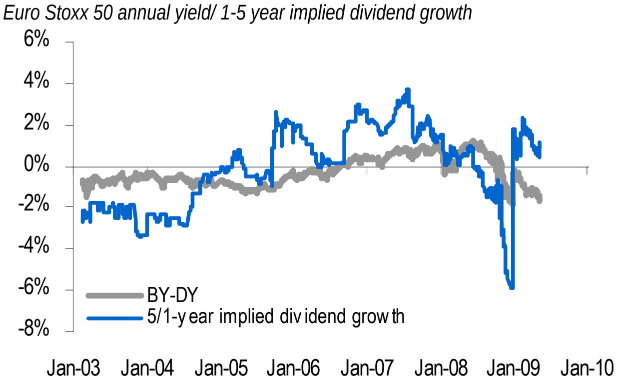
*Implied dividend*




Source: J.P. Morgan.

Figure 35: The spread between spot dividend yields and 10-year bond yields implies a negative implied dividend slope

*Euro Stoxx 50 annual yield/ 1-5 year implied dividend growth*




Source: J.P. Morgan. DY is 1-year forward dividend yield.

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We can now extend this analysis to link long-term dividend growth to the underlying stock price and more specifically the current dividend yield. Using a Dividend Discount Model (DDM), the stock price can be written as:

$$S = \sum_{t=0}^{\infty} \mathrm{E}_d[D_t]e^{-yt} \quad \text{or} \quad \sum_{t=0}^{\infty} \mathrm{E}_d[D_t]e^{-(r+d)t}$$ where $y$ is the equity discount yield and $d$ is the dividend risk premium

Using our assumption for constant dividend growth, we can write the stock price as the following sum:

$$S = \sum_{t=0}^{\infty} D_0 e^{(g-r-d)t} \ ,$$

which can be calculated in the limit if ***r+d>g***, and is equal to:

$$S = \frac{D_0}{1-e^{(g-r-d)}} \approx \frac{D_0}{r+d-g}$$ , for small values of ***(r+d-g)***.

This is the usual expression for the Gordon-Growth model. However we can substitute our term ***G=(g-d)*** into this equation and rearrange to get

$$G = r - \frac{D_0}{S}$$ , or alternatively ***G = BY-DY***, where ***BY*** is the government bond yield and ***DY*** is the current dividend yield.

**This expression shows that the spread between the risk free rate and the current dividend yield should be equal to the long term *implied* growth rate.**

Using the above expression shows why bond yields should exceed dividends yields when dividend growth is expected to be particularly strong (i.e. ***G*>0** implies ***DY<BY***, *section 3.4*). For example, dividend growth is likely to be naturally stronger in an inflationary environment (*section 3*.3). However the spread is actually driven by the *dividend risk premium adjusted* growth **G=(g-d)** and not the predicted dividend growth ***g***. Hence in a risk-averse environment, dividend yields can exceed bond yields despite the market predicting that dividend growth is likely to happen.

Nonetheless, because the implied growth rate in the above equation is already risk-adjusted, we do not need to make any assumptions about either the predicted dividend growth rates or the dividend risk premium. Moreover, we can estimate the risk-adjusted level directly from the implied dividend term structure and directly compare this level to the ***BY-DY*** yield spread (Figure 35). The two levels have shown a degree of consistency over the last six years, but have recently diverged. This divergence implies either one of the following:

- Implied long term dividend growth is too high.
- Spot dividend yields are too high (equities are cheap relative compared to dividends).
- Long term bonds yield are too low.

The above relationship between bond yields, dividend yields and long term risk-adjusted dividend growth is based upon a fairly simple model of predicted constant dividend growth and constant discount rates being used across all maturities. Consequently, there is likely to be a large degree of noise at any one time in the relationship. However, we believe using this model does provide a fairly simple framework to check the consistency between bonds, equity, the level of dividends and the dividend term structure at any one time.

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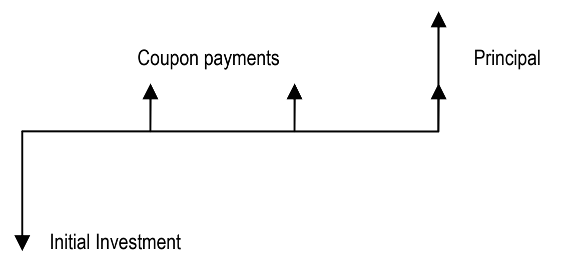
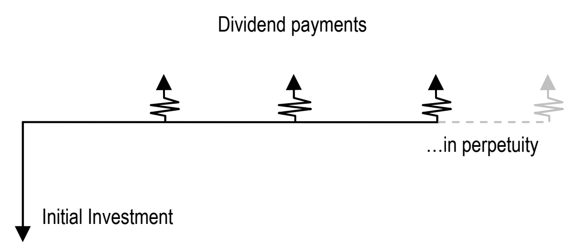
Since we can convert individual dividend payments into investable instruments, we can now use these dividend *strips* to recreate dividend-linked notes whose coupons or principal are linked to the level of dividends paid in that year. Indeed equity itself is a natural extension of this concept where both coupons and principal payment are dividend related, but taken to the extreme limit of perpetual maturity (Figure 37). Indeed, investors who have equity positions which have embedded realised dividend exposure can sell dividends swaps in order to guarantee the level of dividends received over a certain time period (Figure 38 and Figure 39). **This would be undertaken in order to exploit downside potential in dividends, or hedge against a potential fall in the *income* from an equity portfolio.** Having the opportunity to hedge the income from a high yielding equity portfolio may be appealing to some investors. Receive payoff from the short dividend swap position exactly when the nominal income will have fallen, at the expense of capping the potential upside on the nominal income. Using dividend swaps instead of selling equities in order to supplement income may help defer potential capital gains tax charges and reduce transaction costs that might otherwise have been incurred.

Figure 36: Typical coupon and principal payments for a fixed-coupon bond




Source: J.P. Morgan

Figure 37: Typical Equity cash flows




Source: J.P. Morgan

By using dividend swaps we can effectively create a hybrid between a pure fixed-rate instrument (Figure 36) and an equity like instrument (Figure 37). In particular we shall create two example structures calling them "Dividend-Coupon" notes and "Dividend-Principal" notes. The creation of these notes is shown diagrammatically for the Dividend-Coupon bond in Figure 40 and Figure 41 and the Dividend-Principal bond in Figure 42 and Figure 43. **What are the reasons for doing this?** We have shown in the drivers section (*section 3*), that dividends themselves are linked to inflation or nominal GDP. Hence by creating "dividend-linked" coupon and principal notes, we can create instruments whose coupons are closely linked to the levels of GDP or CPI. These instruments can provide attractive alternatives to commodities, inflation linked bonds and convertibles for liability driven investors.

Table 12 : Potential dividend linked structures

| Principal / Coupons | Dividend-linked | Fixed |
|---|---|---|
| Dividend-linked | Equity | Dividend-Coupon bond |
| Fixed | Dividend-Principal notes | notes |

Source: J.P. Morgan

For example a Dividend-Coupon bond may provide a partial hedge to a short-dated annuity whose payments are linked to CPI. In this case we could set the final principal value to zero.

A Dividend-Principal bond provides a way of "fixing" dividend payments, but with capital linked to the level of dividends. This product could be used to hedge inflation exposure or provide an alternative to convertible bonds.

We have referred to these structures as notes, because while they are funded instruments and can be collateralized using underlying government securities, the realised dividend payout is underwritten by the investment bank issuing the note. In that sense they are different from an investment in the actual dividend as the profit/loss of any change in the dividend payment is borne by the underwriter rather than the company issuing that dividend. In contrast an investment in a bond and equity issued by a company is usually exposed solely to the credit risk of that company.

**Options on dividends also allow for Dividend-Principal notes to be capital protected**. This is achieved by replacing the dividend swap on the final principal with a call option on realised dividends (at the expense of lower coupons in order to pay for the protection). Since dividends options can have lower implied volatility than equity options they can provide useful upside "linked" exposure, while reducing the amount of coupon which has to be sacrificed.

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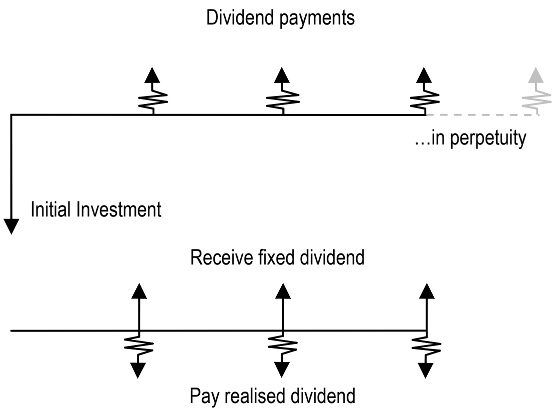
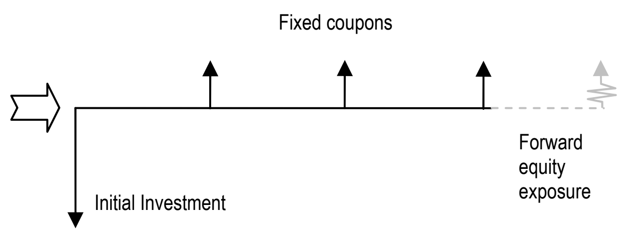
Figure 38: Equity and short a strip of dividend swaps ...



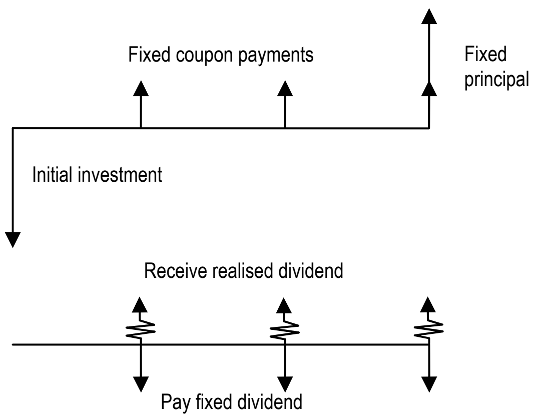

Source: J.P. Morgan

Figure 39: ... to get a partial fixed dividend and equity exposure



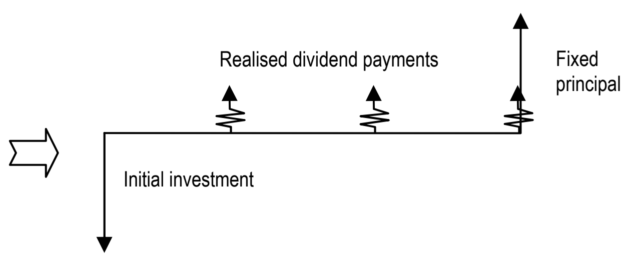

Source: J.P. Morgan

Figure 40: Bond and long a strip of dividend swaps ...



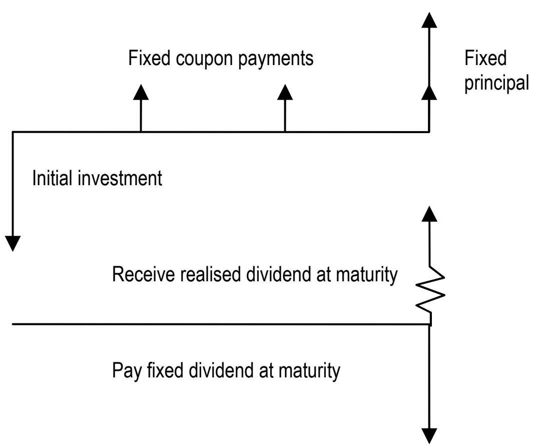

Source: J.P. Morgan

Figure 41: ... to get a Dividend-Coupon note



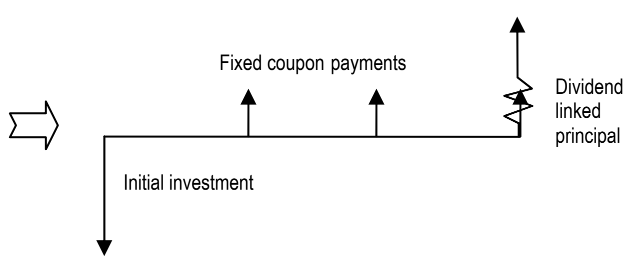

Source: J.P. Morgan

Figure 42: Bond and long a final maturity dividend swap ...




Source: J.P. Morgan

Figure 43: ... to get a Dividend-Principal note




Source: J.P. Morgan

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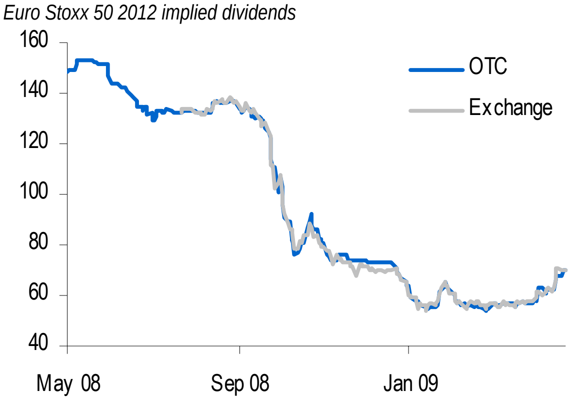
## 4.2. Dividend swap futures

In June 2008 EUREX introduced Euro STOXX 50 dividend swap futures, with contracts based upon the future settlement of the realised dividends going ex- in that calendar year (Dec thru Dec expiry) and these have tracked the level of OTC dividends swaps closely (Figure 44). Since that time the volume and open interest has grown considerably, helped by the push to have central clearing counterparties, following the default of Lehman Brothers in September 2008 (Figure 45). **There have also been useful by-products from the launch of dividend swaps, namely transparency in the pricing and official settlement of the underlying realised dividend payments.**

Figure 44: Dividend swap futures are priced at basically the same level as OTC dividend swaps.

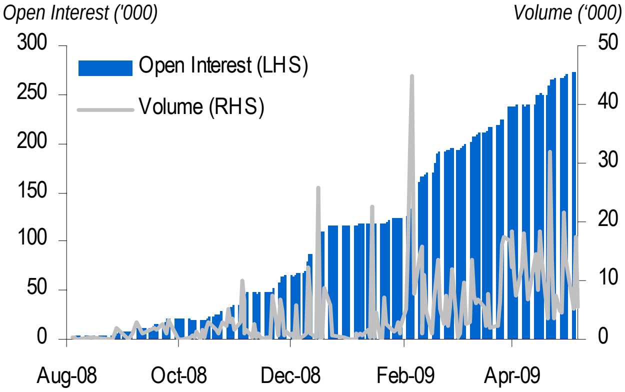
*Euro Stoxx 50 2012 implied dividends*




Source: J.P. Morgan, DataStream

Figure 45: Open interest and volume for Euro Stoxx 50 dividend futures has grown rapidly since their introduction in June 2008

*Open Interest ('000)* *Volume ('000)*

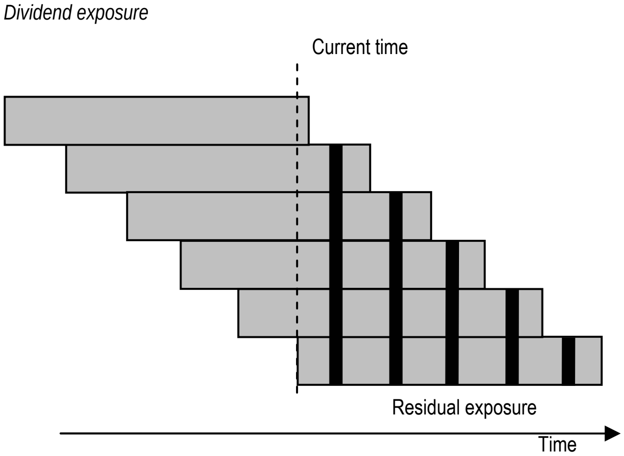



Source: J.P. Morgan, DataStream

The distribution of open interest of dividend futures also is indicative that structured products continue to have influence over the market. We can see this, by considering how dividend exposures are built up by structured products over time. Each long dated structured product, schematically shown in Figure 46 builds up exposure to implied dividends that is fairly linearly distributed through the maturity of that product. Hence as the product matures, some of its implied dividend exposure is lost, but that loss of exposure is be topped up by new structured products issued. Hence at any current point in time there should be a *ladder* of future dividend exposure, with the majority of that exposure being in the closest maturities. In Figure 47 we show the open interest of dividend swap futures indeed shows this *ladder*, with most of the exposure in shorter maturities.

Figure 46: Schematic showing the evolution of structured product dividend exposures over time

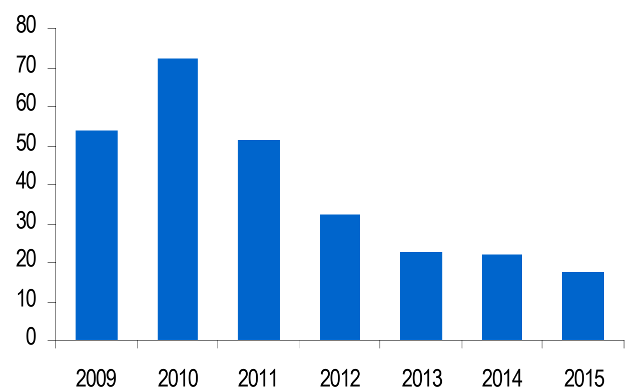
*Dividend exposure*




Source: J.P. Morgan, DataStream

Figure 47: The current open interest profile of dividend swap futures, shows a run-off profile that was expected

*Open Interest ('000)*




Source: J.P. Morgan, DataStream. Data as of May 2009

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**In principle dividend swap futures are equivalent to OTC dividend swaps at expiry and so the price is driven by the same mechanics as the underlying dividend swaps.** The main difference is that the dividend swap payout is valued at the expiry of the dividend swap and so the interim mark-to-market is the discounted value of this future payment. In contrast, the dividend future has a mark-to-market based on the change of the forward price and has no discounting. The different discounting means that futures have an equivalent *notional* size compared to dividends, but a different *mark-to-market or risk equivalent* size.

Euro Stoxx 50 OTC dividend swaps are usually traded in a basket size where 1 basket has the notional equivalent of €1 per index point of dividend. Euro Stoxx dividend swap futures have a notional size such that 1 index point is worth €100. Thus 1 future has the equivalent *notional* size of 100 OTC dividend baskets. Suppose the investor can choose a long position in 5-yr forward dividend swaps either using 100 OTC baskets or 1 future. If the implied dividend swap strike rises by 1pt, each strategy has the following p/l :

Future p/l : €100 x 1 = €100

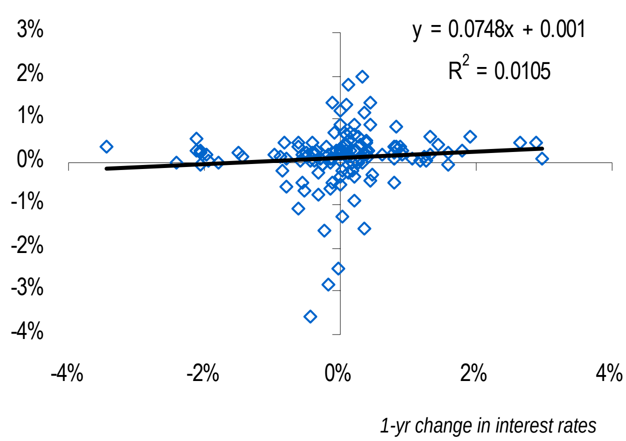
OTC p/l: PV( 100 x 1 x €1 ) = PV(€100) = €88 (using 2.5% discount rate).

Hence the futures position has exposure equal to *100 x 1/(PV Factor)* or 1/0.88 = 113 baskets of the equivalent OTC contract.

**The fact that dividend swap futures have a non-present valued mark-to-market, also introduces the possibility of a financing bias adjustment to their price in comparison to the underlying OTC instrument.** This effect is clearly observed in interest rate futures. However, unlike interest rate futures, any financing bias will require a perception that dividend levels are correlated to the level of overnight funding interest rates. Obviously, for interest rate futures, forward rates and overnight rates are likely to have a strong correlation, but for dividend swaps the relationship is likely to be significantly weaker. Using our long term historic data, there does appear to be a positive (though weak) relationship between dividend changes and changes in short-term rates (Figure 48).

Figure 48: There is a weak positive relationship between changes in interest rates and changes in dividend levels

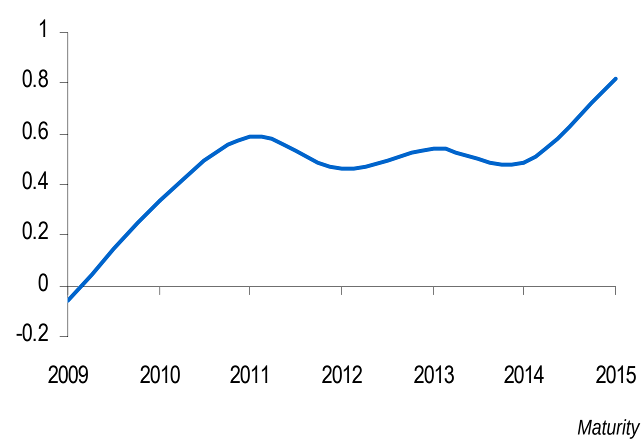
*1-yr change in dividends (scaled by starting index level)*




Source: J.P. Morgan, DataStream

Figure 49: Futures have been trading rich recently compared to OTC levels, with an increasing basis for longer maturities

*2-month average Futures – OTC level*




Source: J.P. Morgan, DataStream

The effect of a positive relationship between dividend swap levels and interest rates can be seen in the following schematic for the p/l of 1 future. Here we assume that interest rates rise 50bp for every 5 index point change in dividend levels.

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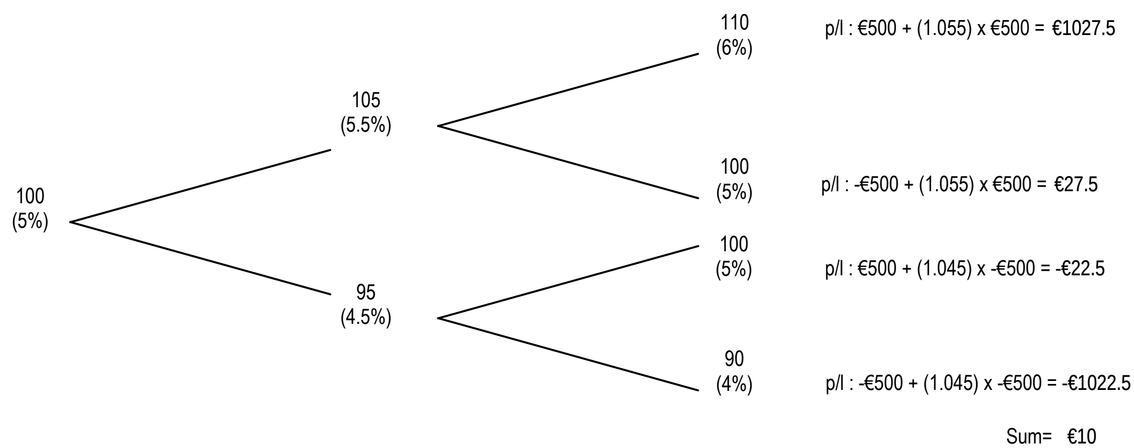
Figure 50: Schematic showing the potential for a financing bias in dividend swap futures, if there exists a positive correlation between changes in interest rates and implied dividend swap levels.




Source: J.P. Morgan

Since the overall sum is positive, holding one future for eventual delivery into an obligation of 100 OTC baskets, has the potential to generate a potential additional profit. Hence, the holder of a long dividend swap futures position should be willing to pay a slightly higher price than an OTC position. **This would mean that the futures price could trade above the OTC level if there was a positive relationship between interest rate changes and dividend swap levels**. The level of this financing bias will also depend upon the volatility of interest rates and dividends (no change in levels gives no chance for extra p/l) and time to expiry, and increases as both increase. Though the above schematic shows the effect is fairly small, and the correlation between rates and dividends is weak, interestingly futures have been trading at a slight premium to OTC levels over recent months (Figure 49).

We believe that much of the recent richness of dividend swaps futures is likely to be flow driven or due to the recent liquidity or counterparty preference - though any persistent bias could be explained by the above argument for financing.

## 4.3. Opportunistic Uses

**1. Buying or selling dividend swaps can be a more compelling proposition than trading a stock or index.** A differentiated view on dividends can be profitably exploited through dividend swaps on a single stock or index. Company earnings receive a great deal of attention, because of their impact on company share prices. However, share prices are influenced by many factors, in addition to earnings announcements. Dividends are driven largely by earnings growth, payout ratios, and cash availability. However, stock prices are impacted by further factors, such as changes in P/E multiples, and expectations about a company's future earnings stream, including those earnings falling outside of the period to which the dividend swap applies. Therefore there are more sources of potential risk in trading stocks. Consequently it is no surprise that dividends have historically been less volatile than either earnings or stock prices (section 3.3).

For example, suppose an investor wishes to gauge the overall level of Euro Stoxx 50 2010 implied dividends in order to decide on an investment into dividend swaps. They can start by predicting the potential dividend payments from each constituent in 2010. Single stock dividends are then aggregated to the index level using the methodology described in section 2 (an example of this aggregation is shown in Table 13).

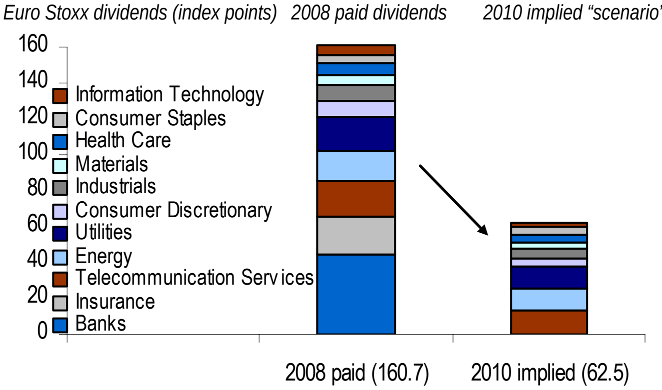
**The advantage of having dividend exposure is that the investor is only exposed to incorrectly predicting the eventual dividend payments made by companies rather than having to gauge whether the equity market will rally or not**.

Indeed, many analysts have a good understanding of near term earnings drivers for specific companies, while having limited knowledge of the direction of overall market valuation. Next the investor could aggregate by sector to see what proportion of dividends may be considered most at risk – for example, banks provided 28.7% of actual paid dividends in 2008. Taking the 2010 implied level, dividend growth rates can then be applied to each sector in order to develop a scenario which is constituent with that being implied (Figure 51).

Based on the company based bottom-up predictions for 2010 dividend payments and interpretation of possible sector dividend growth rates, but taking into account the appropriate dividend risk premium (section 4.1), the investor can then decide whether the dividend swap is an attractive investment or not.

Figure 51: 2010 implied dividends were consistent with a scenario where banks and insurers pay zero, and all other sectors cut by 33%

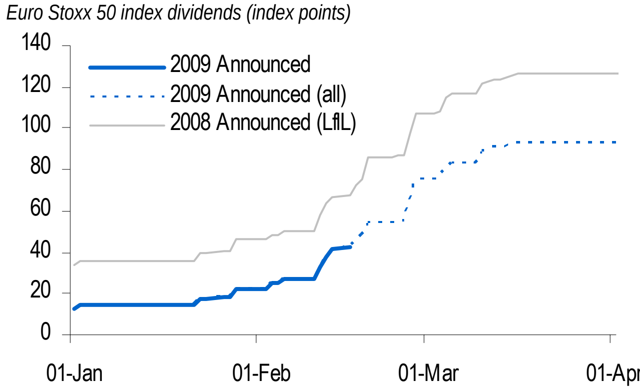
*Euro Stoxx dividends (index points) 2008 paid dividends 2010 implied "scenario"*




Source: J.P. Morgan. Data as of Feb 2009

Figure 52: 2009 accrued and announced dividends, compared to the 2008 run rates

*Euro Stoxx 50 index dividends (index points)*




Source: J.P. Morgan Data as of Feb 2009

The other advantage that investing in any particular year dividend swap has over an equity investment, **is that realised dividend payments can be compared year-on-year.** Firstly this helps an investor to gauge whether company behaviour may have recently changed and consequently adding uncertainty to their predictions (Figure 52). Secondly, an investor can use the earnings calendar to time an investment. Companies typically announce their intentions about dividend payments, and often provide explicit target or scheduled dividend payments during the reporting season and so it can reasonably be expected that earnings announcements will provide key catalysts for the dividend swap market.

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Table 13: Example. We show the estimated dividend payments and calculate the contribution for each stock to overall index dividend points for each calendar year, from 2009 – 2012 as of February 2009

| Stock | | Current Price | Current Weight | Current Divisor | 2008 | 2008 (DPS) | 2009 | 2009 (DPS) | 2010 | 2010 (DPS) | 2011 | 2011 (DPS) | 2012 | 2012 (DPS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGN NA | AEGON | 3.81 | 0.47% | 2.72 | 1.69 | 0.62 | 0.41 | 0.15 | 0.82 | 0.30 | 0.84 | 0.31 | 0.99 | 0.36 |
| AI FP | AIR LIQUIDE | 58.53 | 1.33% | 0.50 | 1.03 | 2.04 | 1.11 | 2.20 | 1.16 | 2.30 | 1.21 | 2.40 | 1.31 | 2.60 |
| ALO FP | ALSTOM | 40.86 | 0.71% | 0.39 | 0.31 | 0.80 | 0.39 | 1.00 | 0.42 | 1.10 | 0.44 | 1.15 | 0.46 | 1.20 |
| ALV GY | ALLIANZ SE | 64.95 | 2.56% | 0.88 | 4.81 | 5.50 | 3.50 | 4.00 | 3.94 | 4.50 | 4.37 | 5.00 | 4.81 | 5.50 |
| CS FP | AXA | 11.77 | 1.71% | 3.23 | 3.88 | 1.20 | 2.42 | 0.75 | 2.42 | 0.75 | 2.91 | 0.90 | 3.23 | 1.00 |
| BAS GY | BASF SE | 24.22 | 1.94% | 1.78 | 3.47 | 1.95 | 3.47 | 1.95 | 3.47 | 1.95 | 3.47 | 1.95 | 3.47 | 1.95 |
| BAY GY | BAYER | 43.24 | 2.88% | 1.48 | 2.00 | 1.35 | 2.00 | 1.35 | 2.00 | 1.35 | 2.07 | 1.40 | 2.22 | 1.50 |
| BBVA SQ | BBVA | 7.00 | 2.17% | 6.89 | 5.25 | 0.76 | 2.32 | 0.34 | 2.79 | 0.40 | 2.86 | 0.41 | 3.10 | 0.45 |
| BNP FP | BNP PARIBAS | 26.59 | 1.99% | 1.66 | 5.56 | 3.35 | 2.16 | 1.30 | 2.16 | 1.30 | 2.49 | 1.50 | 2.90 | 1.75 |
| ACA FP | CREDIT AG. | 8.42 | 0.74% | 1.96 | 2.17 | 1.11 | 0.78 | 0.40 | 0.78 | 0.40 | 1.18 | 0.60 | 1.37 | 0.70 |
| CA FP | CARREFOUR | 26.86 | 1.43% | 1.18 | 1.27 | 1.08 | 1.27 | 1.08 | 1.27 | 1.08 | 1.30 | 1.10 | 1.41 | 1.20 |
| UCG IM | UNICREDIT | 1.37 | 1.60% | 25.83 | 6.71 | 0.26 | 0.00 | 0.00 | 2.06 | 0.08 | 2.06 | 0.08 | 2.58 | 0.10 |
| DAI GY | DAIMLER AG- | 23.90 | 1.86% | 1.73 | 3.45 | 2.00 | 1.72 | 1.00 | 1.72 | 1.00 | 2.07 | 1.20 | 2.24 | 1.30 |
| BN FP | DANONE | 37.21 | 1.55% | 0.92 | 1.02 | 1.10 | 1.06 | 1.15 | 1.15 | 1.25 | 1.20 | 1.30 | 1.25 | 1.35 |
| DB1 GY | DEUTS. BOERSE | 37.48 | 0.64% | 0.38 | 0.79 | 2.10 | 1.02 | 2.70 | 1.02 | 2.70 | 1.15 | 3.05 | 1.24 | 3.30 |
| DBK GY | DEUTS. BANK | 21.95 | 1.09% | 1.11 | 4.97 | 4.50 | 0.55 | 0.50 | 0.55 | 0.50 | 0.99 | 0.90 | 1.44 | 1.30 |
| DTE GY | DEUTS. TEL | 9.58 | 2.49% | 5.77 | 4.49 | 0.78 | 4.49 | 0.78 | 4.73 | 0.82 | 4.73 | 0.82 | 4.84 | 0.84 |
| ENEL IM | ENEL | 4.41 | 1.61% | 8.12 | 3.97 | 0.49 | 3.97 | 0.49 | 3.97 | 0.49 | 3.97 | 0.49 | 3.97 | 0.49 |
| ENI IM | ENI | 16.82 | 3.57% | 4.72 | 6.36 | 1.35 | 6.36 | 1.35 | 6.36 | 1.35 | 6.83 | 1.45 | 7.54 | 1.60 |
| EOAN GY | E.ON | 23.91 | 3.85% | 3.57 | 4.88 | 1.37 | 5.36 | 1.50 | 5.89 | 1.65 | 6.43 | 1.80 | 7.14 | 2.00 |
| FORB BB | FORTIS | 1.15 | 0.22% | 4.24 | 2.50 | 0.59 | 0.00 | 0.00 | 0.34 | 0.08 | 0.93 | 0.22 | 0.64 | 0.15 |
| FTE FP | FRANCE TEL | 18.14 | 3.00% | 3.68 | 6.98 | 1.90 | 5.22 | 1.42 | 5.40 | 1.47 | 5.66 | 1.54 | 5.88 | 1.60 |
| G IM | GENERALI | 15.29 | 1.58% | 2.30 | 2.07 | 0.90 | 1.15 | 0.50 | 1.38 | 0.60 | 1.72 | 0.75 | 2.18 | 0.95 |
| GSZ FP | GDF SUEZ | 27.90 | 3.14% | 2.50 | 5.15 | 2.06 | 3.35 | 1.34 | 4.08 | 1.63 | 4.20 | 1.68 | 4.43 | 1.77 |
| IBE SQ | IBERDROLA | 5.50 | 1.75% | 7.08 | 1.92 | 0.27 | 2.43 | 0.34 | 2.83 | 0.40 | 3.25 | 0.46 | 3.54 | 0.50 |
| INGA NA | ING GROEP | 5.94 | 1.08% | 4.03 | 6.27 | 1.56 | 0.60 | 0.15 | 1.21 | 0.30 | 1.81 | 0.45 | 1.91 | 0.47 |
| ISP IM | INTESA SANP | 2.33 | 1.81% | 17.32 | 6.03 | 0.35 | 0.00 | 0.00 | 2.08 | 0.12 | 2.08 | 0.12 | 2.77 | 0.16 |
| MT NA | ARCELOR MITTAL | 19.26 | 1.24% | 1.43 | 1.49 | 1.04 | 1.65 | 1.15 | 1.76 | 1.23 | 2.09 | 1.46 | 2.20 | 1.54 |
| MC FP | LVMH | 47.97 | 1.08% | 0.50 | 0.80 | 1.60 | 0.80 | 1.60 | 0.82 | 1.65 | 0.92 | 1.85 | 1.00 | 2.00 |
| MUV2 GY | MUNICH RE | 102.75 | 1.85% | 0.40 | 2.20 | 5.50 | 2.20 | 5.50 | 2.20 | 5.50 | 2.32 | 5.80 | 2.44 | 6.10 |
| NOK1V FH | NOKIA | 9.54 | 3.16% | 7.36 | 3.90 | 0.53 | 2.94 | 0.40 | 2.94 | 0.40 | 3.31 | 0.45 | 3.68 | 0.50 |
| OR FP | L'OREAL | 52.16 | 1.08% | 0.46 | 0.64 | 1.38 | 0.65 | 1.40 | 0.69 | 1.50 | 0.74 | 1.60 | 0.78 | 1.70 |
| PHIA NA | PHILIPS | 15.03 | 1.32% | 1.96 | 1.37 | 0.70 | 1.37 | 0.70 | 0.78 | 0.40 | 0.98 | 0.50 | 1.08 | 0.55 |
| RNO FP | RENAULT | 17.06 | 0.30% | 0.39 | 1.47 | 3.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 1.00 | 0.58 | 1.50 |
| REP SQ | REPSOL YPF | 13.98 | 0.96% | 1.53 | 1.53 | 1.00 | 1.61 | 1.05 | 1.68 | 1.10 | 1.84 | 1.20 | 1.99 | 1.30 |
| RWE GY | RWE | 59.33 | 2.13% | 0.80 | 2.52 | 3.15 | 3.75 | 4.70 | 3.11 | 3.90 | 3.51 | 4.40 | 3.83 | 4.80 |
| SAN SQ | SANTANDER | 5.74 | 4.00% | 15.47 | 9.73 | 0.63 | 9.68 | 0.63 | 9.77 | 0.63 | 9.99 | 0.65 | 10.51 | 0.68 |
| SAP GY | SAP | 28.68 | 2.18% | 1.69 | 0.85 | 0.50 | 0.85 | 0.50 | 0.90 | 0.53 | 1.00 | 0.59 | 1.12 | 0.66 |
| SAN FP | SANOFI- | 46.90 | 4.23% | 2.00 | 4.14 | 2.07 | 4.20 | 2.10 | 4.50 | 2.25 | 4.70 | 2.35 | 5.00 | 2.50 |
| SU FP | SCHNEIDER | 52.22 | 1.13% | 0.48 | 1.58 | 3.30 | 1.67 | 3.50 | 1.67 | 3.50 | 1.67 | 3.50 | 1.77 | 3.70 |
| DG FP | VINCI | 28.37 | 1.22% | 0.96 | 1.50 | 1.57 | 1.50 | 1.57 | 1.50 | 1.57 | 1.58 | 1.65 | 1.72 | 1.80 |
| SGO FP | SAINT-GOBAIN | 29.73 | 0.78% | 0.58 | 1.19 | 2.05 | 1.19 | 2.05 | 1.19 | 2.05 | 1.19 | 2.05 | 1.22 | 2.10 |
| SIE GY | SIEMENS | 45.79 | 3.26% | 1.58 | 2.53 | 1.60 | 2.53 | 1.60 | 2.53 | 1.60 | 2.69 | 1.70 | 2.84 | 1.80 |
| GLE FP | SOCIETE GENERALE | 26.94 | 1.36% | 1.12 | 1.01 | 0.90 | 1.01 | 0.90 | 1.01 | 0.90 | 1.35 | 1.20 | 1.68 | 1.50 |
| TEF SQ | TELEFONICA | 14.01 | 5.01% | 7.94 | 7.14 | 0.90 | 8.53 | 1.07 | 9.32 | 1.17 | 9.92 | 1.25 | 10.71 | 1.35 |
| TIT IM | TELECOM ITALIA | 1.01 | 0.90% | 19.79 | 1.58 | 0.08 | 1.19 | 0.06 | 1.19 | 0.06 | 1.38 | 0.07 | 1.58 | 0.08 |
| FP FP | TOTAL | 40.60 | 7.43% | 4.07 | 8.98 | 2.21 | 9.35 | 2.30 | 9.43 | 2.32 | 10.16 | 2.50 | 10.97 | 2.70 |
| UNA NA | UNILEVER NV | 16.04 | 2.17% | 3.01 | 2.28 | 0.76 | 2.31 | 0.77 | 3.33 | 1.11 | 2.49 | 0.83 | 2.70 | 0.90 |
| VIV FP | VIVENDI | 19.57 | 1.99% | 2.26 | 2.94 | 1.30 | 2.94 | 1.30 | 3.17 | 1.40 | 3.39 | 1.50 | 3.62 | 1.60 |
| VOW GY | VOLKSWAGEN | 258.2 | 2.47% | 0.21 | 0.38 | 1.80 | 0.38 | 1.80 | 0.16 | 0.75 | 0.19 | 0.90 | 0.21 | 1.00 |
| | TOTAL | 2222.0 | 100.0% | | 160.7 | | 119.4 | | 129.7 | | 140.0 | | 152.1 | |

Source: J.P. Morgan Equity Derivatives Strategy, DaDD, IBES, DataStream. Correct at close of business 12 February 2009.

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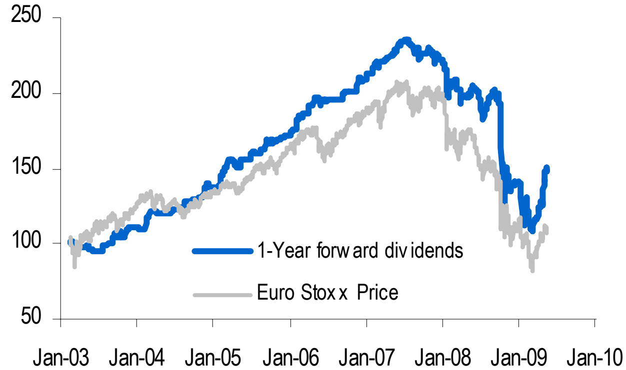
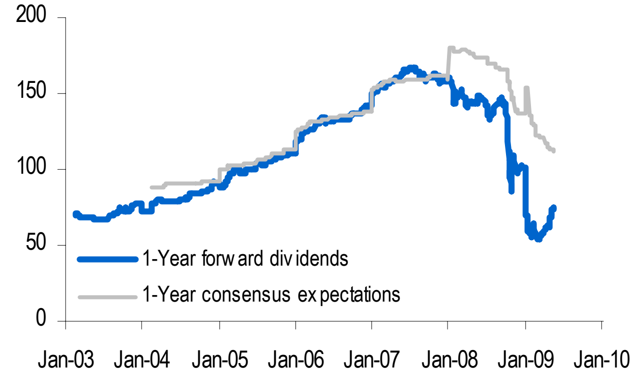
**2. Index implied dividends as an alternative to equity exposure.** We have shown in section 3.7, that 1-year forward dividends have recently shown a strong correlation to the underlying equity markets (also see Figure 53). Since they are strongly correlated to equity markets, a rolling 1-year forward position in implied dividends can be used as an attractive alternative to equity market positions.

Figure 53: A rolling 1-year forward dividend swap position has outperformed the equity market
*Index return, Feb 2003 = 100*




Source: J.P. Morgan, DataStream

Figure 54: Implied dividends have generally traded at a discount to analyst's expectations
*Index dividends*




Source: J.P. Morgan, DataStream, DaDD

Moreover, since a dividend swap requires no principal investment (apart from margin), including an additional return on deposited funds would provide further outperformance versus an equity market total return (Table 14).

Table 14 : Rolling 1-year forward Euro Stoxx 50 implied dividend returns versus equity market returns

| Dividend Maturity Year | Calendar Year | Level at Period End | Return Over Period | (+LIBOR) | Market Total Return | Dividend vs. Market Returns | Correlation | IBES Chg/Implied Chg | IBES Discount @ Start of Year |
|---|---|---|---|---|---|---|---|---|---|
| 2011 | 2010 | 71.0* | - | - | - | - | - | - | 135.1% |
| 2010 | 2009* | 74.5* | 3.1% | 5.8% | -1.8% | 7.6% | 0.65 | 4.6% | 113.2% |
| 2009 | 2008 | 103.9 | -36.4% | -31.7% | -42.4% | +10.7% | 0.55 | 74.8% | 10.7% |
| 2008 | 2007 | 160.0 | 6.7% | 10.7% | 9.6% | +1.1% | 0.35 | 72.7% | 1.5% |
| 2007 | 2006 | 143.0 | 21.6% | 24.5% | 18.0% | +6.5% | -0.01 | 52.0% | 6.3% |
| 2006 | 2005 | 112.2 | 23.3% | 25.7% | 24.3% | +1.4% | 0.03 | 64.7% | 9.7% |
| 2005 | 2004 | 92.0 | 22.8% | 25.2% | 9.4% | +15.8% | 0.00 | - | - |

Source: J.P. Morgan. * - YTD values. Data as of 13 May 2009

We have shown in section 4.1 that, in theory at least, a 1-year forward dividend swap position should return the dividend risk premium and cash return over that period and so implied dividends should optically trade lower than consensus predictions. Indeed since 2003, 1-year forward dividend returns have been driven by a convergence to these predictions, but they have also been driven by an increase in consensus expectations themselves. Since 2003, earnings expectations have increased almost monotonically in response to a prolonged period of earnings expansion. At the same time, the P/E of the equity market has fallen and payout ratios have increased - meaning that dividend growth has outpaced earnings growth, and the P/E multiple applied to the earnings have fallen, **meaning that dividend growth has outpaced equity returns.**

Thus, going forward to decide between equity and dividend exposure an investor has to judge whether the factors that have driven strong dividend growth over the last few years will remain valid going forward.

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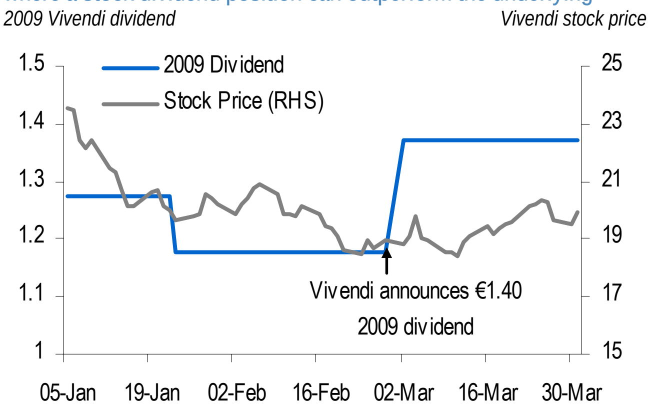
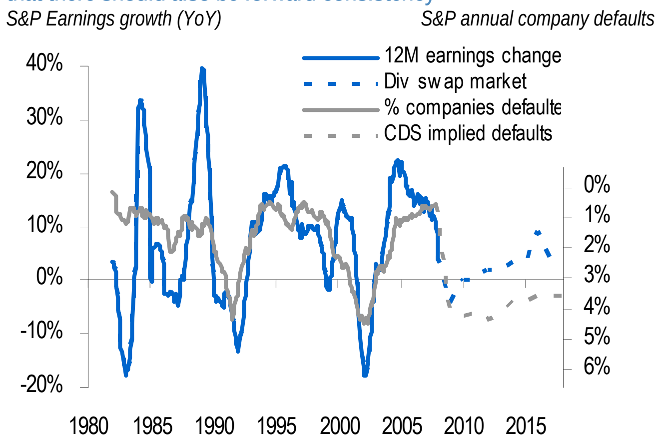
**3. Opportunistic single stock example – Vivendi dividend 2009.** Our analyst expected Vivendi's 2009 dividend (2008FY announced DPS) to be €1.37 and consensus expectation was €1.40 at that time. In contrast the implied dividend for the Dec-09 dividend swap was at €1.18 giving a 16% potential return if the dividend turned out as expected. On 2nd March, Vivendi announced their dividend at €1.40 and the implied levels jumped accordingly (Figure 55). Noticeably, at that time, the share price was unchanged (the ex-dividend was set for 12th May) after the announcement and so a positive view of the dividend was best (only) captured through taking the dividend swap exposure.

Figure 55: The announcement of Vivendi's 2009 dividend is an example where a stock dividend position can outperform the underlying




Source: J.P. Morgan, DataStream

Figure 56: Earnings growth and credit default cycles are aligned, so that there should also be forward consistency




Source: J.P. Morgan, S&P, DataStream

**4. Trading economic cycles.** As dividend swaps are based on discreet calendar years, it is possible to calculate the dividend growth implied by the dividend swaps market for any calendar year. Due to structured product flows, and greater mark-to-market risks from holding longer-dated dividend swaps, the dividend growth implied by dividend swaps for more distant years is frequently lower than the dividend growth that has historically been delivered. Furthermore, since dividends are based upon specific future cash flows, nuanced trades take advantage of economic trends and exposures, such as timing of recessions, business cycles, inflation exposure etc rather than an *average* view embedded within a share price.

Investors can more accurately position for a market bottom, without taking directional exposure between now and then (by selling the dividend associated with the calendar year in which they believe that dividend swaps will bottom, and buying a longer dated dividend swap to benefit from the anticipated growth in dividends after the bottom). In particular, implementing the 2015-2010 steepener over recent years has allowed the investor to hedge the entry point of an outright long 2015 dividend swap position, without the risk of an overall drop in implied dividend levels. This steepener position was taken with the view that 2010 was biased to be the low point in the realised dividend cycle (section 3.5). However, we have already noted that the implied dividend curve does *not* price the actual expected dividend growth, but one that is risk-adjusted. This makes trading curves outright difficult in absolute terms, but views can be taken against other forward looking "risk-adjusted" curves.

**5. Trading relative value versus other asset classes.** Since dividend swaps provide the ability to trade specific parts of the dividend cycle, they can be compared to other tradable forward looking instruments, in particular those instruments which have a fixed term maturity. For example, the relationship between credit defaults and earnings growth has been strong over previous years, and so implied dividends versus credit curve positions can be used to construct trades, which take advantage of any inconsistent outlook between the two asset classes (Figure 56). Other interesting relative value trades can be done against other assets such as commodities, equities or bonds (see section 4.1). For example, if dividends are pricing a more bearish market outlook than equities, investors may subsidize their Euro Stoxx 50 index protection by selling protection on dividend swaps.

**6. Price Return Swaps (PRS).** Long dated synthetic exposure to equities can be replicated using Equity Swaps. Usually swaps are offered in the form of Total Return Swaps (TRS). The reasoning behind TRS being the most liquid equity swap product is that swap provider hedges their exposure by holding the underlying basket of stocks. When these stocks pay dividends, this risk of these dividends being lower than expected is passed on to the investor through the swap, as the TRS includes the total return *including* dividends. Some investors require or want exposure to only the price level which can be synthetically gained through a Price Return Swap (PRS). PRS are difficult to hedge with a basket of stocks unless the PRS provider knows the level of dividend expected upfront. This is where dividend swaps can be used. The hedger can hold the basket of stocks and sell a dividend swap of the same maturity of the PRS, effectively fixing the level of dividends paid (section 4.1). This fixed level of dividends can then be used to price the level of funding spread for a PRS with respect to the level of spread priced into the TRS. In some markets PRS are fairly actively traded and prices of implied dividends used in PRS can vary greatly from that implied by the dividend swap market. Such a situation occurred in the Nikkei 225 PRS in early 2009.

**6. Dividends should have a strong positive relationship to inflation!** We demonstrated using theoretical examples that there should be a relationship between the performance of dividends and inflation. Hence dividend swaps can be used as an alternative to trading other inflation linked products to express a change in inflation expectations. This can be undertaken either from the point of view of any investors looking to express a tactical view on inflation or as an alternative asset class relevant for liability-driven investments (pension funds, insurance companies, etc.). We discuss the structural uses in more detail in section 4.4.

**7. Options of dividend swaps.** With increased interest and liquidity in dividend swaps **has come increased demand for options on dividends**. Investors can buy and sell put and call options on dividend swaps of various maturities and strikes. Dividend options can also be used as in section 4.1 to create dividend-linked structures, but with capital guarantees. We discuss the historic realised volatility of dividend swaps in section 4.5.

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## 4.4. Structural uses in portfolio allocation

While the main use of dividend swaps over the last few years has been to take opportunistic views on the relative value of implied dividends compared to that expected, the strong relationship between dividends and inflation and nominal GDP gives rise to the potential to use dividend swaps as an alternative to equities and bonds in efficient portfolio allocation.

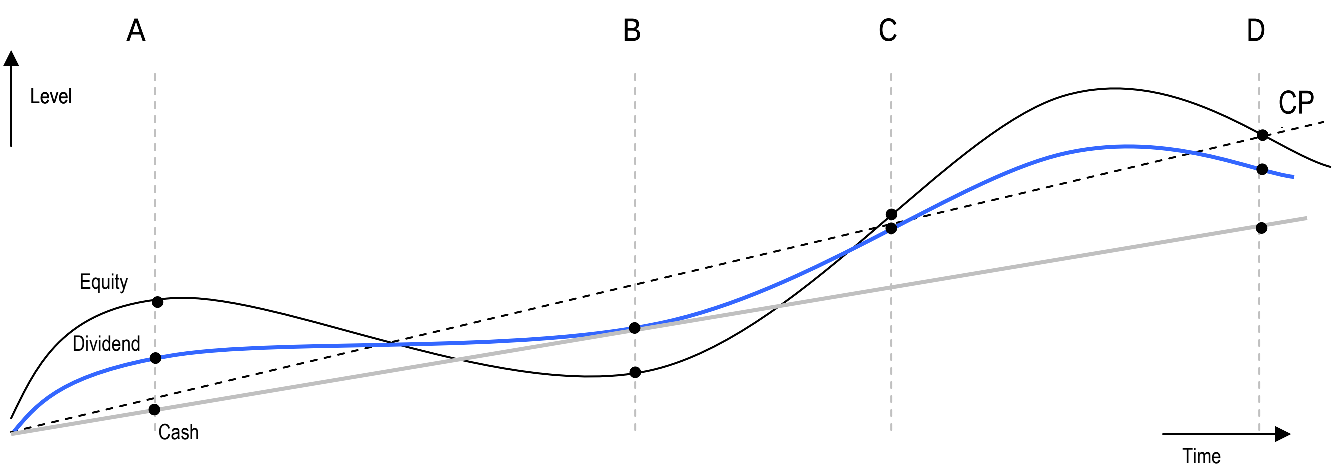
This fact is particularly relevant for liability-driven investors (pension funds, insurance companies, etc.) where the liabilities are index linked either to inflation or wages. Intuitively, we have shown that dividends will be linked to inflation, but since dividends are less exposed to a valuation cycle they may offer a more pure exposure to inflation than equities. Equities, for example, can suffer P/E contraction commensurate with a greater required return on equity in an inflationary environment. Hence the ability to buy and sell dividends may offer a useful half-way house alternative to equity exposure, especially for hedging short to medium term index linked liabilities.

The most important questions to ask for any liability driven investment are: **When are the liabilities due? What are they linked too? What is the best measure of risk for the liability matching of the assets?** Determining the answers to these questions is crucial in deciding what the best financial instruments are for investing in now in order to hedge those future liabilities.

Even investors who have no clearly defined liabilities or benchmark should know what their overall investment objective is. Is the objective capital, spending power or wealth preservation? Arguably deciding on these targets will mean that the investor has a total return, CPI or GDP liability and should adjust their investments according.

In section 3, we showed that over the longer term both equities and dividends have followed the overall trend of GDP/CPI growth, but the valuation applied to equities has tended to be more cyclical. On top of the cyclicality risk, there is also substantial excess-volatility in equities, which is often produced by effects such as over-reaction to news or buying/selling flows. Ignoring the effect of this excess volatility, which tends to affect shorter holding periods; we can schematically represent the equity and dividend cycles that have been observed over time (Figure 57. Figure 12 show the real observed picture. The schematic representation bears a fair resemblance).

Figure 57: Schematic representation of equity and dividend cycles through time




Source: J.P. Morgan

Suppose we are asked to invest in some assets that are designed to hedge liabilities that are linked to CPI. It can be seen that the risk of matching this liability is heavily exposed to the timing of the investment and the subsequent exposure to business cycles (**cyclical timing risk**). Firstly, we assume that an investment has to be made at time **A** in Figure 57 in order to hedge a CPI linked liability at some time in the future. The appropriate investment instrument to use is consequently dependent on the exact future timing of the liability. In chronological order, we look at the appropriate investment for several different horizons

**Liability due at time B**. Equities and dividends are at cyclical highs and so could substantially underperform CPI. This is because the underperformance due to cyclical effects can outweigh the positive benefit of greater exposure to CPI. In this case an investment in cash or bonds would be appropriate.

**Liability due at time C**. Although there is slight overall underperformance of dividends versus CPI, the smoother nature of the dividend cycle compared to equities could mean that a dividend investment will provide the best tracking error. The underperformance of cash versus CPI over the longer term means that the CPI linked nature of dividends outweighs the cyclical risk. In this case dividends are likely to be the appropriate investment.

**Liability due at time D**. In this case, the cyclical effects have now become less significant compared to the overall CPI linked nature of equities. Moreover, since equity total returns compound both inflation linked dividends and capital appreciation, they are likely to be the best performing asset class over time. Thus equities have proven to be the best asset class for inflation linked liabilities where the liabilities are long dated. In particular, equity works well when these liabilities are due at a time greater than one business cycle in the future (i.e. greater than 10 years in the future).

This schematic suggests that optimal portfolio allocation is likely to be a mixture of cash and equity for short dated nominal or CPI linked liability matching and likely to favour equity in longer holding period portfolios. However, the smoother dividend cycles does provide an opportunity for dividend investment to be a significant contribution to optimal portfolio allocation for medium term holding periods.

While this is a useful discussion in theory, the case is best backed up using hard data. We have already shown the long term history of equity and bond returns since 1870 and we can also show how dividends and earnings have varied over that period. However as shown in section 3.7, realised dividends are *not* actually tradable in terms of dividend swaps and the available dividend history for tradable implied dividends is limited to less than ten years worth of data – not enough for an analysis of portfolio allocation which may have holding periods of around 1-10 years, in our opinion.

Nonetheless, using the study conducted in section 3.7, we showed how implied dividends have behaved compared to realised dividends and can use the findings to extrapolate levels of implied dividends using realised dividends as a base. This analysis shows that most of the dividend curve shape is dominated by the difference between the current realised dividend and the first year maturity implied dividend, and that the curve is typically flat thereafter. We suggest two models:

- **Constant implied growth**: Implied dividends are taken to be 4% above the current spot level irrespective of maturity (market always anticipates long term growth, which averages 4%, will be delivered in the first year, Table 8).
- **Variable implied growth**: There is some evidence that the first year of implied growth is equal to the previous years equity market return (section 3.6, section 3.7 and section 4.3).

In order to make our study as conservative as possible, **we have used the constant implied growth assumption in order to model historic levels for implied dividends**. Hence implied dividends, independent of maturity, are always taken to be 4% above the current year's realised dividend. It actually transpires that the specific model has limited impact on the final conclusions, so we have only shown the results for the constant implied growth model.

**The data set used in this analysis is the long dated US equity markets, going back to 1870, that we used to show historical relationships in section 3.** We freely admit that using data from pre-1930 may lack reliability, but the contrasting regime in this period compared to the last 60 years (see section 3 for details) leads us to believe that we get a better representation of risk and returns with this data included.

In our study the investments available for asset allocation are

- **Equities** – S&P total return with dividends reinvested into the equity market
- **Bonds –** US bond returns on a constant 10 year maturity bond index, so includes coupon payments and capital gains
- **Cash** – rolling 1-month cash investment, with compounded interest
- **Dividends –** a dividend investment is made using a Dividend-Principal linked zero coupon bond of maturity equal to the holding period. The dividend return from this investment is given in section 4.1.

**Why have we not included other inflation linked asset classes**? In practice, investors may use other asset classes to hedge linked liabilities, such as property, commodities or inflation-linked bonds and swaps. We have excluded these investments, because the aim of the report is merely to highlight that dividend investing offers a potential alternative asset, rather than a full and detail study of optimal asset allocation. Historical data sets for these investments are also limited. Precious metals returns are also "corrupted" due to past implementation of gold standard currency implementation. Nonetheless, it is worth pointing out that property and commodities, in particular, are assets which have shown a large amount of cyclicality and are exposed to supply/demand imbalances. Dividends, in contrast, may end up being purchased at cheap or expensive prices, but ultimately settle based on realised dividends. As already stated early in this report, this pull-to-realised effect can reduce the risk of a timely exit from the trade.

Using the above four assets we compare portfolio allocation for the three different investment return targets: **total return, CPI and GDP linked**.

The risk measure we use is the usual **annualized standard deviation** of returns. It is known that this measure can over-state the risk for investments with high upside volatility of returns, unnecessarily penalizing assets or strategies that offer large outperformance compared to their benchmark. Nonetheless, we use it as a conservative and typically used measure of portfolio risk.

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**Total return benchmark**. In this scenario we assume that the investor has a total return benchmark, targeting the preservation of the nominal value of their investments. It is observed that an investment in dividend swaps only appears in an efficient portfolio when the holding period and risk preference increases.

Remember that we have assumed that implied dividends are priced at 4% above the previous year's realised dividend. Since this premium is equal to the long term average S&P dividend growth then dividend swaps should *not* have any extra return over cash. However dividend swap positions have additional risk due to the variability of dividends (even over a one year horizon, see section 3.4) and consequently they are unlikely to beat cash in the short term.

Limiting the data sample to just the post-1950 era increases the allocation of dividend positions, primarily at the expense of bonds, due to the smoother observed dividend growth cycles (section 3.4). Nonetheless, **the past year has shown that the outlook for dividends may not be as clear as the last 50 years. In this case, including the pre-1950 data could give a better representation of the overall risk**. The underperformance of our modelled dividend swap returns for shorter holding periods suggests that the implied premium should be closer to 0% (i.e. dividend curve always prices zero y-o-y growth at the first year) in order to bring dividend swaps closer to a similar risk-return as other asset classes (Figure 58).

Figure 58: Dividend returns over 1-year have a low Sharpe ratio, mainly due to the 4% implied premium used, however...
*Annualised 1-year returns*

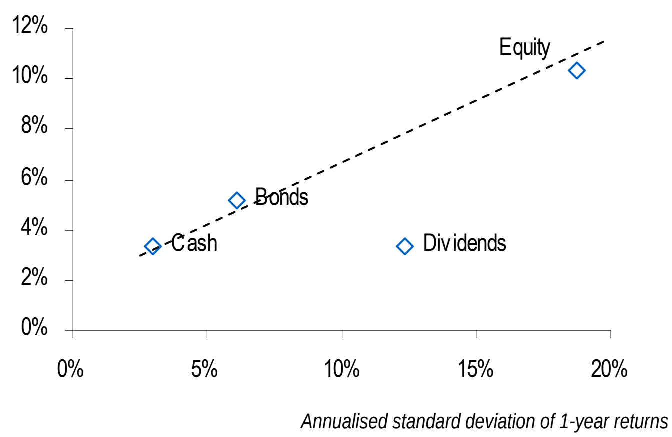



Figure 59: ... over a five year holding period the effect of this premium becomes less of a handicap
*Annualised 5-year returns*

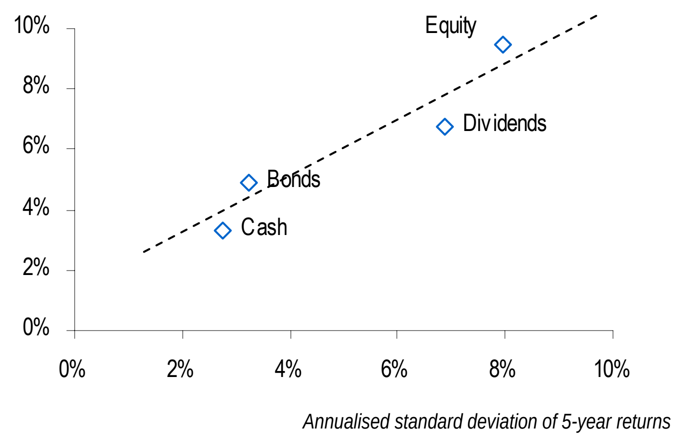



Figure 60: Consequently dividends investments do not add anything for an investor targeting efficient total return over the long run
*Annualised 5-year returns*

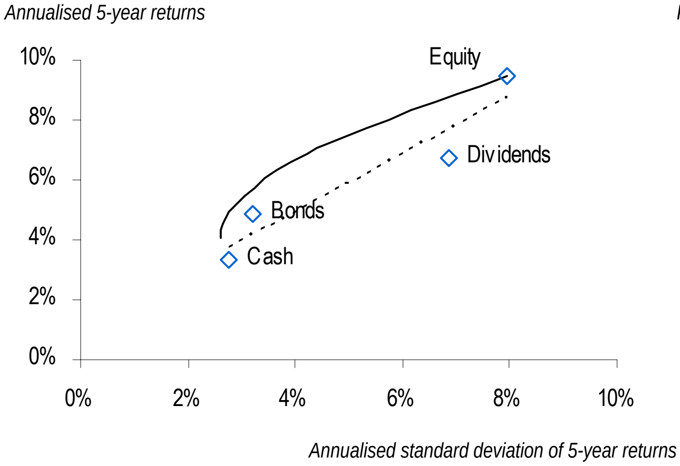
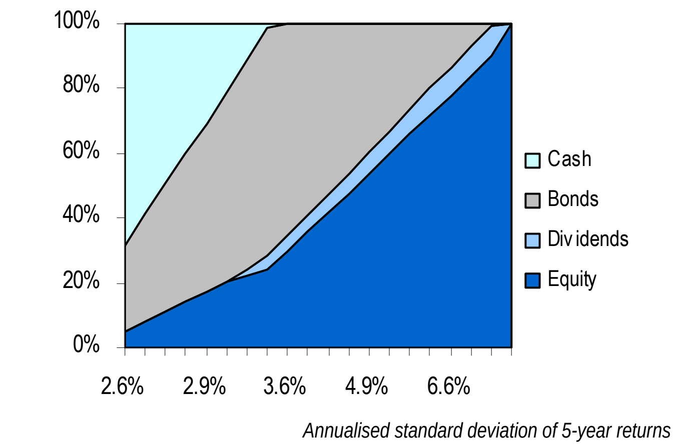



Figure 61: The efficient portfolio allocation for a total return over a 5-year holding period for different levels of risk
*Portfolio Allocation*




Source for all charts: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller. Annual data since 1870

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**CPI benchmark**. In this scenario we assume that investors have a CPI linked benchmark, or are targeting the preservation of the spending power of their investments. In the short dates, the performance of dividends is again penalized by the assumed 4% growth rate priced in by our proxy implied dividends (Figure 62). Nonetheless, over longer holding periods this penalty is outweighed by the smoother CPI tracking of dividends compared to cash, bonds and equities (Figure 64 and Figure 65). Hence dividend swaps have a considerable portfolio allocation of around 20% across all risk preferences for medium term holding periods (Figure 65).

Figure 62: The risk/reward profile for different assets targeting CPI linked returns over a 1-year holding period

*Annualised 1-year returns v CPI*

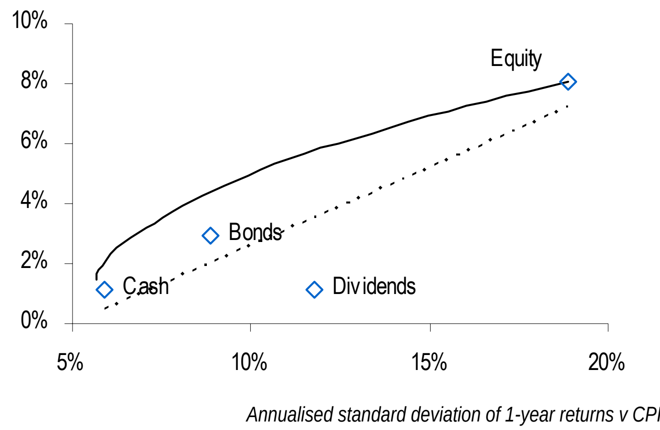



Figure 63: The efficient portfolio allocation for CPI linked returns over a 1-year holding period for different levels of risk

*Annualised 1-year returns*

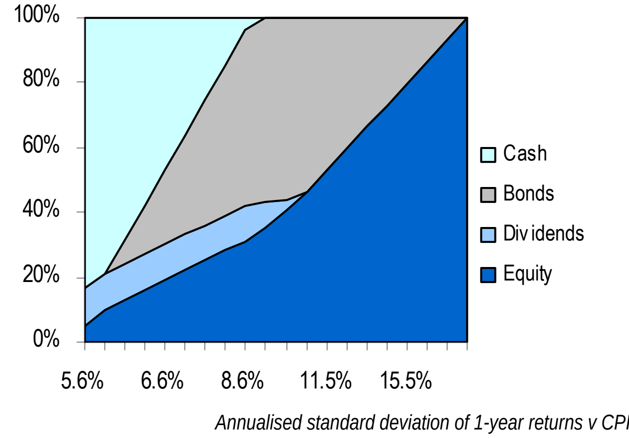



Figure 64: The risk/reward profile for different assets targeting CPI linked returns over a 5-year holding period

*Annualised 5-year returns v CPI*

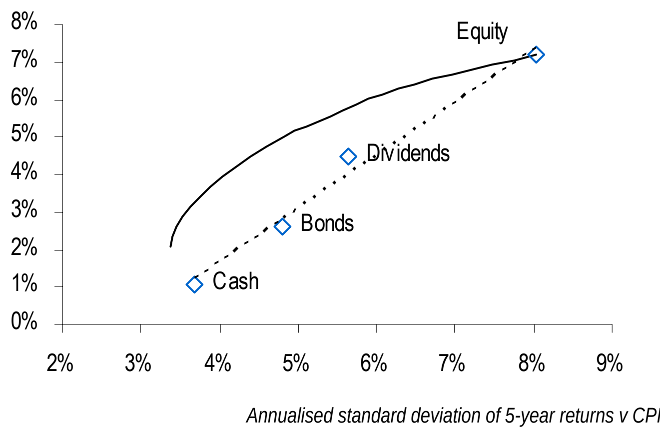
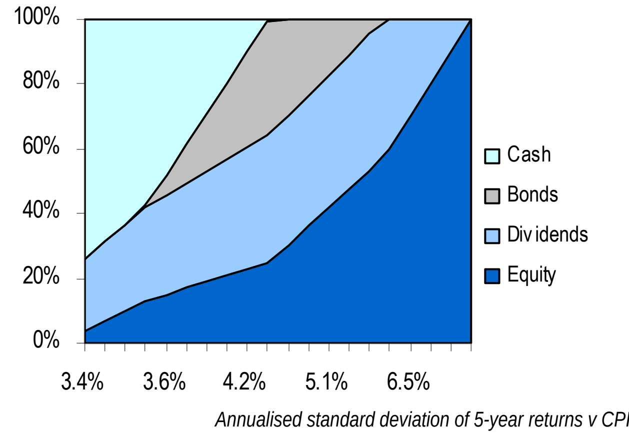



Figure 65: The efficient portfolio allocation for CPI linked returns over a 5-year holding period for different levels of risk

*Portfolio Allocation*




Source for all charts: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller. Annual data since 1870

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**Nominal GDP benchmark**. In this scenario we assume that investors have a GDP linked benchmark, or are targeting the preservation of the "relative value" of their investments. Again for short holding period, the 4% implied growth inhibits dividends, but they still appear as an asset in the most efficient portfolio allocation, with a similar allocation to that observed in CPI benchmarking (Figure 68). As the holding period is increased dividend swaps can improve risk returns for the higher risk portfolios (Figure 69), mainly at the expense of bonds.

Figure 66: The risk/reward profile for different assets targeting GDP linked returns over a 1-year holding period

*Annualised 1-year returns v GDP*

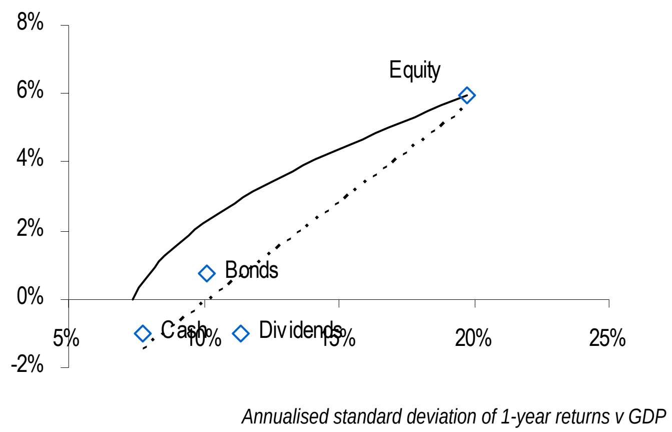



Figure 67: The efficient portfolio allocation for GDP linked returns over a 1-year holding period for different levels of risk

*Portfolio Allocation*

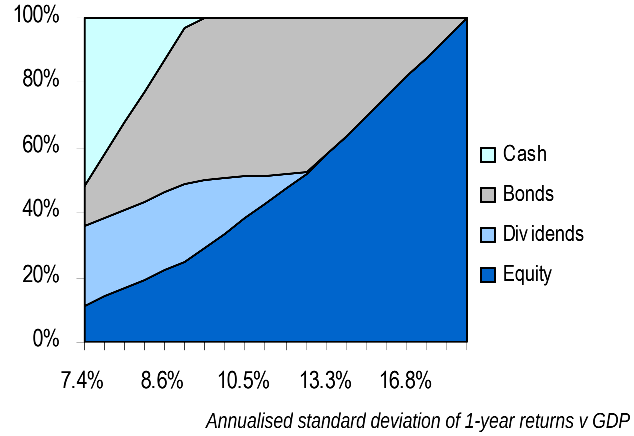



Figure 68: The risk/reward profile for different assets targeting GDP linked returns over a 5-year holding period

*Annualised 5-year returns v GDP*

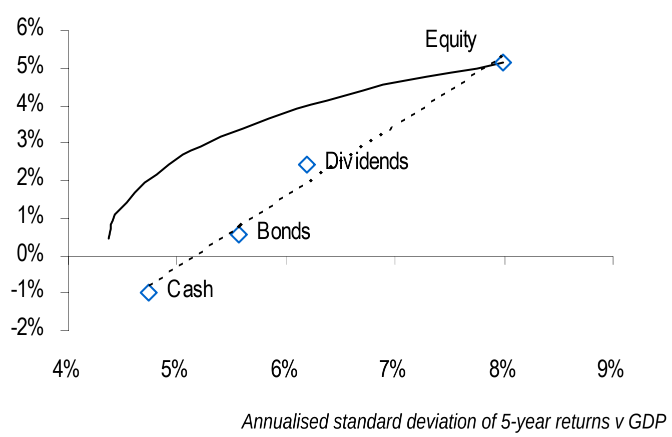
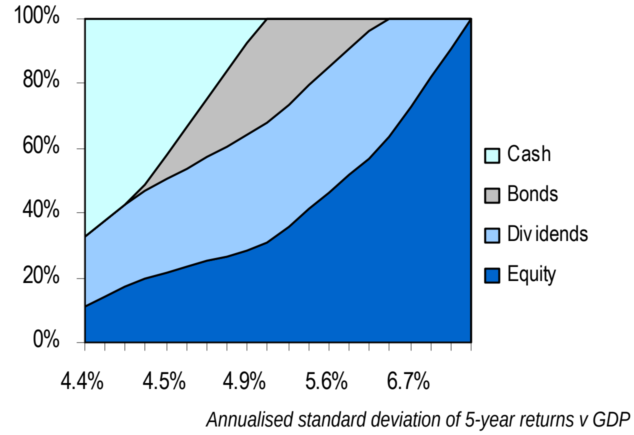



Figure 69: The efficient portfolio allocation for GDP linked returns over a 5-year holding period for different levels of risk

*Portfolio Allocation*




Source for all charts: J.P. Morgan, BEA, DataStream, US Dept of Commerce: Bureau of the Census, S&P, Robert Shiller. Annual data since 1870

**The main conclusions to draw from this limited analysis are that dividend investing appears to improve risk/returns in portfolios, particularly those which are benchmarked against CPI or GDP linked returns and with a medium term holding period.**

Efficient portfolios that target absolute cash returns may be unlikely to include dividend investments in their portfolio allocation. The main reason for this has been the heavy penalty of 4% growth priced into the first year exceeding the rate of dividend return over the long run. If this assumption were to prove too conservative then dividends could still be a valuable asset class for lower risk total return benchmarked portfolios. Furthermore, if one-year implied dividend growth is too low in any one year, trading dividend swaps may be an attractive tactical alternative to equities.

Implied dividends can play a valuable part in an efficient portfolio that is designed to hedge liabilities that are *inflation* linked. In particular they can be a useful substitute for equity and bond exposures, where short to medium dated inflation - linked liabilities need to be matched. This is because historically the dividend cycle has tended to be smoother than the equity valuation cycle, so **"cycle-risk" is mitigated without the loss of inflation linked exposure**.

For longer term liabilities (>10yrs), while dividends are theoretically a possible alternative to equities, liquidity is a major constraint and the smoothing of the equity valuation cycle may favour equities over dividend investment due to the overall superior returns.

Going forward, the main challenge for investors using dividend swaps in asset allocation is likely to be the depth of market. One can consider that the equity market capitalisation is the total available market size that could hope to be achieved in the dividend swap market, since equities just represent the aggregate sum of all future dividends. The potential size of realised dividends in any one year is limited to the "dividend yield" of the total market capitalisation (assuming all dividends for that year are *stripped* and sold separately). Nonetheless **as dividend swaps are cash settled, they have the capacity to grow beyond the physical market** in the same way the CDS market has grown beyond the bounds of the physical bond market.

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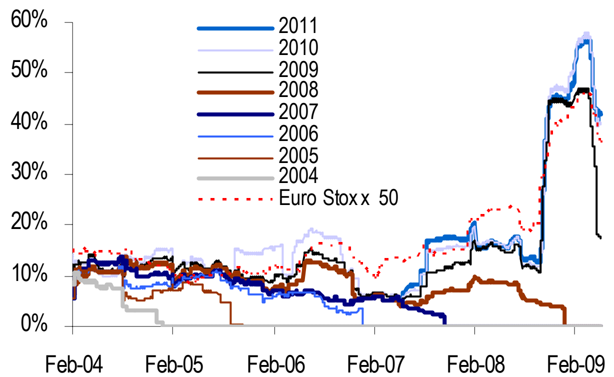
## 4.5. Volatility of dividend swap returns, and beta / correlation to equity markets

In this section we discuss the historical realised volatility of dividend swaps. We also investigate the relationship between the performance of dividend swaps and the underlying equity market.

**The realised volatility of a dividend swap declines as the dividend swap approaches expiry**. When dividends are announced, any uncertainty about what those realised dividends will be is reduced. When dividend payments are made (i.e. the relevant stock goes ex-dividend), any remaining risk associated with those dividend payments is eliminated. As the dividend swap approaches expiry, it becomes increasingly likely that the realised dividends have either already been accrued, or that the company's earnings and management intentions have been announced. As the potential for changes in expectations about realised dividends diminishes, so the volatility of implied dividends falls (Figure 70).

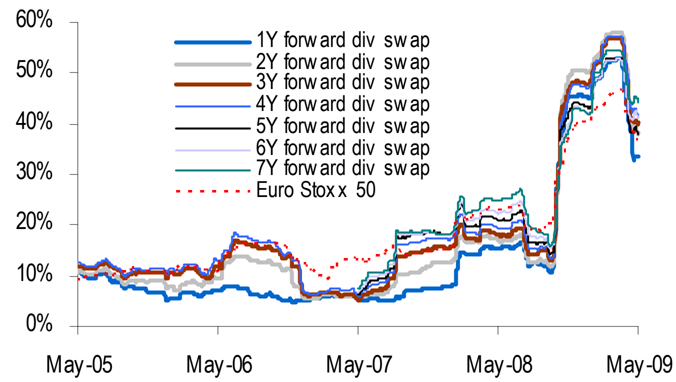
**Long-dated dividend swaps typically deliver higher realised volatility than medium- or short-dated dividend swaps.** Extreme uncertainty about earnings and balance sheet risk can lead to excess realised volatility at shorter dates, as was observed during 2008 / 2009. However, there is generally greater confidence regarding dividends that are approaching their ex-dividend dates than there is about those further in the future. Furthermore, long dated dividend expectations are more susceptible to changes in assumptions about the sustainability of a company's earnings, as well as macro-economic variables such as growth and inflation, right across the term structure. Consequently, longer dated dividend swaps tend to exhibit higher realised volatility (Figure 71).

Figure 70: The realised volatility of a dividend swap declines as the dividend swap approaches expiry
*6-month annualised volatility of weekly returns*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 71: Longer dated dividend swaps typically deliver higher realised volatility than shorter dated dividend swaps
*6-month annualised volatility of weekly returns*



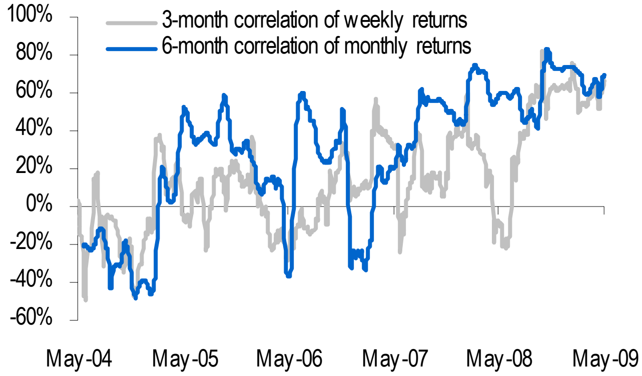

Source: J.P. Morgan Equity Derivatives Strategy.

For the purposes of investigating the general trends in dividend swaps, and normalising for the collapse in volatility that is observed as expiry is reached, we frequently refer to *generic* forward starting dividend swaps (i.e. dividend swaps associated with a calendar year that is a fixed number of years forward). For example, at any point during 2008, the 2-year forward dividend swap would refer to the 2010 dividend swap contract, and throughout 2009, it would refer to the 2011 dividend swap contract.

**Limited historical implied dividend swap data.** As the dividend swap market is relatively new, accurate *implied* dividend swap data is only available since about 2003. In the past, dividend swaps were not re-priced as frequently as they have been more recently, and so daily dividend swap data was also not always available, even since 2003. This means that the use of daily returns may underestimate the actual volatility of dividend swaps, as well as the correlation between dividend swap returns and equity market returns. Consequently, we use weekly returns in our volatility and correlation analysis (both for the dividend swap and for the index itself). Given the increased liquidity and transparency of the dividend swap market, and the greater possibilities for daily rebalancing of dividend swap delta positions, the use of daily returns may become more appropriate in future.

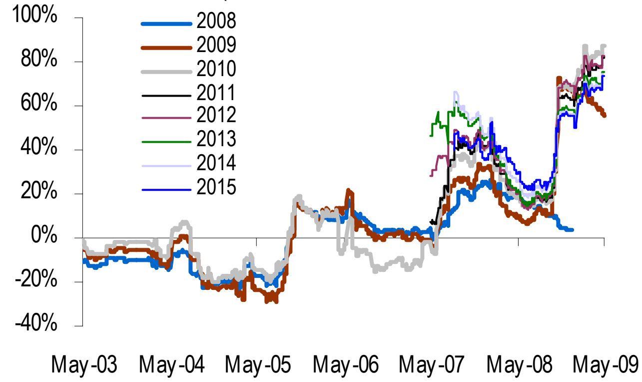
**The correlation between dividend swaps and the underlying equity market has increased** (Figure 72)**.** The relationship between dividend swap returns and the underlying market returns has strengthened, particularly since September 2008. We have measured the beta at each point by taking the previous six-months of over-lapping weekly returns. This captures any change in the beta of dividend swaps versus the underlying index (Figure 73).

Figure 72: The correlation between Euro Stoxx 50 dividend swap returns and the returns of the underlying equity index has increased…
*Correlation between 2-year forward dividend swap returns and index returns*




Source: J.P. Morgan

Figure 73: … leading to the dividend swaps exhibiting a relatively high beta versus the equity market itself, particularly since September 2008
*6-month beta of dividend swap versus Euro Stoxx index*

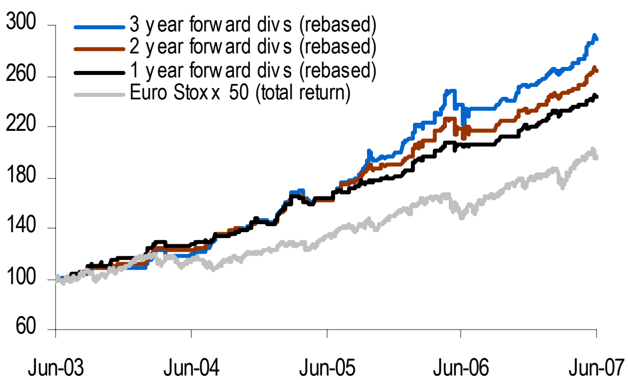



Source: J.P. Morgan

**Dividend swaps have exhibited a higher beta to downside moves than upside moves of the underlying equity index.** There was actually relatively low correlation between the returns of dividends and the Euro Stoxx index during the 2003-2007 bull market. Dividends seem to have been gradually marked higher during this period, regardless of the actual market returns (including during the May 2006 and Feb 2007 corrections) rather than exhibiting a "beta" to the underlying equity index (Figure 74). When the returns data is combined with the more recent history since June 2007, it appears that dividend swaps tend to exhibit a higher beta to the underlying equity market on down-moves than up-moves (Figure 75).

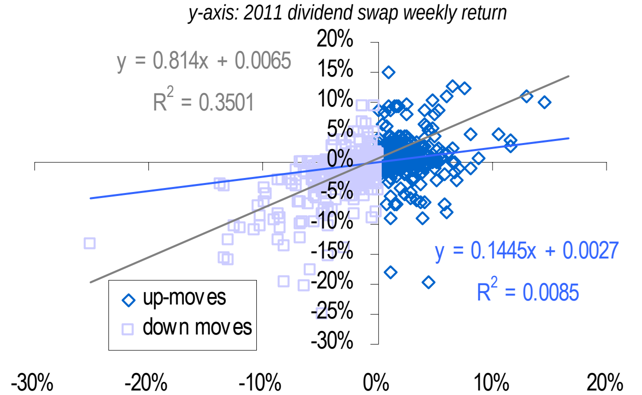
One might have concluded from the dividend swap returns during the bull market that investing in dividends was merely a matter of being patient and waiting for the implied dividends to reflect increases in nominal earnings. However, this approach would clearly have underestimated the risk inherent in dividend swap investments resulting from the potential for changes in the ability and willingness of company management to pay dividends, across the cycle. Nonetheless, **equity market cycles are usually led largely by valuations, rather than earnings, so in this sense the most recent (earnings-led) cycle is quite unusual,** and may explain the relatively high correlation between dividend swaps and the underlying equity market.

Figure 74: Dividends appear to have been gradually marked higher during the 2003 -2007 bull market, almost regardless of index returns
*Dividend swap return / index return (rebased to 100 on 12 June 2003)*




Source: J.P. Morgan, DataStream.

Figure 75: Increased volatility and correlation during the bear market led dividends to exhibit a higher beta to downside moves than upside
*y-axis: 2011 dividend swap weekly return*




*x-axis: Euro Stoxx 50 weekly return*

Source: J.P. Morgan Equity Derivatives Strategy. Data from June 2003 – May 2009.

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# 5. Technical considerations

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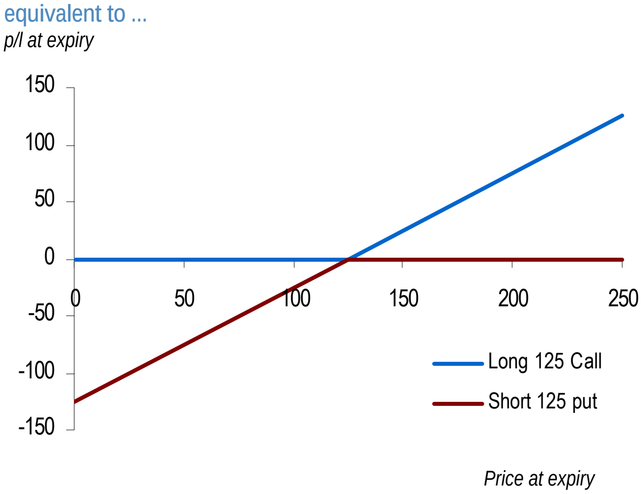
# 5. Technical considerations

## 5.1. Put-Call parity and forwards

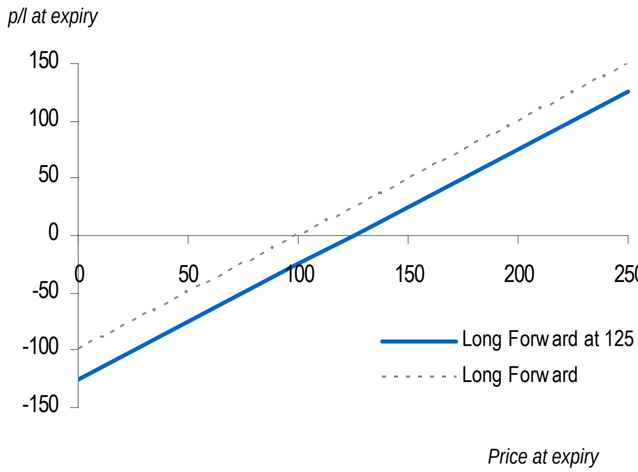
To understand how forward exposure arises from options positions, we return to the basics of options and in particular the concept of **put-call parity**. Put-call parity is shown by combining a long European style call position with a short put position, both struck at the same strike K (Figure 76). This combination of options has the same economic benefit as being in a long forward position struck at K (Figure 77).

Figure 76: A long call position and short position at the same strike is equivalent to ...




Source: J.P. Morgan

Figure 77: ... a long forward position in the underlying at that strike




Source: J.P. Morgan

If the call and put options were priced incorrectly and the premium that was received for selling the put did not exceed the cost of the call by at the discounted difference between the strike and the forward price, an investor could make a risk-free profit by selling a forward against the position to attain a "risk-free" profit. Thus because the put and call combination is equivalent to the forward, the following identity must hold:

$$P(K,T) - C(K,T) = (K - F(T)) \times e^{-rT}$$

where $P(K,T)$ and $C(K,T)$ are the put and call prices for strike $K$ and expiry $T$. Since a long call/short put combination is equivalent to a forward position, then a long call is equivalent to a long forward/long put position.

We can also reverse the above equation to calculate the price of the forward in terms of put and call prices:

$$F(T) = K + (C(K,T) - P(K,T)) \times e^{rT} \quad (1)$$

In practice forward prices are calculated using this equation, as options tend to be more commonly traded than forwards. The forward price can be constructed using any strike, for a given maturity. There may be differences across strike, but that is mostly due to pricing errors introduced by bid/offer spreads on option prices. In practice, using the at-the-money (ATM) strike options is likely to give the most accurate price.

This step is the first stage in connecting option prices to the level of dividend swaps. However to introduce dividends we must introduce the other method of constructing forward exposure, that is cash-and-carry.

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## 5.2. Cash-and-carry

Suppose we have a market where there are no actively traded forwards. A forward obligation on an underlying can still be replicated, in principle, using the method of **cash-and-carry or non-arbitrage free replication**. This method of replication involves a two step process:

- **Cash** – Borrow sufficient funds to purchase the underlying asset at the current spot price.
- **Carry –** Hold the underlying until the forward settlement date, paying for the warehousing costs and receiving any income accrued on underlying asset.

This replication method is non-arbitrage in the sense, that if any forward price in the market is too high, then I could implement the cash-and-carry strategy and sell the forward against that position for a risk free profit - or if the forward price is too low I will buy the underlying through the forward and short the spot instrument against it. Hence if the market forward price deviates sufficiently versus the cash-and-carry calculated price, arbitrageurs will implement the cash-and-carry strategy in order to make a risk-free profit, with the likely result that the forward price will move closer to the cash-and-carry price.

The principle of cash-and-carry does require some key features, which should not be taken for granted.

**Warehousing**. Can the underlying actually be warehoused until expiry? For example the perishability of soft commodities makes cash-and-carry arbitrage difficult. For some commodities, such as oil or metals, storage capacity may also prevent effective warehousing. The lack of existence of a spot market in some instruments such as short term interest rates, power, emissions and weather contracts will also add additional uncertainty in the forward price. The ability of warehousing is obviously less of an issue for financial instruments such as bonds and equities.

**Term Lending**. Does a term lending market exist? This feature has largely been ignored historically, but has become an issue more recently, since the bankruptcy of Lehman Brothers. A cash-and-carry strategy relies on fixing a funding rate until forward settlement, since one has to borrow funds between the spot and forward settlement dates. The difference in counterparty risk has introduced increased volatility in the funding rates and hence in the overall market forward price for any underlying.

**Liquidity matching of the funding**. The introduction of interest rate swaps has allowed arbitrageurs to fix the funding levels of long horizon, but has not solved issues involving the liquidity of the funding. In order to make the cash-and-carry strategy totally risk free, the liquidity of the funding could match either the liquidity of the underlying instrument or the forward strategy. Since there is a liquid equity market, the liquidity of the funding could actually be rolled overnight, and this could reduce the cost of funding. The overall cost of this funding can be guaranteed using the Overnight-Index-Swap (OIS) market. Imposing longer term liquidity could introduce a counterparty risk cost, which would not accurately reflect the cheapest attainable risk-free price.

**Certainty of Income.** Some Most underlying assets only have partially certain income. Commodities generally have no income. Financial instruments receive income either due to some ***fee income*** that can be obtained from owning that asset, or some ***investment income***.

**Fee income**. In fixed income, *fee income* is usually expressed through a lower repurchase ("repo") rate for that instrument which reduces the cost of funding. Alternatively, the underlying instrument may be used as collateral as part of the lending agreement, lowering the overall funding costs. In equities, the fee income usually comes from the ability to lend these instruments to other investors who will pay to borrow the instrument between the spot and forward settlement, mainly for the purposes of shorting the instrument in the market. This fee income is referred to as *borrow* because it results from the payment made by an investor wishing to borrow the stock. Fee income is usually fixed upfront and so is certain throughout the lifetime of the cash-and-carry period, although there is a risk of short-selling restrictions, and potential for recall, etc.

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**Investment income.** Investment income in bonds is normally fixed and known upfront, as it usually comes in the form of coupons. In equities the investment income comes in the form of dividends. As we have already discussed in section 2 the timing, size and eligibility are not guaranteed at the time the forward contract is agreed. Moreover the impact of changes in tax regimes and potential constituent changes (if the underlying is an index) can also add to the uncertainty. Nonetheless, the investor implementing the cash-and-carry strategy can make an (informed!) assumption about the dividends (and other pricing factors) expected through the lifetime of the contract.

Using these factors, the cash-and-carry forward price can be written as:

$$F(T) = S + Interest + Costs - Fee\_Income - Investment\_Income \, ,$$

***S*** is the spot price of the underlying.

***Interest*** is the fixed interest charge of the appropriate liquidity matched funding.

***Costs*** are the cost of warehousing the underlying between the spot and forward settlement date.

***Fee_Income*** is the fixed and known income contribution at the writing of the forward contract.

***Investment_Income*** is the forward value of the investment income between the spot and forward settlement dates.

Usually the interest charge is expressed as a percentage of the spot price. Fixed costs and income are also usually written as a rebate or additional spread on the funding cost, because like income these costs are usually accrued through the lifetime of the forward (the exceptions are things like stamp duty, which are a one-off (in and out) cost. This can be an important consideration for forwards based on property, for example). Using continuous compounding terminology for brevity, we can write an equity forward as:

$$F(T) = Se^{(r-b)T} - FV_T(D_{0,T})$$

***r*** is the instantaneous funding rate

***b*** is the borrow fee (minus costs, which are usually negligible for equities)

$FV_T(D_{0,T})$ is the forward value at time T of all the dividend income accrued between spot and forward dates.

Since we do not actually know the dividend income upfront at the time of fixing the forward price, we have to take a view on the dividends to be paid and we write this as

$$F(T) = Se^{(r-b)T} - I_{0,T} \qquad \textbf{(2)}$$

where $I_{0,T}$ is the implied dividends that are expected to be accrued between spot and forward dates.

This expression for the cash-and-carry derived forward (2) can be substituted into the expression for the forward derived using the put-call parity (1) to give:

$$I_{0,T} = Se^{(r-b)T} - K - (C(K,T) - P(K,T)) \times e^{rT} \qquad \textbf{(3)}$$

Overall, put-call parity shows that an investor who is long calls or short puts has an exposure that is (delta) equivalent to a long forward position. The cash-and-carry principle shows how a long forward position is equivalent to a short dividend position. For example if implied dividends were to rise (assuming that all other factors remain unchanged) then the forward price would fall. Since long calls/short puts are primarily the positions of end investors in retail structured products, investment banks are left with the opposite position of being short forward exposure and hence long implied dividend exposure. Dividend swaps were designed to hedge this exposure.

## 5.3. Forwards and dividend swaps

We now consider the usual position of investment banks that write structured products on equities. In general, this will involve accruing short exposure to equity forwards. This exposure could be hedged in two ways.

The first hedge is to just buy forwards in the market to cover the risk. However, since the flow is likely to be one way (consistent sellers of equity forwards have not materialised), the prices of forwards in the market would likely become prohibitively expensive compared to the cost of warehousing the risk. Furthermore, buying forwards effectively shifts the dividend risk onto the counterparty taking the other side of this transaction.

The second hedge is to implement a cash-and-carry strategy, paying the interest and collecting any dividend income between the spot and forward date. The value of this replicating strategy at the expiry of the forward is equal to

$$p/l(T) = F(T) - \left(Se^{(r-b)T} - FV_T(RD_{0,T})\right)$$

where $FV_T(RD_{0,T})$ is the forward value at time T of all the ***received*** dividend income accrued between spot and forward dates. Substituting the expression for the forward price agreed upfront (2), derived in the previous section, gives:

$$p/l(T) = \left(FV_T(D_{0,T}) - I_{0,T}\right) \qquad \textbf{(4)}$$

Hence the overall p/l from the cash-and-carry strategy is equal to the accumulated value of the dividends received (+reinvestment income) minus that originally implied in the forward price. Hence the residual risk to the cash-and-carry hedge is ultimately just the risk of incorrectly pricing the future dividend stream. However it is noticeable that the p/l of the cash-and-carry forward replication strategy is just the same as the p/l of a dividend swap. This is no coincidence since the dividend swap market was initially created to hedge the short forward exposure of investment banks. Indeed the dividend swap market can be thought of as the convention by which the equity forward market is quoted.

While selling the dividend swap does remove the dividend risk from the cash-and-carry replication, it merely passes this risk on to the counterparty (the buyer of the dividend swap). In return for taking this risk, an investor is likely to acquire the dividend swap only at a price that represents a discount to *their* true expectation of the future dividend payments. We showed in section 4.1 that the return obtained from a funded dividend positions is simply the sum of the dividend return and a risk free return. The efficient pricing of risky assets should dictate that a return greater than the risk free rate is achieved for providing the capital necessary for warehousing this dividend risk. This capital charge manifests itself in the implied dividend being equal to the *dividend-risk adjusted* expectation of the future dividend payments.

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## 5.4. Constructing forward calendar year dividend swaps

One can replicate a long dividend swap between any two forward settlement dates, by selling the longer dated forward and buying the shorter dated forward and simultaneously fixing the funding levels between the shorter and longer dates on a notional equal to the level of the short forward price. This trade is usually transacted through a combination of 4 separate option trades, often referred to as a *jelly* roll: short longer-dated call/long longer-dated put and long shorter-dated call/short shorter-dated put. The prices of the two forwards are given by:

Long dated forward: $F(L) = Se^{r_L L} - I_{0,L}$

Short dated forward: $F(S) = Se^{r_S S} - I_{0,S}$

At the expiry of the short dated forward, delivery of the stocks is taken, for the short-dated forward price (if the underlying asset is an equity index, this will involve buying the current basket of constituent stocks at the correct weighting). Consequently the dividends paid by those stocks between the two forward dates are received and since the funding of the stock position has been fixed at $r_{S,L}$, the final overall p/l at the expiry of the long dated forward is:

$$p/l(L) = F(L) - \left(F(S)e^{r_{S,L}(L-S)} - FV_L(RD_{S,L})\right)$$

where $FV_L(RD_{S,L})$ is the realised dividend received between spot and forward dates valued at the long-forward date. We can now substitute the expression for the short-dated and long-dated forward prices to give:

$$p/l(L) = Se^{r_L L} - I_{0,L} - (Se^{r_S S} - I_{0,s})e^{r_{S,L}(L-S)} + FV_L(RD_{S,L})$$

Using non-arbitraging considerations for the funding, which states that the overall result of a funding arrangement should be independent of the compound schedule gives:

$$e^{r_L L} = e^{r_S S} e^{r_{S,L}(L-S)}$$

This means that the funding parts of the above p/l equation cancel out to leave:

$$p/l(L) = \left(FV_L(RD_{S,L}) - I_{0,L} + I_{0,S}e^{r_{S,L}(L-S)}\right)$$

Remember the definition of $I$ which is the just the expected value of dividends valued at the forward date. This expression can be split into two time periods since dividend payments are additive and fixed to one particular time. Hence:

$$I_{0,L} = FV_L(ID_{0,L}) = FV_L(ID_{0,S}) + FV_L(ID_{S,L})$$

The third term in the above p/l equation just represents moving the forward value from the short-dated forward expiry to the longer-dated expiry date. Hence we obtain:

$$p/l(L) = \left(FV_L(RD_{S,L}) - \left(FV_L(ID_{0,S}) + FV_L(ID_{S,L})\right) + FV_L(ID_{0,S})\right) = \left(FV_L(RD_{S,L}) - FV_L(ID_{S,L})\right)$$

Hence the overall construction shows that risk of the position is equal to the forward value at the longer date of the dividends accrued between the shorter and forward dates, or just equivalent to the forward calendar year implied dividend swap strike. Since the reinvestment risk is small, the **dividend swap strike always reflects the forward value of the dividends accrued over that period**. Discounting in the dividend swap is reflected in the mark-to-market of the change in dividend swap strike as the overall cash flow is taken to be at the longer date.

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# Appendices

# Appendices

## Some useful web links for index rules

**S&P Equity Indices** (including the S&P 500, S&P/MIB, S&P/ASX200 and S&P/TSX 60)

http://www2.standardandpoors.com/portal/site/sp/en/us/page.family/indices_ei/2,3,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0.html

**STOXX** (including the DJ Euro Stoxx 50)

http://www.stoxx.com/indices/rulebooks.html

**FTSE** UK (including the FTSE 100)

http://www.ftse.com/Indices/UK_Indices/Index_Rules/index.jsp

**Euronext** (including the CAC, IBEX, AEX)

http://www.euronext.com/editorial/documentation/wide/documents-1871-EN.html

**DAX**

http://deutsche-boerse.com/dbag/dispatch/en/kir/gdb_navigation/market_data_analytics/20_indices/60_publications/20_guidelines

**SMI**

http://www.six-swiss-exchange.com/index_info/online/share_indices/smi/smifamily_rules_en.pdf

**TSE** (including the TOPIX)

http://www.tse.or.jp/english/market/topix/e-yoryo.pdf

**Nikkei family** (including the Nikkei 225)

http://www.nni.nikkei.co.jp/e/fr/info/nifaq/225.aspx#calculation

**Hang Seng** (including the HSI and HSCEI)

http://www.hsi.com.hk/HSI-Net/HSI-Net

**MSCI**

http://www.mscibarra.com/products/indices/stdindex/methodology.html

**FTSE All world**

http://www.ftse.com/Indices/FTSE_All_World_Index_Series/Index_Rules/index.jsp

## Long term historical data

Throughout the report we have used long term historical data from several sources. Data in the period after 1930 is most reliable and is directly available from the Bureau of Economic Analysis (BEA) for economic data and S&P for equity data. The data before 1930 has been extrapolated and so is less reliable. A useful source of long dated US economic data can be sourced from the US Dept. of Commerce: Bureau of the Census document: *Historical Statistics of the US: Colonial Times to 1970*. Robert Shiller provides long term equity data, which he used in *Irrational Exuberance [Princeton University Press 2000, Broadway Books 2001, 2nd ed., 2005]*. In this data set, equity dividend and earnings data before 1926 are from Cowles and associates (*Common Stock Indexes, 2nd ed. [Bloomington, Ind.: Principia Press, 1939]*). Index prices can also be interpreted from the Dow Jones Industrial Average, which started in 1896.

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## Risks of common option strategies

**Risks to Strategies**:
Not all option strategies are suitable for investors; certain strategies may expose investors to significant potential losses. We have summarized the risks of selected derivative strategies. For additional risk information, please call your sales representative for a copy of "Characteristics and Risks of Standardized Options". We advise investors to consult their tax advisors and legal counsel about the tax implications of these strategies Please also refer to option risk disclosure documents

**Put Sale.** Investors who sell put options will own the underlying stock if the stock price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the stock price below the strike potentially to zero, and they will not participate in any stock appreciation if the option expires unexercised.

**Call Sale.** Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

**Call Overwrite or Buywrite**. Investors who sell call options against a long position in the underlying stock give up any appreciation in the stock price above the strike price of the call option, and they remain exposed to the downside of the underlying stock in the return for the receipt of the option premium.

**Booster**. In a sell-off, the maximum realised downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long stock position, upside losses are capped (as for a covered call), but downside losses are not.

**Collar.** Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any stock appreciation above the strike price of the call option.

**Call Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is below the strike price of the call option.

**Put Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is above the strike price of the put option.

**Straddle or Strangle**. The seller of a straddle or strangle is exposed to stock increases above the call strike and stock price declines below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the stock would have limited losses should the stock rally. Covered writers are exposed to declines in the long stock position as well as any additional shares put to them should the stock decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the stock above the strike price of the call option.

**Put Spread**. The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying stock will have downside protection between the higher strike put and the lower strike put. However, should the stock price fall below the strike price of the lower strike put, investors regain exposure to the underlying stock, and this exposure is multiplied by the number of puts sold.

**Call Spread**. The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the stock and gives up the spread between the two call strikes should the stock rally.

**Butterfly Spread.** A butterfly spread consists of two spreads established simultaneously. One a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price, the maximum loss is the net debit.

**Pricing Is Illustrative Only:** Prices quoted in the above trade ideas are our estimate of current market levels, and are not indicative trading levels.

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# Global Derivatives Themes

## Focus Topic: Opportunities in Global Dividends


### Summary

- Mixed corporate and macroeconomic data are keeping volatility high while depriving investors of a sense for market direction. Option investors can take advantage of this environment by engaging in option writing and relative value option trading strategies.
- In the first section, we provide a comparative analysis of two popular S&P 500 option-writing strategies. We illustrate how seasonality and skew of implied volatility can have a significant impact on index overwriting.
- Our rangebound methodology provides a framework for a more targeted stock option selling program. In the second section, we review the performance of this model and provide several option trading opportunities based on our rangebound methodology for European underlyings.
- By combining our views on the implied volatility surface with J.P. Morgan's equity and macroeconomic outlooks, in the third section we formulate several relative-value trade recommendations for Asia Pacific indices.
- In the focus topic section of this report we analyze **opportunities in global dividends.** Our analysis of structured product markets points to a continued supply of longer dated dividends. In particular we relate structured product issuance and institutional protection buying to the observed discount of global dividends relative to their fair values. In addition to region-specific analyses, we provide bottom-up estimates for Euro STOXX 50, FTSE, Nikkei, and S&P 500 dividends. Our recommended systematic strategy is rolling 1-year forward dividends.



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# Equity Derivatives Themes

## Introduction

The European sovereign credit crisis and fears of a global contagion fueled sharp increases of market volatility in May and late June. During the month of July, market volatility quickly declined as relatively strong US Q2 earnings results boosted optimism for equities. As 75% of S&P 500 companies beat analyst EPS estimates by an average of 10%, the VIX index dropped from the mid 30s to low 20s range. However, the most recent economic data suggests a slowdown in global production, consumer spending, and US job growth. Mixed corporate and macroeconomic data are providing a support for higher market volatility and are depriving investors of a sense for market direction.

While directional cash equity investors may stay on the sidelines and wait for a resolution, option investors can take advantage of a volatile directionless market by engaging in option writing and relative value option trading strategies. In this report we highlight several topics relevant for the current market environment. In the first section, we provide a comparative analysis of the BXM and PUT indices, two popular S&P 500 option-writing strategies. We illustrate how seasonality and skew of implied volatility impact index overwriting. Our rangebound methodology provides a framework for a more targeted stock option selling program. In the second section, we update the performance of this model and provide several option trading opportunities based on our rangebound methodology for European underlyings. The third section combines our views on the implied volatility surface with J.P. Morgan's equity and macroeconomic outlooks to formulate trade recommendations for Asia Pacific indices.

In the focus topic section of this report we analyze opportunities in global dividends. Our analysis of structured product markets points to a continued supply of longer dated dividends. In particular we relate structured product issuance and institutional protection buying to the observed discount/premium of global dividends. In addition to region-specific analyses, we provide dividend tear sheets and bottom up estimates for Euro STOXX 50, FTSE 100, Nikkei, and S&P 500 dividends. Our recommended systematic dividend strategy is rolling 1-year forward dividends.

## US: S&P 500 Overwriting and Underwriting

The current level of the VIX of ~25 is in the 80th percentile relative to its 20-year history. Despite the decline from extreme levels observed in May, in a historical context, market volatility remains high. These elevated levels of volatility and a lack of clear market trend usually bode well for yield enhancement strategies such as call writing and put writing ('Option-writing' strategies).

Option-writing strategies have a significantly lower market exposure compared to outright equity holdings. For instance, overwriting an equity position with ATM calls (or underwriting by selling ATM puts) will usually have only about 50% of the market exposure of an outright equity position at inception.[1] For this reason, the performance of overwriting or underwriting strategies is still largely determined by the performance of underlying equity (e.g., market direction) but will typically experience lower volatility of returns. For the same reason, overwriting strategies typically underperform equity holdings in a strong rising market (due to a lower beta) and outperform in a flat, down, or even a mildly rising market.

On a risk-adjusted basis (i.e., taking into account the appropriate market beta), an option-writing strategy on average is expected to outperform the equity holding if the options are sold above their fair value and underperform if the options are sold below fair value. As we highlighted in our previous research.[2] S&P 500 index options typically trade above their fair value. The premium of S&P 500 option implied volatility (above its fair value) is largely driven by the premium of option implied correlation. This volatility premium is currently more pronounced for downside puts due to the rich index implied volatility skew. Because of the richness of index options, S&P 500 based option-writing strategies will typically outperform the outright equity holding on a risk-adjusted basis.

[1] This exposure can increase to 100% or decrease to 0% as the option approaches maturity.
[2] For example, see our Global Outlook for Derivatives Markets in H2 2010.

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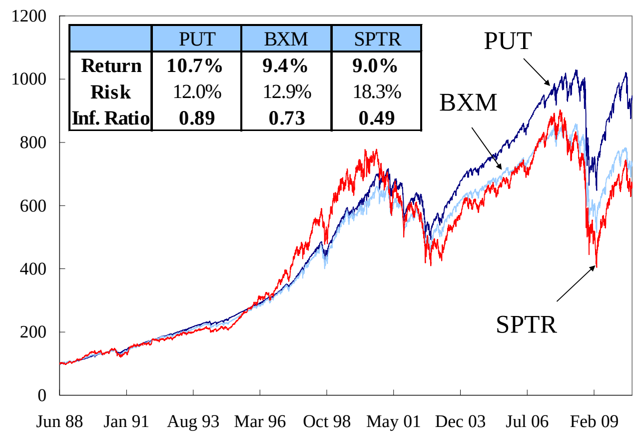
Two popular S&P 500 option-writing strategies are the CBOE S&P 500 BuyWrite strategy (BXM) and CBOE S&P 500 PutWrite strategy (PUT). BXM consists of holding a long S&P 500 position and selling near month at-the-money options every third Friday. PUT consists of selling near month at-the-money put options on the S&P 500 every third Friday while investing the equivalent notional amount into short-term treasuries.[3]

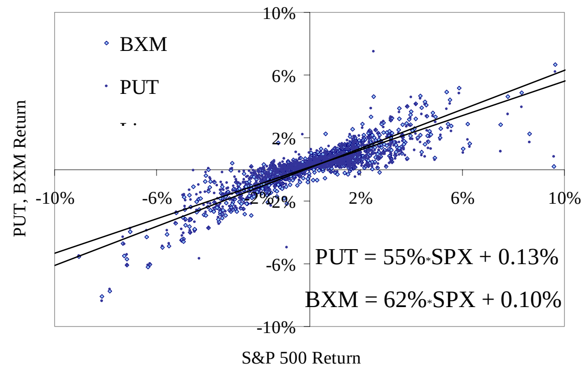
The performance of PUT, BXM, and the total return of S&P 500 since 1988 is shown in Figure 1 (left). As expected, PUT and BXM have outperformed the S&P 500 on a risk-adjusted basis (as well as in absolute terms). The Information Ratio of the BXM and PUT were 50% and 85% higher than S&P 500 total return, respectively, and the information ratio of PUT was 85% higher than the information ratio of the S&P 500 total return. The S&P 500 had lower annualized returns (9.0%) compared to PUT (10.7%) and BXM (9.4%) and higher volatility (18.3%) compared to the volatility of PUT (12%) and BXM (12.9%).

Figure 1: Performance of PUT, BXM, and S&P 500 Total Return Since 1988.




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 2: Beta and Alpha of PUT and BXM Strategies




Source: J.P. Morgan Equity Derivatives Strategy.

In the framework of Black-Scholes option pricing theory, the performance of BXM and PUT should be identical. Due to the 'Put-Call Parity' relationship, a portfolio that consists of long S&P 500 and a short ATM call option should always have the same value as a portfolio that is short a put, and invests the index notional amount into a risk-free rate yielding account. For this reason, it may come as a surprise that PUT has outperformed BXM by 1.3% annually since 1988. In addition, PUT had a lower risk, for a net improvement in the information ratio of 22% over BXM.

In this section we investigate this outperformance of PUT and suggest some enhancements to index overwriting strategies based on our findings. Figure 2 (right) shows the regressions of PUT returns vs. S&P 500, and BXM returns vs. S&P 500. The regression analysis shows that the BXM strategy had a higher beta (62% for BXM vs. 55% for PUT) and lower weekly alpha (10bps for BXM, vs. 13bps for PUT) compared to the PUT strategy.

The beta and alpha differentials between BXM and PUT arise largely on account of a subtle difference in the design of these two strategies. PUT and BXM are not selling exactly ATM options. PUT sells 1-month puts nearest but below the current S&P 500 price, while BXM sells 1-month calls nearest but above the current S&P 500 price.

The difference between strikes of listed S&P 500 options is usually 5 index points (in some cases it could be larger). As PUT sells one strike below the spot and BXM one strike above the spot, the difference between the strikes of puts and calls will in most cases be 5 index points. Since 1988, the 5 point spread was on average 0.7% of index value. This will lead to a

[3] More precisely, BXM sells call options close to the at-the-money level, but above the current spot; option premiums and index dividends are reinvested. PUT sells put options close to the at-the-money level, but below the current spot; option premiums and interest on treasuries are reinvested.

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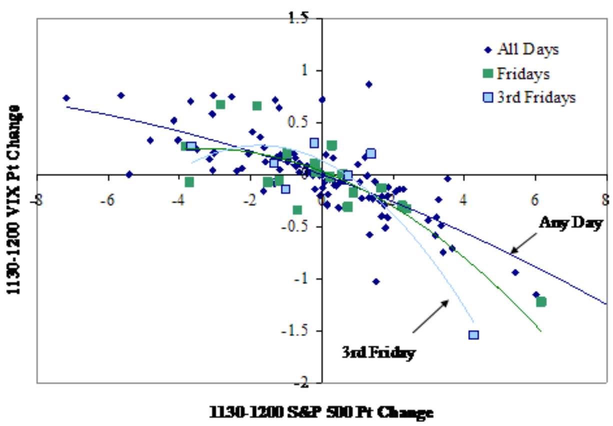
small performance differential as the implied volatility of lower strike puts is higher than the implied volatility of calls. Looking at implied volatility skew for this strike differential gives on average a ~50bps volatility differential (puts having 50bps higher volatility than calls). The difference in premium for 1-month options equivalent to a 50bps volatility spread is on average 63bps, which annualizes to (12 monthly option sales per year) 0.75% additional premium.

In addition to the skew effect, there is a borrow cost for the S&P 500 that causes put prices to be more expensive than call prices. Assuming a short-term borrow rate of 20bps, this would represent an additional 0.10% performance advantage for PUT.

We showed that the strike price differential between PUT and BXM and borrow cost for S&P 500 can account for about 0.85% of performance differential between PUT and BXM. As the actual performance differential was 1.30%, there is about 45bps of unattributed performance differential. In our view, this is likely a result of the market impact and execution slippage of the BXM strategy that historically had a much larger asset base than the PUT strategy. For instance, a large BXM order may move the volatility on the 3rd Fridays between 11:30AM to 12:00PM when the options are sold. Figure 3 (left) shows the change in the VIX from 11:30AM to 12:00PM vs. the change in the S&P 500 level during the same time interval for all business days, Fridays, and 3rd Fridays only over the past 6 months. While the intraday data sample is not large, we note that the VIX on average decreases more (and rises less) with an increase (decrease) in the S&P 500 on the 3rd Fridays. This suggests a supply pressure, potentially coming from the BXM strategy itself.

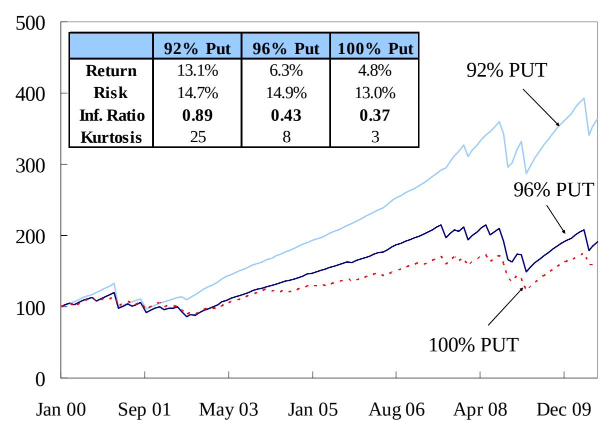
We showed that even a small difference in strikes may impact the performance of option-writing strategies in a meaningful way. In particular, the premium of implied volatility skew helps the strategies selling lower-strike options. We can further explore the impact of a strike differential larger than that in the PUT/BXM strategies. Figure 4 below right shows the past 10-year monthly performance of generalized "PUT" strategies selling 100%, 96%, and 92% strike 1-month puts. In order for strategies to have the same market risk (beta), the notional amount of options sold is different for different strikes. The 100% PUT strategy sells 1 option, 96% PUT strategy sells ~2 options, and 92% PUT strategy sells ~4 puts.[4] Over the past 10 years, selling OTM puts outperformed selling ATM puts on account of high skew. For instance selling 92% puts resulted in an Information Ratio of 0.89, more than twice the IR of the 100% PUT strategy (0.37) over the same time period.

Figure 3: Intraday Data Suggests a Potential Market Impact of the BXM Strategy on Volatility Levels.




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 4: Selling Low Strike Puts Increases Absolute and Risk-Adjusted Returns. However, it also Increases Tail Risk.




| | 92% Put | 96% Put | 100% Put |
|---|---|---|---|
| **Return** | 13.1% | 6.3% | 4.8% |
| **Risk** | 14.7% | 14.9% | 13.0% |
| **Inf. Ratio** | **0.89** | **0.43** | **0.37** |
| **Kurtosis** | 25 | 8 | 3 |

Source: J.P. Morgan Equity Derivatives Strategy.

However, the outperformance of OTM PUT strategies does not come for free. Even if the volatility of strategies selling OTM puts is roughly the same as the risk of strategy selling ATM puts, tail risk when selling OTM puts quickly increases.

[4] More precisely, the fractional amount of puts sold is determined each month to exactly match the 'delta' (i.e., S&P 500 beta) for each strategy at the time of option sale.

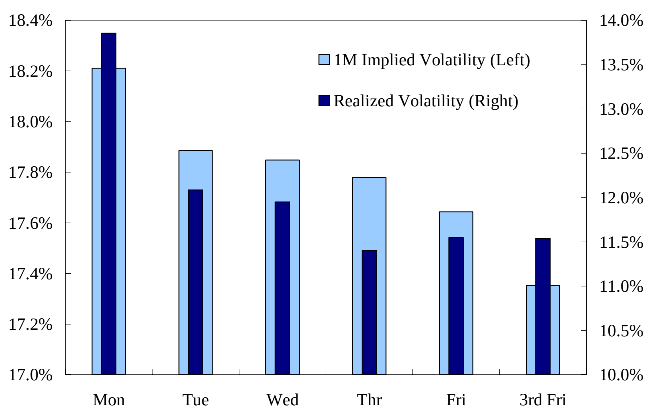
Tail risk (as measured by the Kurtosis of monthly returns) quickly increases from ~3 for ATM PUT, to ~8 for 96% PUT and to ~25 for 92% PUT. In essence, the risk adjusted outperformance of strategies selling OTM put options is a result of selling the expensive implied volatility skew (downside tail risk).

In addition to the selection of option strikes, the timing of the option sale may impact the performance of option-writing strategies. This will be the case if implied volatility shows seasonal patterns.

Figure 5 (left) shows a strong intraweek seasonality of implied and realized volatility levels. Since 1989, 1 month at-the-money implied volatility was highest on Monday and lowest on Friday. The difference between average Monday and Friday implied volatility levels was ~0.6 points (18.2 vs. 17.6). In addition, during the option expiration Fridays (generally the 3rd Friday of each month), implied volatility was an additional 0.3 points lower (compared to non-expiry Fridays). Similarly, the average realized move was the highest on Monday (due to the market move over the weekend) and then declined toward the end of the week.[5]

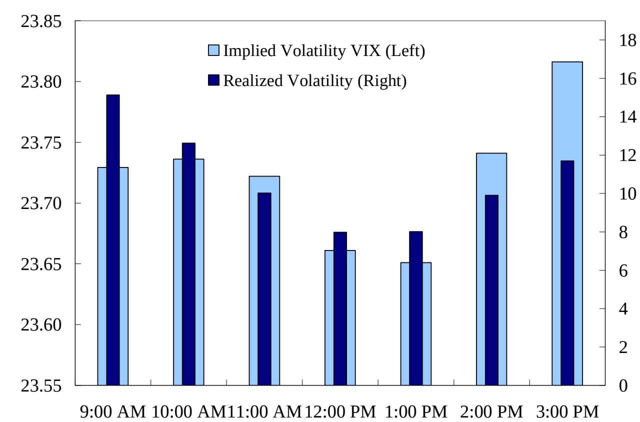
Intraday, volatility is high at the open, bottoms midday, and increases again going into the close. The effect is much more pronounced for realized volatility than implied volatility (e.g., the VIX). For instance, YTD the S&P 500 realized volatility averaged 8% from noon to 1PM and averaged 15% in the first hour of trading. Implied volatility (intraday VIX) showed a similar pattern but with a much smaller variation. For instance, YTD the VIX averaged 23.65 from noon to 1PM (bottom), and peaked at ~23.8 during the last hour. Hour by hour VIX and realized volatility levels are shown in Figure 6 (right).

Figure 5: Intraweek Seasonality of S&P 500 Implied and Realized Volatility. 1M ATM Implied Data Since 1989, Realized Data Since 1928.




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 6: Intraday Seasonality of S&P 500 Implied and Realized Volatility. 1-Minute VIX and Realized Return Data YTD.




Source: J.P. Morgan Equity Derivatives Strategy.

The seasonality of S&P 500 volatility will have an impact on the performance of the BXM, PUT, and general index option-writing strategies. The timing of BXM and PUT overwriting is negatively impacted by a pattern that 3rd Friday volatility tends to be lower than volatility during other days by up to 0.6 volatility points, and a pattern that volatility from 11:30-12:00 tends to be lower than, for example, volatility at the close by 0.1–0.15 points. The suboptimal choice of the day (3rd Friday) and time (11:30-12:00) negatively impacts these index option-writing strategies. The performance drag of sub-optimal timing on option-writing strategies is estimated to be in a 0.75% to 1 % range per annum.

[5] The average daily realized volatility was calculated from data since 1928.

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## Europe: Trading straddles based on Rangebound methodology

In addition to programmatically selling options based on a fixed time schedule (such as with BXM and PUT strategies discussed in the previous section), many investors use proprietary methodologies to determine which options look expensive and should be sold or alternatively which options look cheap and should be bought. We update the performance of our Rangebound methodology, which we last analysed in our 2010 Global Equity Derivatives Outlook. The model aims to identify attractive candidates for trading unhedged options intended to be held to maturity. The Rangebound methodology combines two metrics – the rangebound score and the mean reversion score – into a single score, where the highest-ranked stocks represent the best candidates on which to sell un-hedged options (see Movers and Shakers, May 2003, for a detailed description of the methodology). The rangebound score compares the ratio of the current implied high-low range that is priced into the options market to the recent realised high-low range of the stock. Additionally, a mean-reversion score associated with the stock is computed based on the difference in the volatility of returns over different holding periods.

We have backtested the effectiveness of the rangebound score by looking at the correlation between the rangebound rank and the subsequent P/L of short straddle positions on these names. The rangebound methodology performed well last year, exhibiting strong correlation between the ranking and straddle returns ($R^2$ = 36%). In 2009, the model's top 3 picks outperformed the bottom 3 picks by 4.4% of the notional value per month on average, which translates to approximately a 53% annualised return for investors who systematically shorted 1-month straddles on the top 3 picks and bought 1-month straddles on the bottom 3 picks (before bid-ask and other trading costs, which we estimate to be roughly 15-30bps of notional on average per option across these names).

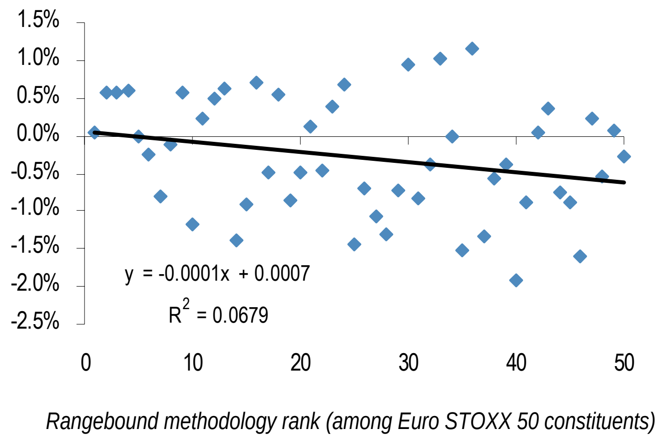
The model has not performed as well in 2010, but the volatility of the strategy's returns has been much smaller than the last 2 years, leading to a relatively good information ratio for the strategy.[6] The model was reasonably successful at picking the most and least desirable names for buying/selling unhedged straddles as top 3 picks outperformed the bottom 3 picks by around 8% annualised (before bid-ask and other trading costs) on average. Figure 7 shows the correlation between the Rangebound ranking and subsequent 1M straddle performance year-to-date.

Table 1 below gives the return statistics by calendar year for a strategy of selling 1M straddles on the top n names in the Euro STOXX 50 and buying straddles on the bottom n names, for n = 1, 3, and 5.

[6] For comparison, top quartile investment managers typically achieve an information ratio of ~0.5 according to "Active Portfolio Management" 2nd edition, by Richard C. Grinold and Ronald N. Kahn

Figure 7: Rangebound methodology continues to identify the best unhedged option selling candidates, but the signal is weaker in 2010

*Avg short straddle return in 2010 YTD*




Source: J.P. Morgan Equity Derivatives Strategy.

Table 1: Rangebound methodology performance in 2008-2010

| | Number of names | 1 | 3 | 5 |
|---|---|---|---|---|
| 2008 | Ann. Return | 19.1% | 23.8% | 18.6% |
| | Volatility | 55.5% | 31.4% | 32.1% |
| | IR | 0.34 | 0.76 | 0.58 |
| | Hit Ratio | 43% | 50% | 44% |
| 2009 | Ann. Return | 51.1% | 53.2% | 41.8% |
| | Volatility | 38.5% | 40.3% | 33.7% |
| | IR | 1.33 | 1.32 | 1.24 |
| | Hit Ratio | 62% | 63% | 60% |
| 2010 YTD | Ann. Return | 4.0% | 7.8% | 9.3% |
| | Volatility | 18.1% | 11.6% | 10.1% |
| | IR | 0.22 | 0.67 | 0.92 |
| | Hit Ratio | 61% | 50% | 50% |

Source: J.P. Morgan Equity Derivatives Strategy.

Hit ratio denotes the % of data points yielding positive returns

Figure 8 depicts the historical returns for selling 1M straddles on the top 3 ranked names from the Euro STOXX 50 constituents according to the Rangebound methodology on a weekly basis since Jan-2008. Figure 9 shows the returns from selling 1M straddles on the top 3 names and buying 1M straddles on the bottom 3 names. Based on this analysis, in our view it is preferable to use the model in a relative value context (i.e., both selling and buying straddles on the top/bottom names, respectively) rather than for outright selling as this reduces the risk of the large negative returns investors can suffer by selling straddles right before a market sell-off. For example, in Q4 2008 and May 2010, investors would have lost money by selling straddles on nearly every single name as the market sold off broadly, while implied volatility at the start of the period was much lower than what was subsequently realised. By contrast, the relative value strategy experienced much more benign losses in May 2010, and was profitable through most of Q4 2008. Additionally, the relative value strategy has a positively skewed returns distribution (i.e., a long right tail) while the systematic short straddle strategy's returns are negatively skewed.

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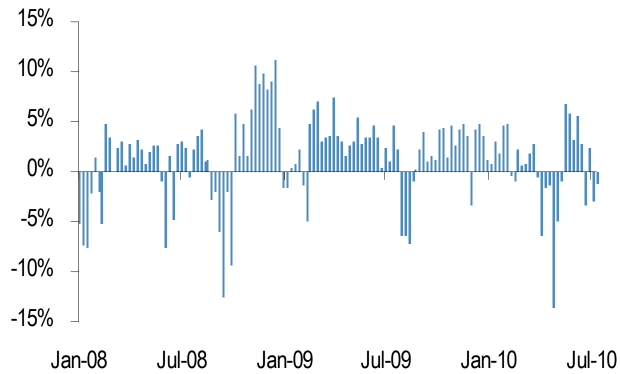
Figure 8: Performance of a systematic 1M short straddle strategy on the top 3 Rangebound names . . .

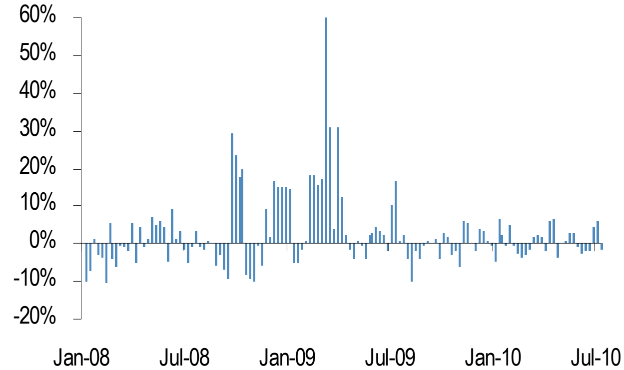
*Avg short straddle return on top 3 names*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 9: . . . .versus a strategy of selling 1M straddles on the top 3 and buying straddles on the bottom 3 Rangebound names

*Avg short straddle return on top 3 names plus avg long straddle return on bottom 3 names*




Source: J.P. Morgan Equity Derivatives Strategy.

Table 2 below lists the current recommendations for Euro STOXX 50 constituents from the Rangebound model. The current top 3 picks for selling 1-month straddles are BASF, Siemens and Carrefour, while the top 3 picks for buying 1-month straddles are Credit Agricole, Deutsche Bank and Telefonica.

Table 2: Recommended straddle trades in-line with Rangebound methodology

| Short 1M Straddle Trades | | Long 1M Straddle Trades | |
|---|---|---|---|
| Name | Implied Vol | Name | Implied Vol |
| BASF | 28.4% | Credit Agricole | 48.7% |
| Siemens | 29.2% | Deutsche Bank | 35.5% |
| Carrefour | 26.9% | Telefonica | 20.1% |
| Santander | 40.3% | France Telecom | 20.5% |
| Saint-Gobain | 38.5% | Iberdrola | 27.3% |

Source: J.P. Morgan Equity Derivatives Strategy. As of 13 August 2010.

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## Asia Pacific: Fundamental and Volatility Relative Value Trading

With most risky assets having now largely normalized since the market stress in May, due to reduced short-term uncertainty, investors have turned to relative value trading or rotational strategies between the outperformers and underperformers. In this section we focus on index option switch strategies to capture relative value, which are kept unhedged to expiry, looking across a range of major Asian indices as well as Western market indices. These option spread trades can capture the relative cheapness/richness of volatility in their pricing and, as a spread trade, perhaps entails less outright market-directional risk compared to a single index option strategy.

Globally, J.P. Morgan asset allocation strategist Jan Loeys is overweight EM equities versus DM equities, while regionally our strategists recommend overweights in India, Korea, SE Asia, and Taiwan but underweight China with a view that there could be a near-term rebound. To implement our strategists' views, investors can consider the following index option long/short trades with current pricings that look attractive compared to their backtests:

**Upside:** Long calls or call spreads on Asian indices such as Hang Seng, H-Shares, KOSPI 200, MSCI Singapore, Nifty, and Taiwan TAIEX versus short calls or call spreads on the Euro STOXX 50, Nikkei 225, and S&P 500.

**Downside:** The Euro STOXX 50, Nikkei 225, and S&P 500 indices appear on the short side of the top put or put spread switch trades, while mostly Asian indices appear on the long side. While buying puts on Asian indices versus selling puts on Western DM indices might not be in line with our strategists' views, this highlights the large gaps between their volatility and downside skews as well as the inherent value in holding low volatility puts to hedge against a crash scenario where correlation and volatility can spike together.

**Skew/Volatility:** Long Asian index risk reversals or straddles versus selling risk reversals or straddles on the Nikkei 225 and S&P 500.

**Backtesting current pricing with historical data:** We have considered a broad range of long/short strategies - ATM calls, 105 calls, 110 calls, ATM/110 call spreads, ATM/115 call spreads, ATM puts, 95 puts, 90 puts, ATM/90 put spreads, ATM/85 put spreads, 95/105 risk reversals, 90/110 risk reversals and straddles and have compared current pricings with historical backtests. The results will reflect not just volatility levels but also relative skews. For example, indices with cheap upside volatility should perform relatively well as candidates for buying OTM calls, while indices with steep downside skew should perform well using put spreads. The figures below show that the ATM volatility and the steepness of the upside and downside skew differ significantly across the indices considered, providing relative value opportunities. Also, while ATM volatility has normalized and has fallen sharply since the market stress in May, downside skew continues to remain elevated across most indices while upside skew is still relatively cheap.

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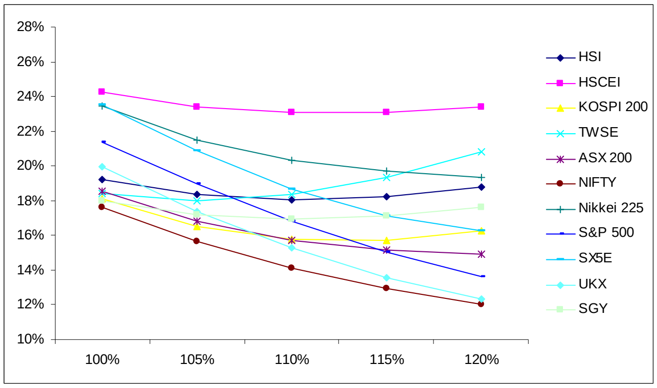
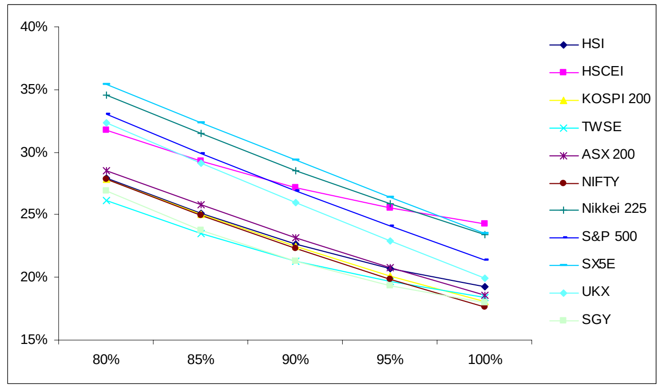
Figure 10: 3M Upside skew on indices from our backtest universe




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 11: 3M Downside skew on indices from our backtest universe




Source: J.P. Morgan Equity Derivatives Strategy.

Our universe comprises 11 index underlyings, of which eight are Asian (ASX 200, Hang Seng, H-Shares, KOSPI 200, MSCI Singapore, Nifty, Nikkei 225, and Taiwan TAIEX) and three are Western (Euro STOXX 50, FTSE 100, and S&P 500). We have backtested the hypothetical return at maturity of various long/short 3M option strategies on all possible pairs of indices and compared to pricing as of August 6. In our backtests we show the net return statistics (based on the current pricing) for all pairs since 2009, ranking them according to their risk/return (information) ratio and present the results in the following sections. While we also have backtested the strategies for a longer history, we think that the recent history is more relevant for a short-term tactical trading with 3M options. Please let us know if you would like to see the backtests over a longer history for any pairs or strategies we highlight above.

**Upside long/short strategies:** We have backtested several upside strategies aimed at discovering if the implied price distributions currently priced into index options can be justified by the historical 3M relative index performance. ATM calls or 105 calls are meant to test whether the relative volatility level is justifiable if we consider only relative upside returns, whilst 110 calls test for less probable events on the wings of the distributions. Call spreads on the other hand are sensitive to the upside skew. We show the top pairs for each of these strategies in the table below.

Table 3: Upside long/short option strategies - top 5 pairs, ranked by information ratio*

| ATM Calls | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | SX5E | 5.4% | -4.6% | 24.3% | 7.9% | 0.69 | 87% | -0.9% |
| SGY | NKY | 5.5% | -10.5% | 24.6% | 8.1% | 0.68 | 83% | -1.0% |
| SGY | SX5E | 6.1% | -11.5% | 29.1% | 9.3% | 0.65 | 88% | -1.2% |
| HSI | NKY | 4.8% | -10.8% | 21.2% | 7.6% | 0.64 | 74% | -0.7% |
| NIFTY | NKY | 6.8% | -11.3% | 39.1% | 11.1% | 0.61 | 72% | -0.2% |
| **105 Calls** | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | NKY | 4.7% | -6.2% | 20.8% | 6.5% | 0.72 | 87% | -0.3% |
| SGY | NKY | 4.8% | -6.0% | 24.1% | 7.6% | 0.63 | 88% | -0.5% |
| NIFTY | NKY | 6.5% | -6.2% | 39.2% | 10.7% | 0.61 | 84% | -0.3% |
| HSI | SX5E | 4.7% | -5.1% | 23.8% | 7.8% | 0.60 | 90% | -0.4% |
| HSCEI | NKY | 4.6% | -7.3% | 24.4% | 7.8% | 0.60 | 48% | 0.8% |
| **110 Calls** | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | NKY | 3.8% | -1.5% | 20.5% | 5.9% | 0.65 | 99% | 0.0% |
| NIFTY | NKY | 6.0% | -1.4% | 39.0% | 10.3% | 0.58 | 96% | -0.1% |
| HSCEI | NKY | 4.0% | -2.3% | 24.4% | 7.3% | 0.54 | 42% | 0.8% |
| SGY | NKY | 3.8% | -2.3% | 23.7% | 7.2% | 0.53 | 96% | -0.1% |
| HSI | SPX | 3.7% | -2.7% | 25.4% | 7.1% | 0.52 | 36% | 0.3% |
| **ATM/110 Call Spreads** | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| SGY | SX5E | 2.0% | -3.6% | 9.2% | 2.4% | 0.83 | 94% | -0.7% |
| HSI | SX5E | 1.5% | -1.4% | 9.2% | 2.1% | 0.73 | 91% | -0.7% |
| SPX | SX5E | 1.3% | -3.9% | 8.6% | 2.2% | 0.61 | 93% | 0.0% |
| TWSE | SX5E | 2.0% | -9.1% | 10.9% | 3.5% | 0.58 | 90% | -0.9% |
| UKX | SX5E | 1.2% | -5.3% | 7.9% | 2.7% | 0.47 | 84% | -0.1% |
| **ATM/115 Call Spreads** | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| SGY | SX5E | 2.7% | -4.7% | 14.5% | 3.4% | 0.79 | 90% | -1.0% |
| HSI | SX5E | 2.5% | -2.9% | 14.3% | 3.6% | 0.69 | 88% | -0.8% |
| SPX | SX5E | 1.5% | -3.7% | 9.2% | 2.4% | 0.61 | 84% | -0.1% |
| TWSE | SX5E | 2.8% | -13.2% | 16.1% | 5.1% | 0.56 | 83% | -1.1% |
| KOSPI2 | SX5E | 1.8% | -7.5% | 12.7% | 3.5% | 0.51 | 84% | -0.3% |

Source: J.P. Morgan Equity Derivatives Strategy.
*Backtest based on data since 2009
**Indicative pricings with bid-offer spreads applied

Euro STOXX 50, Nikkei 225, and S&P 500 indices appear on the short side of the top 5 call and call spread switch trades. By this measure, they appear to trade at a relatively high volatility. On the other hand, on the long side, Asian indices such as Hang Seng, MSCI Singapore, and Nifty show up the most on the upside long option strategies. Therefore, investors who share our strategists' view of overweight EM equities versus DM equities can consider long calls or call spreads on those Asian indices versus short calls or call spreads on the Euro STOXX 50, Nikkei 225, and S&P 500.

**Downside long/short strategies:** Similar to the upside strategies, we have looked at trades that involve selling puts or put spreads on one index and buying the same puts or put spreads on the other index. These strategies profit when the long options index sells off and underperforms the short options index.

Table 4: Downside long/short option strategies - top 5 pairs, ranked by information ratio*

| ATM Puts | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| AS51 | SPX | 0.74% | -1.67% | 5.58% | 0.96% | 0.77 | 96% | -0.4% |
| AS51 | SGY | 1.01% | -1.91% | 10.32% | 2.56% | 0.40 | 28% | 0.1% |
| UKX | SPX | 0.45% | -2.18% | 6.71% | 1.28% | 0.35 | 96% | -0.1% |
| AS51 | TWSE | 0.62% | -2.79% | 5.91% | 1.78% | 0.35 | 86% | -0.1% |
| KOSPI2 | SGY | 0.35% | -3.18% | 4.79% | 1.03% | 0.34 | 84% | -0.5% |
| 95 Puts | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| AS51 | SPX | 0.54% | -0.34% | 2.59% | 0.49% | 1.10 | 97% | -0.4% |
| AS51 | SX5E | 0.49% | -3.94% | 2.51% | 0.97% | 0.50 | 88% | -0.7% |
| KOSPI2 | TWSE | 0.14% | -3.44% | 0.23% | 0.46% | 0.32 | 94% | -0.2% |
| UKX | SX5E | 0.18% | -2.56% | 1.75% | 0.59% | 0.30 | 93% | -0.2% |
| KOSPI2 | SPX | 0.43% | -7.34% | 0.86% | 1.45% | 0.30 | 90% | -0.9% |
| 90 Puts | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| AS51 | SPX | 0.36% | 0.33% | 1.48% | 0.16% | 2.23 | 100% | -0.3% |
| AS51 | SX5E | 0.53% | -1.13% | 1.52% | 0.30% | 1.75 | 96% | -0.6% |
| KOSPI2 | SPX | 0.57% | -2.58% | 0.62% | 0.39% | 1.45 | 97% | -0.6% |
| KOSPI2 | SX5E | 0.73% | -4.47% | 0.85% | 0.66% | 1.11 | 97% | -0.8% |
| NIFTY | SPX | 0.43% | -2.72% | 0.48% | 0.39% | 1.09 | 97% | -0.5% |
| ATM/90 Put Spreads | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| SX5E | SGY | 1.28% | -1.93% | 9.45% | 2.73% | 0.47 | 33% | 0.1% |
| AS51 | SGY | 0.95% | -1.88% | 7.79% | 2.29% | 0.41 | 28% | 0.1% |
| UKX | SGY | 1.02% | -1.83% | 9.95% | 2.53% | 0.40 | 22% | 0.1% |
| SX5E | TWSE | 0.80% | -2.90% | 9.64% | 2.08% | 0.39 | 87% | 0.0% |
| NKY | SGY | 1.13% | -1.33% | 9.61% | 2.94% | 0.38 | 29% | 0.4% |
| ATM/85 Put Spreads | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| SX5E | SGY | 1.19% | -2.13% | 11.47% | 3.03% | 0.39 | 32% | 0.3% |
| AS51 | SGY | 1.00% | -1.92% | 10.31% | 2.56% | 0.39 | 28% | 0.1% |
| UKX | SGY | 1.04% | -1.94% | 11.66% | 2.89% | 0.36 | 22% | 0.2% |
| SX5E | TWSE | 0.78% | -3.03% | 9.50% | 2.27% | 0.34 | 28% | 0.1% |
| AS51 | TWSE | 0.59% | -2.82% | 5.88% | 1.78% | 0.33 | 86% | -0.1% |

Source: J.P. Morgan Equity Derivatives Strategy.

*Backtest based on data since 2009

**Indicative pricings with bid-offer spreads applied

As shown in Table 4, the Euro STOXX 50, Nikkei 225, and S&P 500 indices appear on the short side of the top 5 put or put spread switch trades, largely due to high option premiums from high volatility and downside skew. On the other hand, Asian indices including the ASX 200, KOSPI 200, Hang Seng and Nifty are often ranked in the top pairs as long put candidates, highlighting the value in Asian indices for put hedges with relatively lower volatility. While buying puts on Asian indices versus selling puts on Western DM indices might not be in line with our strategists' views, should we experience a crash scenario where correlation and volatility often spike together, the inherent value in holding low volatility puts can be crystallized as they have the potential to outperform the higher volatility puts.

**Skew/volatility strategies:** In the skew/volatility section we have tested three strategies, namely 95/115 risk reversals, 90/110 risk reversals, and straddles. A long risk reversal would involve buying a call and selling a put. Asian indices seem to work well for this type of strategy, based on current pricing and the historical distribution of returns. For the short leg, investors may consider the Euro STOXX 50, FTSE 100, or S&P 500 indices. This result also highlights the historical appeal of collars (or call writing) on the DM indices.

For straddles, the top pairs came from Asian markets – long straddles on the Hang Seng, H-Shares, or Nifty versus short straddles on the Euro STOXX 50, Nikkei 225, and S&P 500, reflecting the current elevated price investors have to pay for volatility on DM indices. However, we would caution against using Euro STOXX 50 in the short leg due to the ongoing risk with the Eurozone sovereign debt crisis.

Table 5: Skew/volatility long/short option strategies - top 5 pairs, ranked by information ratio**

| 95/105 Risk Reversals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | NKY | 4.34% | -8.66% | 19.85% | 6.82% | 0.64 | 59% | 0.7% |
| SGY | NKY | 4.73% | -7.21% | 22.91% | 7.56% | 0.63 | 62% | 0.7% |
| NIFTY | NKY | 6.12% | -7.77% | 37.61% | 10.42% | 0.59 | 55% | 1.3% |
| TWSE | NKY | 4.97% | -7.12% | 29.84% | 8.98% | 0.55 | 59% | 0.6% |
| HSCEI | NKY | 4.51% | -13.23% | 24.11% | 8.58% | 0.53 | 59% | 1.1% |
| 90/110 Risk Reversals | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | NKY | 3.34% | -2.40% | 19.62% | 5.82% | 0.57 | 49% | 0.9% |
| NIFTY | NKY | 5.20% | -2.55% | 37.84% | 10.11% | 0.51 | 46% | 1.1% |
| HSCEI | NKY | 3.73% | -6.74% | 24.01% | 7.37% | 0.51 | 49% | 1.2% |
| SGY | NKY | 3.17% | -3.46% | 22.59% | 7.12% | 0.45 | 42% | 1.0% |
| HSI | SPX | 3.06% | -3.40% | 24.77% | 7.09% | 0.43 | 35% | 1.0% |
| Straddles | | | | | | | | |
| Long | Short | Avg | Min | Max | Stdev | IR | % Positive | Pricing** |
| HSI | SX5E | 5.62% | -7.62% | 24.66% | 8.50% | 0.66 | 77% | -1.3% |
| HSI | NKY | 4.88% | -12.04% | 21.84% | 8.25% | 0.59 | 70% | -1.3% |
| HSI | SPX | 4.59% | -8.47% | 26.26% | 8.77% | 0.52 | 59% | -0.5% |
| NIFTY | SX5E | 6.92% | -12.62% | 42.83% | 13.24% | 0.52 | 68% | -1.7% |
| HSCEI | SX5E | 5.23% | -12.16% | 26.10% | 10.16% | 0.51 | 61% | 0.9% |

Source: J.P. Morgan Equity Derivatives Strategy.

*Backtest based on data since 2009

**Indicative pricings with bid-offer spreads applied

# Focus: Global Dividend Opportunities

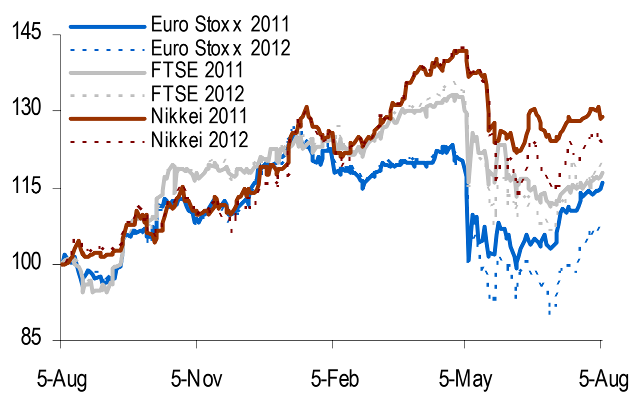
Euro STOXX 50, FTSE, and Nikkei 2011 dividends are up ~15-30% over the last year, with 2012 dividends up ~10-25%. Implied dividends suffered a significant correction in May, and all contracts have yet to recover to their pre-May sell-off levels. However, short-dated dividend futures have led implied dividends higher recently as second quarter earnings announcements have provided a positive catalyst and the contracts have converged toward bottom-up fair value estimates (Figure 12).

## Impact of Structured Product Flows

Given the importance of structured products for the supply of dividends, in this section we review recent developments in the retail structured products market (for analysis of how structured products lead to dividend exposure see the Appendix). In particular, we discuss issuance, typical structures, durations, and underlyings, all of which will have implications on global dividend markets.

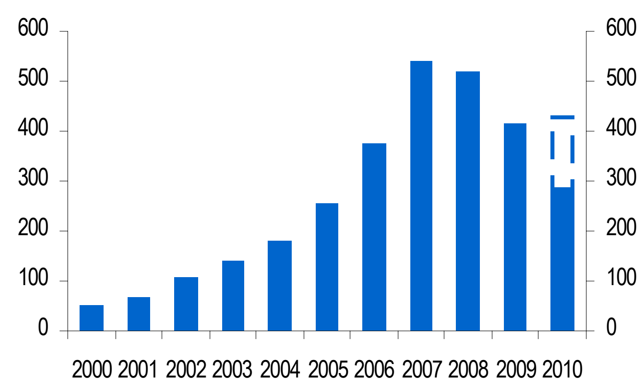
We estimate that the total structured product volume for 2010 will be around USD 430bn, representing a ~5% growth relative to 2009 (Figure 13). This would mean that volumes remain more than 20% below the peak issuance levels of 2007.

Figure 12: Dividends suffered a correction in May. The front calendar year dividend contracts have led the subsequent recovery.
*Performance of implied dividends, rebased to 100 on 5 August 2009*




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg. Nikkei: JPJDNKY1 & JPJDNKY2.

Figure 13: We expect total global structured products volumes to be around 5% higher in 2010 compared to 2009.
*Global Structured Product Volumes (USD bn)*




Source: J.P. Morgan Equity Derivatives Strategy, strucuturedretailproducts.com.

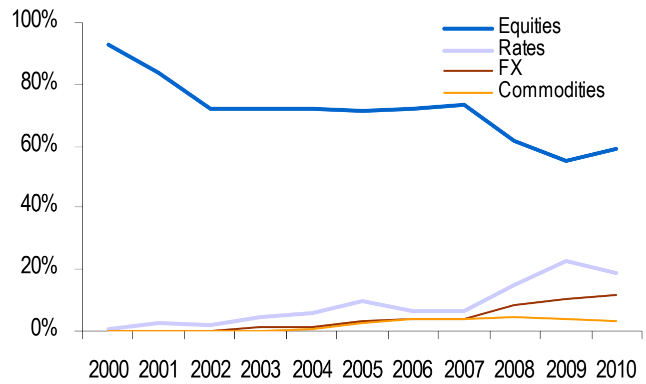
Although equities still largely dominate as the underlying for structured products, equities' share has fallen as investors look to Rates, FX, Commodities, and other assets (Figure 14). The share of total structured products issued with a single equity index as the underlying actually remains close to 2005 levels at around 27%.The share of total structured products issued with an equity index basket as the underlying has fallen from 12% in 2007 to only 4% in 2010 as investors have shifted towards simpler, more transparent structures.

The majority of structured products have historically been issued with a maturity between 2 and 6 years; however, there has been a substantial increase in the issuance of products with a maturity shorter than 2 years. This has been partly driven by increased use of shorter dated, short volatility products such as reverse convertibles, particularly in Asia Pacific and the Americas.[7] Issuance of structured products with a maturity greater than six years constitutes around 20% of total issuance (Figure 15).

[7] Reverse convertibles (similar to short puts) are outright short volatility and generate premium in return for the investor taking some downside risk. The issuance of reverse convertibles suffered initially during 2008 due to adverse equity performance; however, falling

Figure 14: Equities still dominate as the underlying for structured products, although equities' share has fallen as investors look to rates, FX, Commodities, and others as alternative underlyings.

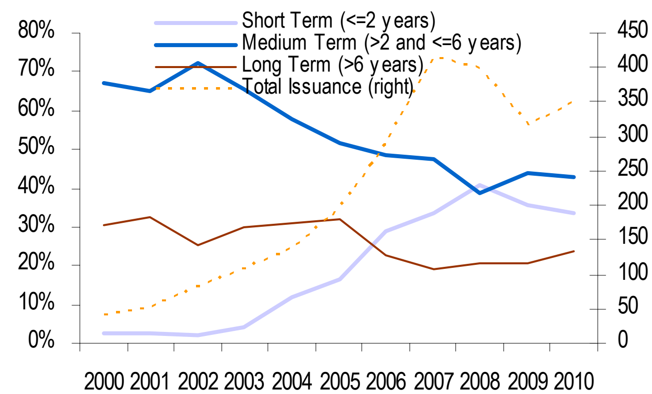
*Proportion of global structured products volume*




Source: J.P. Morgan Equity Derivatives Strategy, structuredretailproducts.com.

Figure 15: The largest proportion of structured products is issued with a medium-term maturity (between 2 and 6 years). Issuance of long-term structured products constitutes around 20% of total issuance.

*Proportion of Global Structured Products with particular maturity* *Total issuance (USD Bn)*




Source: J.P. Morgan Equity Derivatives Strategy, structuredetailproducts.com.

The effect of these changes will likely be to reduce the average duration of outstanding structured products and therefore reduce the exposure of issuers to long dated dividends. However, this will not be sufficient to offset the increase in total exposure due to the overall growth of structured product issuance.

There has been a gradual increase in the use of capped calls as the payoff for structured products. Strategies that mitigate against buying volatility at relatively high levels include capped calls (similar to call spreads), which partially offset the cost of an outright long call by selling further out-of-the-money calls. In the case of capped calls, the delta of the position will be smaller than that for an uncapped call, and therefore the dividend exposure may be smaller as a result of the gain in share of capped calls at the expense of uncapped calls.

**In our view, the supply of dividends will continue to weigh on longer dated dividend positions despite changes in structured product markets.** Even after taking into account the decline in issuance during 2008-2009, changes in product types and average durations, we expect the total outstanding volume to increase in coming years. The overall growth in structured product flows over the last ten years implies that even if we were to assume zero growth in issuance from 2010 onwards, the amount outstanding would only peak in 2020 (Figure 16). Therefore, we believe that the supply of dividends generated by structured product flows in Europe and Asia will continue to be an important factor and should continue to put downward pressure on long-dated implied dividend levels.

**Europe remains the largest market for structured products, with estimated 2010 issuance of products specifically linked to the performance of the Euro STOXX 50 equating to around ~2% of the total index market capitalisation.** The percentage of structured products issued in different regions is roughly split 65% in Europe, 20-25% in Asia, and 10-15% in the US. While this reflects a decrease in the proportion of structured products issued in Europe compared to previous years, Europe remains by far the largest market for structured products. We estimate that the volume of structured products issued in 2010 that are specifically linked to the performance of the Euro STOXX 50 index will equate to ~2% of the total market cap of the index. This is followed by the FTSE with ~0.8%, the Nikkei with ~0.7% and the S&P with only ~0.1%. This provides some indication of the importance of structured products flows for listed and OTC equity derivatives linked to these indices. The issuance of products offered on major global indices is shown in Figure 21 below.

implied volatility levels and the recovery in equity prices during 2009 contributed to a recovery in the performance of these particular products.

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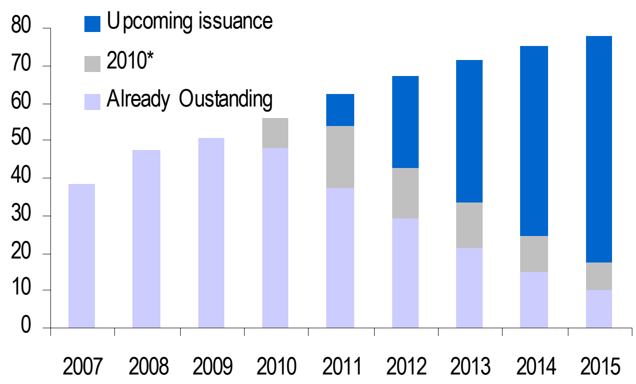
Figure 16: Even assuming zero growth in annual structured products issuance, we expect the total open interest for structured products to increase in coming years.

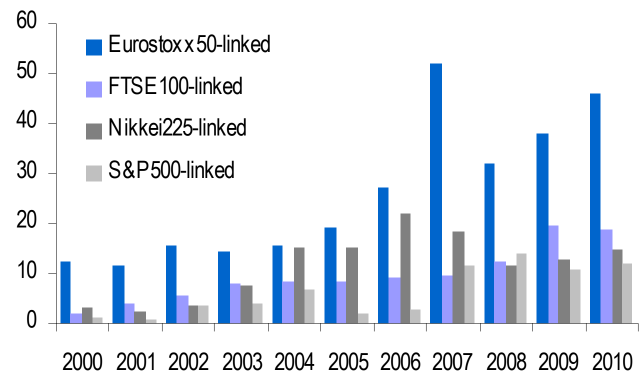
*Forward equivalent notional open interest (EUR bn)*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 17: Europe remains the largest market for structured products, with estimated 2010 issuance of products specifically linked to the Euro STOXX 50 equating to around ~2% of the total index market cap.

*Annual global structured products with specific underlying (USD bn)*




Source: J.P. Morgan Equity Derivatives Strategy.

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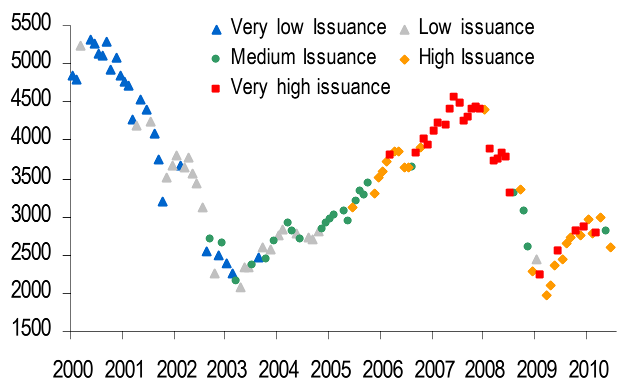
## European Dividend Markets, Euro STOXX 50 and FTSE Tear Sheets

Given the relationship between market performance and typical structured products issuance, most long-dated call-like products were struck at levels higher than current index levels (Figure 18).[8] Hence, the delta adjusted forward exposure on the Euro STOXX 50 that was originated through the structured products market ought to be more benign now than at the top of the market. The forward delta of new structured products issuance is likely to be higher than that of outstanding products. New issuance in 2010 already appears to be outpacing the 2009 run rate, indicating issuance levels that are substantially higher than any of the years 2000-2006. As a result of these two factors, we believe structured flows could again start to have an increasingly large effect on European dividends, as opposed to a diminishing one.

In order to estimate the notional size of long forward exposure coming from structured product flows on the Euro STOXX 50, we use several matrices of data incorporating the typical mix of structured products payoffs, typical maturities, and the proportion of annual issuance falling into each maturity bucket. We then apply a hypothetical maturity schedule, assume a typical delta at inception of ~50% (and adjust the delta of outstanding open interest from issuance that occurred in previous years to reflect changes in the index level since inception). Figure 20 shows the result of applying this methodology to all calendar years, and comparing each maturity of current and future estimated open interest to actual existing open interest of dividend futures.

Figure 18: Structured Product volumes in Germany.

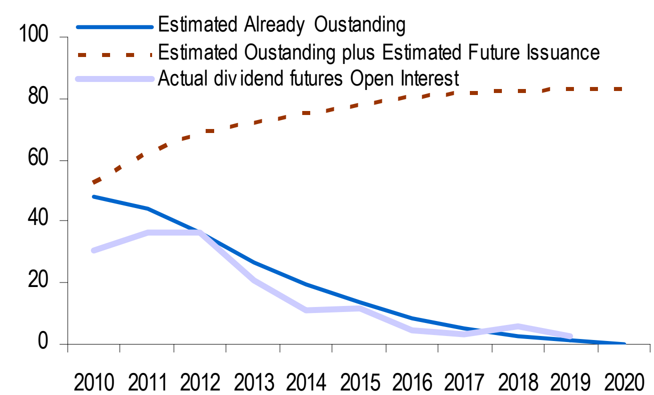
*Estimated Total Open Interest (EUR bn)*




Source: J.P. Morgan Equity Derivatives Strategy, retailstructuredproducts.com..

Figure 19: We expect total European structured product volumes to be slightly higher in 2010 compared to 2009.

*Forward notional equivalent open interest (EUR bn)*




Source: J.P. Morgan Equity Derivatives Strategy, retailstructuredproducts.com.

For instance, the forward notional size of the open interest for 2011 dividend futures positions is around EUR 30bn, or roughly EUR 1.2bn of dividend notional. We estimate that the size of the open interest emanating from the structured products market (including an estimate of all outstanding open interest from issues that were struck during 2000-2010) is around EUR ~50bn forward notional equivalent, or around EUR ~2bn of dividend notional (i.e., just under EUR 20m per index point). Our estimate for the size of total dividend exposure implies that about ~60% of the exposure is represented in listed dividend futures, while a still significant part of it (up to ~40%) may be in the OTC dividend swap market or kept unhedged.

The listed dividend futures have attracted more investors, particularly at the front end of the curve, where bid-offer spreads are lower (Figure 20), liquidity is greater (Figure 21), and there is better visibility about the ultimate payoff from the

[8] The opposite effect would apply for short put-like structures such as reverse convertibles or bonus certificates (where the delta of the put would have increased as the index fell and the put became more in the money). However, in spite of changes to the mix of structured products, these short put structures remain typically shorter-dated products on single stock underlyings as opposed to indices where a substantial proportion remains capital protected upside or partial upside participation notes and certificates.

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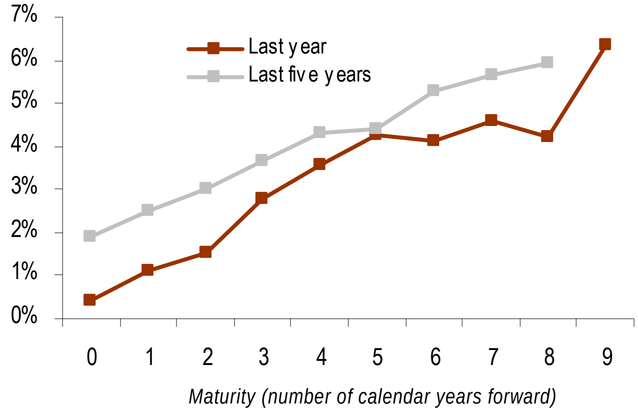
dividend contract. The open interest for all Euro STOXX 50 dividend futures contracts has grown to a combined notional value of around EUR 60bn, and over the last year, weekly volume has averaged around 70,000 contracts.

Figure 20: Average bid-offer spreads over the last year have been higher for longer dated dividend futures.

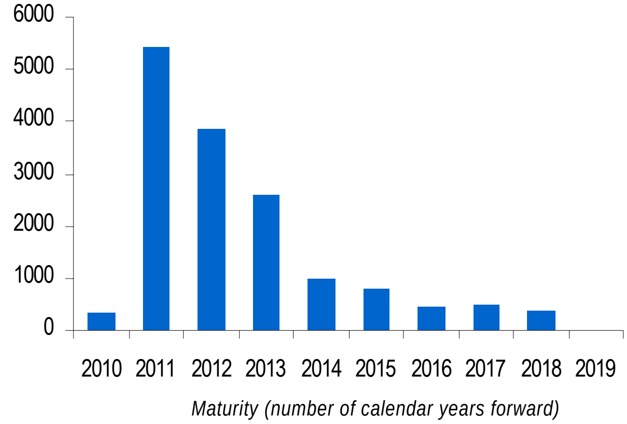
*Average bid-offer spread (as % of mid)*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 21: Greater liquidity of short dated dividend futures has induced more short-term investors into the dividend market.

*Average daily volume, last three months*




Source: J.P. Morgan Equity Derivatives Strategy.

However, listed dividend futures do not provide the whole picture of dividend market. There remain substantial dividend positions of longer maturities held in the OTC market. Many investment banks continue to warehouse dividend risk accumulated through structured products issuance, and a number of long-term investors hold large positions that also remain OTC.

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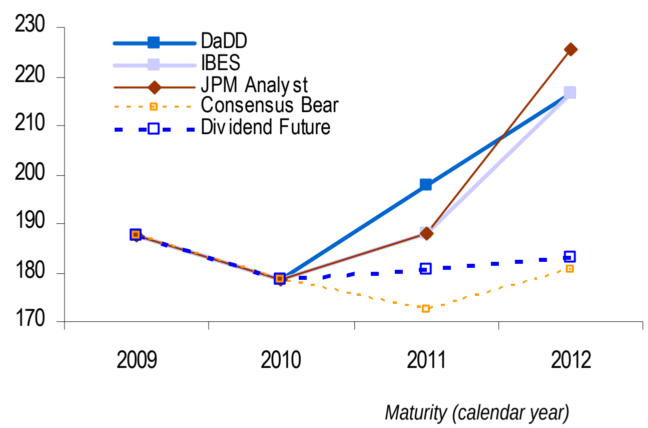
## FTSE 100 dividends Tear Sheet

Figure 22: FTSE 100 Index Dividend "Fair Value" Estimates

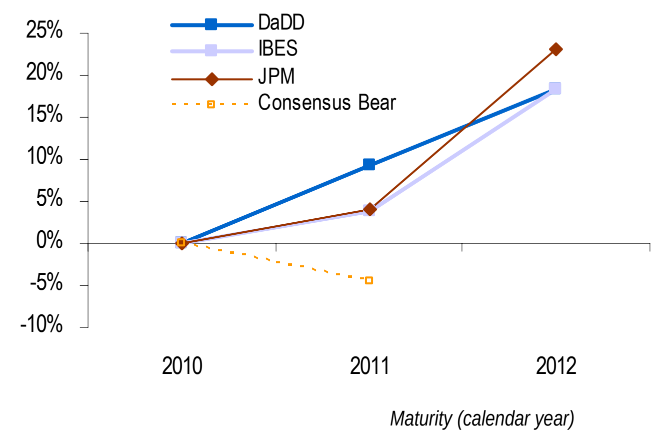
*FTSE 100 Implied / Estimated Dividend (index points)*




Source: J.P. Morgan.

Figure 23: The FTSE offers only moderate upside potential to fair value estimates for 2011, but around 18% upside potential for 2012.

*Upside / Downside Potential to "Fair Value" Estimates*




Source: J.P. Morgan.

Table 6: Bottom-up estimates using JPM / consensus DPS estimates

| Bottom-Up Estimates | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| DaDD | | | 197.8 | 216.4 |
| IBES | | | 187.9 | 216.5 |
| **JPM Analyst** | | | **187.9** | **225.3** |
| Consensus Bear | | | 172.5 | 180.7 |
| **Dividend Future** | **187.7** | **178.5** | **180.8** | **183.0** |

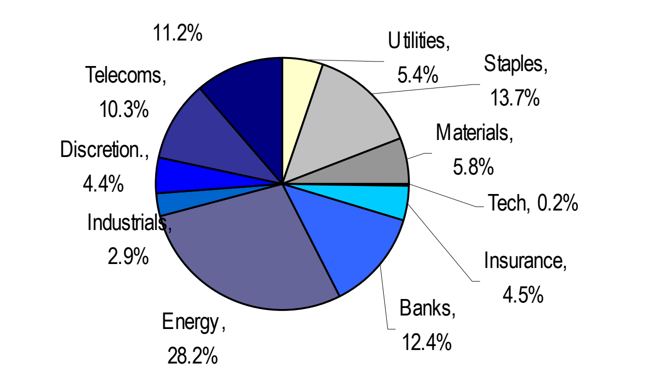
Source: J.P. Morgan.

Table 7: Upside / downside potential to bottom-up estimates

| Upside / downside potential | 2011 | 2012 |
|---|---|---|
| DaDD | 9.4% | 18.3% |
| IBES | 3.9% | 18.3% |
| **JPM** | **3.9%** | **23.1%** |
| Consensus Bear | -4.6% | |

Source: J.P. Morgan.

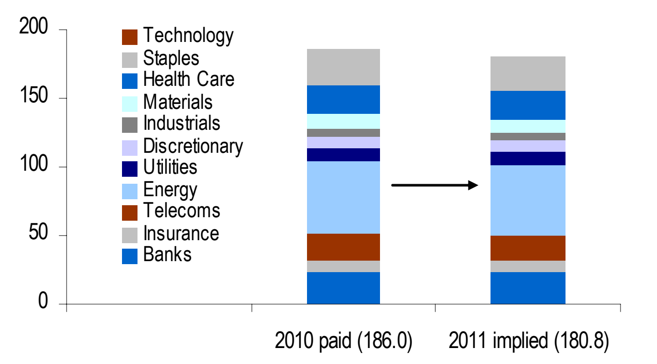
Figure 24: The FTSE100 index dividend depends heavily on dividends from Energy companies, including BP.




Source: J.P. Morgan.

Figure 25: 2011 dividend futures now price in slight growth compared to 2010 paid dividends.

*FTSE 100 Index Dividend (GBP, index points)*

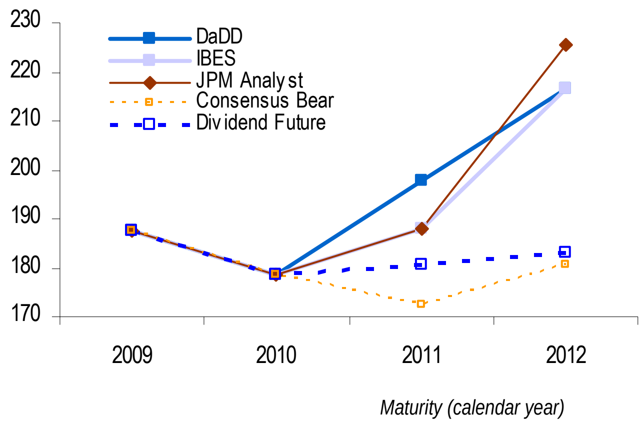



Source: J.P. Morgan.

## FTSE 100 dividends Tear Sheet

Figure 26: FTSE 100 Index Dividend "Fair Value" Estimates

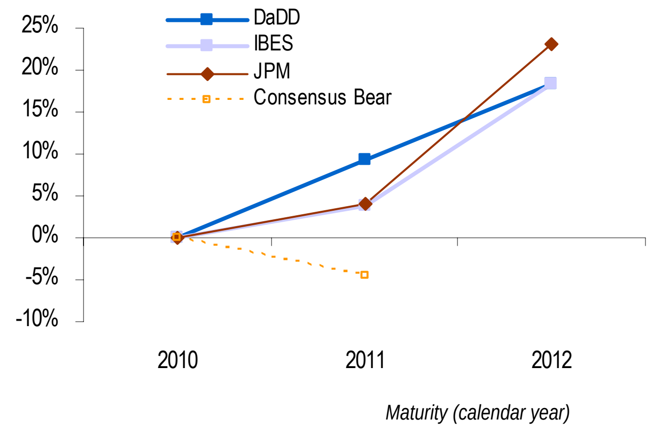
*FTSE 100 Implied / Estimated Dividend (index points)*




Source: J.P. Morgan.

Figure 27: The FTSE offers only moderate upside potential to fair value estimates for 2011, but around 18% upside potential for 2012.

*Upside / Downside Potential to "Fair Value" Estimates*




Source: J.P. Morgan.

Table 8: Bottom-up estimates using JPM / consensus DPS estimates

| Bottom-Up Estimates | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| DaDD | | | 197.8 | 216.4 |
| IBES | | | 187.9 | 216.5 |
| **JPM Analyst** | | | **187.9** | **225.3** |
| Consensus Bear | | | 172.5 | 180.7 |
| **Dividend Future** | **187.7** | **178.5** | **180.8** | **183.0** |

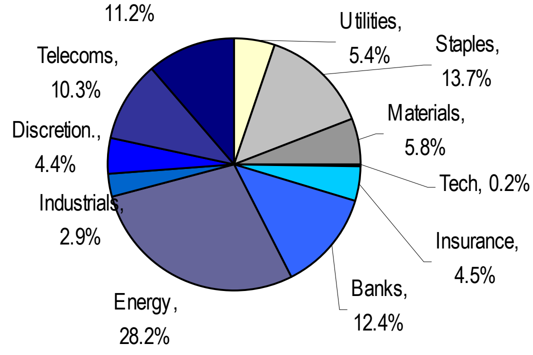
Source: J.P. Morgan.

Table 9: Upside / downside potential to bottom-up estimates

| Upside / downside potential | 2011 | 2012 |
|---|---|---|
| DaDD | 9.4% | 18.3% |
| IBES | 3.9% | 18.3% |
| **JPM** | **3.9%** | **23.1%** |
| Consensus Bear | -4.6% | |

Source: J.P. Morgan.

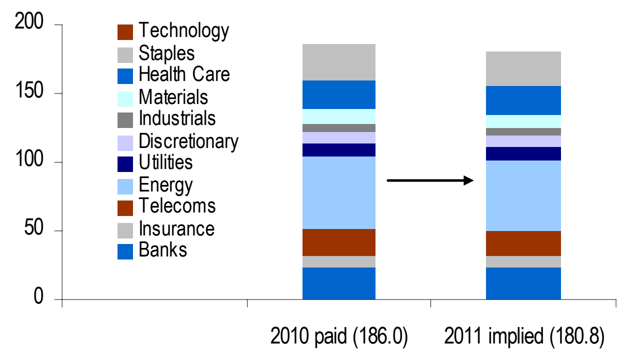
Figure 28: The FTSE100 index dividend depends heavily on dividends from Energy companies, including BP.




Source: J.P. Morgan.

Figure 29: 2011 dividend futures now price in slight growth compared to 2010 paid dividends.

*FTSE 100 Index Dividend (GBP, index points)*

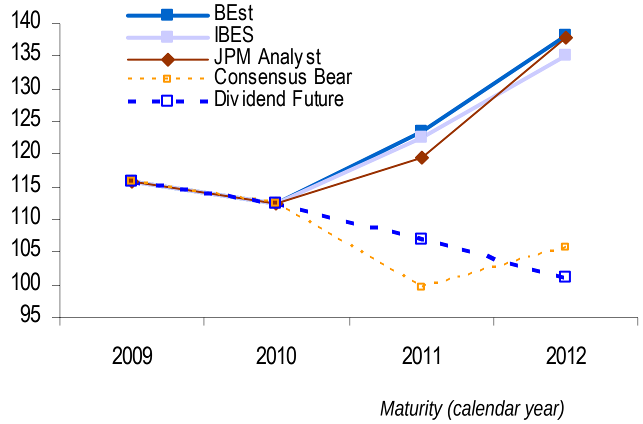



Source: J.P. Morgan.

## Euro STOXX 50 Dividends Tear Sheet

Figure 30: Euro STOXX 50 Implied dividend swaps levels remain well below our "Fair Value" Estimates.

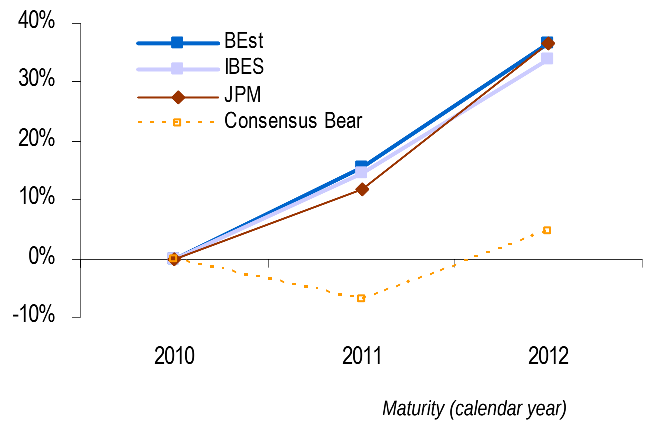
*Euro STOXX 50 Implied / Estimated Dividend (index points)*




Source: J.P. Morgan.

Figure 31: Euro STOXX 50 2011 dividend swaps still offer around 12% upside potential.

*Upside / Downside Potential to "Fair Value" Estimates*




Source: J.P. Morgan.

Table 10: Bottom-up estimates using JPM / consensus DPS estimates

| Bottom-Up Estimates | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| BEst | | 123.5 | 138.1 | 151.5 |
| IBES | | 122.4 | 135.2 | 150.8 |
| **JPM Analyst** | | **119.6** | **138.0** | **150.8** |
| Consensus Bear | | 99.7 | 105.6 | 109.8 |
| **Dividend Future** | **112.3** | **107.0** | **101.0** | **100.0** |

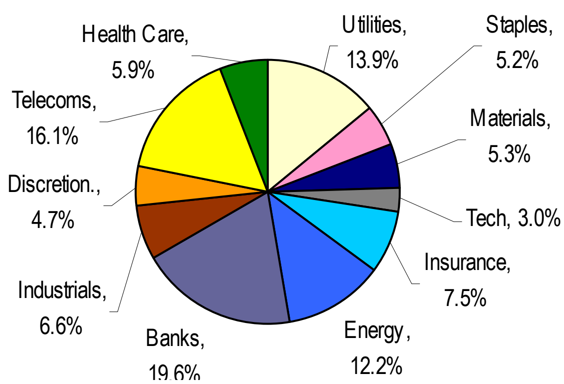
Source: J.P. Morgan.

Table 11: Upside / downside potential to bottom-up estimates

| Upside / downside potential | 2011 | 2012 | 2013 |
|---|---|---|---|
| BEst | 15.4% | 36.7% | 51.5% |
| IBES | 14.4% | 33.9% | 50.8% |
| **JPM** | **11.8%** | **36.6%** | **50.8%** |
| Consensus Bear | -6.8% | 4.6% | 9.8% |

Source: J.P. Morgan.

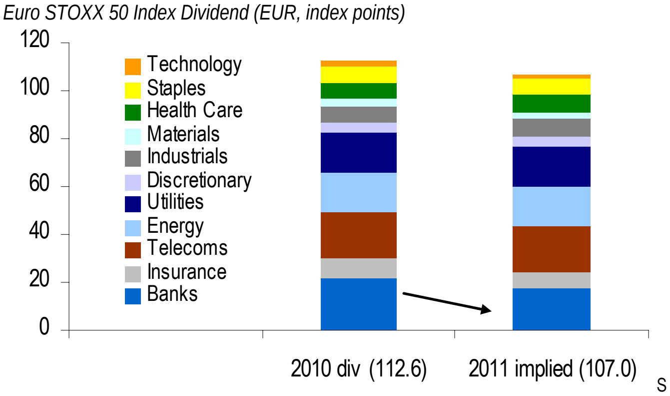
Figure 32: Euro STOXX 50 dividends still depend heavily on Banks sectors




Source: J.P. Morgan.

Figure 33: 2011 implied dividends are consistent with a 19% cut from all banks and insurers, assuming other sectors pay flat on 2010.

*Euro STOXX 50 Index Dividend (EUR, index points)*




Source: J.P. Morgan.

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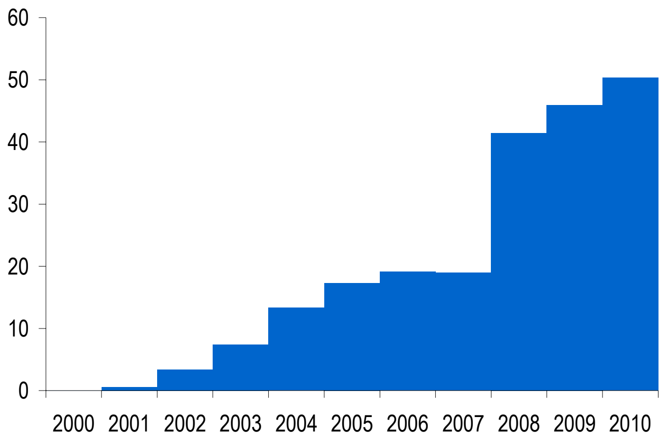
## Japanese Dividend Markets, Nikkei Tear Sheet

The recovery in the equity market in the first quarter of this year generated the heaviest flow of structured products in Japan since 2007. Although the tenors are typically much shorter (1 to 3 years as opposed to over 5 years), the basic structure remains the same, i.e. put-embedded notes with a knock-in barrier well below strike and knock-out barrier 5% above strike.

Barriers create discontinuities, which makes forward hedging more complex (more difficult to judge deltas). That said, dealers nevertheless resort to buying and selling forwards in order to hedge their delta exposure, and dividend swaps are used actively to hedge out the dividend risk associated with it. Despite the introduction of Nikkei index dividend futures on the Singapore Exchange in June 2010, and Nikkei, TOPIX, and TOPIX Core 30 dividend index futures in Tokyo Stock Exchange in July, the predominant driver of implied dividends continues to be the hedging needs by dealers in Japan.

Figure 34: Structured Products Volumes in Japan.

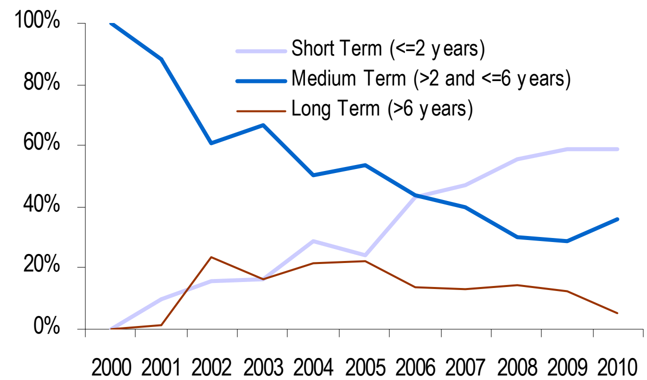
*Structured products volumes (USD bn)*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 35: Shift to shorter maturities may mitigate some of the impact from potential growth of outstanding structured products volumes

*Percentage of Asia Pacific annual structured product volumes*




Source: J.P. Morgan Equity Derivatives Strategy.

The end result is that implied dividend levels are more subject to spot market movements (particularly long-dated dividends) than bottom-up estimates of realized dividends. As we saw back in 2008, when the Nikkei spot market fell by 50%, the long-dated Nikkei implied dividends fell by more than 70%. This was not only based on the reasonable assumption that, in recession, dividends can go to zero before share prices do but also on the mass behavior by dealers to avoid dividend risk. The observations in the European dividend market, therefore, largely apply to the Japanese market as well. Consequently, we suggest similar strategies when trading Japanese dividends.

**Stay long at front end of the curve and continue to roll the position:** Front end dividend swaps are the most actively traded and most certain as well. The very front end, CY2010, however, has limited upside, as most of the CY2010 dividends have already been announced. The CY2011 or CY2012 dividends, however, still have plenty of room for appreciation. The current IBES estimates for Nikkei CY2011 dividends is 182.1, for example, compared to the implied level of 162. The current IBES estimates for CY2012 dividend is 197.3 vs, the implied level of 155.

**Higher risk of short squeeze for very long dated dividend positions:** Investors are exposed to liquidity risk in long-dated dividends. Also, as discussed earlier, long-dated dividends are more subject to spot market fluctuations. Those less sensitive to temporary mark-to-market losses should consider long-dated dividends for a substantial potential upside. For example, the current CY2013 implied dividend of 153 is well-below the 158 points paid in CY2009, possibly the worst year in Japanese corporate earnings.

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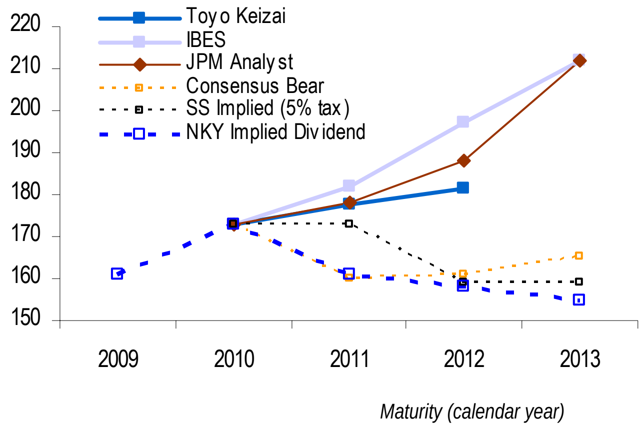
## Nikkei Dividends Tear Sheet

Figure 36: NKY Index Dividend "Fair Value" Estimates: Even the "Consensus Bear" estimate suggests upside potential for 2011 & 2012.

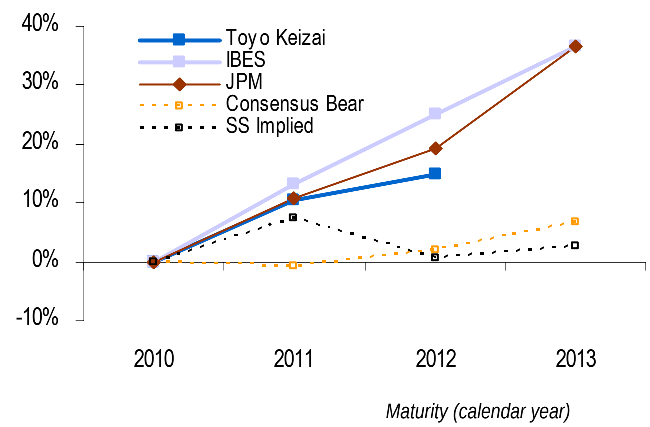
*NKY Implied / Estimated Dividend (JPY, index points)*




Source: J.P. Morgan.

Figure 37: Nikkei 225 index dividends are substantially undervalued for 2011-2013 maturities, in our view.

*Upside / Downside Potential to "Fair Value" Estimates*




Source: J.P. Morgan.

Table 12: Bottom-up estimates using JPM / consensus DPS estimates

| Bottom-Up Estimates | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Toyo Keizai | | 177.7 | 181.4 | |
| IBES | | 182.1 | 197.3 | 211.9 |
| **JPM Analyst** | | **178.1** | **188.3** | **211.9** |
| Consensus Bear | | 159.8 | 160.8 | 165.2 |
| SS Implied (5% tax) | | 172.8 | 158.9 | 158.9 |
| **NKY Implied Dividend** | **172.9** | **161.0** | **157.9** | **155.0** |

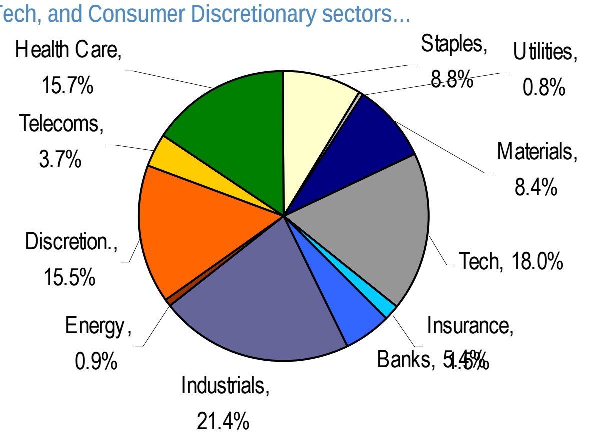
Source: J.P. Morgan.

Table 13: Upside / downside potential to bottom-up estimates

| Upside / downside potential | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Toyo Keizai | | 10.4% | 14.9% | |
| IBES | | 13.1% | 25.0% | 36.7% |
| **JPM** | | **10.6%** | **19.2%** | **36.7%** |
| Consensus Bear | | -0.7% | 1.9% | 6.6% |
| SS Implied | | 7.3% | 0.7% | 2.5% |

Source: J.P. Morgan.

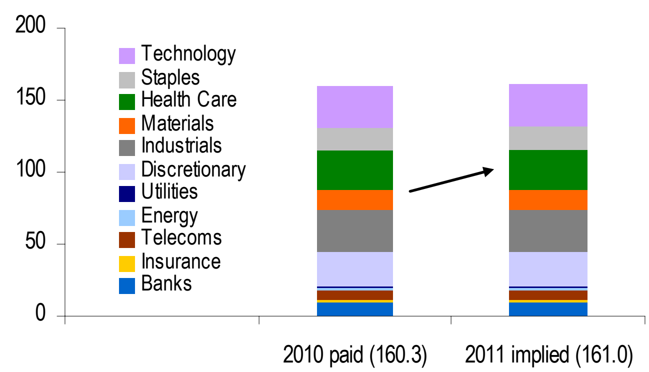
Figure 38: Nikkei dividends depend heavily on Industrials, Health Care, Tech, and Consumer Discretionary sectors...




Source: J.P. Morgan.

Figure 39: ...while implied levels already factor in dividend cuts from most of these sectors

*NKY Index Dividend (JPY, index points)*




Source: J.P. Morgan.

## US Dividend Markets, S&P 500 Tear Sheet

**Structured products issuance does not have a large impact on US dividends.** The expected annual issuance of structured products linked to the performance of the S&P 500 equates to only ~0.1% of the total market capitalization of the index. Consequently, the impact from structured products on US equity derivatives markets is mild compared to the impact it has on European and Asian equity derivatives markets.

**The impact of institutional investors buying protection on the S&P is a far more significant factor in our view.** Insurance companies and asset managers buy S&P options in order to hedge their exposure to equity markets. In particular, insurance companies' hedging of variable annuity products typically results in substantial demand for long dated S&P puts. The influence of these market participants on the S&P forward market is the reverse of that for structured products in Europe as they are effectively short forwards and therefore long dividends. A very rough estimate is that ~$3-5bn of short forward exposure may result from variable annuity hedging flows on the S&P per year.[9] This should be compared to ~$18bn of long forward exposure on the Euro STOXX 50 from structured products.

The S&P 500 dividend term structure is upward sloping, reflecting both dividend growth expectations and also the bias toward buyers of long-term protection, in our view. As shown in the S&P 500 dividends tear sheet, **S&P implied dividends are also expensive relative to fair value estimates for 2011 and 2012, reflecting the institutional demand for downside puts.**

[9] Based on the volatility demand estimates from "*Investing in Long Dated Volatility,*" *31 July 2008*

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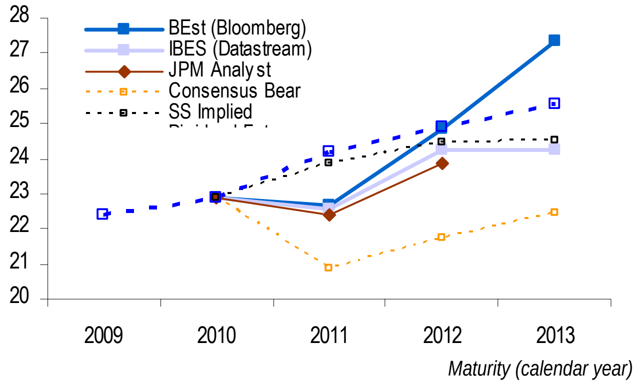
## S&P 500 Dividends Tear Sheet

Figure 40: S&P Index Dividend "Fair Value" Estimates

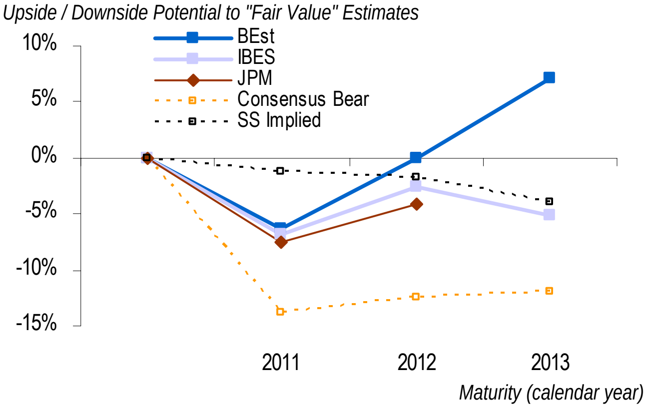
*S&P 500 Implied / Estimated Dividend (index points, USD)*




Source: J.P. Morgan.

Figure 41: S&P 2011 and 2012 dividends appear overvalued in our view

*Upside / Downside Potential to "Fair Value" Estimates*




Source: J.P. Morgan.

Table 14: Bottom-up estimates using JPM / consensus DPS estimates

| Bottom-Up Estimates | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| BEst (Bloomberg) | | 22.7 | 24.9 | 27.3 |
| IBES (Datastream) | | 22.5 | 24.2 | 24.2 |
| **JPM Analyst** | | **22.4** | **23.9** | |
| Consensus Bear | | 20.9 | 21.8 | 22.5 |
| SS Implied | | 23.9 | 24.5 | 24.5 |
| **Dividend Future** | **22.9** | **24.2** | **24.9** | **25.5** |

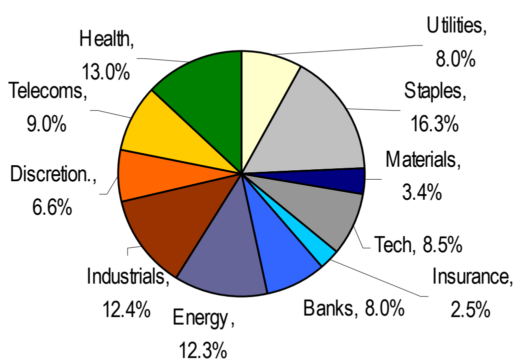
Source: J.P. Morgan.

Table 15: Upside / downside potential to bottom-up estimates

| Upside / downside potential | 2011 | 2012 | 2013 |
|---|---|---|---|
| BEst | -6.4% | -0.1% | 7.1% |
| IBES | -6.8% | -2.6% | -5.2% |
| **JPM** | **-7.5%** | **-4.1%** | |
| Consensus Bear | -13.8% | -12.5% | -12.0% |
| SS Implied | -1.3% | -1.7% | -3.9% |

Source: J.P. Morgan.

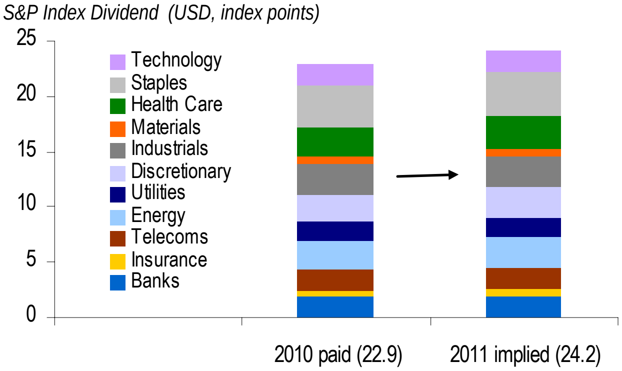
Figure 42: Sector contributions for S&P 2010 dividends




Source: J.P. Morgan.

Figure 43: S&P 2011 dividends price in 6% growth on 2010 although J.P. Morgan analyst and consensus estimates suggest a 1-2% fall.

*S&P Index Dividend (USD, index points)*




Source: J.P. Morgan.

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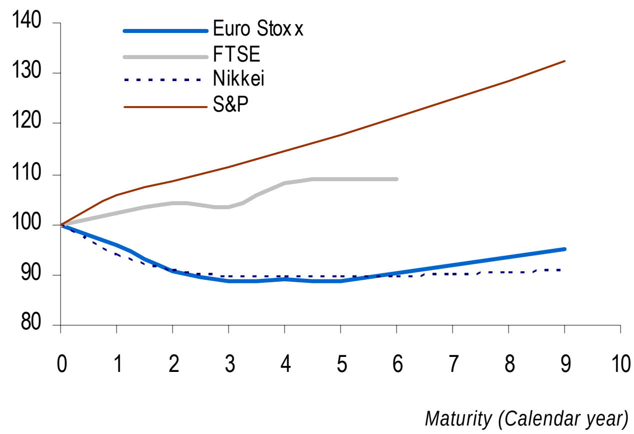
## Investing in Dividends

As discussed in previous sections, the structured products flows in Europe and Asia and institutional protection buying in the US are one of the main drivers of dividend prices. These supply/demand factors largely determine the term structure of implied dividends. Figure 44 shows a downward sloping term structure for Euro STOXX 50 and Nikkei and a steeply upward sloping term structure for S&P 500 dividends.

The supply pressure from structured products can be clearly observed in the discount of implied levels to their 'fair value' (bottom up) estimates for Euro STOXX 50, FTSE, and Nikkei. The opposite applies for the S&P index where implied levels are bid above fair value estimates on account of demand for downside protection that is more than offsetting supply trough structured products (Figure 45).

Figure 44: Dividend term structure: the Nikkei and Euro STOXX 50 term structures are downward sloping as a result of structured product dividend supply, while S&P 500 is upward sloping reflecting the demand for long-term downside protection

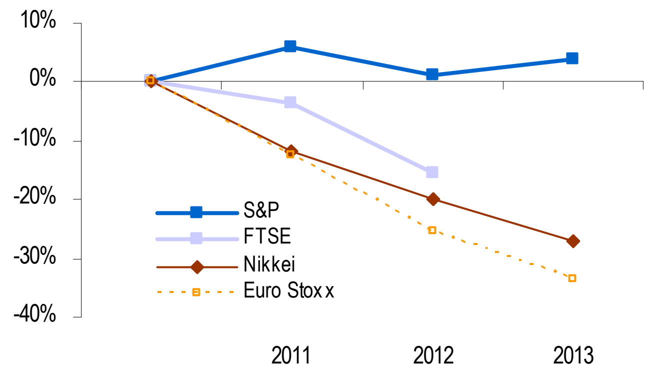
*Relative dividend term structure for global indices, front maturity set at 100*




Source: J.P. Morgan Equity Derivatives Strategy.

Figure 45: The supply of dividends from structured products puts pressure on NKY, FTSE, and Euro STOXX 50 implied dividends, which can be observed in the substantial discount of implied levels to fair value estimates. S&P 500 dividends trade at a slight premium

*Premium / Discount to consensus bottom-up estimates*




Source: J.P. Morgan Equity Derivatives Strategy.

The structural discount of Nikkei, Euro STOXX 50 and FTSE dividends relative to fair value represents an opportunity for a long dividend investor. While the discount increases for longer maturities, liquidity of longer dated dividends is lower and exhibit higher mark to market volatility. When selecting the maturity, a dividend investor hence needs to balance between the upside potential and the position's volatility and tail risk.

For an investor with good market timing skills and a higher appetite for mark-to-market risk, longer dated dividends are a better trading instrument. Longer dated contracts generally trade at a higher discount to fair value, they generally sell off and rally more as compared to short-dated contracts. This should provide higher return and higher leverage to an opportunistic investor.

Short-dated contracts generally exhibit less upside potential, less mark-to-market volatility, and their prices tend to be more influenced by convergence toward realized dividend levels.

Assuming that an investor does not have market timing ability, one needs to investigate what are the risk-adjusted returns of strategies that systematically roll contracts of different maturities. The table below shows the performance of systematic dividend roll strategies since January 2003 after accounting for full transaction costs.

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Figure 46: Performance of systematic dividend roll strategies since January 2003, including full transaction costs

| Since 01-Jan-03 | 0 year forward | 1 year forward | 2 year forward | 3 year forward | 4 year forward | 5 year strip of divs | Euro Stoxx 50 (total return) |
|---|---|---|---|---|---|---|---|
| Returns | 36.2% | 63.2% | 4.8% | -6.1% | -6.0% | 50.0% | 42.9% |
| Annualised | 4.2% | 6.7% | 0.6% | -0.8% | -0.8% | 5.6% | 4.9% |
| Volatility | 6.6% | 18.4% | 21.5% | 22.4% | 23.1% | 15.3% | 21.5% |
| Information Ratio | 0.63 | 0.37 | 0.03 | -0.04 | -0.04 | 0.36 | 0.23 |

Source: J.P. Morgan Equity Derivatives Strategy

One can see that systematic rolling of short maturities has provided higher risk adjusted returns (information ratio) compared to rolling longer dated contracts. Strategies that roll 1 year forward, as well as rolling a 5-year strip have outperformed the Euro STOXX 50 index over the past 7 years in both absolute and risk-adjusted terms.

**Stay long at front end of the curve and continue to roll the position.** Convergence toward fair value is what drives superior risk-adjusted returns for rolling one year forward dividends. This strategy historically performed well and should continue to benefit from valuation anomalies driven by supply of dividends from structured products. The negative effect of greater volatility and tail risk outweighed the appeal of large price discounts for very long-dated dividend contracts.

# APPENDIX

## How Dividend Exposure Arises from Structured Products Flows

Generally investors use structured products to express a bullish view on equities, whether it is through capital protected notes, bonus certificates, discount certificates, or reverse convertibles. As a recap, we briefly review the relationship between implied dividends, forwards, and option prices. From put-call parity, we can represent the forward price as $F(T) = K + (C(K,T) - P(K,T)) \times e^{rT}$ where ***P(K,T)*** and ***C(K,T)*** are the put and call prices for strike ***K*** and expiry ***T*** and ***r*** is the instantaneous funding rate.

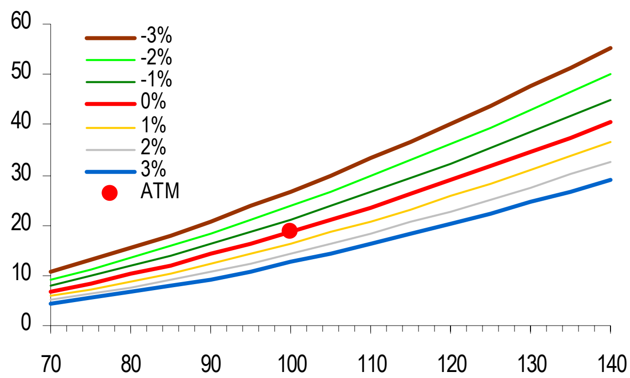
Using a no-arbitrage cash-and-carry replication for an equity of price S, and assuming an equity borrow fee ***b*** rate we can also show that $F(T) = Se^{(r-b)T} - FV_T(D_{0,T})$ where $\mathbf{FV_T(D_{0,T})}$ is the forward value at time T of the dividends accrued between the spot and forward dates. Substituting the expression for the cash-and-carry derived forward into the expression for the forward derived using the put-call parity, we can represent the *expected* forward value at time T of all the dividends accrued between the spot and forward dates dividend ($I_{0,T}$) as $I_{0,T} = Se^{(r-b)T} - K - (C(K,T) - P(K,T)) \times e^{rT}$ .

This shows that a long forward position is equivalent to a combined long stock, short dividend position. A long forward position would also benefit from an increase in interest rates or a decrease in borrow cost. An investor who is long calls or short puts has an exposure that is (delta) equivalent to a long forward position. For example if implied dividends were to rise (assuming that all other factors remain unchanged) then the forward price would fall. Since long calls/short puts are primarily the positions of end investors in retail structured products, investment banks are left with the opposite position of being short forward exposure and hence long implied dividend exposure. Dividend swaps were designed to hedge this exposure. See *"Dividend Swaps – Product Note", 18 May 2009*, for a more detailed discussion on the mechanics and technical considerations of dividend swaps.

To provide an example, we show the price of a hypothetical 5-year ATM call using a range of dividend assumptions. We assume implied volatility of 30%, a 5-year interest rate of 2%, and a base case dividend yield assumption of 4%. The price is heavily influenced by changes in implied dividend assumptions (Figure 47). From this chart it is also possible to see how the dividend exposure of a long-dated call option changes, given changes in the underlying market. As the option moves further into the money (the delta increases) the impact of a change in implied dividend is greater. By contrast, as the equity market falls and the delta of the position declines, the impact from changes in rates expectations also declines.

Figure 47: The price of a 5-year ATM call is heavily influenced by implied dividend assumptions.

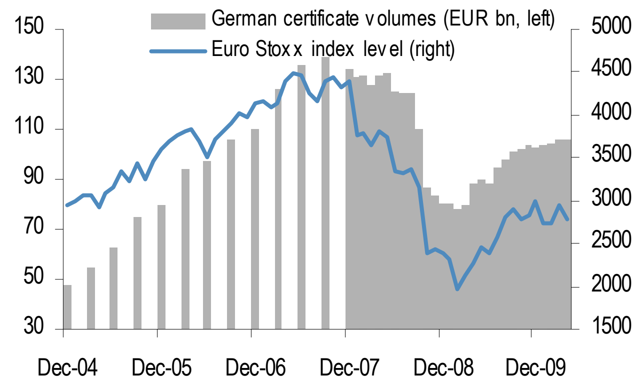
*Value of 5-year call, given different dividend assumptions*




Source: J.P. Morgan Equity Derivatives Strategy.
5-year ATM call, assuming 30% implied volatility, 2% interest rate, dividend yield 1%-7%.

Figure 48: The volume of structured product issuance is linked to equity market performance.

*German certificate volumes* *Euro STOXX 50 index*




Source: J.P. Morgan Equity Derivatives Strategy, Deutscher Derivate Verbund.

This leads to a related concept of the influence of market performance on the issuance of structured products. Structured product issuance is likely to decline during a weak equity market environment. Investment flows from retail investors will likely be both a driver of equity market returns (their capital is used to purchase securities during inflows or securities are sold to facilitate outflows) and reactive to prior equity market returns (as inflows typically increase after periods of strong equity performance, see Figure 48). This means that the magnitude of the dividend exposure associated with structured product volumes already outstanding may be likely to decline at the same time that further issuance is also likely to decline, during a falling market (although as seen in 2008, this effect has been outweighed by other factors). By contrast, the influence of changes in implied dividends is greater when the market has performed strongly, and in these circumstances, further structured product issuance may also be likely to occur, increasing the supply of dividends in the market. Of course this crudely assumes that all structured product flows have similar characteristics to a long-dated call option, and while this may be so in some cases, it is certainly not always the case. Indeed, reverse convertibles, similar to short put positions, have a delta (and therefore dividend) exposure that increases as the underlying falls. As we discussed in the report, changes in the prevalence of typical product payoffs, different underlyings, and the timing of flows are all important considerations for judging what the aggregate influence on the dividend market may be.

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**Put Sale.** Investors who sell put options will own the underlying stock if the stock price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the stock price below the strike potentially to zero, and they will not participate in any stock appreciation if the option expires unexercised.

**Call Sale.** Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

**Call Overwrite or Buywrite**. Investors who sell call options against a long position in the underlying stock give up any appreciation in the stock price above the strike price of the call option, and they remain exposed to the downside of the underlying stock in the return for the receipt of the option premium.

**Booster.** In a sell-off, the maximum realised downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long stock position, upside losses are capped (as for a covered call), but downside losses are not.

**Collar.** Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any stock appreciation above the strike price of the call option.

**Call Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is below the strike price of the call option.

**Put Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is above the strike price of the put option.

**Straddle or Strangle**. The seller of a straddle or strangle is exposed to stock increases above the call strike and stock price declines below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the stock would have limited losses should the stock rally. Covered writers are exposed to declines in the long stock position as well as any additional shares put to them should the stock decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the stock above the strike price of the call option.

**Put Spread**. The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying stock will have downside protection between the higher strike put and the lower strike put. However, should the stock price fall below the strike price of the lower strike put, investors regain exposure to the underlying stock, and this exposure is multiplied by the number of puts sold.

**Call Spread**. The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the stock and gives up the spread between the two call strikes should the stock rally.

**Butterfly Spread.** A butterfly spread consists of two spreads established simultaneously. One a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price, the maximum loss is the net debit.

**Pricing Is Illustrative Only:** Prices quoted in the above trade ideas are our estimate of current market levels, and are not indicative trading levels.

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| IB clients* | 68% | 61% | 53% |

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J.P.Morgan

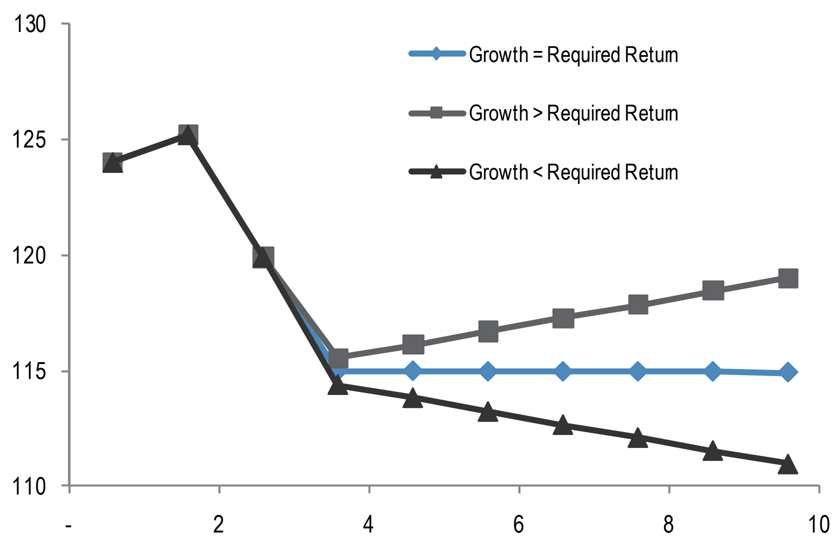
Europe Equity Derivatives & Delta One Strategy
19 May 2011

# Guide to Trading Euro Stoxx 50 Dividends

## A Risk Premium Perspective

- In this report we examine the drivers of Euro Stoxx 50 dividend futures. While investors have mostly focused on the fundamental estimates, we believe the market risk premium is what drives the day-to-day volatility.
- We compare the front end to credit instruments and show that currently the risk premium priced into the dividends market is excessive, **making buying the 2012 – 13s dividends attractive.**
- On the back end, the dynamics is driven by long term growth expectations, which currently appears elevated. As a result we believe the back end term structure is likely to remain flat or become downward sloping absent a strong rally in equities.
- In addition to trading dividend futures outright, we examine curve strategies and conclude that **front end steepeners are profitable when the required returns between two expiries compress, and back end steepeners are a play on the real (risk adjusted) growth rate**.
- Finally, we introduce our Weekly Euro Stoxx 50 Dividend Monitor to aid investors' decision making when trading dividends.

Shape of the dividend term structure is determined by both required return and growth rate




Source: J.P. Morgan Equity Derivatives Strategy

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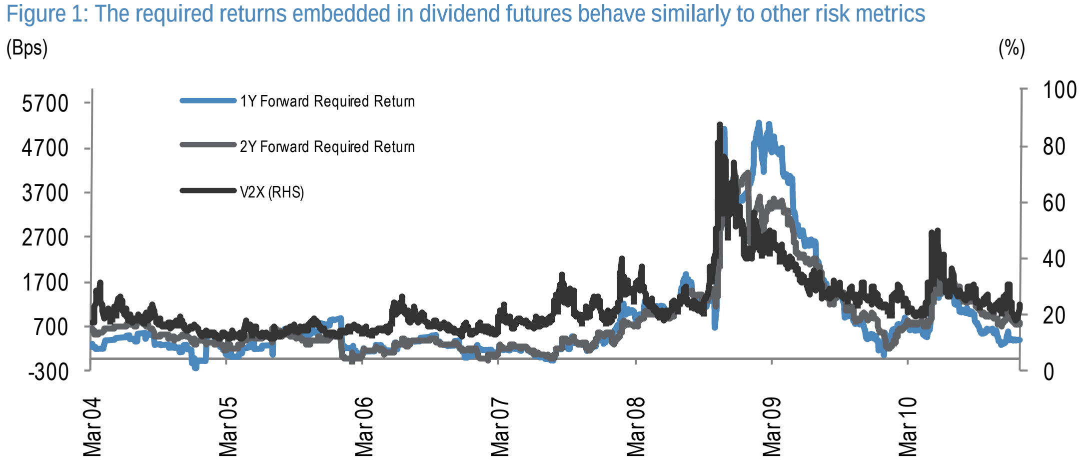
## How to trade dividends: it is all about risk premium

Unlike equities, dividend futures are pulled to the realised dividends upon expiry. As a result, the valuation of dividends depends mainly on two factors: the expected future realised dividend value and the perceived risk of this value. The price of the dividend futures is the expected realised dividends discounted at a risk premium (see Dividend Swaps: A Product Note, page 40).

The expected realised dividends are commonly taken to be the aggregate IBES dividend estimates. Sell-side analysts estimate companies' future dividends based on management communication, historical dividend policy and trend, as well as fundamental valuation. It can be thought of as the market's best guess of the future realised amount.

The dividend estimates are usually slow changing and under normal circumstances do not account for the day-to-day volatility of the dividend futures. Therefore, changes in risk premium are the main driver of the dividend futures volatility, in our view. As seen in Figure 1, the risk premia on the one and two year forward dividend futures move closely in tandem with other risk premium metrics such as the VSTOXX index.

Figure 1: The required returns embedded in dividend futures behave similarly to other risk metrics




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The key to understanding the dividend futures dynamics, therefore, is to understand the risk premia across various parts of the dividend curve. In the following sections we study the properties of the risk premuim embedded in the dividend futures.

## The front end of the dividend curve: dividends as credit-like instruments

We illustrate the approach by analysing the current pricing of the 2012 and 2013 dividend futures as credit instruments, first proposed in our 30 Mar, 2011 Weekly Outlook.

The front end of the dividend curve (up to 3 years) benefits from high visibility of the expected dividend payouts from a variety of sources including analyst estimates, company announcements, historical dividend trends, competitor read-across, etc. Moreover, the dividend futures are pulled to realised as expiry approaches. Figure 2 illustrates that the volatility of the Euro STOXX 50 2011 div futures diminishes as the expiry approaches, which is similar to the volatility dynamics of a corporate bond. From a cash flow perspective, being long dividend futures is similar to owning a zero coupon bond, since there is no interim cash flow until maturity (Figure 3). The difference is that bonds are funded instruments whereas dividend futures are unfunded.

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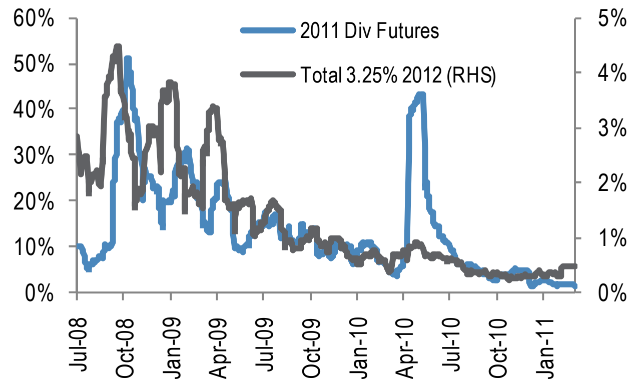
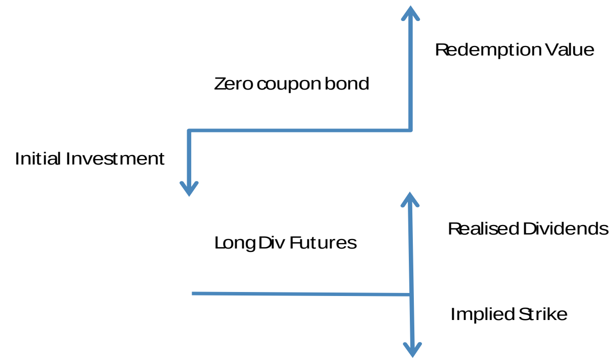
Figure 2: Volatility diminishes for both div futures and bonds as maturity approaches

30D Realised Volatility




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

Figure 3: Cash flow comparison of a zero coupon bond and a long dividend futures position

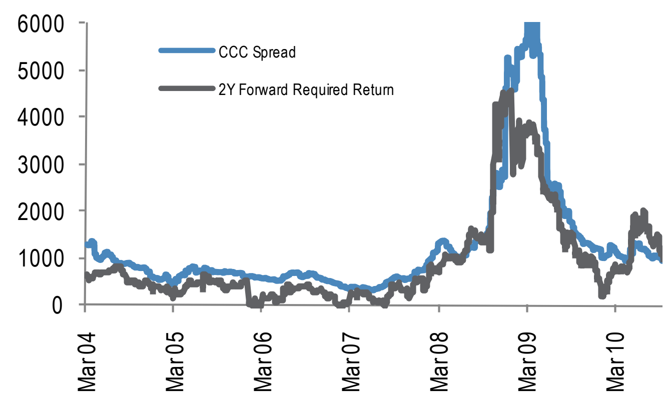



Source: J.P. Morgan Equity Derivatives Strategy ↓ signifies cash outflow, ↑ signifies cash inflow

If we accept the IBES estimates as a good proxy for the expected final payout, we can back out the annualised required return from the difference between the IBES estimates and the futures price[1]. In Figure 4, we compare the rolling 2-year forward dividend required return to European HY bonds. The positions are rolled into futures with T + 2 years maturity at the beginning of year T. The dividend required return appears to be moving generally in tandem with the CCC-rated spread (OAS). Figure 5 shows that in terms of returns, the rolling 2Y div futures index is also similar to the total return of the JP Morgan Euro CCC index. The similarity makes sense as even though SX5E dividends are paid out by blue chip companies, they sit at the bottom of the capital structure and therefore resemble highly risky bonds

Figure 4: Div futures required return levels and movements closely track CCC bond spreads

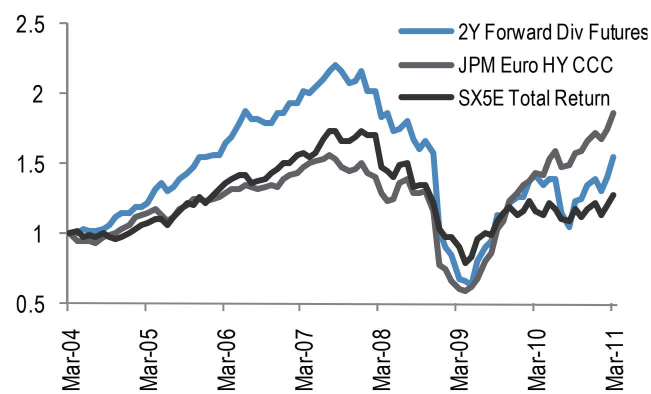
(bps)




Source: J.P. Morgan Equity Derivatives Research, JP Morgan High Yield Research

Figure 5: Div Futures and CCC total returns also behave similarly

Indexed total return




Source: J.P. Morgan Equity Derivatives Research, JP Morgan High Yield Research , Bloomberg

Having examined the expected return, we now turn to examine the risks. In Figure 6 and Figure 7 below, we show the historical IBES over/underestimate to the realised dividends. While for dividend years 2005 – 2008 IBES generally show under or inline estimates, analysts overestimated the dividends paid out in 2009 and 2010. The maximum overestimate 1 year forward is 36%, and the 2 years forward is 40%. In other words, if an investor was long the 2009/2010 dividend futures

[1] Specifically we can solve for the required return s in $D = F \cdot \exp(-s \cdot t)$ where D is the IBES estimate, F the current price of dividend futures, and t the time to expiry.

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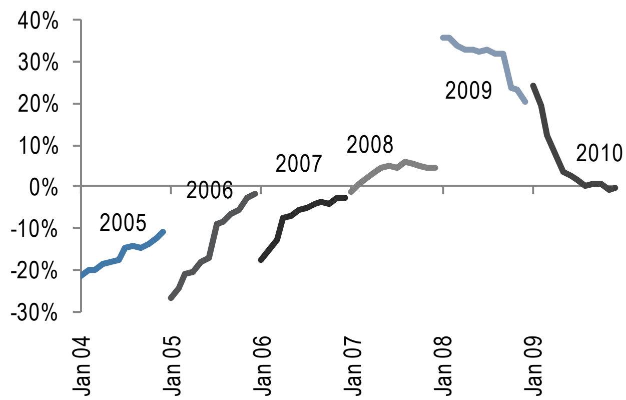
in February/March 2008 based on IBES estimates, his realised payout would have been 36% and 40% lower than expected, respectively.

Figure 6: 1Y Forward IBES over / (under) estimate vs. realised

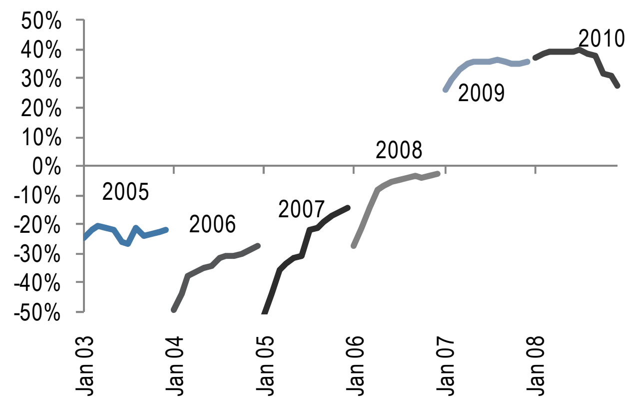
Over/(under) estimate of realised div as % of IBES




Source: J.P. Morgan Equity Derivatives Research, IBES, Bloomberg

Figure 7: 2Y Forward IBES over / (under) estimate vs. realised

Over/(under) estimate of realised div as % of IBES

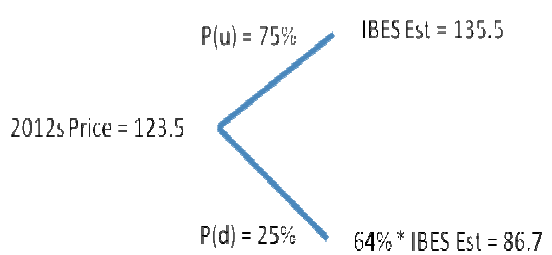



Source: J.P. Morgan Equity Derivatives Research, IBES, Bloomberg

Having understood the maximum loss incurred historically, we can stress test the current dividend futures pricing by constructing a two-state world where realised dividends either reach the IBES estimates, or they are cut by 36% or 40%, depending on the years to expiry. The current dividend futures level is the probability weighted average of the two outcomes, allowing us to back out the implied probability using a binomial approach. The probability of the upside is (Cur Px - Downside)/(Upside - Downside). The downside probability is therefore 1 - Prob(upside).

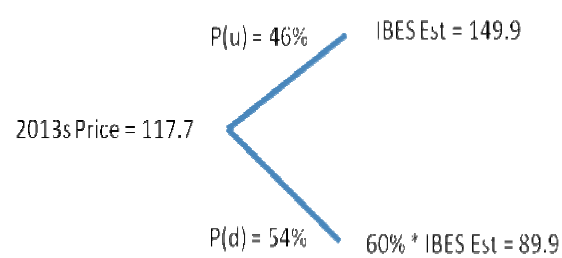
As seen in Figure 8 and Figure 9, the market is implying a 25% probability that the IBES estimates will be cut by 36% for 2012, and a 54% probability of a 40% cut for 2013. These probabilities likely exceed most investors' expectation of what will happen in the next year or two. Over the long run, it is also unlikely that the 08/09 financial crisis will repeat itself with such a high frequency. Aside from technical factors such as liquidity (notional outstanding of dividend futures market is still relatively small at €8 billion) and supply pressure from structured products (see our report here), the differential between the implied probability and expected frequency to be realised can be mainly explained by the excessively high risk premium. **Given the current outlook on the macroeconomic environment, we find the downside probability priced into the dividend futures excessive. Therefore the risk-reward in short dated dividend futures is attractive, in our view.**

Figure 8: 2012 div futures implying a 25% chance of a 36% cut




Source: J.P. Morgan Equity Derivatives Research

Figure 9: 2013 div futures implying a 54% chance of a 40% cut




Source: J.P. Morgan Equity Derivatives Research

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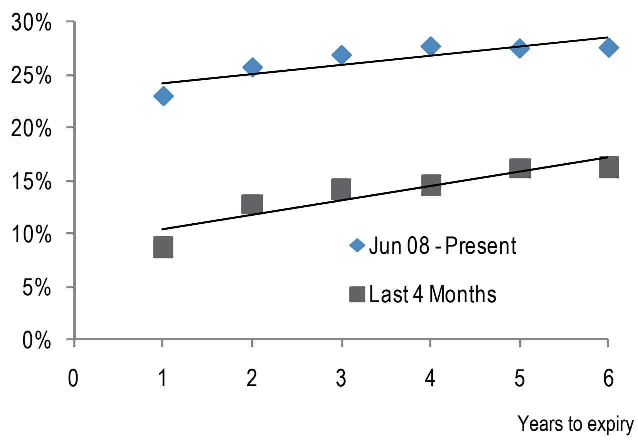
## Longer dated dividends: where the equity risk premium lies

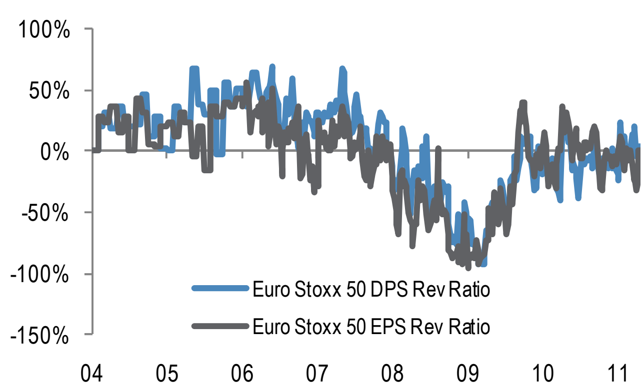
In contrast to the short dated dividend futures, the framework we have developed in the previous section cannot be easily applied to the back end of the dividend curve. Firstly, there are no explicit consensus estimates. Secondly, the variability of outcomes around the expectation is less binary and much more diffused. The higher uncertainty of the back end dividend futures is manifested in higher volatility (Figure 10). Rather than being comparable to bonds, the dynamics of the longer dated dividends are much more equity like.

Figure 10: Realised volatility increases linearly with time to expiry




Source: J.P. Morgan Equity Derivatives Strategy

Figure 11: Dividend expectations are closely linked to earnings expectations




Source: J.P. Morgan Equity Derivatives Strategy

Moreover, unlike the front end, where investors can express views on each yearly contract, it is much harder to differentiate the expected dividends of, say, five years vs. six years out. In our view, it is natural to assume on all back year contracts a constant required return, which is a discount rate applied to the expected realised dividends, and a constant growth rate, which is the year over year increase of expected dividend payouts. The shape of the long dated div futures reflect a combination of these two factors:

1) Required return > growth rate => Downward sloping

2) Required return = growth rate => Flat

3) Required return < growth rate => Upward sloping

Within this framework, the real growth rate, defined as the growth rate less the required return, determines the slope of the term structure, whereas the changes in the required return determines the parallel shifts of the curve, as we show in Figure 12 and Figure 13.

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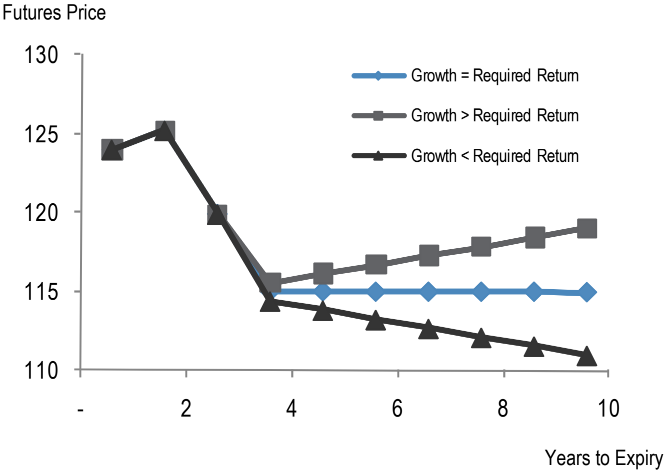
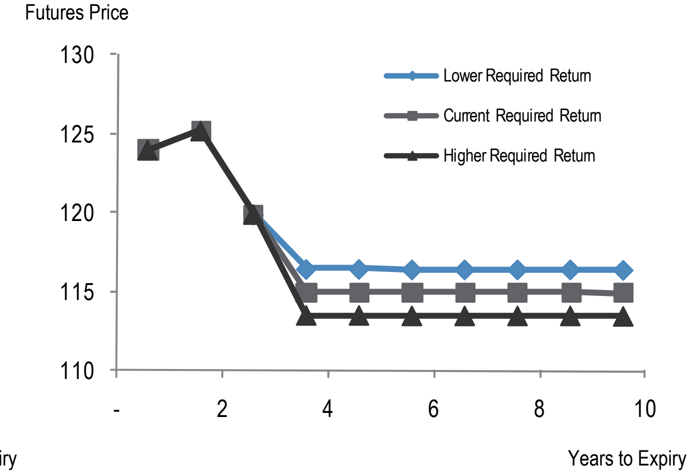
Figure 12: The slope of the back end is determined by the long term real growth rate...




Source: J.P. Morgan Equity Derivatives Strategy

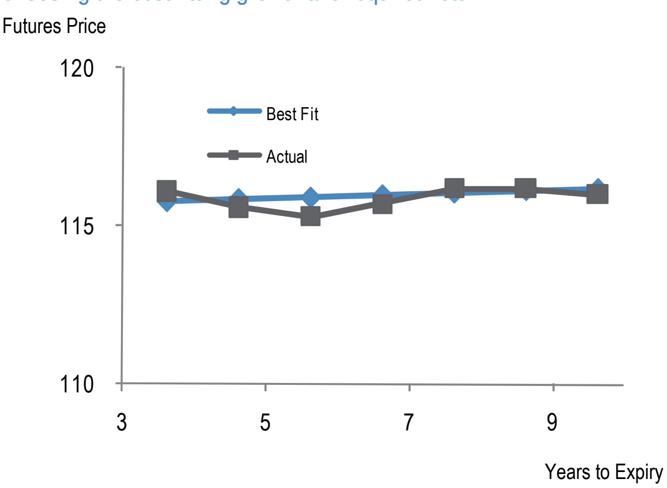
Figure 13: ...whereas parallel shifts are determined by the changes in required return




Source: J.P. Morgan Equity Derivatives Strategy

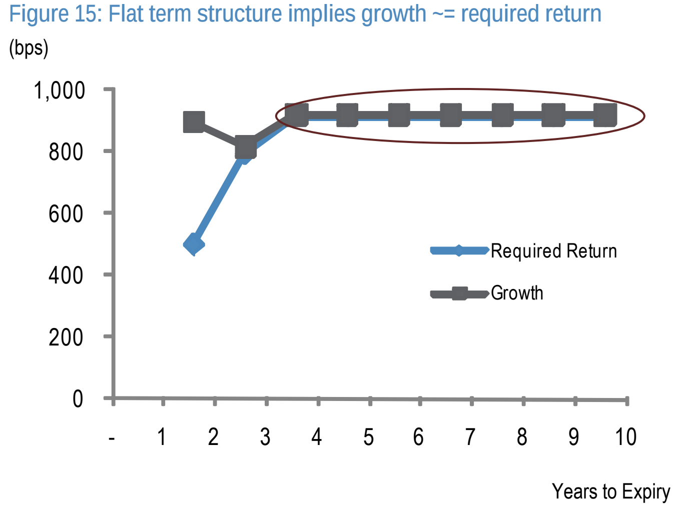
We back out the market implied required return and growth rate that best fit the current 2014s – 2020s term structure assuming that they are constant from 2014 onwards. As we can see, the current term structure is relatively flat, implying that the growth rate and the required return are approximately equal (Figure 14 and Figure 15).

Figure 14: A line can be fitted to the current term structure by choosing the best fitting growth and required return




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg, Data as of 29/04/11

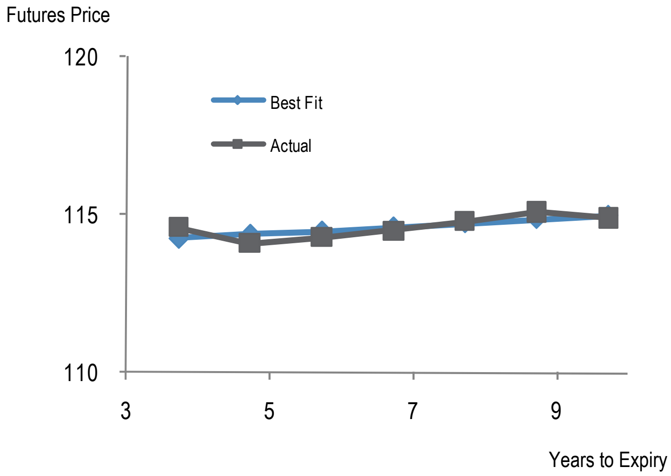
Figure 15: Flat term structure implies growth ~= required return




Source: J.P. Morgan Equity Derivatives Strategy, Data as of 29/04/11

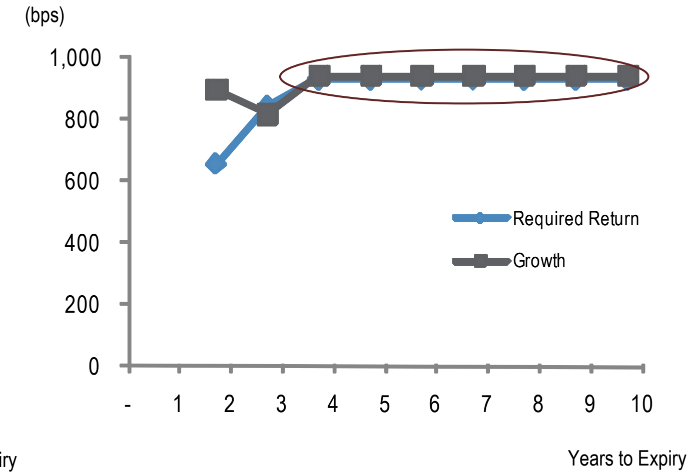
Compare the current shape to a month ago: the slope hasn't changed very much, but levels have improved (Figure 16 and Figure 17). This implies that the real growth rate remains very close to zero, but the required return has compressed since a month ago.

Figure 16: Term structure and best fit line observed on 29/03/2011




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

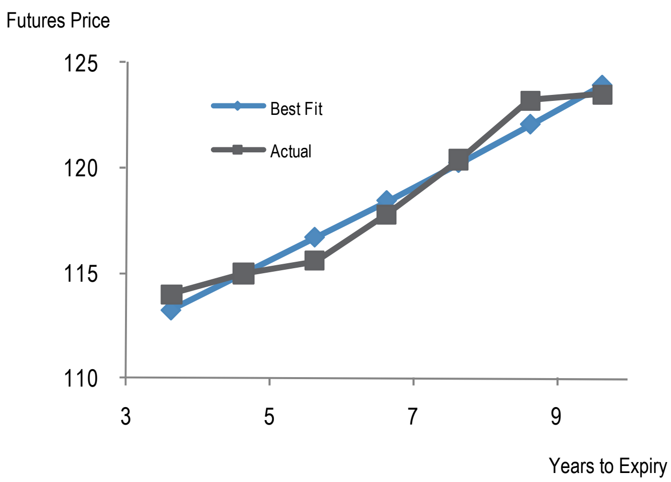
Figure 17: Growth ~= required return due to the flat term structure




Source: J.P. Morgan Equity Derivatives Strategy

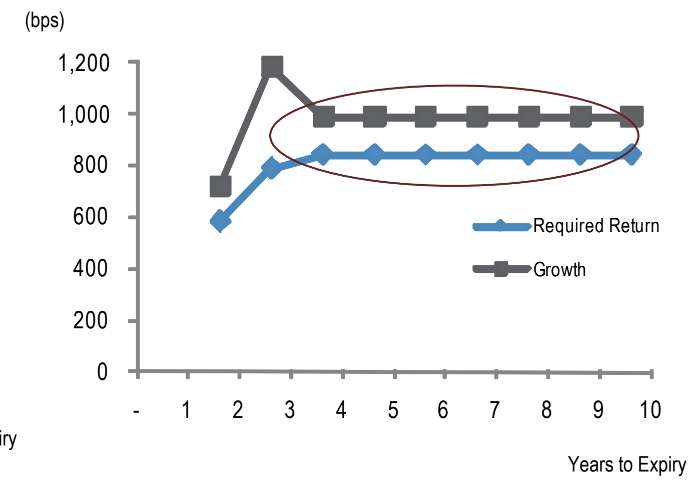
On the other hand, a year ago, when the term structure was much more upward sloping, the growth rate was much higher than the required return (Figure 18 and Figure 19).

Figure 18: Term structure and best fit line observed on 29/04/2010




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

Figure 19: Growth > required return when term structure upward sloping




Source: J.P. Morgan Equity Derivatives Strategy

As we see above, what determines the slope of the curve is the real growth rate. We can go back in history and implement the same fitting procedure for historical dividend futures time series (Figure 20). The back end term structure is not confined to a particular shape and assumed various shapes in the past. It was downward sloping prior to 2006, became upward sloping from 2007 to 2010 and has only recently flattened. The question remains, what is the market force driving the required return and growth?

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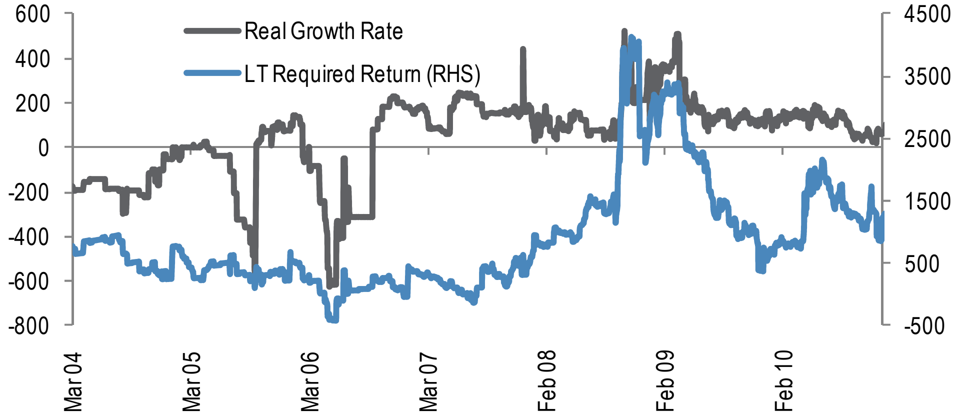
Figure 20: The real growth rate has shown significant volatility over the years




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

In the past we have constructed a simple model that links bonds, equity, and dividend term structure (see Dividend Swaps: A Product Note, page 41). Since short dated dividends are sticky and long dated dividend expectations vary much more closely with the earnings, we recreate the model below using a fixed percentage of earnings yield (inverse of P/E) instead of the current dividend yield.

Using the dividend discount model, and assuming the 50% of earnings are paid out as dividends (historical average), the value of a stock can be written as:

$$S = \frac{0.5E_0}{r + s - g}$$

where r is the risk free rate, s the required return, and g the long term growth rate. We can substitute the real growth rate term G = (g-s) and the equation above can be rearranged as:

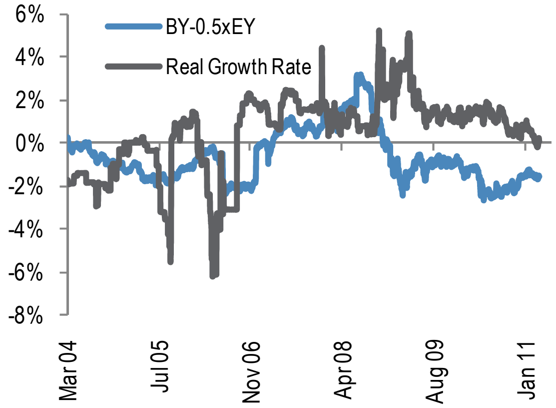
$$G = r - \frac{0.5E_0}{S}$$

Alternatively, G = BY – 0.5EY where BY is the risk free bond yield and EY the earnings yield. Empirically, G is the real growth rate we back out from the dividend term structure, and the right hand side of the equation is constructed by the difference between the German 10Y bond yield and 50% of the SX5E earnings yield. Figure 21 below the two time series. Figure 22 attempts to remove the noise by plotting the 200D moving average of the time series. Both time series appear to be generally moving in line with each other.

Clearly, the relationship between bonds, equity, and dividend term structure is based on a fairly simple model and therefore there is a large degree of noise at any one time. However, by looking at the time series we can still check the consistency between the asset classes.

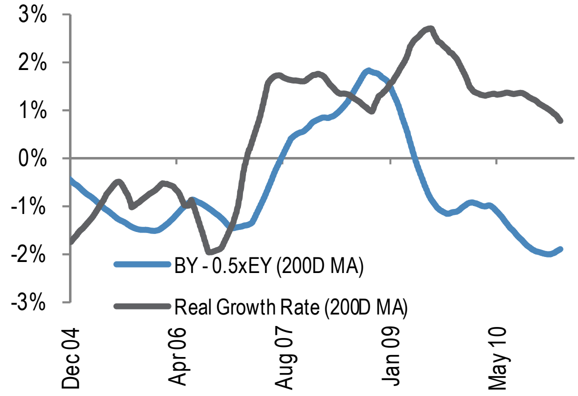
Along the lines of the Fed Model, we can roughly characterize BY - 0.5xEY < 0 as equity being undervalued and vice versa, allowing us to draw interesting conclusions from the time series. Prior to mid 2006, the long dated term structure was downward sloping, implying a low real growth rate and corresponding to a period of undervalued equities. Between mid 2006 to mid 2008, a period of overvalued equities resulted in an upward sloping term structure (high real growth rate).

Figure 21: The trend is identifiable despite the noise




Source: J.P. Morgan Equity Derivatives Strategy, J.P. Morgan Equity Strategy, Bloomberg

Figure 22: Moving averages display a clearer trend




Source: J.P. Morgan Equity Derivatives Strategy, J.P. Morgan Equity Strategy, Bloomberg

Since mid 2008, however, the two time series have diverged. Whereas the bond-earnings yield spread fell dramatically, the real growth rate of dividend futures has not done so to the same degree. This divergence implies at least one of the following:

1) Implied real dividend growth is too high, and the term structure should be more downward sloping

2) Earnings yields are too high (P/E multiples too low – i.e. equities are cheap)

3) Long term bond yields are too low

While the current situation is probably a combination of the three factors, we can conclude that the **term structure of long dated dividend futures is likely to stay flat or become downward sloping, judging by the historical relationship examined above. In the near term it is unlikely to return to an upward sloping shape which we witnessed in the past few years, absent a strong rally in bond yields or equities.**

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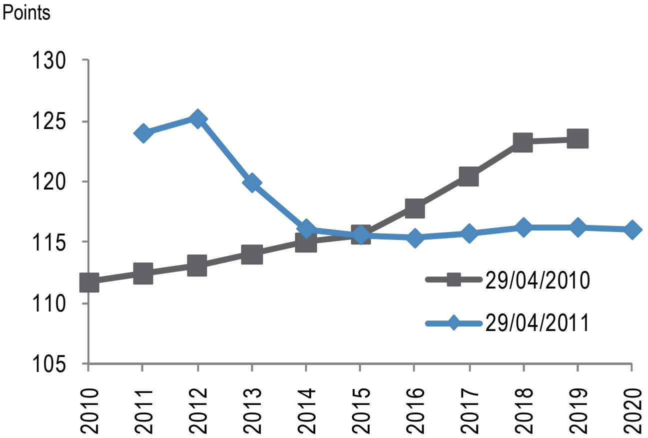
## Dividends curve plays: what makes sense and what does not

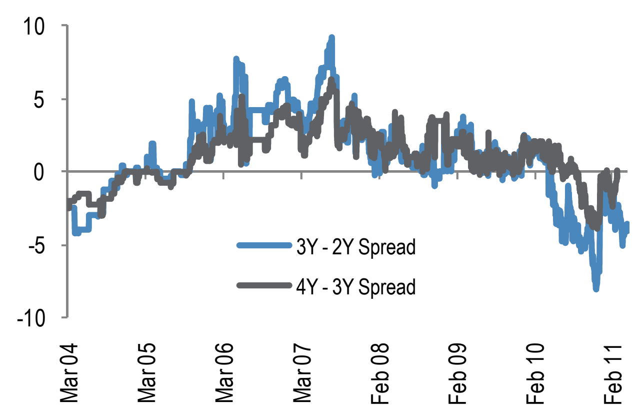
Even though the entire curve of dividend futures tends to move in parallel, the slope may also vary across the curve. Figure 23 shows the recent term structure compared to one year ago. One can see that the shifts in the shape and slope of the term structure can be significant. As Figure 24 shows, the dividend spreads exhibit volatile behaviour. Curve trades, in which an investor buys one point of the dividend curve and simultaneously sells another, can be an attractive way for investors to generate profit without taking strong directional views.

Figure 23: Dividend futures term structure changed significantly now vs. 1Y ago




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

Figure 24: Historical steepness of the forward 2Y-4Y sector




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

Below we highlight the drivers and characteristics of the curve trades. Specifically we make a distinction between trading the front end and the back end of the curve, given their different dynamics as discussed in the previous section.

## Steepeners on the Front End (Forward 1Y –3Y)

Given that the future dividend payouts on the front end are relatively visible, trading in this sector is mainly a trade on the the relative changes in the required return. For example, currently the 2012 futures are implying a required return of 582 bps, whereas the 2013s are implying 773 bps. Investors who believe that the difference will compress should be long the 13s and short the 12s, a strategy known as a steepener. Steepening generally means the term structure becoming more upward sloping, whereas flattening means the term structure becoming more downward sloping.

We describe the common scenarios under which the slope changes, and show examples of the P&L of the steepener strategy under various scenarios.

**Bull steepening**: in a bullish environment, the slope may steepen (longer dated required return decreases faster than shorter dated) because investors demand a lower return for the additional risk of holding a longer maturity instrument.

**Bear steepening**: in a bearish environment, the slope may steepen (shorter dated required return increases faster than longer dated) because investors perceive higher risks in the near term, but see longer term possibility of recovery.

**Bull flattening**: in a bullish environment, the slope may flatten (shorter dated required return decreases faster than longer dated) because the front year gets pulled to realised and the risk decreases much more quickly than the back year.

**Bear flattening**: in a bearish environment, the slope may flatten (longer dated required return increases faster than shorter dated) because investors begin to value the near term certainty much more and demand a higher return for the increased uncertainty of longer holding periods on the back end.

**Scenario 1: required return differential compresses**

Table 1:13s required return down by 100 bps, 12s unchanged (bull steepening)

| | 2012 s | 2013s | |
|---|---|---|---|
| Expiry | Dec-12 | Dec-13 | |
| Years to Maturity | 1.63 | 2.63 | |
| IBES | 135.4 | 147.0 | |
| Required Returns (bps) | 482 | 673 (↓) | |
| Price After | 125.2 | 123.1 | |
| Price Before (29/04/11) | 125.2 | 119.9 | Total |
| PNL | 0.0 | 3.2 | 3.2 |

Source: J.P. Morgan Equity Derivatives Strategy

Table 2:12s required return up by 100 bps, 13s unchanged (bear steepening)

| | 2012s | 2013s | |
|---|---|---|---|
| Expiry | Dec-12 | Dec-13 | |
| Years to Maturity | 1.63 | 2.63 | |
| IBES | 135.4 | 147.0 | |
| Required Returns (bps) | 582 (↑) | 773 | |
| Price After | 123.2 | 119.9 | |
| Price Before (29/04/11) | 125.2 | 119.9 | Total |
| PNL | 2.0 | 0.0 | 2.0 |

Source: J.P. Morgan Equity Derivatives Strategy

Now we look at the scenarios where the required return differential remains unchanged and compare the P/L.

**Scenario 2: required return shifts in parallel, steepness unchanged**

Table 3:12s and 13s required returns both down by 100 bps

| | 2012s | 2013s | |
|---|---|---|---|
| Expiry | Dec-12 | Dec-13 | |
| Years to Expiry | 1.63 | 2.63 | |
| IBES | 135.4 | 147.0 | |
| Required Returns (bps) | 382 (↓) | 673 (↓) | |
| Price After | 127.3 | 123.1 | |
| Price Before (29/04/11) | 125.2 | 119.9 | Total |
| PNL | -2.1 | 3.2 | 1.2 |

Source: J.P. Morgan Equity Derivatives Strategy

Table 4:12s and 13s required returns both up by 100 bps

| | 2012s | 2013s | |
|---|---|---|---|
| Expiry | Dec-12 | Dec-13 | |
| Years to Expiry | 1.63 | 2.63 | |
| IBES | 135.4 | 147.0 | |
| Required Returns (bps) | 582 (↑) | 873 (↑) | |
| Price After | 123.2 | 116.8 | |
| Price Before (29/04/11) | 125.2 | 119.9 | Total |
| PNL | 2.0 | -3.1 | -1.1 |

Source: J.P. Morgan Equity Derivatives Strategy

From the above scenarios we can observe that a 1-to-1 steepener is also net long delta. Therefore, the profit is maximised when the level of required return compresses in absolute terms as well as in relative terms (bull steepening). One can infer that the opposite strategy, a flattener, maximises profit when the level of required return widens in both absolute and relative terms (bear flattening).

## Steepeners on the Back End (F4Y+)

Further out the div futures curve, it is much harder to differentiate the relative risk premia from one year to the next. Therefore, assuming a constant discount and growth rate in this part of the curve, what determines the steepness of the price curve is the real growth rate. Figure 25 shows that the long term growth rate can generally be captured by steepeners on the back end.

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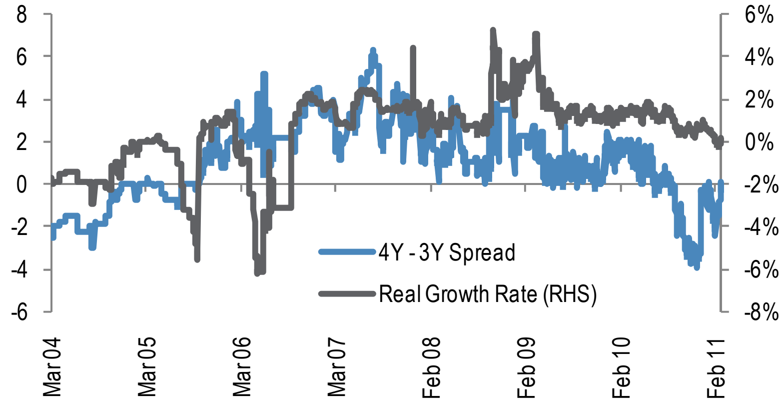
Figure 25: 4Y – 3Y spread vs. real growth rate




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The real growth rate is influenced by a combination of factors. Through the relationship between real growth rate and bond yield / equity yield we proposed in the previous section (shown again below), we can try to assess the probable changes in the real growth rate.

$$G = r - \frac{0.5E_0}{S}$$

Currently the forward P/E multiple of the SX5E is around 10x. Assuming market participants start to price in a higher growth and the SX5E multiple rerates to 11x, the real growth rate would increase by 45 bps, holding everything else constant. A steepener on the long end would therefore produce a profit. However, note that the relationship can have long and variable leads/lags (see Figure 22). Moreover, whereas a rerating to 11x from 10x P/E multiple means an equity return of 10%, that translates into a relatively small profit in dividend steepener (see Table 5 - Table 7). Having said that, an investor who wants to express a strong view on the long term growth rate should maximise the expiry mismatch. That is, selling the 13s or14s and buying the 19s or 20s, since such a steepener position is the most sensitive to changes in the growth rate.

Table 5: Base case pricing of 13s/20s steepener (as of 29/04/11)

| Implied Growth Rate: 918 bps | 2013s | 2020s |
|---|---|---|
| Expiry | Dec-13 | Dec-20 |
| Years to Expiry | 2.6 | 9.6 |
| IBES | 147.0 | 279.7 |
| Required return (bps) | 773 | 912 |
| Price | 119.9 | 116.0 |

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

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Table 6: Long term growth rate up by 45 bps

| Growth 963 bps | 2013s | 2020s | |
|---|---|---|---|
| Expiry | Dec-13 | Dec-20 | |
| Years to Expiry | 2.6 | 9.6 | |
| IBES | 147.0 | 288.7 (↑) | |
| Required Returns (bps) | 773 | 912 | |
| Price After | 119.9 | 120.4 | |
| Price | 119.9 | 116.0 | Total |
| PNL | 0.0 | 4.4 | 4.4 |

Source: J.P. Morgan Equity Derivatives Strategy

Table 7:Long term growth rate down by 45 bps

| Growth 873 bps | 2013s | 2020s | |
|---|---|---|---|
| Ex▯iry | Dec-13 | Dec-20 | |
| Years to Expiry | 2.6 | 9.6 | |
| IBES | 147.0 | 271 (↓) | |
| Required Returns (bps) | 773 | 912 | |
| Price After | 119.9 | 113.0 | |
| Price | 119.9 | 116.0 | Total |
| P▯L | 0.0 | -3.0 | -3.0 |

Source: J.P. Morgan Equity Derivatives Strategy

## Appendix: the weekly Euro STOXX 50 dividend monitor

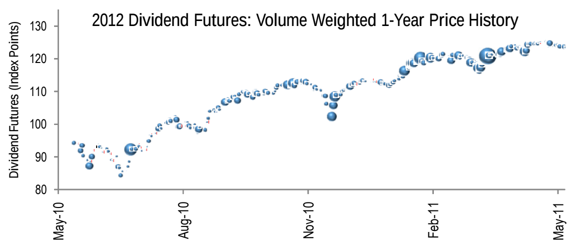
Investors can use our weekly Euro Stoxx 50 dividend monitor to gain an up-to-date overview of the Euro Stoxx 50 dividend futures market. Below we provide a brief explanation of the information contained in the product.

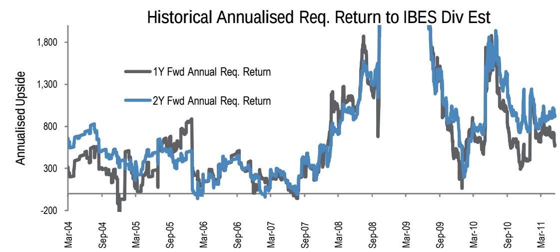
J.P.Morgan

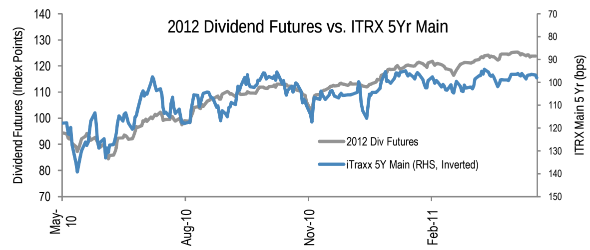
**Euro Stoxx 50 Dividend Weekly**

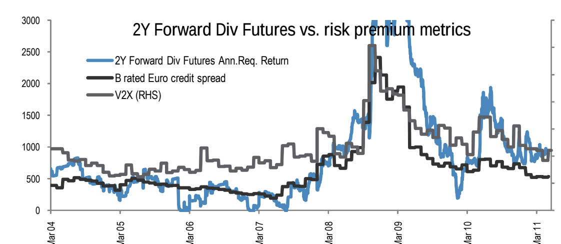
May 18, 2011

| | | | |
|---|---|---|---|
| European Equity Derivatives & Delta One Strategy | **Peng Cheng** | +44 (0)207 325 6935 | peng.cheng@jpmorgan.com |
| Data as of 17/05/2011 | **Davide Silvestrini** | +44 (0)207 777 1018 | davide.silvestrini@jpmorgan.com |
| Sources: JP Morgan Equity Derivatives Strategy, Bloomberg | **Bram Kaplan** | +44 (0)207 325 8183 | bram.kaplan@jpmorgan.com |

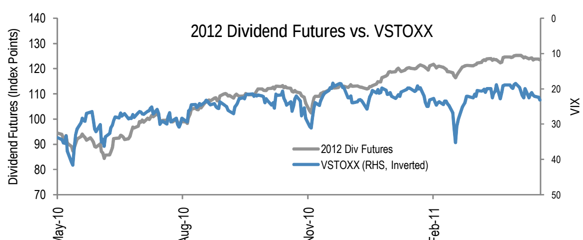


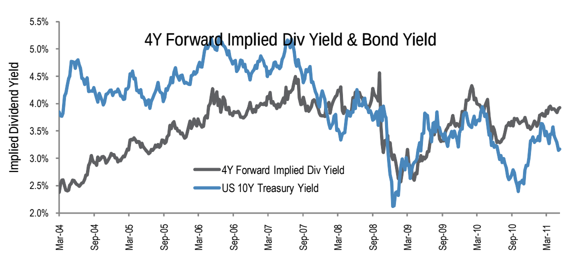




| JPM Euro HY Index Statistics | BB | B | Div '12 | Div '13 |
|---|---|---|---|---|
| Avg Maturity (Yrs) | 5.0 | 5.5 | 1.6 | 2.6 |
| Annual Req Return / Spread (bps) | 321 | 533 | 665 | 899 |




| Steepness Pts (1Y) | Div Futures 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|
| 2011 | | 0.8 | 6.6 | 10.5 | 11.1 | 11.0 |
| 2012 | | | 5.8 | 9.7 | 10.3 | 10.2 |
| 2013 | | | | 3.9 | 4.5 | 4.4 |
| 2014 | | | | | 0.6 | 0.5 |
| 2015 | | | | | | -0.1 |
| 2016 | | | | | | |




| Steepness %ile (1Y) | Div Futures 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|
| 2011 | | 16% | 27% | 53% | 61% | 67% |
| 2012 | | | 85% | 90% | 91% | 93% |
| 2013 | | | | 93% | 93% | 90% |
| 2014 | | | | | 83% | 81% |
| 2015 | | | | | | 73% |
| 2016 | | | | | | |

Source: J.P. Morgan Equity Derivatives Strategy

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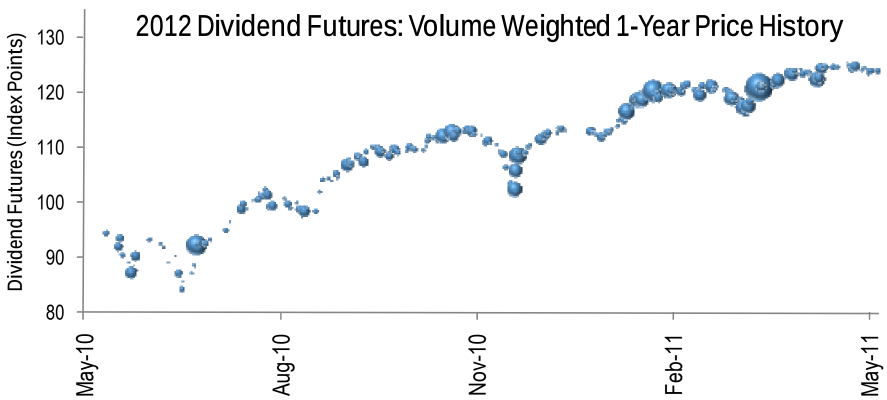
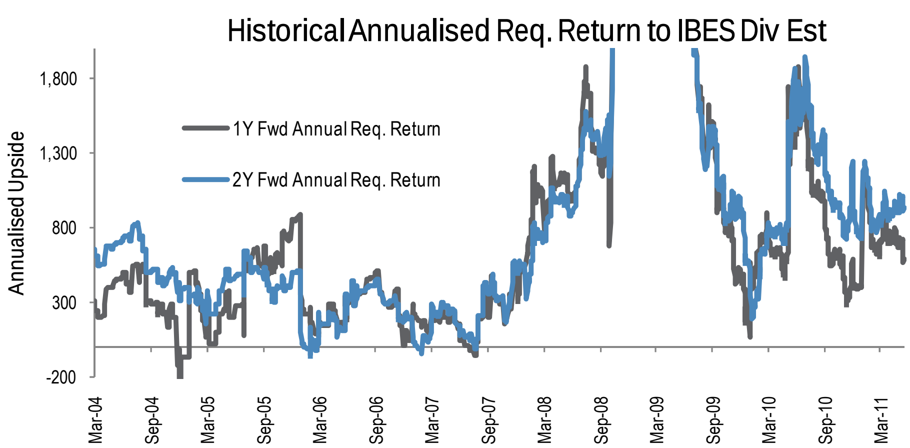
Figure 26: 2012 Dividend futures: volume weighted 1-Yeaer Price History




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The size of the bubble represents the traded volume of the 2012 dividend futures (Bloomberg Ticker: DEDZ2 Index). The user can identify whether any price movement is supported by healthy volume.

Figure 27: Historical annualised required return to IBES dividend estimates




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg, IBES

The time series of annual required return to IBES estimates give the user an overview of the short dated dividend futures (2012s and 13s) in a historical context. The figure helps the user determine whether the current entry point is attractive compared to history.

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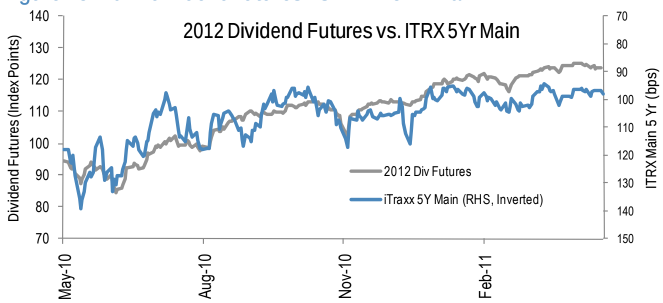
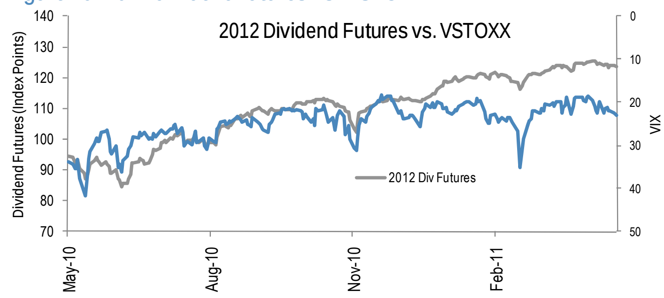
Figure 28: 2012 dividend futures vs. ITRX 5 Yr Main




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

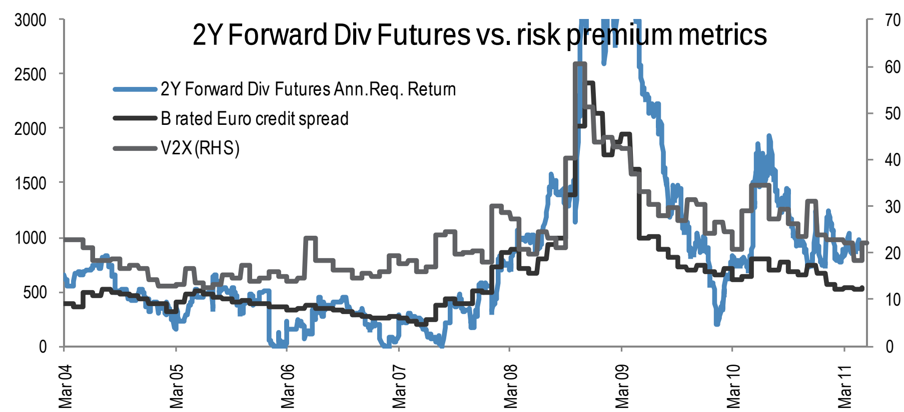
Figure 29: 2012 dividend futures vs. VSTOXX




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The figures above show the current pricing of short dated dividend futures (2012s) compared to risk aversion metrics (ITRX Main and VSTOXX). A decoupling of the prices and risk metrics may indicate an attractive entry point into dividend futures.

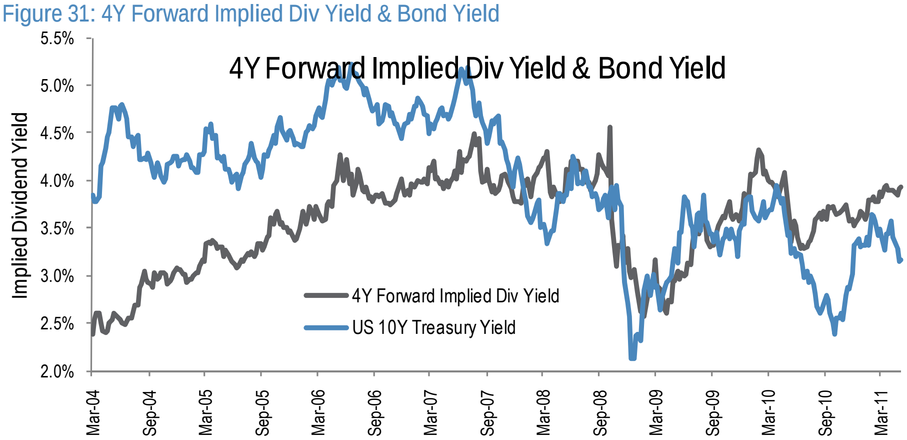
Figure 30: 2Y Forward Div Futures vs. risk premium metrics




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The figure above compares the required return to bond yield and VSTOXX, a more direct comparison than Figure 28 and Figure 29.

Figure 31: 4Y Forward Implied Div Yield & Bond Yield




Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

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According to the model we proposed in this report, dividend yield and bond yield should trade inline with each other over the long run. By examining the implied dividend yield (2015 dividend futures / SX5E spot) the investor can determine whether longer dated dividends are over or under valued compared to equities.

Table 8: Dividend futures steepness in points

| Steepness Pts (1Y) | Div Futures | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 2011 | | 0.8 | 6.6 | 10.5 | 11.1 | 11.0 |
| 2012 | | | 5.8 | 9.7 | 10.3 | 10.2 |
| 2013 | | | | 3.9 | 4.5 | 4.4 |
| 2014 | | | | | 0.6 | 0.5 |
| 2015 | | | | | | -0.1 |
| 2016 | | | | | | |

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

Table 9: Dividend futures steepness (1Y percentile)

| Steepness %ile (1Y) | Div Futures | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 2011 | | 16% | 27% | 53% | 61% | 67% |
| 2012 | | | 85% | 90% | 91% | 93% |
| 2013 | | | | 93% | 93% | 90% |
| 2014 | | | | | 83% | 81% |
| 2015 | | | | | | 73% |
| 2016 | | | | | | |

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg

The steepness is calculated as the front year price – back year price. Therefore a high value of steepness in points and percentile indicate a potentially attractive timing for putting on a steepener.

## Risks of common option strategies

**Risks to Strategies**:
Not all option strategies are suitable for investors; certain strategies may expose investors to significant potential losses. We have summarized the risks of selected derivative strategies. For additional risk information, please call your sales representative for a copy of "Characteristics and Risks of Standardized Options". We advise investors to consult their tax advisors and legal counsel about the tax implications of these strategies. Please also refer to option risk disclosure documents

**Put Sale.** Investors who sell put options will own the underlying stock if the stock price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the stock price below the strike potentially to zero, and they will not participate in any stock appreciation if the option expires unexercised.

**Call Sale.** Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

**Call Overwrite or Buywrite**. Investors who sell call options against a long position in the underlying stock give up any appreciation in the stock price above the strike price of the call option, and they remain exposed to the downside of the underlying stock in the return for the receipt of the option premium.

**Booster**. In a sell-off, the maximum realised downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long stock position, upside losses are capped (as for a covered call), but downside losses are not.

**Collar.** Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any stock appreciation above the strike price of the call option.

**Call Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is below the strike price of the call option.

**Put Purchase.** Options are a decaying asset, and investors risk losing 100% of the premium paid if the stock is above the strike price of the put option.

**Straddle or Strangle**. The seller of a straddle or strangle is exposed to stock increases above the call strike and stock price declines below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the stock would have limited losses should the stock rally. Covered writers are exposed to declines in the long stock position as well as any additional shares put to them should the stock decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the stock above the strike price of the call option.

**Put Spread**. The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying stock will have downside protection between the higher strike put and the lower strike put. However, should the stock price fall below the strike price of the lower strike put, investors regain exposure to the underlying stock, and this exposure is multiplied by the number of puts sold.

**Call Spread**. The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the stock and gives up the spread between the two call strikes should the stock rally.

**Butterfly Spread.** A butterfly spread consists of two spreads established simultaneously. One a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price, the maximum loss is the net debit.

**Pricing Is Illustrative Only:** Prices quoted in the above trade ideas are our estimate of current market levels, and are not indicative trading levels.

## Disclosures

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**J.P. Morgan Equity Research Ratings Distribution, as of March 31, 2011**

| | **Overweight** (buy) | **Neutral** (hold) | **Underweight** (sell) |
|---|---|---|---|
| J.P. Morgan Global Equity Research Coverage | 47% | 42% | 11% |
| IB clients* | 50% | 45% | 33% |
| JPMS Equity Research Coverage | 43% | 49% | 8% |
| IB clients* | 70% | 62% | 56% |

*Percentage of investment banking clients in each rating category.
For purposes only of FINRA/NYSE ratings distribution rules, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category.

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Sample screen for the strategy

November 27, 2013

# Global Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

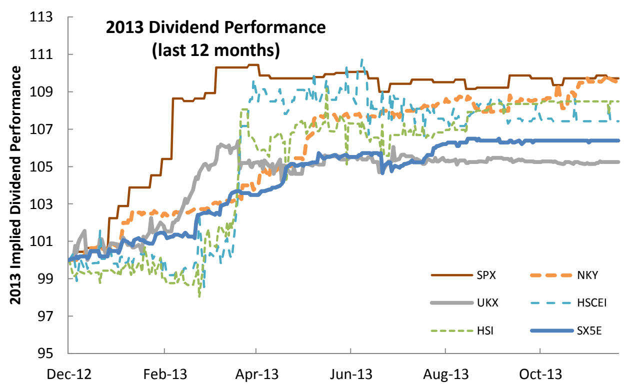
This report contains an overview of the global index dividend market. We include listed dividend futures in Europe (Euro STOXX 50 and FTSE 100) and Asia Pacific (Nikkei 225, HSI and HSCEI), and OTC dividend swaps in the US (S&P 500). The first two pages give a global overview of dividend performance and bottom-up estimates, and the subsequent sections provide detailed analysis for the major dividend contracts in each region.

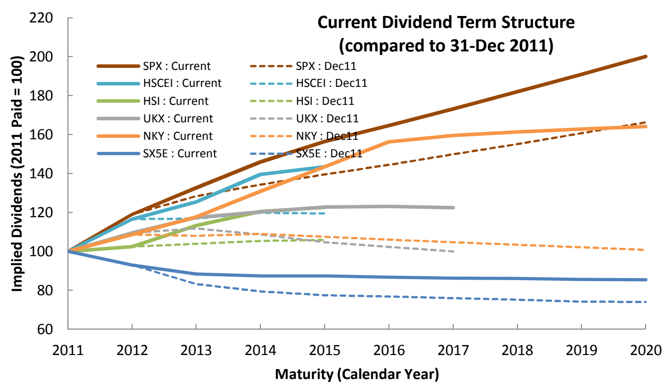
**Contents:**

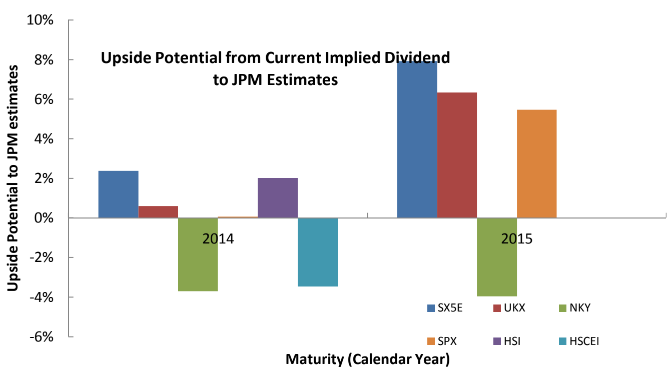


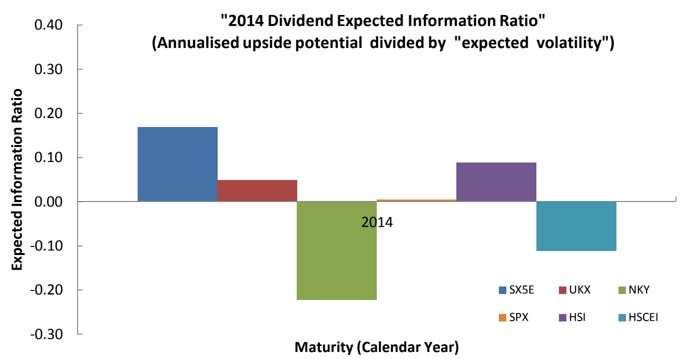
**Upside Potential from Current Implied Dividend to JPM Estimates**

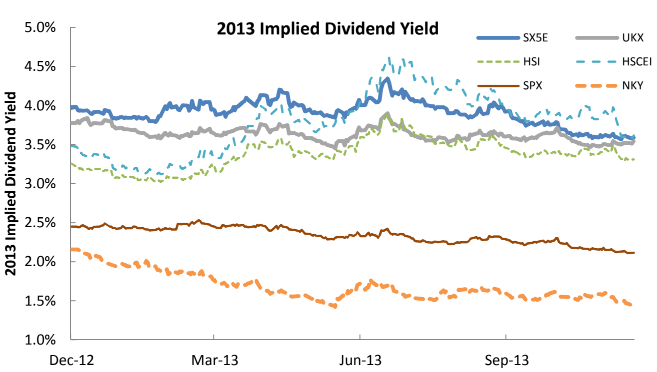
| 2014 Dividend | | | 2015 Dividend | | |
|---|---|---|---|---|---|
| Index | Current | Upside | Index | Current | Upside |
| SX5E | 108.6 | 2.4% | SX5E | 108.7 | 7.9% |
| HSI | 833.9 | 2.0% | UKX | 246.3 | 6.3% |
| UKX | 241.4 | 0.6% | SPX | 41.0 | 5.5% |
| SPX | 38.3 | 0.1% | NKY | 274.5 | -4.0% |
| HSCEI | 454.5 | -3.5% | HSI | 848.0 | - |
| NKY | 250.3 | -3.7% | HSCEI | 467.2 | - |

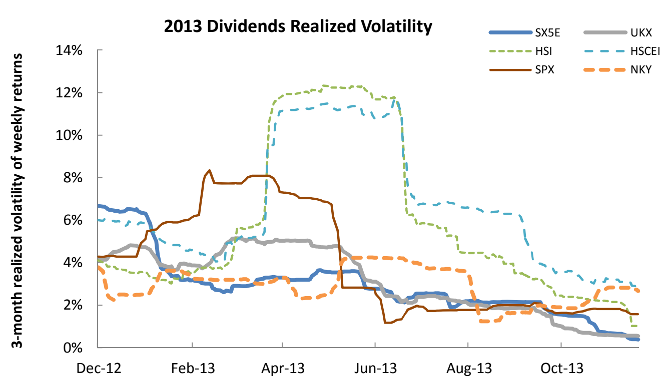


J.P.Morgan

November 27, 2013

# Global Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

**Marko Kolanovic**
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See Pages 13-14 for a full team list, contact details and legal affiliations

## Global Dividend Table

| Euro Stoxx 50 (Ticker: DEDZ-) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | SX5E | 2012 yield |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Current Level** | **115.6** | **109.9** | **108.6** | **108.7** | **107.9** | **107.3** | **107.0** | **106.5** | **106.2** | **106.3** | **3,063** | **3.8%** |
| YTD Return | | 6.2% | 10.0% | 13.0% | 13.0% | 13.5% | 14.6% | 15.4% | 15.4% | 15.5% | 16.2% | |
| Week-on-Week Return | | 0.0% | 0.1% | 0.2% | 0.2% | 0.3% | 0.0% | 0.0% | -0.2% | 0.1% | 0.4% | |
| Bottom up JPM / Consensus Estimates | | | **111.2** | **117.3** | **125.4** | | | | | | | |
| Upside / Downside Potential | | | **2.4%** | **7.9%** | **16.2%** | | | | | | | |
| YTD Avg. Daily Value Traded ($m) | | 21.9 | 56.4 | 45.9 | 30.0 | 19.0 | 18.7 | 7.1 | 2.2 | 0.7 | | |
| Current Open Interest ($m) | | 2,801 | 2,897 | 1,815 | 865 | 716 | 835 | 662 | 266 | 120 | | |
| YTD Beta to Index (5-day returns) | | 0.00 | 0.21 | 0.38 | 0.52 | 0.62 | 0.69 | 0.74 | 0.78 | 0.82 | | |
| YTD Realized volatility (5-day returns) | | 2.3% | 7.0% | 8.9% | 10.5% | 12.2% | 13.7% | 14.7% | 15.7% | 15.6% | | |
| YTD Information Ratio | | 3.0 | 1.6 | 1.6 | 1.4 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | | |
| **"Expected Information Ratio"** | | **0.0** | **0.2** | **0.3** | | | | | | | | |
| **FTSE 100 (Ticker: UKDZ-)** | | | | | | | | | | | **UKX** | |
| **Current Level** | **219.7** | **235.2** | **241.4** | **246.3** | **247.0** | **245.6** | | | | | **6,636** | **3.3%** |
| YTD Return | | 5.0% | 10.7% | 17.3% | 20.5% | 22.6% | | | | | 12.5% | |
| Week-on-Week Return | | 0.0% | -0.2% | 0.1% | 0.0% | 0.7% | | | | | -0.9% | |
| Bottom up JPM / Consensus Estimates | | | **242.9** | **261.9** | **270.3** | | | | | | | |
| Upside / Downside Potential | | | **0.6%** | **6.3%** | **9.4%** | | | | | | | |
| YTD Avg. Daily Value Traded ($m) | | 0.85 | 0.76 | 0.69 | 0.42 | 0.01 | | | | | | |
| Current Open Interest ($m) | | 473 | 512 | 212 | 180 | 100 | | | | | | |
| YTD Beta to Index (5-day returns) | | 0.05 | 0.22 | 0.40 | 0.52 | 0.61 | | | | | | |
| YTD Realized volatility (5-day returns) | | 3.0% | 5.9% | 8.2% | 10.1% | 11.2% | | | | | | |
| YTD Information Ratio | | 1.9 | 2.0 | 2.3 | 2.2 | 2.2 | | | | | | |
| **"Expected Information Ratio"** | | **0.0** | **0.0** | **0.2** | | | | | | | | |
| **S&P 500 (OTC dividend swaps)** | | | | | | | | | | | **SPX** | |
| **Current Level** | **31.2** | **34.8** | **38.3** | **41.0** | **43.2** | **45.4** | **47.7** | **50.1** | **52.5** | **54.9** | **1,803** | **1.7%** |
| YTD Return | | 3.4% | 8.6% | 12.1% | 13.9% | 15.6% | 17.3% | 18.8% | 20.3% | 21.8% | 26.4% | |
| Week-on-Week Return | | 0.1% | 0.4% | 0.3% | 0.2% | 0.2% | 0.4% | 0.4% | 0.4% | 0.4% | 0.8% | |
| Bottom up JPM / Consensus Estimates | | **35.3** | **38.3** | **43.2** | | | | | | | | |
| Upside / Downside Potential | | **1.4%** | **0.1%** | **5.5%** | | | | | | | | |
| YTD Beta to Index (5-day returns) | | 0.03 | 0.04 | 0.07 | 0.08 | 0.06 | 0.04 | 0.04 | 0.04 | 0.01 | | |
| YTD Realized volatility (5-day returns) | | 4.1% | 4.7% | 5.8% | 6.9% | 7.4% | 8.0% | 8.1% | 8.4% | 8.7% | | |
| YTD Information Ratio | | 0.9 | 2.0 | 2.3 | 2.2 | 2.3 | 2.4 | 2.5 | 2.7 | 2.7 | | |
| **"Expected Information Ratio"** | | **0.2** | **0.0** | **0.2** | | | | | | | | |
| **Nikkei 225 (Tickers: MNDZ- and INTZ-)** | | | | | | | | | | | **NKY** | |
| **Current Level** | **208.0** | **225.3** | **250.3** | **274.5** | **299.0** | **305.3** | **308.8** | **311.5** | **314.3** | | **15,515** | **1.3%** |
| YTD Return | | 8.9% | 20.0% | 33.4% | 47.3% | 52.2% | 55.9% | 59.3% | 62.8% | | 49.3% | |
| Week-on-Week Return | | 0.0% | 0.3% | 0.6% | 1.0% | 1.2% | 1.4% | 1.4% | 1.5% | | 2.6% | |
| Bottom up JPM / Consensus Estimates | | **224.5** | **241.0** | **263.6** | | | | | | | | |
| Upside / Downside Potential | | **-0.3%** | **-3.7%** | **-4.0%** | | | | | | | | |
| YTD Avg. Daily Value Traded ($m) | | 2.36 | 4.15 | 3.31 | 2.87 | 1.19 | 0.46 | 0.37 | 0.49 | | | |
| Current Open Interest ($m) | | 557 | 510 | 197 | 206 | 103 | 106 | 62 | 73 | | | |
| YTD Beta to Index (5-day returns) | | 0.02 | 0.25 | 0.42 | 0.51 | 0.57 | 0.60 | 0.61 | 0.65 | | | |
| YTD Realized volatility (5-day returns) | | 3.1% | 8.2% | 14.0% | 16.7% | 18.3% | 19.2% | 20.0% | 20.6% | | | |
| YTD Information Ratio | | 3.2 | 2.7 | 2.6 | 3.1 | 3.1 | 3.2 | 3.3 | 3.4 | | | |
| **"Expected Information Ratio"** | | **-0.1** | **-0.2** | **-0.1** | | | | | | | | |
| **HSCEI (Ticker: DHCZ-)** | | | | | | | | | | | **HSCEI** | |
| **Current Level** | **379.6** | **408.5** | **454.5** | **467.2** | **460.3** | **461.9** | | | | | **11,302** | **3.4%** |
| YTD Return | | 7.4% | 16.5% | 20.2% | 18.4% | 18.8% | | | | | -1.2% | |
| Week-on-Week Return | | -0.8% | 2.1% | 1.3% | -0.7% | -1.0% | | | | | -0.6% | |
| Bottom up JPM / Consensus Estimates | | **411.8** | **438.8** | | | | | | | | | |
| Upside / Downside Potential | | **0.8%** | **-3.5%** | | | | | | | | | |
| YTD Avg. Daily Value Traded ($m) | | 0.5 | 0.8 | 0.5 | | | | | | | | |
| Current Open Interest ($m) | | 115 | 86.2 | 56 | | | | | | | | |
| YTD Beta to Index (5-day returns) | | 0.00 | 0.25 | 0.35 | 0.47 | | | | | | | |
| YTD Realized volatility (5-day returns) | | 7.1% | 10.7% | 12.0% | 13.0% | | | | | | | |
| YTD Information Ratio | | 1.1 | 1.7 | 1.8 | 1.6 | | | | | | | |
| **"Expected Information Ratio"** | | **0.1** | **-0.1** | | | | | | | | | |
| **HSI (Ticker: DHSZ-)** | | | | | | | | | | | **HSI** | |
| **Current Level** | **708.7** | **784.0** | **833.9** | **848.0** | **854.7** | **860.2** | | | | | **23,681** | **3.0%** |
| YTD Return | | 9.1% | 14.4% | 15.8% | 15.6% | 16.3% | | | | | 4.5% | |
| Week-on-Week Return | | 0.6% | 0.8% | 0.3% | -0.3% | -0.3% | | | | | 0.1% | |
| Bottom up JPM / Consensus Estimates | | **778.2** | **850.6** | | | | | | | | | |
| Upside / Downside Potential | | **-0.7%** | **2.0%** | | | | | | | | | |
| YTD Avg. Daily Value Traded ($m) | | 0.1 | 0.1 | 0.0 | | | | | | | | |
| Current Open Interest ($m) | | 24 | 23.4 | 0.3 | | | | | | | | |
| YTD Beta to Index (5-day returns) | | 0.03 | 0.17 | 0.33 | 0.45 | | | | | | | |
| YTD Realized volatility (5-day returns) | | 7.1% | 7.1% | 8.2% | 9.7% | | | | | | | |
| YTD Information Ratio | | 1.4 | 2.2 | 2.1 | 1.8 | | | | | | | |
| **"Expected Information Ratio"** | | **-0.1** | **0.1** | | | | | | | | | |

* **JPM/consensus bottom-up estimates are based on aggregated J.P. Morgan analyst dividend per share estimates, where available, or IBES/Bloomberg consensus estimates.**
* **Average daily notional value traded and current open interest** are shown only for listed dividend futures contracts, based on exchange data and shown in $m.
* Index "Daily Value Traded" and "Open Interest" reflect front-month index futures volume/open interest averages over the last month.
* We define **2012 implied dividend yield** as the 2012 implied dividend divided by the respective index level.
* **Year-to-date realized volatility and beta versus the respective index are calculated based on weekly returns. Year-to-date beta/ realized volatility levels are based on since 2012 data.**
* The Information ratio is calculated as the annualized year-to-date return divided by year-to-date realized volatility.
* The **"Expected Information Ratio"** is the annualized upside potential (to JPM bottom-up estimate) divided by the "expected volatility", described below.

***The "expected volatility" is calculated by assuming that realized volatility for the respective forward maturity dividend contracts will persist.*** *For example, we assume Euro Stoxx 2014 dividend futures will continue to deliver the same year-to-date realized volatility through year-end, then deliver realized volatility next year that is equal to the current 2013 dividend futures year-to-date realized volatility, and then deliver realized volatility the following year that is equal to the current 2012 dividend futures year-to-date realized volatility.*

# Euro Stoxx 50 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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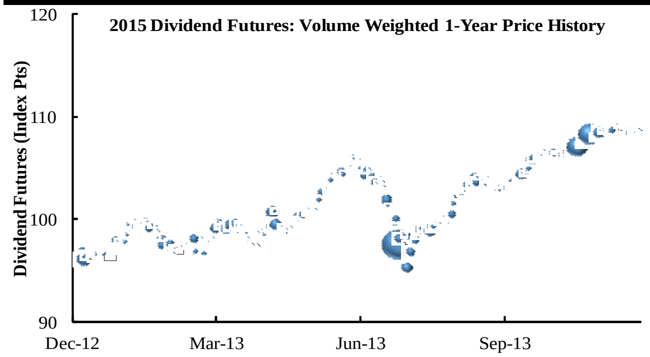
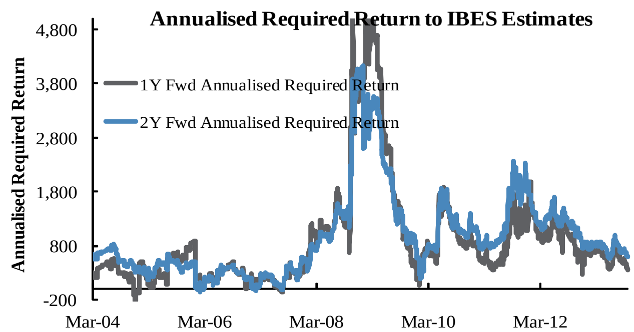
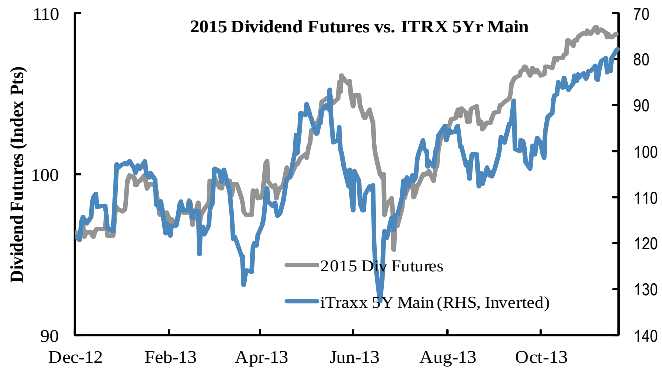
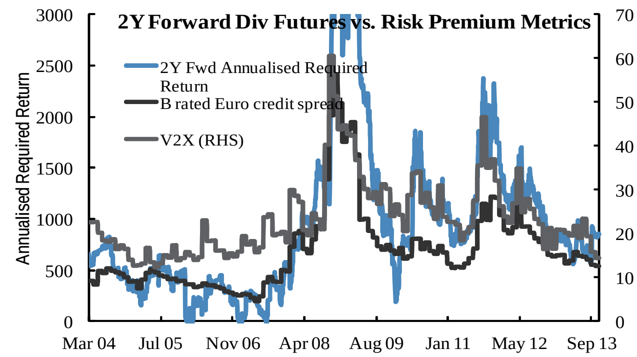
See Pages 13-14 for a full team list, contact details and legal affiliations

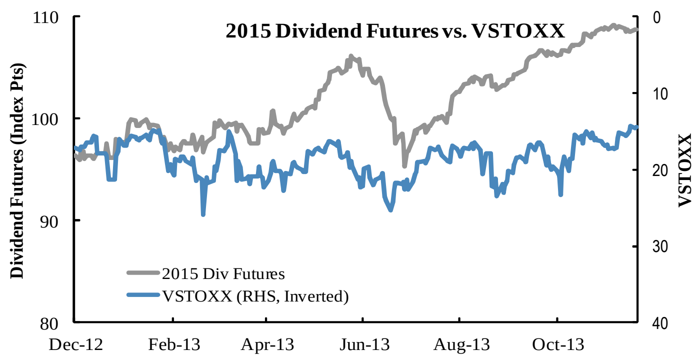
## Dividend Futures Risk Premium Analysis

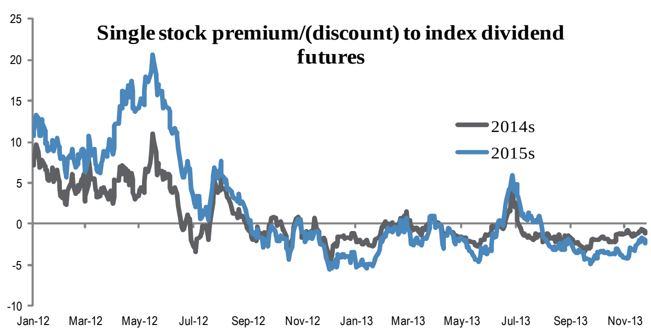



* Annualized require return: the ratio between the IBES estimates and the dividend futures prices, annualised by the number of years to expiry

**JPM Euro HY Index Statistics**

| | BB | B | Div '14 | Div '15 | Div '16 |
|---|---|---|---|---|---|
| Avg Maturity (Yrs) | 4.7 | 4.8 | 1.0 | 2.0 | 3.1 |
| Annual Req Return / Spread (bps) | 277 | 539 | 347 | 473 | 598 |

* J.P. Morgan Euro Credit B index and J.P. Morgan Euro Credit BB index

| Steepness Pts (over last 12M) | Div Futures | | | | | |
|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| 2013 | | 1.3 | 1.2 | 2.0 | 2.6 | 2.9 |
| 2014 | | | -0.1 | 0.7 | 1.3 | 1.6 |
| 2015 | | | | 0.8 | 1.4 | 1.7 |
| 2016 | | | | | 0.6 | 0.9 |
| 2017 | | | | | | 0.3 |
| 2018 | | | | | | |

| Steepness %ile (over last 12M) | Div Futures | | | | | |
|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| 2013 | | 16% | 5% | 5% | 4% | 4% |
| 2014 | | | 2% | 4% | 4% | 4% |
| 2015 | | | | 12% | 8% | 6% |
| 2016 | | | | | 5% | 2% |
| 2017 | | | | | | 4% |
| 2018 | | | | | | |

J.P.Morgan

November 27, 2013

# Euro Stoxx 50 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

**Peng Cheng**
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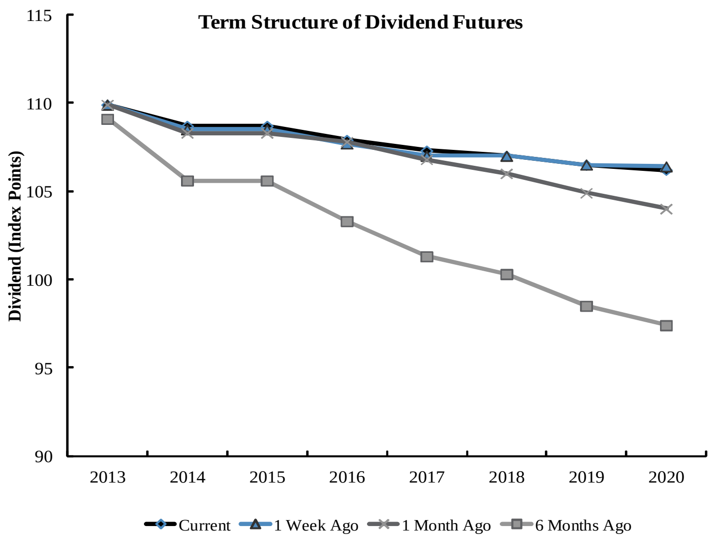
See Pages 13-14 for a full team list, contact details and legal affiliations

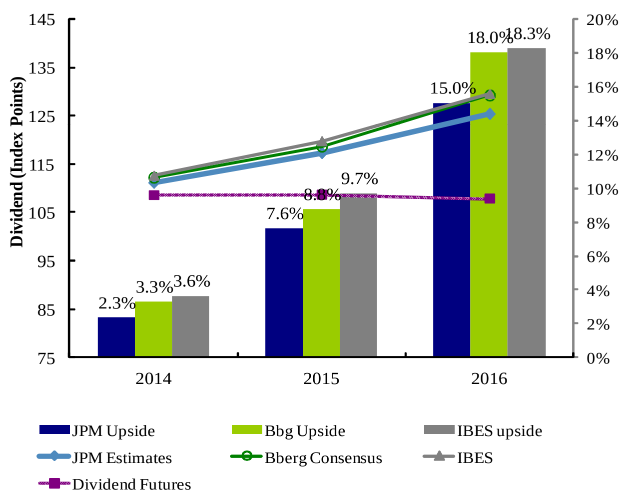
## Dividend Futures and Options Overview

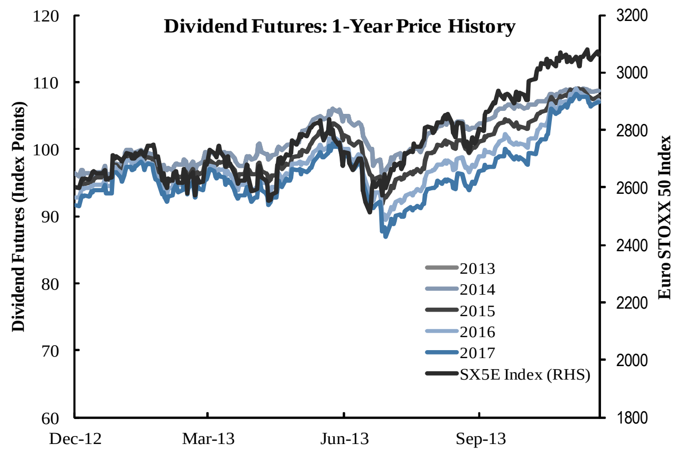
| Current | | Div Futures Historical Change | | | | | |
|---|---|---|---|---|---|---|---|
| | | Week-on-Week | | Month to Date | | Year to Date | |
| Year | Last | Points | % | Points | % | Points | % |
| 2013 | **109.9** | 0.0 | 0.0% | 0.0 | 0.0% | 6.4 | 6.2% |
| 2014 | **108.6** | 0.1 | 0.1% | -0.3 | -0.3% | 9.9 | 10.0% |
| 2015 | **108.7** | 0.2 | 0.2% | 0.2 | 0.2% | 12.5 | 13.0% |
| 2016 | **107.9** | 0.2 | 0.2% | -0.1 | -0.1% | 12.4 | 13.0% |
| 2017 | **107.3** | 0.3 | 0.3% | 0.1 | 0.1% | 12.8 | 13.5% |
| 2018 | **107.0** | 0.0 | 0.0% | 0.8 | 0.8% | 13.6 | 14.6% |
| SX5E | **3062.6** | 13.4 | 0.4% | -5.3 | -0.2% | 426.7 | 16.2% |




**Div Futures Options**

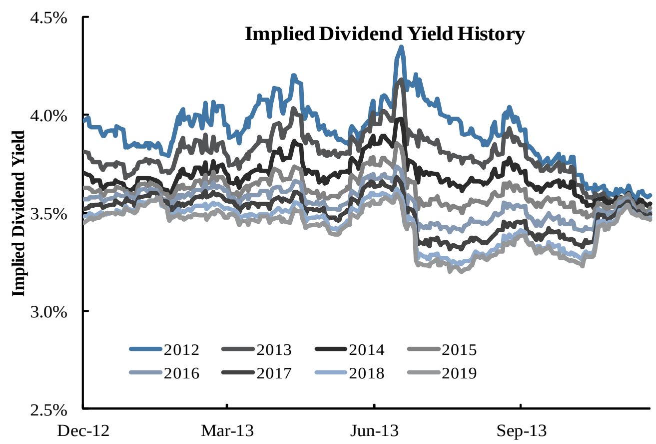
| Year | Type | Strike | Bid | Bid % | Ask | Ask % | Ref |
|---|---|---|---|---|---|---|---|
| 2014 | **Call** | 115 | 1.4 | 1.3% | 2.2 | 2.0% | 108.4 |
| 2014 | **Call** | 110 | 4.3 | 4.0% | 5.1 | 4.7% | |
| 2014 | **Put** | 105 | 0.7 | 0.6% | 1.5 | 1.4% | |
| 2014 | **Put** | 100 | 0.0 | 0.0% | 0.7 | 0.7% | |
| 2015 | **Call** | 110 | 1.2 | 1.1% | 2.0 | 1.8% | 107.2 |
| 2015 | **Call** | 105 | 4.4 | 4.1% | 5.2 | 4.8% | |
| 2015 | **Put** | 105 | 1.0 | 0.9% | 1.8 | 1.7% | |
| 2015 | **Put** | 100 | 0.1 | 0.1% | 0.9 | 0.9% | |




**Implied Dividends vs. Estimates and Potential Upside**

| Source | 2014 | Potential Upside | 2015 | Potential Upside | 2016 | Potential Upside |
|---|---|---|---|---|---|---|
| JPM Estimates | 111.2 | 2.3% | 117.3 | 7.6% | 125.4 | 15.0% |
| Bberg Consensus | 112.2 | 3.3% | 118.7 | 8.8% | 129.2 | 18.0% |
| IBES | 112.6 | 3.6% | 119.8 | 9.7% | 129.5 | 18.3% |
| Dividend Futures | 108.6 | | 108.7 | | 107.9 | |



# Euro Stoxx 50 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## Dividend Estimates and Projections

**2014 Dividend Estimates**

| | JPM Estimates* | | | Bberg Consensus | | | IBES | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Consumer Discretionary | 7.9 | 7.1% | 2.8% | 7.9 | 7.1% | 2.8% | 7.9 | 7.0% | 2.8% |
| Consumer Staples | 8.7 | 7.8% | 3.0% | 8.6 | 7.7% | 2.9% | 8.2 | 7.3% | 2.8% |
| Energy | 14.9 | 13.4% | 5.6% | 14.7 | 13.1% | 5.6% | 14.9 | 13.2% | 5.6% |
| Financials | 31.1 | 27.9% | 3.8% | 31.1 | 27.7% | 3.8% | 31.5 | 27.9% | 3.9% |
| Health Care | 8.1 | 7.3% | 2.6% | 8.6 | 7.6% | 2.8% | 8.6 | 7.6% | 2.8% |
| Industrials | 11.4 | 10.3% | 3.0% | 11.5 | 10.2% | 3.0% | 11.5 | 10.2% | 3.0% |
| Information Technology | 1.7 | 1.5% | 1.2% | 1.8 | 1.6% | 1.3% | 1.8 | 1.6% | 1.3% |
| Materials | 6.1 | 5.5% | 3.2% | 6.0 | 5.4% | 3.2% | 6.1 | 5.4% | 3.2% |
| Telecommunication Services | 11.6 | 10.4% | 5.7% | 11.7 | 10.5% | 5.7% | 12.0 | 10.6% | 5.9% |
| Utilities | 9.7 | 8.7% | 5.3% | 10.3 | 9.2% | 5.6% | 10.2 | 9.1% | 5.6% |
| **Total** | **111.2** | **100%** | **3.6%** | **112.2** | **100%** | **3.7%** | **112.6** | **100%** | **3.7%** |

* Bloomberg estimates are used where JPM estimates are unavailable

**2015 Dividend Estimates**

| | JPM Estimates* | | | Bberg Consensus | | | IBES | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Consumer Discretionary | 8.5 | 7.3% | 3.0% | 8.7 | 7.4% | 3.0% | 8.6 | 7.1% | 3.0% |
| Consumer Staples | 9.6 | 8.2% | 3.3% | 9.5 | 8.0% | 3.3% | 8.8 | 7.3% | 3.0% |
| Energy | 15.4 | 13.1% | 5.8% | 15.0 | 12.7% | 5.7% | 15.2 | 12.7% | 5.8% |
| Financials | 34.0 | 29.0% | 4.2% | 33.6 | 28.3% | 4.1% | 35.2 | 29.4% | 4.3% |
| Health Care | 8.7 | 7.4% | 2.8% | 9.4 | 7.9% | 3.0% | 9.3 | 7.8% | 3.0% |
| Industrials | 12.3 | 10.5% | 3.2% | 12.6 | 10.6% | 3.3% | 12.6 | 10.5% | 3.3% |
| Information Technology | 1.9 | 1.6% | 1.4% | 2.0 | 1.7% | 1.5% | 2.0 | 1.7% | 1.5% |
| Materials | 6.3 | 5.4% | 3.3% | 6.4 | 5.4% | 3.4% | 6.3 | 5.3% | 3.3% |
| Telecommunication Services | 11.0 | 9.3% | 5.4% | 11.4 | 9.6% | 5.6% | 11.8 | 9.9% | 5.8% |
| Utilities | 9.6 | 8.2% | 5.3% | 10.0 | 8.4% | 5.5% | 9.9 | 8.2% | 5.4% |
| **Total** | **117.3** | **100%** | **3.8%** | **118.7** | **100%** | **3.9%** | **119.8** | **100%** | **3.9%** |

* Bloomberg estimates are used where JPM estimates are unavailable

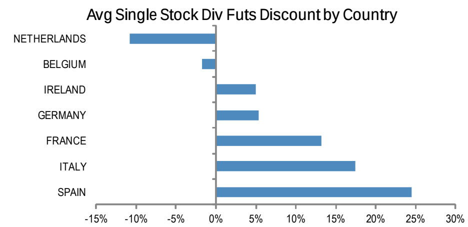
**2016 Dividend Estimates**

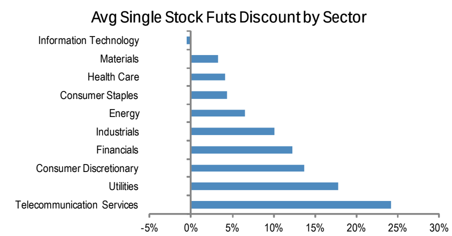
| | JPM Estimates* | | | Bberg Consensus | | | IBES | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Consumer Discretionary | 9.6 | 7.7% | 3.4% | 9.8 | 7.6% | 3.4% | 9.6 | 7.4% | 3.4% |
| Consumer Staples | 11.1 | 8.9% | 3.8% | 10.5 | 8.1% | 3.6% | 9.6 | 7.4% | 3.3% |
| Energy | 15.8 | 12.6% | 6.0% | 15.4 | 11.9% | 5.8% | 15.7 | 12.1% | 5.9% |
| Financials | 38.3 | 30.5% | 4.7% | 38.9 | 30.1% | 4.8% | 40.2 | 31.0% | 5.0% |
| Health Care | 9.7 | 7.7% | 3.1% | 10.4 | 8.0% | 3.4% | 10.2 | 7.9% | 3.3% |
| Industrials | 13.5 | 10.8% | 3.5% | 13.7 | 10.6% | 3.6% | 13.7 | 10.5% | 3.6% |
| Information Technology | 2.2 | 1.8% | 1.6% | 2.3 | 1.8% | 1.7% | 2.3 | 1.7% | 1.7% |
| Materials | 6.5 | 5.2% | 3.4% | 6.8 | 5.2% | 3.6% | 6.8 | 5.3% | 3.6% |
| Telecommunication Services | 10.1 | 8.0% | 4.9% | 11.6 | 9.0% | 5.7% | 11.5 | 8.9% | 5.6% |
| Utilities | 8.5 | 6.8% | 4.6% | 9.8 | 7.6% | 5.4% | 10.0 | 7.7% | 5.4% |
| **Total** | **125.4** | **100%** | **4.1%** | **129.2** | **100%** | **4.2%** | **129.5** | **100%** | **4.2%** |

* Bloomberg estimates are used where JPM estimates are unavailable

| Upside Beta (over last 12M) | SX5E | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|
| **SX5E** | 1.00 | 0.08 | 0.14 | 0.32 | 0.41 | 0.48 |
| **2013** | | 1.00 | 1.53 | 1.37 | 1.37 | 1.40 |
| **2014** | | | 1.00 | 0.94 | 0.70 | 0.61 |
| **2015** | | | | 1.00 | 0.86 | 0.82 |
| **2016** | | | | | 1.00 | 1.05 |
| **2017** | | | | | | 1.00 |

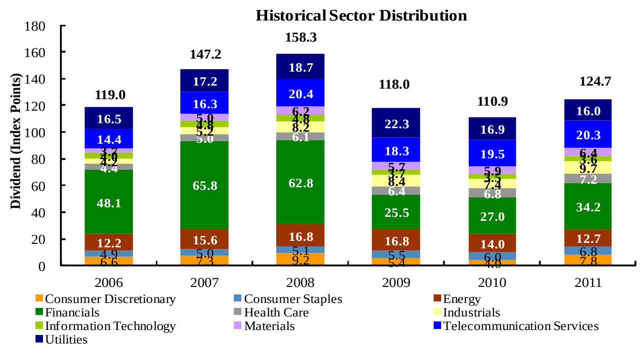
| Downside Beta (over last 12M) | SX5E | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|
| **SX5E** | 1.00 | 0.00 | 0.33 | 0.54 | 0.76 | 1.00 |
| **2013** | | 1.00 | 0.44 | 0.26 | 0.25 | 0.10 |
| **2014** | | | 1.00 | 1.36 | 1.52 | 1.95 |
| **2015** | | | | 1.00 | 1.20 | 1.52 |
| **2016** | | | | | 1.00 | 1.28 |
| **2017** | | | | | | 1.00 |

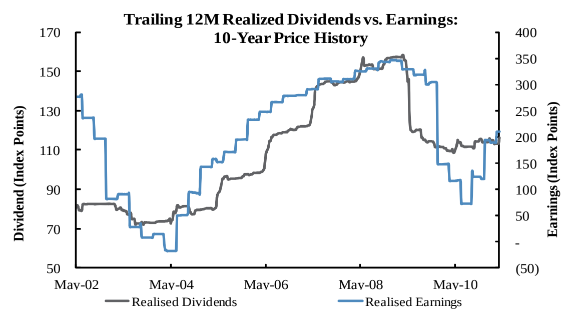



**Historical Dividends and Sector Distribution**

| | 2006 | | | 2007 | | | 2008 | | | 2009 | | | 2010 | | | 2011 | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Consumer Discretionary | 6.6 | 5.5% | 3.2% | 7.3 | 4.9% | 3.2% | 9.2 | 5.8% | 2.9% | 5.4 | 4.6% | 2.9% | 4.0 | 3.6% | 2.7% | 7.8 | 6.2% | 4.6% | 6.7 | 5.1% | 3.3% |
| Consumer Staples | 4.9 | 4.1% | 2.3% | 5.0 | 3.4% | 2.0% | 5.1 | 3.2% | 2.1% | 5.5 | 4.7% | 3.6% | 6.0 | 5.4% | 2.6% | 6.8 | 5.5% | 2.8% | 5.5 | 4.4% | 2.6% |
| Energy | 12.2 | 10.3% | 3.0% | 15.6 | 10.6% | 3.8% | 16.8 | 10.6% | 4.4% | 16.8 | 14.2% | 6.4% | 14.0 | 12.6% | 4.9% | 12.7 | 10.2% | 4.9% | 14.7 | 11.4% | 4.6% |
| Financials | 48.1 | 40.4% | 3.6% | 65.8 | 44.7% | 4.0% | 62.8 | 39.7% | 4.3% | 25.5 | 21.6% | 3.9% | 27.0 | 24.3% | 2.9% | 34.2 | 27.4% | 4.5% | 43.9 | 33.0% | 3.9% |
| Health Care | 4.4 | 3.7% | 2.1% | 5.0 | 3.4% | 2.5% | 6.1 | 3.9% | 2.8% | 6.4 | 5.4% | 4.2% | 6.8 | 6.2% | 3.5% | 7.2 | 5.8% | 4.1% | 6.0 | 4.7% | 3.2% |
| Industrials | 4.2 | 3.5% | 1.9% | 5.2 | 3.5% | 2.3% | 8.2 | 5.2% | 2.2% | 8.4 | 7.1% | 4.2% | 7.4 | 6.6% | 2.9% | 9.7 | 7.8% | 3.1% | 7.2 | 5.6% | 2.8% |
| Information Technology | 4.0 | 3.4% | 1.8% | 4.8 | 3.3% | 2.0% | 4.8 | 3.0% | 1.7% | 3.7 | 3.1% | 3.0% | 3.5 | 3.2% | 3.1% | 3.6 | 2.9% | 3.2% | 4.1 | 3.1% | 2.5% |
| Materials | 3.7 | 3.1% | 2.9% | 5.0 | 3.4% | 3.4% | 6.2 | 3.9% | 2.8% | 5.7 | 4.9% | 5.4% | 5.9 | 5.3% | 3.1% | 6.4 | 5.2% | 3.0% | 5.5 | 4.3% | 3.4% |
| Telecommunication Services | 14.4 | 12.1% | 4.8% | 16.3 | 11.1% | 4.8% | 20.4 | 12.9% | 5.2% | 18.3 | 15.5% | 6.4% | 19.5 | 17.5% | 6.8% | 20.3 | 16.3% | 7.1% | 18.2 | 14.2% | 5.8% |
| Utilities | 16.5 | 13.9% | 4.5% | 17.2 | 11.7% | 3.8% | 18.7 | 11.8% | 3.6% | 22.3 | 18.9% | 7.0% | 16.9 | 15.3% | 5.2% | 16.0 | 12.8% | 6.0% | 17.9 | 14.1% | 5.0% |
| **Total:** | **119.0** | **100.0%** | **3.3%** | **147.2** | **100.0%** | **3.6%** | **158.3** | **100.0%** | **3.6%** | **118.0** | **100.0%** | **4.8%** | **110.9** | **100.0%** | **3.7%** | **124.7** | **100.0%** | **4.5%** | **129.7** | **100.0%** | **3.9%** |



# Euro Stoxx 50 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
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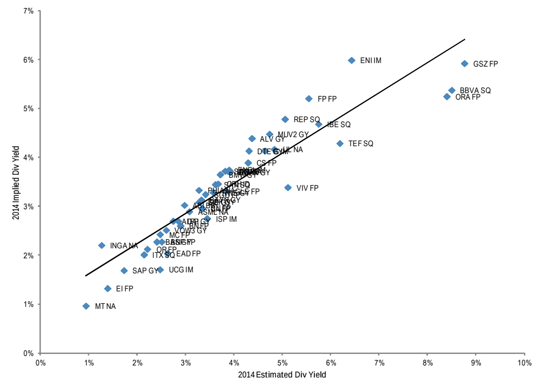
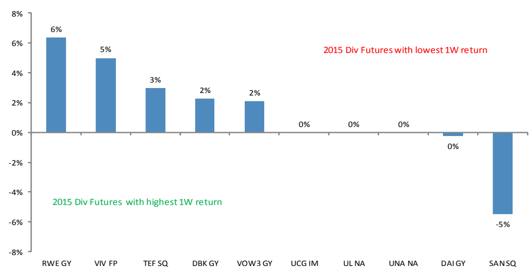
See Pages 13-14 for a full team list, contact details and legal affiliations

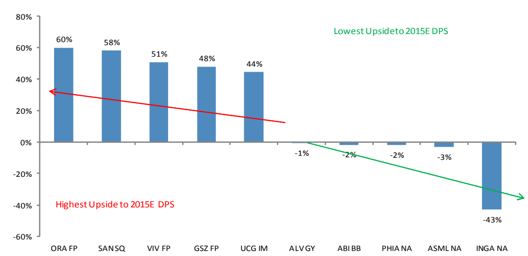
## Dividend Estimates and Projections

**IBES Dividend Estimates vs SSDF : All Euro Stoxx 50 Constituents**

| | | 2014 | | | 2015 | | | 2016 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ticker** | **Company Name** | **DPS (€)** | **Div Futs** | **% Upside** | **DPS (€)** | **Div Futs** | **% Upside** | **DPS (€)** | **Div Futs** | **% Upside** |
| AI FP | AIR LIQUIDE SA | 2.60 | 2.60 | 0.0% | 2.79 | 2.75 | 1.5% | 3.10 | 2.75 | 12.7% |
| ALV GY | ALLIANZ SE-REG | 5.27 | 5.30 | -0.6% | 5.50 | 5.53 | -0.5% | 5.66 | 5.53 | 2.4% |
| ABI BB | ANHEUSER-BUSCH INBEV NV | 2.05 | 2.20 | -6.7% | 2.25 | 2.29 | -1.7% | 2.53 | 2.56 | -1.0% |
| ASML NA | ASML HOLDING NV | 0.55 | 0.60 | -8.3% | 0.64 | 0.66 | -3.0% | 0.79 | 0.68 | 16.2% |
| G IM | ASSICURAZIONI GENERALI | 0.40 | 0.40 | 0.0% | 0.51 | 0.48 | 6.3% | 0.62 | 0.48 | 29.2% |
| CS FP | AXA SA | 0.82 | 0.79 | 3.8% | 0.88 | 0.79 | 12.1% | 0.93 | 0.76 | 21.2% |
| BBVA SQ | BANCO BILBAO VIZCAYA ARGENTA | 0.37 | 0.34 | 8.8% | 0.37 | 0.34 | 10.1% | 0.37 | 0.24 | 53.3% |
| SAN SQ | BANCO SANTANDER SA | 0.55 | 0.47 | 17.8% | 0.55 | 0.35 | 58.1% | 0.55 | 0.29 | 89.7% |
| BAS GY | BASF SE | 2.70 | 2.67 | 1.1% | 2.80 | 2.67 | 4.9% | 3.00 | 2.67 | 12.4% |
| BAYN GY | BAYER AG-REG | 2.08 | 2.06 | 1.0% | 2.30 | 2.18 | 5.5% | 2.55 | 2.24 | 13.8% |
| BMW GY | BAYERISCHE MOTOREN WERKE AG | 2.61 | 2.66 | -1.8% | 2.80 | 2.64 | 6.1% | 3.09 | 2.45 | 26.1% |
| BNP FP | BNP PARIBAS | 1.74 | 1.76 | -0.9% | 2.04 | 2.00 | 1.8% | 2.49 | 2.00 | 24.3% |
| CA FP | CARREFOUR SA | 0.61 | 0.62 | -1.6% | 0.72 | 0.65 | 10.0% | 0.83 | 0.68 | 22.2% |
| SGO FP | COMPAGNIE DE SAINT-GOBAIN | 1.24 | 1.20 | 3.3% | 1.30 | 1.15 | 13.0% | 1.39 | 1.15 | 20.9% |
| CRH ID | CRH PLC | 0.63 | 0.63 | 0.8% | 0.63 | 0.60 | 5.0% | 0.63 | 0.57 | 10.5% |
| DAI GY | DAIMLER AG-REGISTERED SHARES | 2.20 | 2.17 | 1.4% | 2.22 | 2.10 | 6.0% | 2.50 | 1.98 | 26.3% |
| BN FP | DANONE | 1.47 | 1.49 | -1.3% | 1.53 | 1.45 | 5.5% | 1.68 | 1.45 | 15.9% |
| DBK GY | DEUTSCHE BANK AG-REGISTERED | 0.75 | 0.74 | 1.4% | 1.00 | 0.90 | 11.1% | 1.37 | 1.24 | 10.1% |
| DPW GY | DEUTSCHE POST AG-REG | 0.75 | 0.76 | -1.3% | 0.82 | 0.77 | 6.5% | 0.90 | 0.77 | 16.9% |
| DTE GY | DEUTSCHE TELEKOM AG-REG | 0.50 | 0.49 | 2.5% | 0.50 | 0.48 | 4.2% | 0.50 | 0.42 | 19.0% |
| EOAN GY | E.ON SE | 0.65 | 0.60 | 8.3% | 0.55 | 0.52 | 5.8% | 0.55 | 0.49 | 12.2% |
| EAD FP | EADS NV | 0.92 | 0.92 | -0.5% | 1.35 | 1.05 | 28.6% | 1.65 | 1.05 | 57.1% |
| ENEL IM | ENEL SPA | 0.13 | 0.13 | 1.6% | 0.13 | 0.13 | 4.0% | 0.14 | 0.12 | 16.7% |
| ENI IM | ENI SPA | 1.11 | 1.08 | 3.3% | 1.14 | 1.06 | 7.3% | 1.16 | 1.02 | 13.2% |
| EI FP | ESSILOR INTERNATIONAL | 0.94 | 0.95 | -1.1% | 1.05 | 1.00 | 4.5% | 1.17 | 1.00 | 17.0% |
| GSZ FP | GDF SUEZ | 1.50 | 1.13 | 32.5% | 1.50 | 1.01 | 47.9% | 1.50 | 0.92 | 62.3% |
| IBE SQ | IBERDROLA SA | 0.28 | 0.26 | 5.8% | 0.27 | 0.22 | 22.7% | 0.27 | 0.22 | 22.7% |
| ITX SQ | INDITEX | 2.16 | 2.15 | 0.3% | 2.47 | 2.33 | 6.2% | 2.79 | 2.33 | 20.0% |
| INGA NA | ING GROEP NV-CVA | 0.00 | 0.04 | -100.0% | 0.12 | 0.21 | -42.9% | 0.30 | 0.38 | -21.1% |
| ISP IM | INTESA SANPAOLO | 0.05 | 0.05 | 0.0% | 0.06 | 0.05 | 25.0% | 0.08 | 0.05 | 66.7% |
| PHIA NA | KONINKLIJKE PHILIPS NV | 0.78 | 0.79 | -1.3% | 0.85 | 0.86 | -1.7% | 0.90 | 0.86 | 4.7% |
| OR FP | L'OREAL | 2.50 | 2.55 | -2.0% | 2.73 | 2.63 | 3.8% | 3.05 | 2.75 | 10.9% |
| MC FP | LVMH MOET HENNESSY LOUIS VUI | 3.10 | 3.25 | -4.6% | 3.48 | 3.42 | 1.8% | 3.83 | 3.53 | 8.4% |
| MUV2 GY | MUENCHENER RUECKVER AG-REG | 7.23 | 7.10 | 1.8% | 7.50 | 7.10 | 5.6% | 7.75 | 7.10 | 9.2% |
| ORA FP | ORANGE | 0.82 | 0.66 | 24.2% | 0.80 | 0.50 | 60.0% | 0.80 | 0.44 | 81.8% |
| REP SQ | REPSOL SA | 0.97 | 0.94 | 3.2% | 0.97 | 0.92 | 5.7% | 0.97 | 0.88 | 10.7% |
| RWE GY | RWE AG | 1.00 | 1.00 | 0.0% | 1.00 | 0.92 | 8.7% | 1.00 | 0.92 | 8.7% |
| SAN FP | SANOFI | 2.79 | 2.82 | -1.2% | 2.98 | 2.91 | 2.4% | 3.24 | 3.03 | 6.9% |
| SAP GY | SAP AG | 0.93 | 0.93 | -0.9% | 1.05 | 1.03 | 1.9% | 1.15 | 1.10 | 4.5% |
| SU FP | SCHNEIDER ELECTRIC SA | 1.90 | 1.88 | 1.1% | 2.05 | 1.82 | 12.6% | 2.20 | 1.83 | 20.2% |
| SIE GY | SIEMENS AG-REG | 3.00 | 3.00 | 0.0% | 3.20 | 3.01 | 6.1% | 3.40 | 3.13 | 8.6% |
| GLE FP | SOCIETE GENERALE | 0.90 | 0.85 | 5.4% | 1.59 | 1.38 | 15.6% | 2.02 | 1.53 | 32.0% |
| TEF SQ | TELEFONICA SA | 0.75 | 0.60 | 25.0% | 0.75 | 0.52 | 44.2% | 0.75 | 0.47 | 59.6% |
| FP FP | TOTAL SA | 2.41 | 2.35 | 2.6% | 2.47 | 2.32 | 6.5% | 2.57 | 2.25 | 14.0% |
| UL NA | UNIBAIL-RODAMCO SE | 8.80 | 8.02 | 9.7% | 9.30 | 8.02 | 15.9% | 10.00 | 8.02 | 24.6% |
| UCG IM | UNICREDIT SPA | 0.09 | 0.09 | 0.0% | 0.13 | 0.09 | 44.4% | 0.20 | 0.09 | 122.2% |
| UNA NA | UNILEVER NV-CVA | 1.08 | 1.08 | 0.2% | 1.12 | 1.07 | 4.2% | 1.16 | 1.07 | 8.4% |
| DG FP | VINCI SA | 1.77 | 1.71 | 3.7% | 1.84 | 1.75 | 5.1% | 1.95 | 1.70 | 14.4% |
| VIV FP | VIVENDI | 1.00 | 0.80 | 25.0% | 0.95 | 0.63 | 50.8% | 0.81 | 0.55 | 46.4% |
| VOW3 GY | VOLKSWAGEN AG-PREF | 4.06 | 4.06 | 0.0% | 5.06 | 4.90 | 3.3% | 6.06 | 5.50 | 10.2% |



November 27, 2013

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## Dividend Estimates and Projections

**Table 1: 2013 Dividend Estimates**

| | JPM Estimates | | | Consensus | | | Toyo Keizai | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Industrials | 48.9 | 21.8% | 1.4% | 48.9 | 21.8% | 1.4% | 48.9 | 21.9% | 1.4% |
| Consumer Discretionary | 40.8 | 18.2% | 1.2% | 40.8 | 18.2% | 1.2% | 40.8 | 18.2% | 1.2% |
| Information Technology | 33.2 | 14.8% | 1.6% | 33.2 | 14.8% | 1.6% | 32.5 | 14.5% | 1.5% |
| Health Care | 27.6 | 12.3% | 2.1% | 27.6 | 12.3% | 2.1% | 27.6 | 12.3% | 2.1% |
| Materials | 19.7 | 8.8% | 1.7% | 19.8 | 8.8% | 1.7% | 19.8 | 8.8% | 1.7% |
| Consumer Staples | 19.5 | 8.7% | 1.8% | 19.5 | 8.7% | 1.8% | 19.5 | 8.7% | 1.8% |
| Financials | 17.6 | 7.8% | 1.5% | 17.6 | 7.8% | 1.5% | 17.5 | 7.8% | 1.5% |
| Telecommunication Services | 14.0 | 6.2% | 0.9% | 14.0 | 6.2% | 0.9% | 14.0 | 6.3% | 0.9% |
| Energy | 2.3 | 1.0% | 2.7% | 2.3 | 1.0% | 2.7% | 2.3 | 1.0% | 2.7% |
| Utilities | 0.9 | 0.4% | 1.8% | 0.9 | 0.4% | 1.8% | 0.9 | 0.4% | 1.8% |
| **Total Nikkei 225** | **224.5** | **100%** | **1.5%** | **224.7** | **100%** | **1.5%** | **223.8** | **100%** | **1.4%** |

**Figure 1: 2013 Dividends Sector Distribution (JPM Estimates*)**

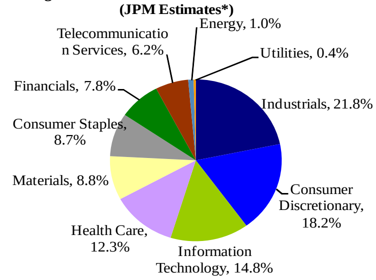



**Table 2: 2014 Dividend Estimates**

| | JPM Estimates | | | Consensus | | | Toyo Keizai | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Industrials | 53.2 | 22.1% | 1.5% | 53.7 | 22.1% | 1.5% | 53.5 | 22.1% | 1.5% |
| Consumer Discretionary | 47.2 | 19.6% | 1.4% | 47.6 | 19.6% | 1.4% | 47.1 | 19.4% | 1.4% |
| Information Technology | 36.5 | 15.2% | 1.7% | 37.6 | 15.5% | 1.8% | 37.5 | 15.5% | 1.8% |
| Health Care | 28.6 | 11.9% | 2.2% | 28.6 | 11.8% | 2.2% | 28.6 | 11.8% | 2.2% |
| Consumer Staples | 20.7 | 8.6% | 1.9% | 20.5 | 8.4% | 1.9% | 20.5 | 8.4% | 1.9% |
| Materials | 19.9 | 8.3% | 1.7% | 20.2 | 8.3% | 1.7% | 20.1 | 8.3% | 1.7% |
| Telecommunication Services | 16.4 | 6.8% | 1.1% | 16.4 | 6.7% | 1.1% | 16.4 | 6.8% | 1.1% |
| Financials | 15.3 | 6.4% | 1.3% | 15.5 | 6.4% | 1.3% | 15.7 | 6.5% | 1.3% |
| Energy | 2.3 | 1.0% | 2.8% | 2.3 | 1.0% | 2.8% | 2.3 | 1.0% | 2.8% |
| Utilities | 0.7 | 0.3% | 1.6% | 0.8 | 0.3% | 1.6% | 0.8 | 0.3% | 1.6% |
| **Total Nikkei 225** | **241.0** | **100%** | **1.6%** | **243.1** | **100%** | **1.6%** | **242.6** | **100%** | **1.6%** |

**Figure 2: Sector Distribution Projection (JPM Estimates*)**

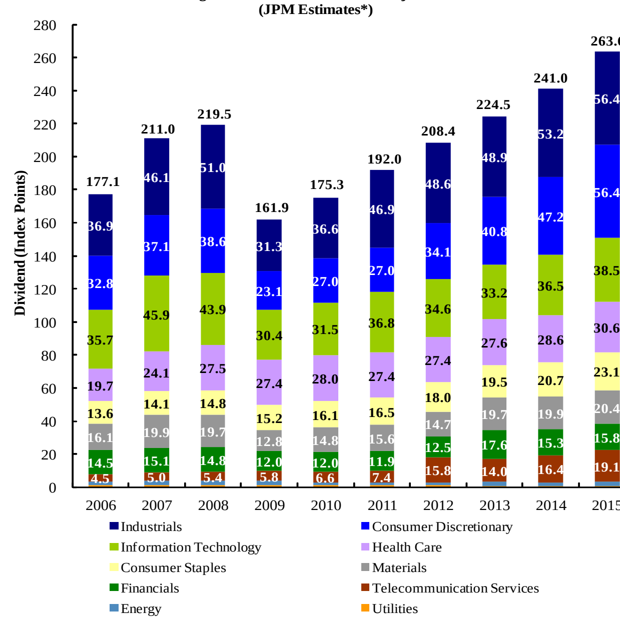



**Table 3: 2015 Dividend Estimates**

| | JPM Estimates | | | Consensus | | | Toyo Keizai* | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Consumer Discretionary | 56.4 | 21.4% | 1.6% | 53.8 | 20.3% | 1.5% | | | |
| Industrials | 56.4 | 21.4% | 1.6% | 57.5 | 21.7% | 1.6% | | | |
| Information Technology | 38.5 | 14.6% | 1.8% | 40.8 | 15.4% | 1.9% | | | |
| Health Care | 30.6 | 11.6% | 2.4% | 30.4 | 11.5% | 2.4% | | | |
| Consumer Staples | 23.1 | 8.8% | 2.1% | 22.7 | 8.6% | 2.1% | | | |
| Materials | 20.4 | 7.7% | 1.8% | 21.2 | 8.0% | 1.8% | | | |
| Telecommunication Services | 19.1 | 7.3% | 1.3% | 19.1 | 7.2% | 1.3% | | | |
| Financials | 15.8 | 6.0% | 1.3% | 16.3 | 6.1% | 1.4% | | | |
| Energy | 2.4 | 0.9% | 2.8% | 2.4 | 0.9% | 2.8% | | | |
| Utilities | 0.8 | 0.3% | 1.7% | 0.9 | 0.3% | 1.9% | | | |
| **Total Nikkei 225** | **263.6** | **100%** | **1.7%** | **265.1** | **100%** | **1.7%** | | | |

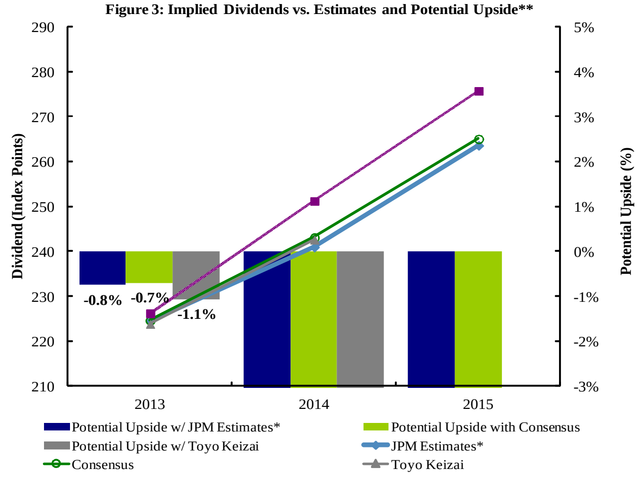
*Currently, Toyo Keizai does not publish estimates beyond two fiscal years.

**Table 5: Implied Dividends vs. Estimates and Potential Upside****

| **Source** | **2013** | **Potent. Upside** | **2014** | **Potent. Upside** | **2015** | **Potent. Upside** |
|---|---|---|---|---|---|---|
| JPM Estimates* | 224.5 | -0.8% | 241.0 | -4.1% | 263.6 | -4.4% |
| Consensus | 224.7 | -0.7% | 243.1 | -3.2% | 265.1 | -3.9% |
| Toyo Keizai | 223.8 | -1.1% | 242.6 | -3.4% | - | - |
| Implied (Dividend Swaps) | 226.3 | | 251.3 | | 275.8 | |

**Potential upside is with respect to the dividend level implied by dividend swaps.

**Figure 3: Implied Dividends vs. Estimates and Potential Upside****



J.P.Morgan

November 27, 2013

# Nikkei 225 Dividend Weekly


Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations


## Dividend Swaps Overview

**Figure 4: Term Structure of Dividend Swaps**

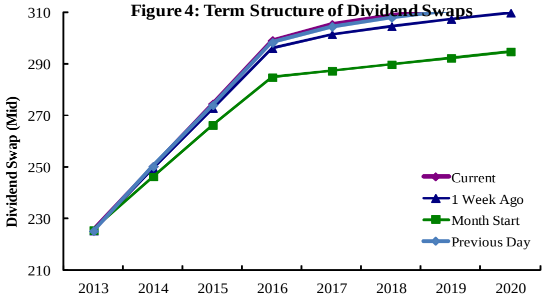



**Table 5: Dividend Swap Prices**

| Year | Current | | | Forecast | | Historical Change | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Week-on-Week | | Month-to-Date | | Year-to-Date | |
| | Bid | Ask | Mid | JPM Est(1) | Potential Upside(2) | Points | % | Points | % | Points | % |
| 2013 | **224.3** | **226.3** | **225.3** | 224.5 | -0.8% | 0.00 | 0.0% | -0.25 | **-0.1%** | 18.50 | **8.9%** |
| 2014 | **249.3** | **251.3** | **250.3** | 241.0 | -4.1% | 0.75 | **0.3%** | 4.00 | **1.6%** | 41.75 | **20.0%** |
| 2015 | **273.3** | **275.8** | **274.5** | 263.6 | -4.4% | 1.75 | **0.6%** | 8.25 | **3.1%** | 68.75 | **33.4%** |
| 2016 | **297.5** | **300.5** | **299.0** | 272.9 | -9.2% | 3.00 | **1.0%** | 14.25 | **5.0%** | 96.00 | **47.3%** |
| 2017 | **303.8** | **306.8** | **305.3** | 282.4 | -7.9% | 3.75 | **1.2%** | 18.00 | **6.3%** | 104.75 | **52.2%** |
| 2018 | **307.0** | **310.5** | **308.8** | 292.3 | -5.9% | 4.25 | **1.4%** | 19.00 | **6.6%** | 110.75 | **55.9%** |
| 2019 | **309.8** | **313.3** | **311.5** | 302.5 | -3.4% | 4.25 | **1.4%** | 19.25 | **6.6%** | 116.00 | **59.3%** |
| 2020 | **312.5** | **316.0** | **314.3** | 313.1 | -0.9% | 4.50 | **1.5%** | 19.50 | **6.6%** | 121.25 | **62.8%** |

(1) Years 2016 and beyond are projected based on the farthest JPM nominal GDP growth forecast available.

(2) Potential upside is with respect to the dividend level implied by dividend swaps.

**Figure 5: Term Structure of Bid-Ask Spreads**

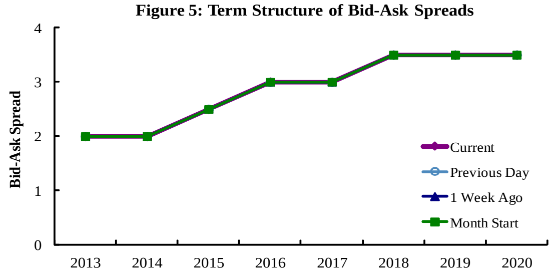



**Table 6: Bid-Ask Spreads**

| Year | Current | Day Ago | | Week Ago | | Month Start | | Year Start | |
|---|---|---|---|---|---|---|---|---|---|
| | | Spread | Chg | Spread | Chg | Spread | Chg | Spread | Chg |
| 2013 | **2.0** | 2.0 | 0.00 | 2.0 | 0.00 | 2.0 | 0.00 | 1.0 | **1.00** |
| 2014 | **2.0** | 2.0 | 0.00 | 2.0 | 0.00 | 2.0 | 0.00 | 1.0 | **1.00** |
| 2015 | **2.5** | 2.5 | 0.00 | 2.5 | 0.00 | 2.5 | 0.00 | 1.0 | **1.50** |
| 2016 | **3.0** | 3.0 | 0.00 | 3.0 | 0.00 | 3.0 | 0.00 | 1.5 | **1.50** |
| 2017 | **3.0** | 3.0 | 0.00 | 3.0 | 0.00 | 3.0 | 0.00 | 1.5 | **1.50** |
| 2018 | **3.5** | 3.5 | 0.00 | 3.5 | 0.00 | 3.5 | 0.00 | 2.0 | **1.50** |
| 2019 | **3.5** | 3.5 | 0.00 | 3.5 | 0.00 | 3.5 | 0.00 | 2.0 | **1.50** |
| 2020 | **3.5** | 3.5 | 0.00 | 3.5 | 0.00 | 3.5 | 0.00 | 2.0 | **1.50** |

*Highlighted cells show the largest positive and negative changes in spreads for the given category.

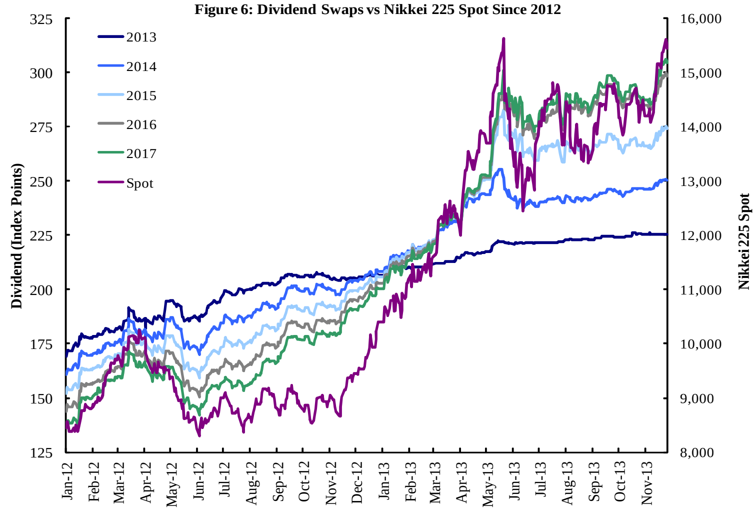
**Correlation Heatmap**

| | Nikkei 225 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|
| **Nikkei 225** | | 0.27 | 0.76 | 0.77 | 0.78 | 0.80 |
| **2013** | 0.27 | | 0.56 | 0.53 | 0.50 | 0.48 |
| **2014** | 0.76 | 0.56 | | 0.86 | 0.78 | 0.77 |
| **2015** | 0.77 | 0.53 | 0.86 | | 0.97 | 0.97 |
| **2016** | 0.78 | 0.50 | 0.78 | 0.97 | | 1.00 |
| **2017** | 0.80 | 0.48 | 0.77 | 0.97 | 1.00 | |

| |
|---|
| >0.8 |
| 0.0~0.8 |
| <0.0 |

*Correlation is calculated using weekly changes, for the past 1 year.

**Figure 6: Dividend Swaps vs Nikkei 225 Spot Since 2012**



# S&P 500 Dividend Weekly

Global Quantitative and Derivatives Strategy

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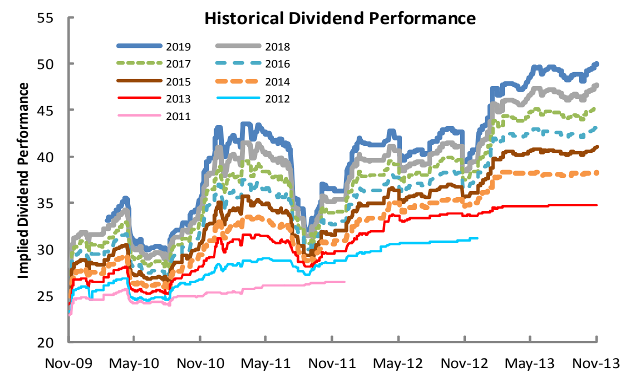
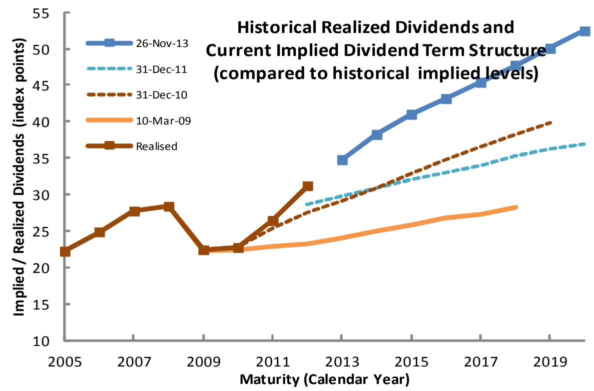
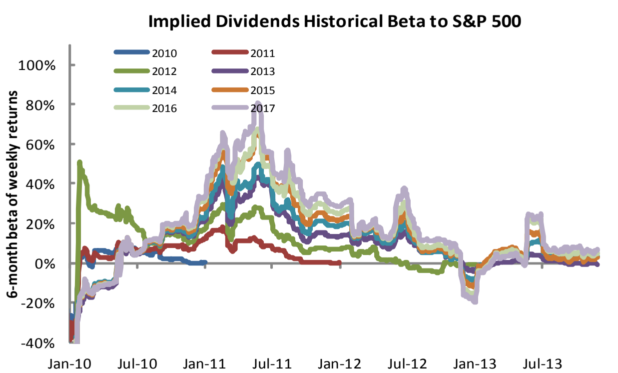
See Pages 13-14 for a full team list, contact details and legal affiliations

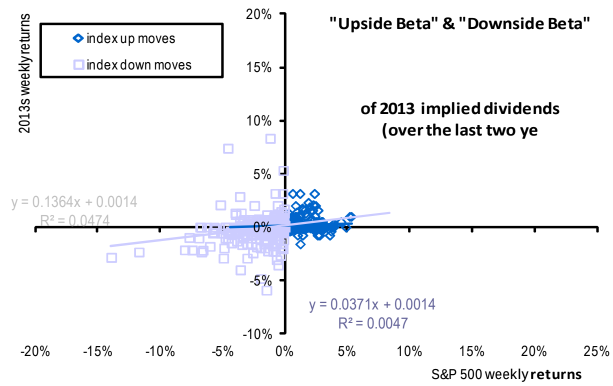
Data as of November 26, 2013

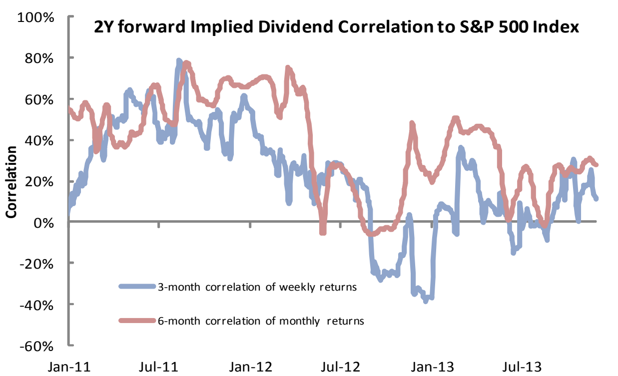
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

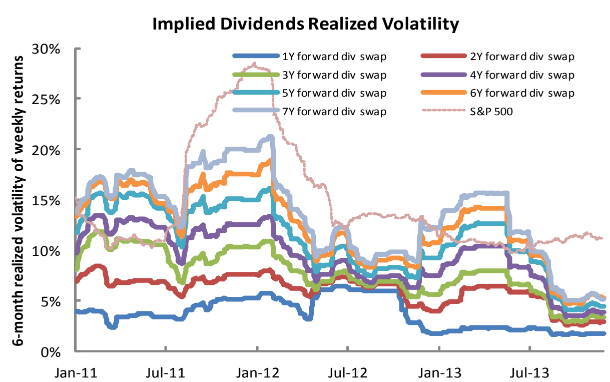


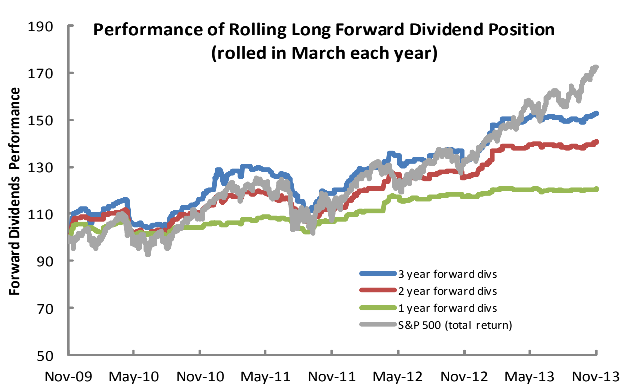



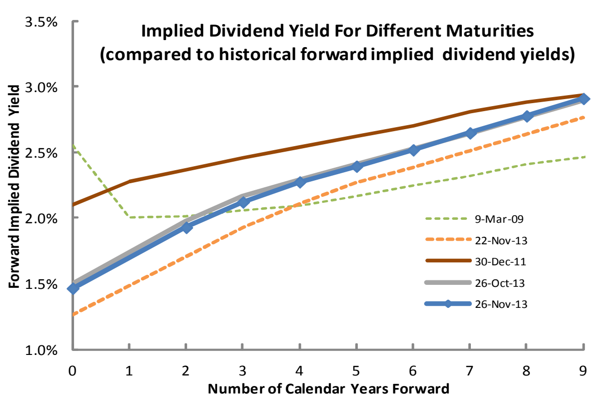



# S&P 500 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## Recent Dividend Changes and Bottom-up Estimates

**Table 1: Dividend Swaps Historical Changes**

| Calendar Year | Bid | Ask | Mid | Week-on-week | | Month-to-date | | Year-to-date | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Points | % | Points | % | Points | % |
| **2013** | 34.7 | 34.9 | **34.8** | 0.0 | 0.1% | 0.0 | 0.1% | 1.2 | 3.4% |
| **2014** | 38.2 | 38.4 | **38.3** | 0.1 | 0.4% | 0.1 | 0.4% | 3.3 | 8.6% |
| **2015** | 40.9 | 41.2 | **41.0** | 0.1 | 0.3% | 0.5 | 1.2% | 5.0 | 12.1% |
| **2016** | 43.0 | 43.4 | **43.2** | 0.1 | 0.2% | 0.5 | 1.0% | 6.0 | 13.9% |
| **2017** | 45.2 | 45.7 | **45.4** | 0.1 | 0.2% | 0.6 | 1.3% | 7.1 | 15.6% |
| **2018** | 47.4 | 48.1 | **47.7** | 0.2 | 0.4% | 0.8 | 1.6% | 8.2 | 17.3% |
| **2019** | 49.7 | 50.4 | **50.1** | 0.2 | 0.4% | 0.8 | 1.6% | 9.4 | 18.8% |
| **2020** | 52.1 | 52.9 | **52.5** | 0.2 | 0.4% | 0.9 | 1.6% | 10.6 | 20.3% |
| **2021** | 54.4 | 55.5 | **54.9** | 0.2 | 0.4% | 1.0 | 1.8% | 12.0 | 21.8% |
| **2022** | 56.9 | 58.2 | **57.5** | 0.7 | 1.2% | 1.2 | 2.0% | 13.4 | 23.3% |

**Figure 1: Term Structure of S&P500 Dividend Swaps**

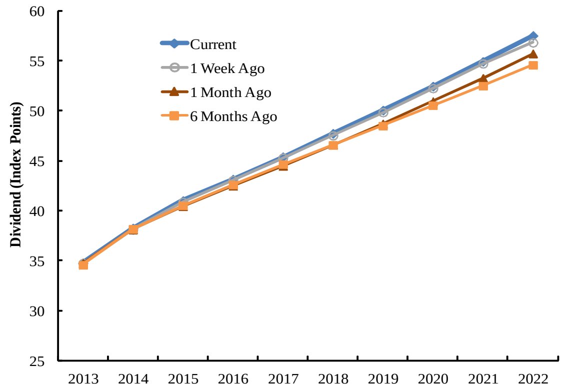


**Table 2: 2013 Dividend Estimates**

| Sector | JPM Estimates | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| | Points | % | Yield | Points | % | Yield | Points | % | Yield |
| Information Technology | 5.1 | 14.4% | 1.6% | 5.2 | 14.6% | 1.6% | 4.9 | 14.0% | 1.5% |
| Health Care | 5.0 | 14.1% | 2.1% | 5.1 | 14.1% | 2.1% | 5.0 | 14.2% | 2.1% |
| Consumer Staples | 4.9 | 13.8% | 2.7% | 5.0 | 13.9% | 2.8% | 4.8 | 13.8% | 2.6% |
| Financials | 4.5 | 12.8% | 1.5% | 4.7 | 12.9% | 1.6% | 4.5 | 12.8% | 1.5% |
| Energy | 3.9 | 11.0% | 2.1% | 4.0 | 11.1% | 2.1% | 3.9 | 11.0% | 2.1% |
| Industrials | 3.5 | 10.0% | 1.8% | 3.6 | 9.9% | 1.8% | 3.5 | 10.0% | 1.8% |
| Consumer Discretionary | 3.1 | 8.9% | 1.4% | 3.1 | 8.7% | 1.4% | 3.1 | 9.0% | 1.4% |
| Utilities | 2.0 | 5.7% | 3.7% | 2.0 | 5.6% | 3.7% | 2.0 | 5.8% | 3.7% |
| Telecommunication Services | 1.8 | 5.2% | 4.3% | 1.9 | 5.2% | 4.4% | 1.8 | 5.3% | 4.3% |
| Materials | 1.4 | 4.1% | 2.3% | 1.4 | 3.9% | 2.3% | 1.4 | 4.1% | 2.3% |
| **Total: S&P 500** | **35.3** | **100%** | **2.0%** | **36.0** | **100%** | **2.0%** | **34.9** | **100%** | **1.9%** |

**Figure 2: Sector Distribution Projection (JPM Estimates)**

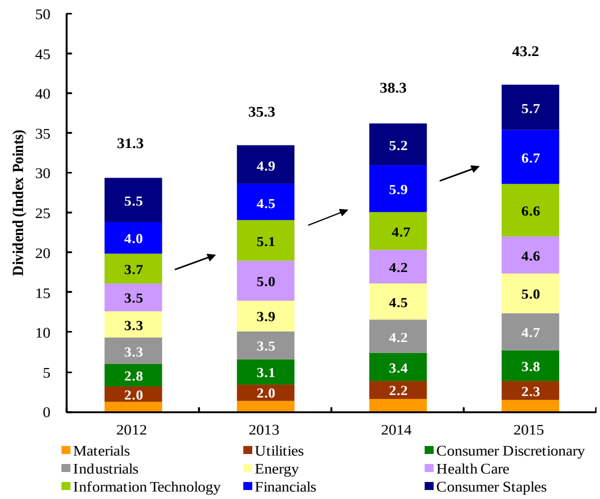


**Table 2: 2014 Dividend Estimates**

| Sector | JPM Estimates | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| | Points | % | Yield | Points | % | Yield | Points | % | Yield |
| Financials | 5.9 | 15.4% | 2.0% | 6.3 | 15.8% | 2.2% | 5.9 | 15.0% | 2.0% |
| Consumer Staples | 5.2 | 13.7% | 2.9% | 5.4 | 13.6% | 3.0% | 5.1 | 13.2% | 2.8% |
| Information Technology | 4.7 | 12.4% | 1.5% | 6.0 | 14.9% | 1.9% | 5.9 | 15.2% | 1.9% |
| Energy | 4.5 | 11.7% | 2.4% | 4.4 | 11.1% | 2.4% | 4.5 | 11.4% | 2.4% |
| Industrials | 4.2 | 11.1% | 2.2% | 4.2 | 10.4% | 2.1% | 4.3 | 10.9% | 2.2% |
| Health Care | 4.2 | 11.1% | 1.8% | 4.4 | 11.1% | 1.9% | 4.2 | 10.8% | 1.8% |
| Consumer Discretionary | 3.4 | 9.0% | 1.5% | 3.5 | 8.7% | 1.5% | 3.4 | 8.7% | 1.5% |
| Utilities | 2.2 | 5.9% | 4.2% | 2.2 | 5.6% | 4.2% | 2.2 | 5.8% | 4.2% |
| Telecommunication Services | 2.1 | 5.5% | 4.9% | 2.1 | 5.2% | 4.9% | 2.0 | 5.2% | 4.7% |
| Materials | 1.6 | 4.3% | 2.6% | 1.4 | 3.6% | 2.3% | 1.4 | 3.7% | 2.3% |
| **Total: S&P 500** | **38.3** | **100%** | **2.1%** | **40.0** | **100%** | **2.2%** | **39.0** | **100%** | **2.2%** |

**Table 3: 2015 Dividend Estimates**

| Sector | JPM Estimates | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| | Points | % | Yield | Points | % | Yield | Points | % | Yield |
| Financials | 6.7 | 15.6% | 2.3% | 7.0 | 16.6% | 2.4% | 6.6 | 15.6% | 2.2% |
| Information Technology | 6.6 | 15.3% | 2.1% | 6.4 | 15.1% | 2.0% | 6.4 | 15.0% | 2.0% |
| Consumer Staples | 5.7 | 13.2% | 3.1% | 5.8 | 13.6% | 3.2% | 5.5 | 13.0% | 3.0% |
| Energy | 5.0 | 11.6% | 2.7% | 5.0 | 11.8% | 2.7% | 4.9 | 11.6% | 2.6% |
| Industrials | 4.7 | 10.9% | 2.4% | 3.5 | 8.3% | 1.8% | 4.7 | 11.0% | 2.4% |
| Health Care | 4.6 | 10.6% | 1.9% | 4.8 | 11.2% | 2.0% | 4.6 | 10.8% | 1.9% |
| Consumer Discretionary | 3.8 | 8.8% | 1.7% | 3.9 | 9.2% | 1.7% | 3.8 | 8.9% | 1.7% |
| Utilities | 2.3 | 5.4% | 4.3% | 2.3 | 5.5% | 4.3% | 2.3 | 5.5% | 4.3% |
| Telecommunication Services | 2.2 | 5.1% | 5.1% | 2.2 | 5.2% | 5.1% | 2.1 | 5.0% | 4.9% |
| Materials | 1.5 | 3.6% | 2.5% | 1.5 | 3.5% | 2.4% | 1.6 | 3.7% | 2.5% |
| **Total: S&P 500** | **43.2** | **100%** | **2.4%** | **42.4** | **100%** | **2.4%** | **42.5** | **100%** | **2.4%** |

**Figure 3: Implied Dividends vs. Estimates and Potential Upside**

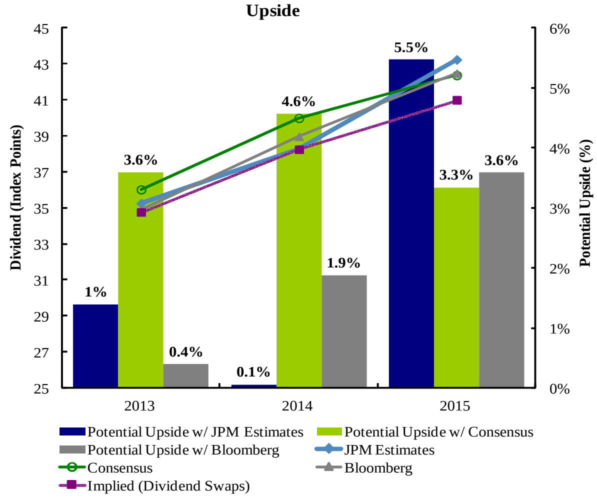


**Table 5: Implied Dividends vs. Estimates and Potential Upside**

| Source | 2013 | Potential Upside | 2014 | Potential Upside | 2015 | Potential Upside |
|---|---|---|---|---|---|---|
| JPM Estimates | 35.3 | 1.4% | 38.3 | 0.1% | 43.2 | 5.5% |
| Consensus | 36.0 | 3.6% | 40.0 | 4.6% | 42.4 | 3.3% |
| Bloomberg | 34.9 | 0.4% | 39.0 | 1.9% | 42.5 | 3.6% |
| Implied (Dividend Swaps) | **34.8** | | **38.3** | | **41.0** | |

*Potential upside is with respect to the dividend level implied by dividend swaps.

# FTSE 100 Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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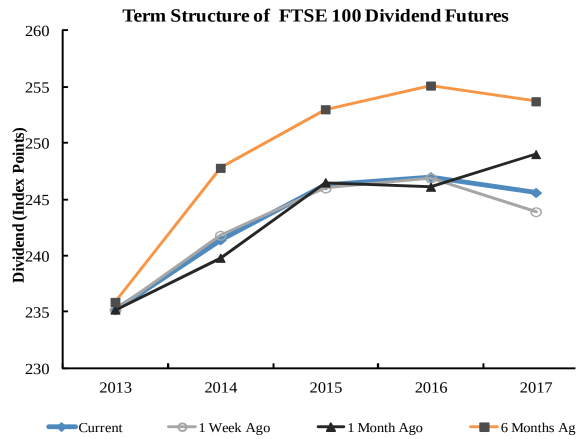
See Pages 13-14 for a full team list, contact details and legal affiliations

## Dividend Futures Overview

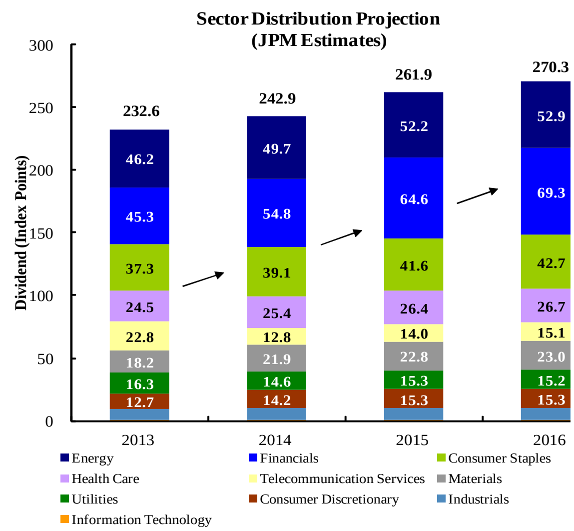
**Dividend Futures Historical Changes**

| Calendar Year | Mid | Week-on-week | | Month-to-date | | Year-to-date | |
|---|---|---|---|---|---|---|---|
| | | Points | % | Points | % | Points | % |
| **2013** | **235.2** | 0.0 | 0.0% | 0.0 | 0.0% | 11.2 | 5.0% |
| **2014** | **241.4** | (0.4) | -0.2% | 1.6 | 0.7% | 23.4 | 10.7% |
| **2015** | **246.3** | 0.3 | 0.1% | (0.2) | -0.1% | 36.3 | 17.3% |
| **2016** | **247.0** | 0.1 | 0.0% | 0.9 | 0.4% | 42.0 | 20.5% |
| **2017** | **245.6** | 1.7 | 0.7% | (3.4) | -1.4% | 45.3 | 22.6% |




**2014 Dividend Estimates**

| Sector | JPM Estimates Points | % | Yield | IBES Points | % | Yield | Bloomberg Consensus Points | % | Yield |
|---|---|---|---|---|---|---|---|---|---|
| Financials | 54.8 | 22.5% | 3.8% | 53.1 | 21.8% | 3.7% | 54.0 | 22.4% | 3.7% |
| Energy | 49.7 | 20.5% | 4.6% | 47.9 | 19.6% | 4.4% | 48.3 | 20.0% | 4.5% |
| Consumer Staples | 39.1 | 16.1% | 3.2% | 40.5 | 16.6% | 3.3% | 39.4 | 16.3% | 3.2% |
| Health Care | 25.4 | 10.5% | 4.3% | 25.6 | 10.5% | 4.4% | 25.4 | 10.5% | 4.3% |
| Materials | 21.9 | 9.0% | 3.3% | 22.6 | 9.3% | 3.4% | 22.0 | 9.1% | 3.3% |
| Telecommunication Services | 14.6 | 6.0% | 4.0% | 13.8 | 5.6% | 4.2% | 12.9 | 5.3% | 4.0% |
| Consumer Discretionary | 14.2 | 5.8% | 2.6% | 14.8 | 6.1% | 2.7% | 14.3 | 5.9% | 2.6% |
| Utilities | 12.8 | 5.3% | 5.0% | 15.1 | 6.2% | 5.1% | 14.7 | 6.1% | 5.0% |
| Industrials | 9.6 | 3.9% | 1.8% | 9.8 | 4.0% | 1.9% | 9.7 | 4.0% | 1.8% |
| Information Technology | 0.7 | 0.3% | 1.0% | 0.8 | 0.3% | 1.2% | 1.0 | 0.4% | 1.4% |
| **Total: FTSE 100** | **242.9** | **100%** | **3.7%** | **244.0** | **100%** | **3.7%** | **241.7** | **100%** | **3.6%** |



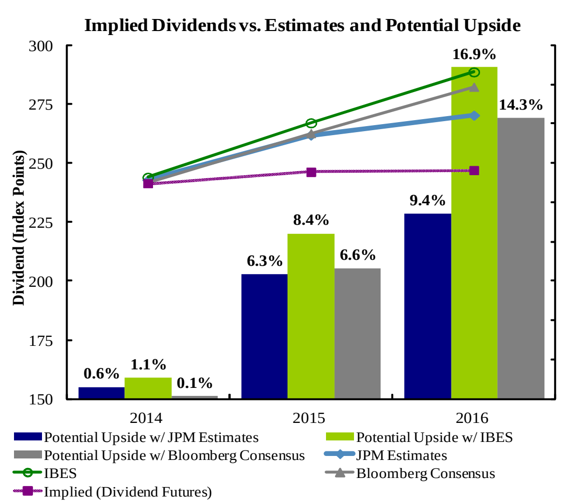

**2015 Dividend Estimates**

| Sector | JPM Estimates Points | % | Yield | IBES Points | % | Yield | Bloomberg Consensus Points | % | Yield |
|---|---|---|---|---|---|---|---|---|---|
| Financials | 64.6 | 24.7% | 4.5% | 63.8 | 23.9% | 4.5% | 64.4 | 24.5% | 4.5% |
| Energy | 52.2 | 19.9% | 4.8% | 50.0 | 18.7% | 4.6% | 50.1 | 19.1% | 4.6% |
| Consumer Staples | 41.6 | 15.9% | 3.6% | 43.8 | 16.4% | 3.7% | 42.0 | 16.0% | 3.7% |
| Health Care | 26.4 | 10.1% | 4.5% | 26.6 | 10.0% | 4.5% | 26.5 | 10.1% | 4.5% |
| Materials | 22.8 | 8.7% | 3.5% | 24.1 | 9.0% | 3.6% | 23.7 | 9.0% | 3.6% |
| Utilities | 15.3 | 5.8% | 5.5% | 15.9 | 6.0% | 5.6% | 15.5 | 5.9% | 5.6% |
| Consumer Discretionary | 15.3 | 5.8% | 2.8% | 16.2 | 6.1% | 2.9% | 15.6 | 5.9% | 2.9% |
| Telecommunication Services | 14.0 | 5.4% | 4.5% | 14.8 | 5.6% | 4.3% | 13.4 | 5.1% | 4.3% |
| Industrials | 9.0 | 3.4% | 1.8% | 10.7 | 4.0% | 2.1% | 10.6 | 4.0% | 2.1% |
| Information Technology | 0.8 | 0.3% | 1.1% | 1.0 | 0.4% | 1.3% | 0.9 | 0.4% | 1.3% |
| **Total: FTSE 100** | **261.9** | **100%** | **3.9%** | **267.0** | **100%** | **4.0%** | **262.7** | **100%** | **4.0%** |

**Currently, Toyo Keizai does not publish estimates beyond two fiscal years.

**2016 Dividend Estimates**

| Sector | JPM Estimates Points | % | Yield | IBES Points | % | Yield | Bloomberg Consensus Points | % | Yield |
|---|---|---|---|---|---|---|---|---|---|
| Financials | 69.3 | 25.7% | 4.8% | 72.1 | 25.0% | 5.1% | 73.4 | 26.0% | 5.1% |
| Energy | 52.9 | 19.6% | 4.9% | 53.8 | 18.6% | 4.8% | 52.1 | 18.4% | 4.8% |
| Consumer Staples | 42.7 | 15.8% | 3.7% | 47.9 | 16.6% | 4.0% | 45.2 | 16.0% | 4.0% |
| Health Care | 26.7 | 9.9% | 4.5% | 27.7 | 9.6% | 4.7% | 27.6 | 9.8% | 4.7% |
| Materials | 23.0 | 8.5% | 3.5% | 25.0 | 8.7% | 3.8% | 25.3 | 9.0% | 3.8% |
| Consumer Discretionary | 15.3 | 5.7% | 2.8% | 17.2 | 6.0% | 3.1% | 16.6 | 5.9% | 3.1% |
| Utilities | 15.2 | 5.6% | 5.5% | 16.1 | 5.6% | 5.7% | 15.7 | 5.6% | 5.7% |
| Telecommunication Services | 15.1 | 5.6% | 4.8% | 16.0 | 5.6% | 4.5% | 14.2 | 5.0% | 4.5% |
| Industrials | 9.3 | 3.4% | 1.9% | 11.3 | 3.9% | 2.3% | 11.3 | 4.0% | 2.3% |
| Information Technology | 0.8 | 0.3% | 1.1% | 1.4 | 0.5% | 1.4% | 1.0 | 0.3% | 1.4% |
| **Total: FTSE 100** | **270.3** | **100%** | **4.1%** | **288.7** | **100%** | **4.3%** | **282.3** | **100%** | **4.3%** |




**Implied Dividends vs. Estimates and Potential Upside**

| Source | 2014 | Potential Upside | 2015 | Potential Upside | 2016 | Potential Upside |
|---|---|---|---|---|---|---|
| JPM Estimates | 242.9 | 0.6% | 261.9 | 6.3% | 270.3 | 9.4% |
| IBES | 244.0 | 1.1% | 267.0 | 8.4% | 288.7 | 16.9% |
| Bloomberg Consensus | 241.7 | 0.1% | 262.7 | 6.6% | 282.3 | 14.3% |
| Implied (Dividend Futures) | **241.4** | | **246.3** | | **247.0** | |

*Potential upside is with respect to the dividend level implied by dividend swaps.

# H-Shares & Hang Seng Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## H-Shares Dividend Estimates and Projection

**Table 1: 2013 H-Shares Dividend Estimates**

| | JPM Estimates* | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Financials | 272.1 | 66.1% | 3.9% | 272.1 | 66.1% | 3.9% | 271.9 | 66.1% | 3.9% |
| Energy | 100.0 | 24.3% | 4.3% | 100.0 | 24.3% | 4.3% | 100.0 | 24.3% | 4.3% |
| Materials | 11.4 | 2.8% | 2.8% | 11.4 | 2.8% | 2.8% | 11.4 | 2.8% | 2.8% |
| Industrials | 8.8 | 2.1% | 2.3% | 8.8 | 2.1% | 2.3% | 8.8 | 2.1% | 2.3% |
| Consumer Discretionary | 6.6 | 1.6% | 1.4% | 6.6 | 1.6% | 1.4% | 6.6 | 1.6% | 1.4% |
| Telecommunication Services | 5.3 | 1.3% | 2.1% | 5.3 | 1.3% | 2.1% | 5.3 | 1.3% | 2.1% |
| Utilities | 4.8 | 1.2% | 2.1% | 4.8 | 1.2% | 2.1% | 4.8 | 1.2% | 2.1% |
| Health Care | 2.0 | 0.5% | 1.1% | 2.0 | 0.5% | 1.1% | 2.0 | 0.5% | 1.1% |
| Consumer Staples | 0.8 | 0.2% | 0.8% | 0.8 | 0.2% | 0.8% | 0.8 | 0.2% | 0.8% |
| Information Technology | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| **Total: H-Shares** | **411.8** | **100%** | **3.6%** | **411.8** | **100%** | **3.6%** | **411.6** | **100%** | **3.6%** |

*Currently, 37 out of 40 constituents are covered by our analysts.

**Figure 1: 2013 H-Shares Dividends Sector Distribution (JPM Estimates*)**

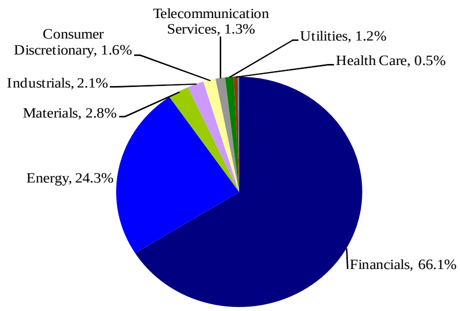


**Table 2: 2014 H-Shares Dividend Estimates**

| | JPM Estimates* | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Financials | 302.1 | 68.9% | 4.3% | 296.2 | 68.0% | 4.2% | 289.2 | 68.0% | 4.1% |
| Energy | 96.8 | 22.1% | 4.1% | 95.4 | 21.9% | 4.1% | 93.1 | 21.9% | 4.0% |
| Utilities | 9.0 | 2.1% | 4.0% | 8.5 | 2.0% | 3.8% | 4.8 | 1.1% | 2.1% |
| Industrials | 8.2 | 1.9% | 2.2% | 9.0 | 2.1% | 2.4% | 8.5 | 2.0% | 2.2% |
| Materials | 8.2 | 1.9% | 2.0% | 8.3 | 1.9% | 2.0% | 13.6 | 3.2% | 3.3% |
| Telecommunication Services | 6.3 | 1.4% | 2.5% | 6.3 | 1.4% | 2.5% | 5.3 | 1.2% | 2.1% |
| Consumer Discretionary | 5.1 | 1.2% | 1.1% | 8.7 | 2.0% | 1.9% | 7.4 | 1.7% | 1.6% |
| Health Care | 2.3 | 0.5% | 1.3% | 2.2 | 0.5% | 1.2% | 2.5 | 0.6% | 1.4% |
| Consumer Staples | 0.7 | 0.2% | 0.6% | 0.9 | 0.2% | 0.9% | 0.7 | 0.2% | 0.7% |
| Information Technology | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| **Total: H-Shares** | **438.8** | **100%** | **3.8%** | **435.5** | **100%** | **3.8%** | **425.3** | **100%** | **3.7%** |

**Figure 2: H-Shares Sector Distribution Projection**

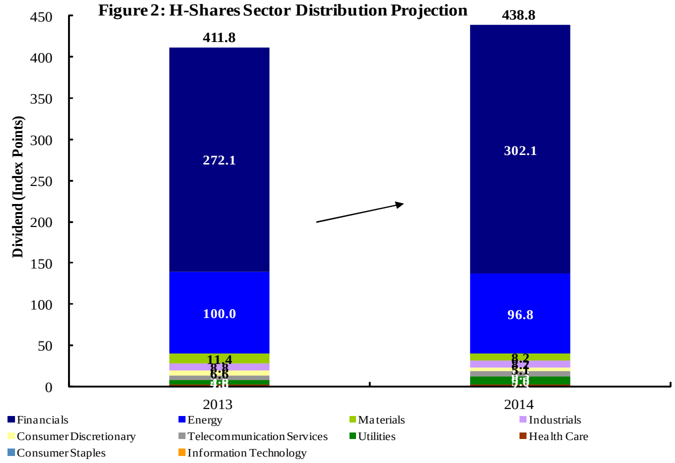


**Figure 3: Implied Dividends vs. Estimates and Potential Upside****

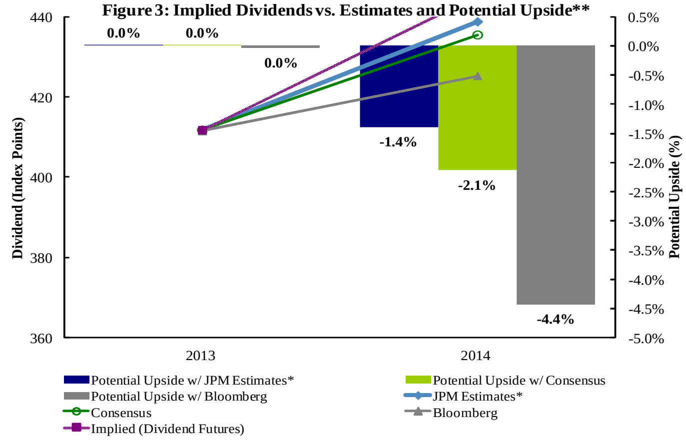


**Table 4: Implied Dividends vs. Estimates****

| | | Potential | | Potential |
|---|---|---|---|---|
| **Source** | **2013** | **Upside** | **2014** | **Upside** |
| JPM Estimates* | 411.8 | 0.0% | 438.8 | -1.4% |
| Consensus | 411.8 | 0.0% | 435.5 | -2.1% |
| Bloomberg | 411.6 | 0.0% | 425.3 | -4.4% |
| Implied (Dividend Futures) | 411.8 | - | 445.0 | - |

**Potential upside is with respect to the dividend level implied by dividend futures.

# H-Shares & Hang Seng Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## Hang Seng Dividend Estimates and Projection

**Table 5: 2013 Hang Seng Dividend Estimates**

| | JPM Estimates* | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Financials | 506.4 | 65.1% | 3.7% | 506.4 | 65.1% | 3.7% | 506.5 | 65.0% | 3.7% |
| Energy | 100.3 | 12.9% | 4.0% | 100.3 | 12.9% | 4.0% | 100.3 | 12.9% | 4.0% |
| Telecommunication Services | 68.9 | 8.9% | 3.9% | 68.9 | 8.9% | 3.9% | 68.9 | 8.9% | 3.9% |
| Utilities | 35.4 | 4.5% | 3.2% | 35.4 | 4.5% | 3.2% | 35.7 | 4.6% | 3.3% |
| Industrials | 27.8 | 3.6% | 2.5% | 27.8 | 3.6% | 2.5% | 27.8 | 3.6% | 2.5% |
| Consumer Discretionary | 18.8 | 2.4% | 1.5% | 18.8 | 2.4% | 1.5% | 18.8 | 2.4% | 1.5% |
| Consumer Staples | 12.8 | 1.6% | 1.7% | 12.8 | 1.6% | 1.7% | 12.8 | 1.6% | 1.7% |
| Information Technology | 7.8 | 1.0% | 0.4% | 7.8 | 1.0% | 0.4% | 7.8 | 1.0% | 0.4% |
| Health Care | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| Materials | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| **Total: Hang Seng** | **778.2** | **100%** | **3.3%** | **778.2** | **100%** | **3.3%** | **778.6** | **100%** | **3.3%** |

*Currently, 46 out of 50 constituents are covered by our analysts.

**Figure 4: 2013 Hang Seng Dividends Sector Distribution (JPM Estimates*)**

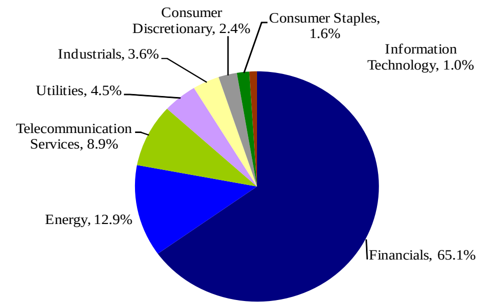


**Table 6: 2014 Hang Seng Dividend Estimates**

| | JPM Estimates* | | | Consensus | | | Bloomberg | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** | **Points** | **%** | **Yield** |
| Financials | 570.9 | 67.1% | 4.2% | 569.9 | 66.8% | 4.2% | 554.6 | 67.9% | 4.1% |
| Energy | 97.0 | 11.4% | 3.9% | 96.0 | 11.3% | 3.8% | 97.0 | 11.9% | 3.9% |
| Telecommunication Services | 67.8 | 8.0% | 3.8% | 69.4 | 8.1% | 3.9% | 68.9 | 8.4% | 3.9% |
| Utilities | 39.0 | 4.6% | 3.6% | 38.3 | 4.5% | 3.5% | 35.9 | 4.4% | 3.3% |
| Industrials | 27.5 | 3.2% | 2.5% | 28.3 | 3.3% | 2.6% | 26.7 | 3.3% | 2.4% |
| Consumer Discretionary | 25.3 | 3.0% | 2.1% | 27.3 | 3.2% | 2.2% | 11.1 | 1.4% | 0.9% |
| Consumer Staples | 15.0 | 1.8% | 2.0% | 14.2 | 1.7% | 1.9% | 13.6 | 1.7% | 1.8% |
| Information Technology | 8.2 | 1.0% | 0.5% | 9.3 | 1.1% | 0.5% | 9.4 | 1.2% | 0.5% |
| Materials | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| Health Care | 0.0 | 0.0% | - | 0.0 | 0.0% | - | 0.0 | 0.0% | - |
| **Total: Hang Seng** | **850.6** | **100%** | **3.6%** | **852.7** | **100%** | **3.6%** | **817.2** | **100%** | **3.4%** |

**Figure 5: Hang Seng Sector Distribution Projection**

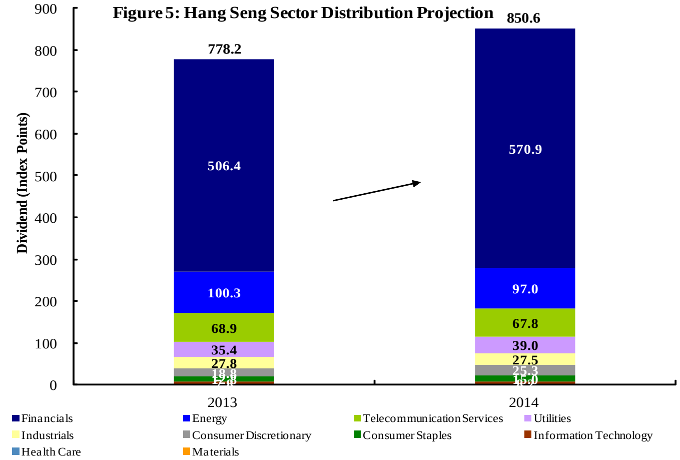


**Figure 6: Implied Dividends vs. Estimates and Potential Upside****

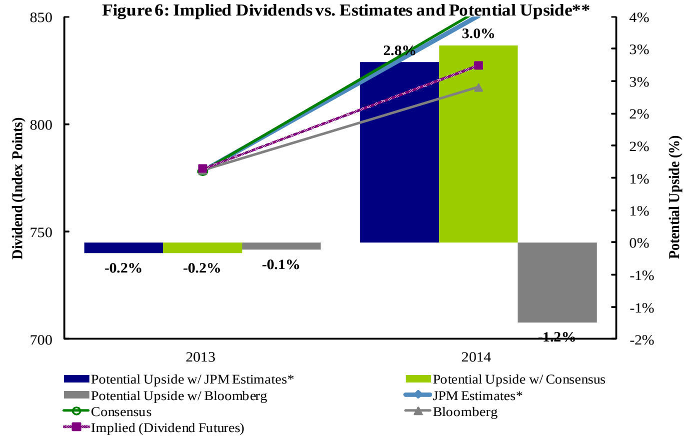


**Table 8: Implied Dividends vs. Estimates****

| Source | 2013 | Potential Upside | 2014 | Potential Upside |
|---|---|---|---|---|
| JPM Estimates* | 778.2 | -0.2% | 850.6 | 2.8% |
| Consensus | 778.2 | -0.2% | 852.7 | 3.0% |
| Bloomberg | 778.6 | -0.1% | 817.2 | -1.2% |
| Implied (Dividend Futures) | 779.5 | - | 827.5 | - |

**Potential upside is with respect to the dividend level implied by dividend futures.

# H-Shares & Hang Seng Dividend Weekly

Global Quantitative and Derivatives Strategy
Data as of November 26, 2013
Sources for data: Global Quantitative and Derivatives Strategy, Bloomberg.

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See Pages 13-14 for a full team list, contact details and legal affiliations

## H-Shares Dividend Futures Overview

**Figure 7: Term Structure of H-Shares Dividend Futures**

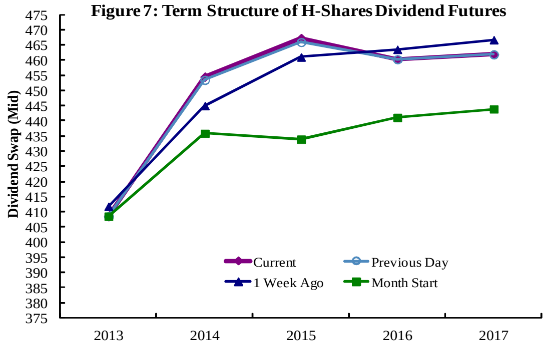



**Table 9: H-Shares Dividend Futures Prices**

| Year | Current Bid | Current Ask | Current Mid | Forecast JPM Est | Forecast Potential Upside (1) | Week-on-Week Points | Week-on-Week % | Month-to-Date Points | Month-to-Date % | Year-to-Date Points | Year-to-Date % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2013 | **402.0** | **415.0** | **408.5** | 411.8 | 0.81% | -3.25 | -0.79% | 0.00 | 0.00% | 28.00 | 7.36% |
| 2014 | **445.7** | **463.3** | **454.5** | 438.8 | -3.46% | **9.52** | **2.14%** | 18.68 | 4.29% | 64.22 | 16.45% |
| 2015 | **454.2** | **480.2** | **467.2** | | | 6.21 | 1.35% | **33.30** | **7.67%** | **78.37** | **20.15%** |
| 2016 | **446.8** | **473.8** | **460.3** | | | -3.24 | -0.70% | 19.20 | 4.35% | 71.44 | 18.37% |
| 2017 | **445.9** | **477.9** | **461.9** | | | **-4.82** | **-1.03%** | 18.02 | 4.06% | 73.03 | 18.78% |

* Highlighted cells show the largest positive and negative changes in percentage for the given category.

(1) Potential upside is with respect to the dividend level implied by dividend futures.

**Figure 8: H-Shares Realized Sector Distribution**

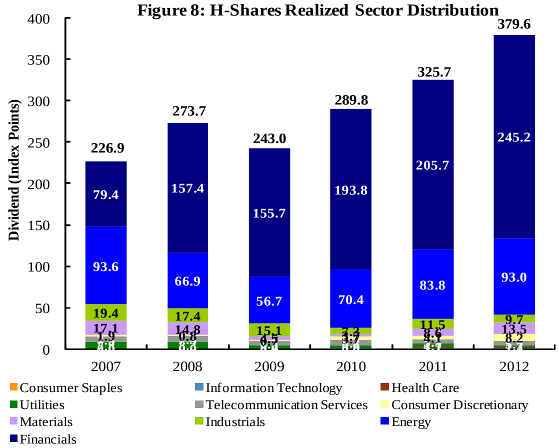
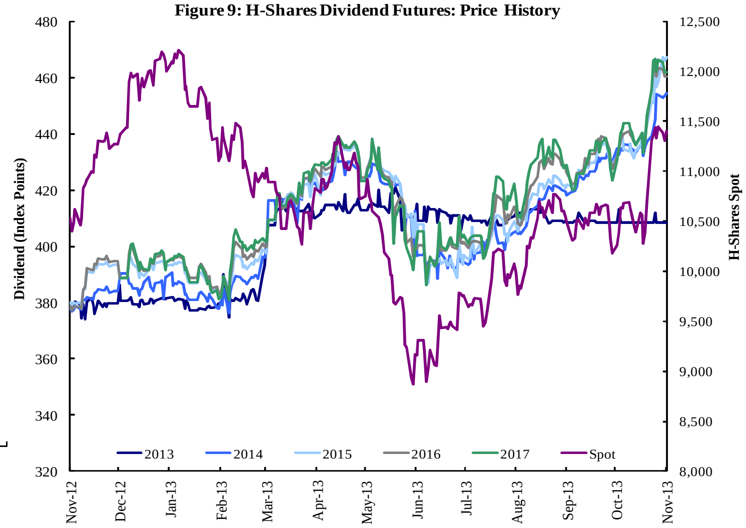



**Figure 9: H-Shares Dividend Futures: Price History**




## Hang Seng Dividend Futures Overview

**Figure 10: Term Structure of Hang Seng Dividend Futures**

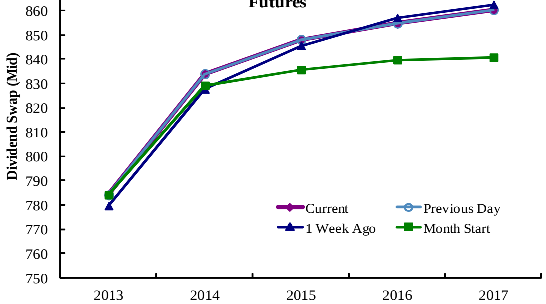



**Table 10: Hang Seng Dividend Futures Prices**

| Year | Current Bid | Current Ask | Current Mid | Forecast JPM Est | Forecast Potential Upside (1) | Week-on-Week Points | Week-on-Week % | Month-to-Date Points | Month-to-Date % | Year-to-Date Points | Year-to-Date % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2013 | **764.0** | **804.0** | **784.0** | 778.2 | -0.74% | 4.50 | 0.58% | 0.00 | 0.00% | 65.40 | 9.10% |
| 2014 | **817.3** | **850.5** | **833.9** | 850.6 | 2.00% | **6.40** | **0.77%** | 4.77 | 0.58% | 105.09 | 14.42% |
| 2015 | **821.1** | **874.9** | **848.0** | | | 2.46 | 0.29% | 12.41 | 1.49% | 115.87 | 15.83% |
| 2016 | **824.7** | **884.7** | **854.7** | | | **-2.33** | **-0.27%** | 15.06 | 1.79% | 115.22 | 15.58% |
| 2017 | **821.2** | **899.2** | **860.2** | | | -2.23 | -0.26% | **19.59** | **2.33%** | **120.75** | **16.33%** |

* Highlighted cells show the largest positive and negative changes in percentage for the given category.

(1) Potential upside is with respect to the dividend level implied by dividend futures.

**Figure 11: Hang Seng Realized Sector Distribution**

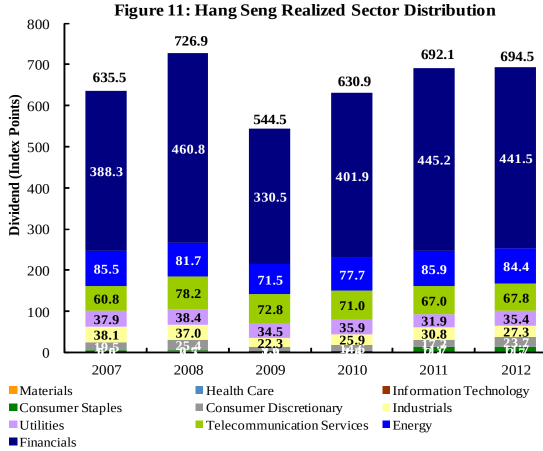
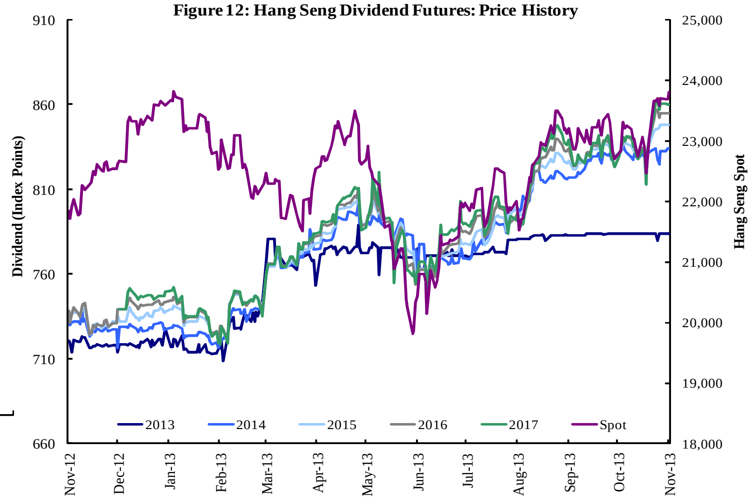



**Figure 12: Hang Seng Dividend Futures: Price History**



# Global Dividend Weekly

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# Global Dividend Weekly

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