DIVIDEND SWAPS AND DIVIDEND FUTURES

A guide to index and single stock dividend trading

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Dividend swaps were created in the late 1990s to allow pure dividend exposure to be traded. The 2008 creation of dividend futures gave a listed alternative to OTC dividend swaps. In the past 10 years, the increased liquidity of dividend swaps and dividend futures has given investors the opportunity to invest in dividends as a separate asset class. We examine the different opportunities and trading strategies that can be used to profit from dividends.

Dividend trading in practice: While trading dividends has the potential for significant returns, investors need to be aware of how different maturities trade. We look at how dividends behave in both benign and turbulent markets.

Dividend trading strategies: As dividend trading has developed into an asset class in its own right, this has made it easier to profit from anomalies and has also led to the development of new trading strategies. We shall examine the different ways an investor can profit from trading dividends either on their own, or in combination with offsetting positions in the equity and interest rate market.

Contents

HOW DIFFERENT INVESTORS CAN PROFIT FROM DIVIDENDS

The improved liquidity of dividend swaps and creation of listed dividend futures has drawn new participants to the implied dividend market. We estimate that hedge funds and proprietary trading desks still account for 80% of the market; however, we expect this to drop over time as dividends become a more established asset class. We examine the dividend trading strategies most appropriate for different investors.

Different trading techniques appeal to different types of investors

- **Equity investors**: As implied dividends usually appear cheap compared with analyst estimates, an investor can replace an equity position with a dividend position. Should equity markets range trade, then the cheap dividends should still reveal a positive return. For more details, see section "Dividends as an alternative to equity".
- **Relative value investors:** Investors who are experienced in trading relative value could apply this experience to trading the implied dividend yield in the equity derivative market. For more details, see section "Trading dividend yield".
- **Macro investors**: Macro views can be implemented using dividends for different regions (either naked long or long short). Investors can also trade an anticipated turn in the economic cycle using steepeners. For more details, please read the section "Trading dividend spread/growth (steepeners)".
- **Hedge funds and proprietary trading desks**: Hedge funds and proprietary trading desks have historically dominated the client base for dividend trading. Until the credit crunch, the most common strategy was to trade implied dividends (or dividend steepeners) naked. However, since the 2008 plummet of implied dividends, many investors sought to protect against the downside risks that were previously held either by hedging an index dividend position with a put option or by selling single stock dividends in sectors with regulatory risk (eg, Financials). For more details, see section "Hedging dividends with options" and "Dividend dispersion trading".
- **Interest rate investors**: Empirically, there is a relationship between dividend yield and interest rates. An investor who would normally invest in the rates market could consider investing in dividend yield instead and benefit from the cheapness in the implied dividend market. More details of the correlation between dividends and interest rates can be seen in the section "Dividends vs interest rates".
- **Investors concerned about inflation**: For more than 100 years, dividend payouts for the UK and US have risen in line with inflation. Dividend payouts have the same advantage as equities as an inflation hedge, but with a lower volatility. For more details, see section "Dividends as inflation hedge".
- **Money market/short-term yield investors**: Investors with a very short time horizon could consider near-dated implied dividends (maturity less than a year) as dividends become a "cash basket" during Q2 of their year of expiry (as majority of dividends would have been announced). As there is usually a "pull to realised" in Q3 of the year preceding maturity, short-term yield investors could consider dividends of maturity circa one year. For more details, please see the section "How dividends trade in a crisis".

EVOLUTION OF THE DIVIDEND MARKET

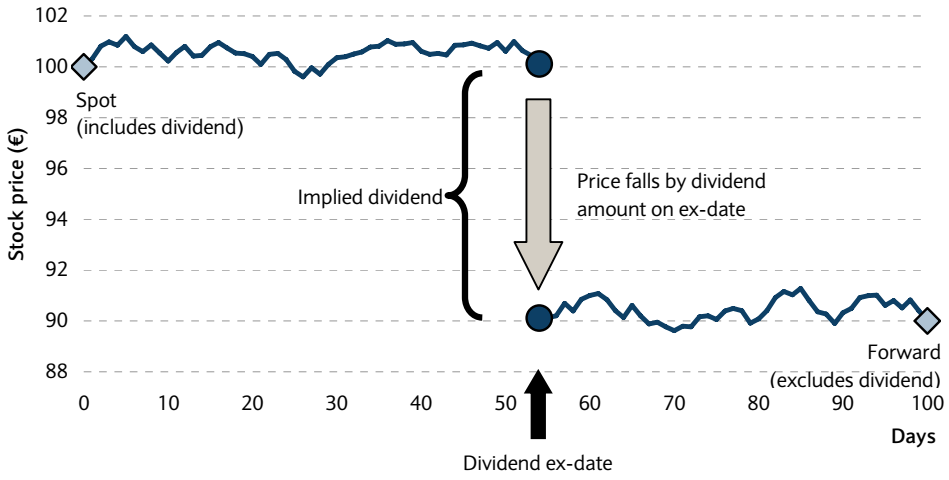
From the difference in price between a stock and its forward (or future), it is possible to calculate the value of an unknown dividend implied by the futures market (the implied dividend). There are three main methods an investor can use to trade an implied dividend: 1) near-dated dividends can be traded through an Exchange For Physical (EFP); 2) to trade dividends between two dates, an investor can use forwards/futures, yet they will have to hedge their interest rates risk as well; 3) the simplest method is dividend swaps/dividend futures, which give pure dividend exposure.

1) EFP (Exchange For Physical)

A useful rule is that a long forward position is a short dividend position

A forward (or future, its listed equivalent) is the most simple equity derivative. As it is an agreement to exchange a security at a specified date in the future (at a price and location agreed today), the owner of the forward does not get any of the benefits of owning the security until the expiry date. This means the owner of a forward on a stock or index does not receive any dividends between now and expiry. Ignoring the effect of interest rates or repo (or assuming these are hedged), the price of a share and its forward will move in tandem. Hence, if an investor has a long stock and short forward position, the combination should only be exposed to the value of the implied dividend embedded in the forward price (and interest rates and repo which we shall assume is hedged). This position is established by selling the Exchange For Physical (EFP). The reverse trade (short stock and long forward), or buying the EFP, can be initiated if an investor wants to short implied dividends.

Figure 1: How implied dividend value can be calculated from spot and forward price



Source: Barclays Capital

EFP allows near-dated dividends to be traded

The price of an EFP is quoted in terms of the basis between the forward and spot (a positive price implies that the forward is trading above cash). If the implied dividend rises in value, the value of spot remains unchanged while the forward price declines. As selling the EFP is short the forward, it earns a profit (as expected because the position is long implied dividends, which have increased). An EFP therefore captures all dividends whose ex-date is between the trade date and the expiry of the forward and, hence, allows near-dated dividends to be traded.

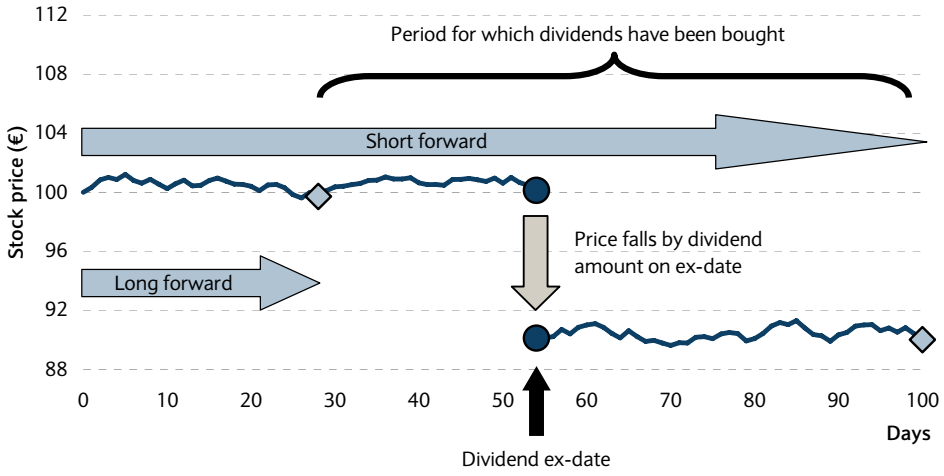
EFP are normally used to trade known dividends

A typical maturity for an EFP is three months. As near-dated dividends have usually been announced, and are therefore known, trading unknown implied dividends via an EFP is not as practical as other methods. One motivation for trading known dividends through an EFP is the different tax treatments of different investors.

2) Forward/futures (or synthetics)

A forward is a contract to buy (or sell) a quantity of an underlying security at a specified price (or strike) on a specified maturity. An investor can trade the implied dividends between two expiries by going long and short two different forwards. The net position is then exposed to the dividends between those two expiries (and interest rates and repo which we shall assume is hedged), as can be seen in Figure 2 below.

Figure 2: Trading dividends between two dates via forwards



Source: Barclays Capital

Investors can go long dividends by trading a long and short futures position

The rule that short forward is long dividends can be amended to a long/short forward rule, as the driver for the dividend position is the position in the far-dated forward. Hence, if an investor is short the far-dated expiry and long the near-dated expiry, then they are long dividends between the two expiries. To be short dividends, the reverse trade can be put on.

Near-dated forward must be rolled approaching expiry

Trading near dated dividends is only possible via an EFP

One problem with using only forwards to trade dividends is that an investor does not have a position in the dividends before the expiry of the near-dated forward. Trading these near-dated dividends is only possible via an EFP. This is not a serious obstacle to using only forwards to trade dividends because near-dated dividends are usually announced well before their ex-date (and as a forward is an OTC instrument, an expiry before the first estimated dividend ex-date can be chosen). When the near-dated forward approaches expiry, it should be rolled to a longer maturity (or the position will turn into a naked position in the far-dated forward).

Trading dividends via forwards ties up less capital than an EFP

One major advantage of using forwards to trade dividends rather than using an EFP is the fact that it is not a funded trade (unlike an EFP). The release of capital by trading forwards rather than an EFP is the primary reason it is a far more popular method of trading implied dividends.

Futures are a listed alternative to forwards

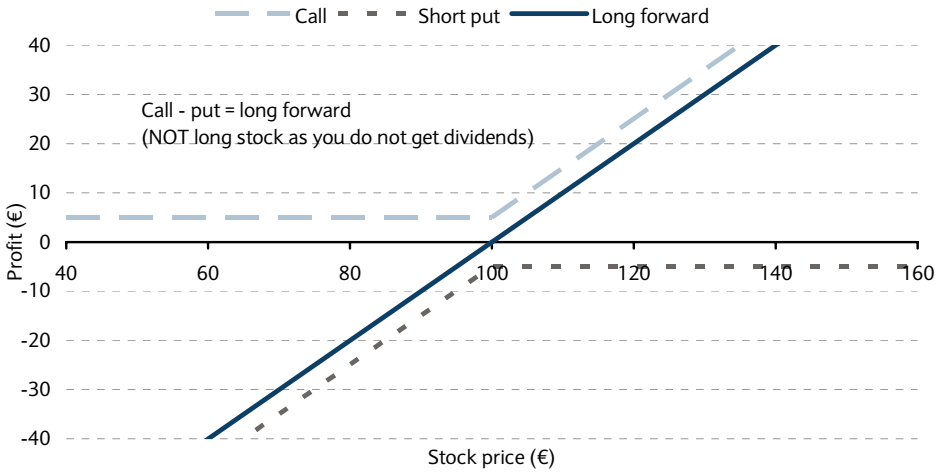
Forwards, being an OTC instrument, have the advantage of being completely flexible. This flexibility, however, comes with the disadvantage of counterparty risk. For investors unwilling to take this risk, or if an investor is restricted to trading listed instruments, then futures are a listed alternative to forwards.

Synthetics (long call, short put) are an alternative to forwards

While put call parity holds for European options, it is only approximately true for American options

A long call and short put position being equal to a long forward is known as put call parity, and this relationship is shown below. While put call parity holds for European options, it is only approximately true for American options. It is key that a long call short put is equal to a forward (not a future), but it is not equal to long stock (as you do not receive the dividends). If the options traded are OTC, then the long OTC call short OTC put is equivalent to an OTC forward. As there is little benefit in splitting an OTC forward into a separate European call and put, we would not recommend this form of trading dividends. However, for listed options, the long listed call short listed put position is equivalent to a future, although the margining is not necessarily identical. As indices usually only have futures for near-dated expiries, and often only on quarterly expiries not monthly expiries, using listed synthetics allows a greater and longer range of maturities to be traded on exchange.

Figure 3: Put call parity (European call – European put = long forward)



Source: Barclays Capital

3) Dividend swaps/dividend futures

The exact ex-date within the period of the dividend swap is irrelevant

In order to simplify dividend trading, dividend swaps were created in the late 1990s. The purchaser of a dividend swap agrees to pay at expiry a fixed dividend amount (fixed leg) in return for the sum of all qualifying dividends during the period of the swap (floating leg). As both the fixed and floating leg payments are on the same date (end of the swap), they are netted off against each other. An important point to note is that as the dividends are summed, the exact ex-date within the period of the dividend swap is irrelevant (as long as it is within the period of the swap). Dividend futures were created in 2008 as a listed alternative to dividend swaps.

Single stock dividend swaps are quoted in number of shares

For single stocks a dividend swap has to be quoted in currency and for a certain number of shares. If an investors buys a single stock dividend swap at €1 for 1,000,000 shares and the sum of the dividends for that year is €1.10, then the investor makes €100,000 = (€1.10 - €1) * 1,000,000. Typically, the maturity of single stock dividend swaps is no more than a couple of years in the future.

Index dividend swap are quoted in amount per index point

The calculation for an index dividend swap is similar to the calculation of the index itself, except the dividend is substituted for the equity price. The payout is therefore the sum of all qualifying dividends multiplied by the free float (as determined by index provider) of the stock paying that dividend divided by the divisor on that ex-date. Index dividend swaps can be found up to five to ten years.

$$\text{Index dividend} = \sum_{\text{All qualifying dividends}} \frac{\text{Number shares of stock paying } D_i}{\text{Index divisor on ex - date of } D_i} D_i$$

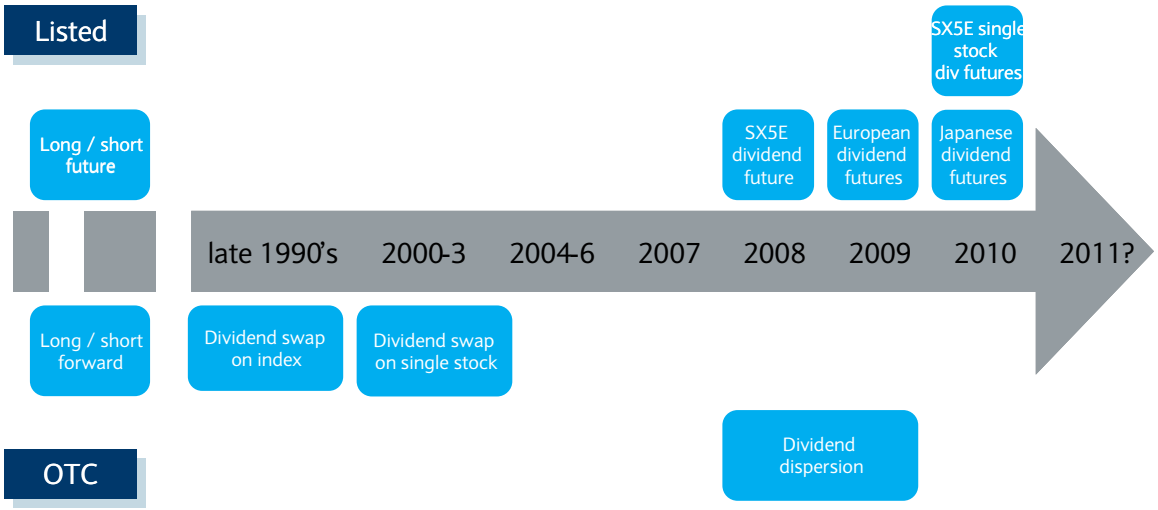
Dividends swaps do not NPV dividend payout, unlike EFP and forwards

We would highlight that while trading dividends via dividend swaps/dividend futures is very similar to using either method 1 or 2, there is a slight difference due to interest rates. Dividend swaps and dividend futures do not differentiate between dividend payments depending on when in the year they were paid. If dividends are traded via EFP or futures/ forwards, then the implied dividend is the net present value of the dividend, hence when the ex-date lies can change the value.

Conclusion: Dividend swaps (or futures) are the most convenient

In order to simplify trading of dividends, the dividend swap was created in the late 1990s. For both EFP and trading dividends via futures, there is a residual interest rate component that should be hedged to obtain pure dividend exposure. There is also the overhead of dealing with index changes, rolling of position, changing repo cost, etc. More recently, a listed version of a dividends swap – a dividend future – has been created. The timeline of the creation of these dividend products is given in Figure 4.

Figure 4: Dividend product timeline, split by listed and OTC offerings



Source: Barclays Capital

SX5E was the first index to have a listed dividend future

The SX5E was the first index to have listed dividend futures, which were launched in June 2008. The success of this product led to increased liquidity and visibility for SX5E implied dividends. A side benefit was anonymity, which was attractive to investors who wanted to reduce (or build) long dividend positions without alerting the market. A year after the success of SX5E dividend futures, most major European exchanges launched listed dividend futures. In 2010, Japanese indices followed suit, and the NKY actually has dividend futures listed on both the Singapore stock exchange and the Tokyo stock exchange.

Single stock dividend future coverage likely to expand

2010 also saw the launch of single stock dividend futures on the members of the SX5E. Eurex is looking to expand its coverage of single stock dividend futures. Ten Swiss stocks are likely to have single stock dividend futures listed by the end of 2010, and we expect some UK stocks to have single stock dividend futures launched in 2011.

S&P500 dividend liquidity suffers from lack of structured products

In our opinion, liquidity of index dividend swaps is driven primarily by the presence of structured products on that index. Without the overhang and inefficiency of the implied dividend market from structured products, there is less reason for investors to trade an instrument in a zero sum game. Because structured product issuance is more common on non-US indices, the implied dividend market is significantly less liquid in the US (especially compared with the size of the equity market). The fact that the S&P500 is such a broad index with a steadier dividend payout (due to low payout ratio) also discourages trading of its implied dividends.

Taxation gives a range for implied dividends

If an investor owns a share, they only receive the net dividend (ie, 100% less withholding tax). If an investor shorts a share, they have to pay the gross dividend (ie, 100%). Therefore, there is a range (or arbitrage channel) that forwards can trade without being arbitraged. We also note that different investors are subject to different taxation on dividends. The "fair value" of a forward (or future) can be thought of as a blend of the different taxation rates of the different investors. In this way, investors with more beneficial tax treatments implicitly share their beneficial tax treatment with other investors.

Ranking of implied dividend liquidity is dependent on maturity

FTSE implied dividends over two years in maturity are correlated to SX5E dividends

While the SX5E is undoubtedly the most liquid index for dividend trading, both the FTSE and S&P500 have a viable claim to be in second place. While the FTSE is the more liquid for maturities up to two years, longer-dated maturities tend not to trade. We would not recommend investors trade long-dated FTSE implied dividends because they are very correlated to SX5E dividends of similar maturity and suffer from reduced liquidity and wider bid offer spreads. If an implied dividend has a maturity greater than two years, we believe the S&P500 is the second most liquid index. The NKY ranks fourth place for liquidity, in our view, no matter what the maturity.

Figure 5: Liquidity of different dividend markets

Index	Typical clip size K	Typical clip size €K	Dividend in points	Typical notional clip (EUR size *div) €Mn
SX5E	c.100	c.100	c.116	c.11.6
FTSE	c.20	c.23	c.195	c.4.5
SPX	c.100	c.72	c.25	c.1.8
NKY	c.1,000	c.8	c.173	c.1.4
Single stock	NA	NA	NA	c.0.4

Source: Barclays Capital

DIVIDEND TRADING IN PRACTICE

HOW DIVIDENDS OF DIFFERENT MATURITY TRADE

Implied dividends trade very differently depending on their maturity. Analyst forecasts are a key driver of value for implied dividends up to one or two years. For maturities of two years or more, implied dividends often trade more as a yield, and therefore are highly correlated to spot in order to keep the dividend yield relatively stable. The overhang from structured products (and additional risk premium for longer maturities) ensures that as implied dividend maturities increase, so does their cheapness.

Analyst dividend forecasts and interest rates are correlated to spot

There is a high correlation between dividends and spot across the entire implied dividend curve

While analyst dividend forecasts and spot are two different variables, they are correlated because higher dividend payments are likely to lift equity prices. In addition, the exact level of the dividend yield for medium- to far-dated maturities is correlated to interest rates, which are often correlated with spot (as interest rates are normally cut in a downturn). The fact that analyst dividend forecasts and dividend yield/interest rates are correlated to spot means there is a high correlation between dividends and spot across the entire implied dividend curve, even at the front end when there is a greater degree of certainty about dividend payments.

Earnings forecasts can be used as a guide for dividend changes

As companies often keep dividends constant and only change the dividend amount when a significant change can be made, this can reduce the accuracy of bottoms up dividend forecasts. For example, let's assume an index has 10 companies each covered by 10 separate analysts, and every year one of those companies increases its dividend, and all the rest keep dividends constant. Each analyst is likely to predict no growth for the company they cover (as each individual company has a 90% chance of not raising its dividend). However, if these forecasts are aggregated, the index dividend bottom-up forecast would also reveal no growth, when there should be an increase as every year one company would lift its dividend. In this case, looking at earnings growth can be a useful guide to dividend growth.

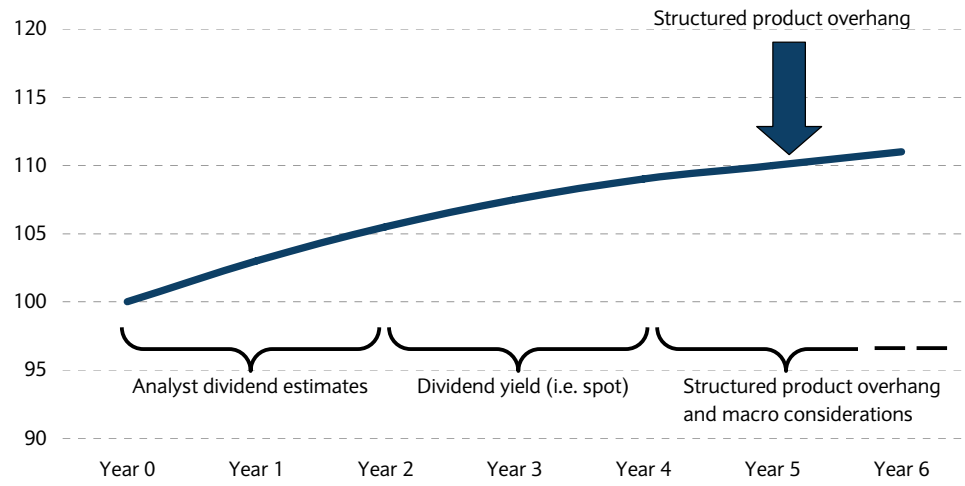
Sometimes bottom-up forecasts need to be amended with a top down view

An alternative method to bottom up is to compute a payout ratio (forecast dividends/forecast earnings) for the index. If the payout ratio is assumed to be constant, then calculating the expected dividend based on multiplying this ratio by the forecast earnings can be a more accurate forecast than a simple bottom up of individual forecasts. Because the dividend bottoms up for the Nikkei 225 implies a falling payout ratio, we are particularly keen on using this alternative method for this index. However, if the forecast payout ratio is more stable (as for other indices), we prefer a simple bottom up of dividends as we believe this will be more accurate.

Structured product issuance weighs on far-dated implied dividends

The dividend overhang from structured products is concentrated in the three to seven year bracket (but lasts until the c.10-year maximum maturity of these products). This overhang does still affect the near end of the curve, as any dislocation (ie, near-dated dividends trading too high) will prompt investors to put on dividend steepeners (short near-dated dividends, long far-dated dividends) to profit from the low implied dividend growth rate. Since the effect of the structured products overhang is greater for longer maturities, this usually results in the increasing cheapness of implied dividends with maturity.

Figure 6: Drivers of implied dividend value by expiry

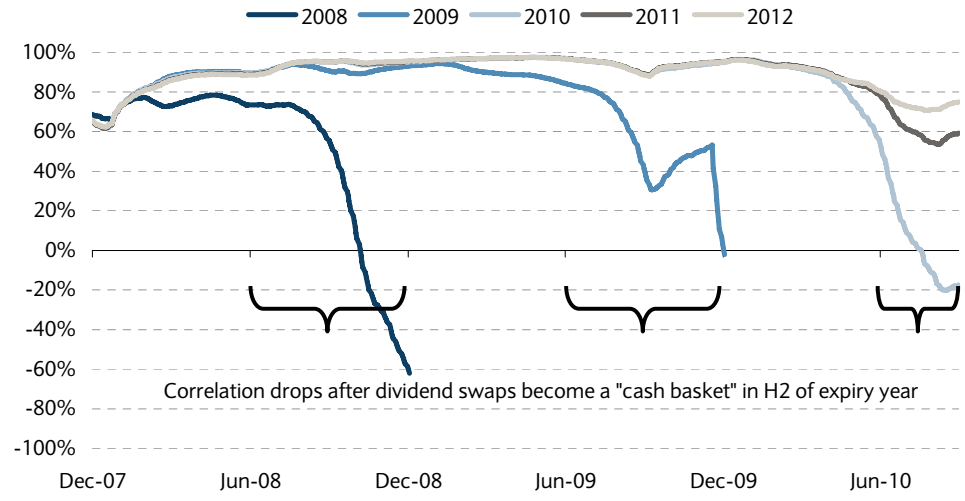


Source: Barclays Capital

Dividend swaps become a "cash basket" during Q2 of expiry year

Irrespective of the frequency of dividend payments, a dividend swap essentially becomes a "cash basket" in Q2 of the expiry year. This is because annual dividends (as are the norm for many continental European companies) are typically announced by the end of H1. If a company pays an interim dividend, then either interim and final are announced at the same time (as in Japan) or the final (and largest) dividend is usually announced in H1 (as in UK). If dividend payments are quarterly (as in the US), then by end H1 half of the dividends would have been announced, and there would be good visibility on the remaining dividends. By plotting annual correlation (see Figure 7), it can be seen that the correlation between implied dividends and spot plummets in H2 of expiration year.

Figure 7: SX5E one year correlation between spot and implied dividends



Source: Barclays Capital

Dividends tend to "pull to realised" in Q3 the year before expiry

As dividends are paid out of the previous year's earnings, by Q3 the previous year investors can have increasing confidence in analyst dividend forecasts

While implied dividends become a cash basket during Q2 the year of expiry, they do converge with bottom-up forecasts beforehand. For the SX5E, this typically occurs during Q3 the year before expiry, as by this point two quarters of results for that calendar year are known. Since dividends are paid out of the previous years earnings by Q3 the previous year, investors can have increasing confidence in analyst dividend forecasts. As more companies in the FTSE pay interim dividends, the "pull to realised" occurs later than for the SX5E because the calendar year dividend payout of a company paying interim dividends is the sum of the final and interim dividends of different financial years (whereas for a company paying an annual dividend it is based on only one financial year). As the earnings for a later period (interim dividends are based on the first six months earnings in a financial year) has to be considered, the "pull to realised" occurs later.

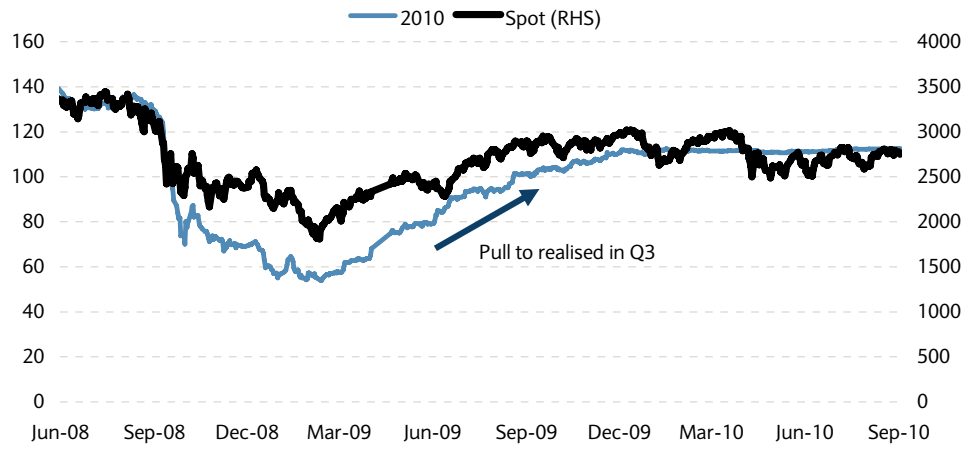
"Pull to realised" effect can be dwarfed by extreme events

This "pull to realised" effect assumes there are no extreme events that could affect dividend payments, which is why it did not occur during 2008 (government restrictions on dividend payments). We note that "pull to realised" does not necessarily mean the value does not change afterward, as FTSE dividends quickly moved when BP cancelled its dividend in 2010.

Effect of financials cutting dividend is particularly acute for the FTSE

The "pull to realised" effect is less visible for the FTSE as the effect of financials cutting their dividends is particularly significant for this index. Because expectations for financials dividends are often correlated to spot, FTSE dividends have been more spot sensitive than other indices in Q1 10. As the credit crunch related restrictions on dividends fade, we would expect implied dividends on the FTSE to behave in a similar manner to other indices.

Figure 8: SX5E 2010 implied dividend "pull to realised" in Q3



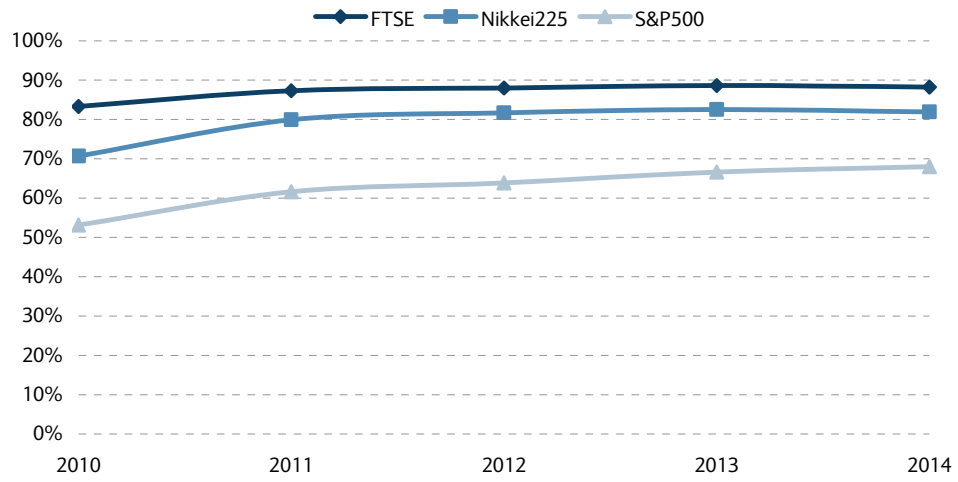
Source: Barclays Capital

Dividend correlation between regions increases as maturity rises

Correlation between implied dividends in different regions increases during bull markets

Implied dividends tend to trade in line with spot; hence, because major indices are correlated, so to are their implied dividends. If we look at dividend yields between the regions, the longer-dated end is more correlated than at the near-dated end. We believe this is because long-dated dividend yield (three years and more) is more concerned with macro considerations that are common to all indices (as can be seen in Figure 9). In addition, the correlation between implied dividends in different regions typically increases during bull markets, as the effect of bear markets differs greatly across regions. The low correlation between the S&P500 and SX5E is due to the fact the S&P500 has a far lower dividend payout and, hence, was able to limit dividend reductions when spot collapsed.

Figure 9: Dividend yield two year (2008-09) correlation with Eurostoxx50 dividend yield



Source: Barclays Capital

HOW DIVIDENDS TRADE IN A CRISIS

Companies are typically reluctant to cut dividends, which makes them "sticky" to the downside. However, in the event of a crisis and severe declines in spot, then companies will reduce them by a large amount, sometimes even to zero. Because companies will regularly increase dividends by a few percent but will only cut dividends by large amounts, this means dividends behave very differently in a crisis. Additionally, as exotics desks become longer dividends, the spot falls further, the technical imbalance in the dividend market becomes more acute during a downturn.

Dividends rarely underperform spot, even in a crisis

The last time S&P500 realised dividends declined more than spot was in the 1930s

As payout ratios are normally well below 100%, even if earnings decline, dividend payments can normally be maintained. Companies usually consider cutting the dividend to be a last resort, which means dividends rarely underperform spot. When the S&P500 declines, there is only a cut in dividends 58% of the time; the last time realised dividends declined more than spot was in the 1930s. However, in 2008, the severity of the credit crunch and the imposition of government constraints on financial institutions caused S&P500 implied dividends to underperform the spot market. Since US dividend yields at c.2% are relatively low, S&P500 dividend swaps have only underperformed spot by 4% (peak to trough). SX5E and FTSE dividends have underperformed by 13-18% due to their relatively high 4% and 3.5% dividend yields, respectively. NKY dividends have underperformed by 15% despite the having a lower c.1.5% dividend yield than the S&P500.

Figure 10: Equity and dividend peak to trough declines during credit crunch

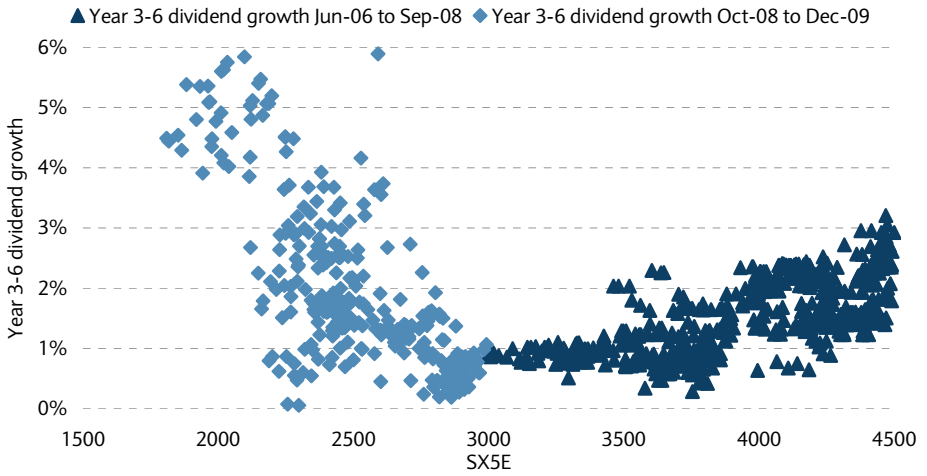
Index	Spot peak to trough	Dividend swap peak to trough (average 2010-15)	Dividend underperformance
Eurostoxx50	60%	73%	13%
S&P500	57%	61%	4%
FTSE	48%	66%	18%
Nikkei 225	61%	76%	15%

Source: Barclays Capital

Credit crunch dividend restrictions caused implied growth rates to soar

The restrictions on paying dividend during the credit crunch caused a collapse of near-dated implied dividends. Since dividend investors appeared to believe there was a fundamental support to long-dated dividend payouts as these effects fade, far-dated dividends suffered less of a decline. Because of this, the beta of far-dated dividends appears to be lower than for near-dated dividends as far-dated dividends are now more "sticky". Hence, as spot declines, the implied dividend growth rate increases, and vice versa. This is the opposite of the relationship pre-Lehman bankruptcy where rising equity markets prompted investors to price in rising dividend yields. This can be seen in Figure 11.

Figure 11: SX5E year 3-6 average implied dividend growth per year



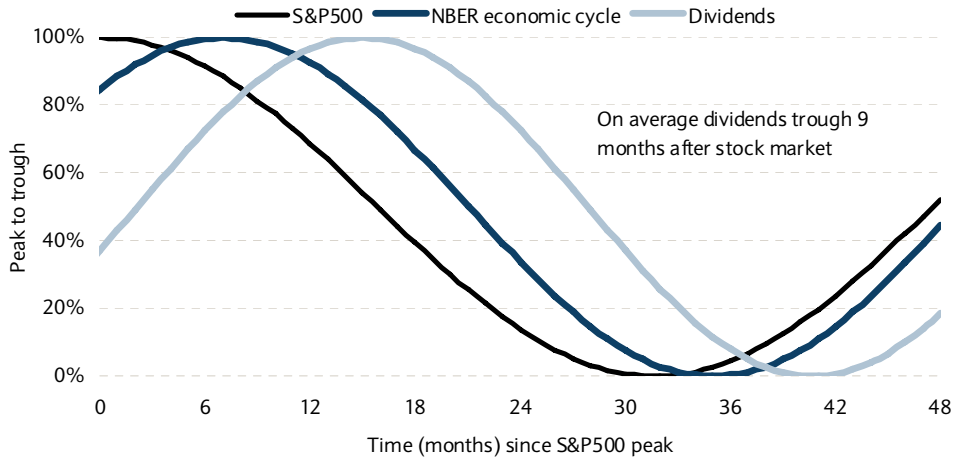
Source: Barclays Capital

Dividend peak to trough cycle is normally shorter than for equities

S&P500 dividend cycle has never troughed more than two years from the equity low point

Comparing the S&P500 dividend cycle (peak to trough) to the performance of the S&P500 itself since 1871, we see that the dividend cycle is on average six months shorter and starts 15 months later. Because dividends, on average, trough nine months after the low of the S&P500, and since we do not believe the March 2009 low will be broken, this implies 2010 should mark the lows for dividend payouts. The S&P500 dividend cycle has never troughed more than two years from the equity low point; thus, we believe that expecting 2011 to mark the lows for dividends can be considered a reasonable "worst case" scenario.

Figure 12: S&P 500, US economy and US dividend average peak to trough since 1871



Source: Barclays Capital

Dividend yields are normally 0.8% lower on average after a severe crash

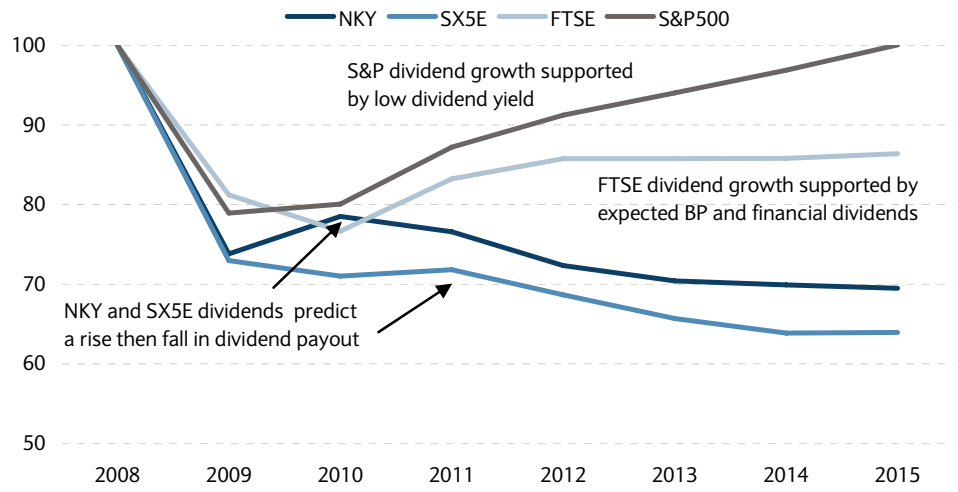
Since 1871, a decline in dividend payments for the S&P500, on average, led to dividend payments returning to their previous values when equities returned to their earlier peak. However, if there was a larger decline in dividends than equities, dividend yields were 0.8% lower on average when spot recovered to its previous levels (as companies hoarded cash).

Current implied dividend levels anticipate a "double dip"

It is unlikely that dividend payments will first rise after a downturn, then subsequently fall, without a severe shock

Implied dividends predict a rise in dividends for the NKY and SX5E in 2010 and 2011, respectively. Subsequently, they predict a decline or "double dip". We believe that excluding a severe shock (sovereign default etc), it is unlikely that dividend payments will first rise after a downturn, then subsequently fall. A shift from paying dividends towards more share buy backs is unlikely to be such a strong trend that it will dwarf the increased dividend payments from other companies. Investors who believe a double dip is unlikely can use dividend steepeners to profit from the anticipated correction. As the S&P500 is a broad index with low payout ratio, it is unlikely to suffer a "double dip". Similarly, as BP and financials have already cut their dividends and dividend payments cannot go below zero, further declines are unlikely.

Figure 13: NKY, SX5E, FTSE and S&P500 dividends by maturity (rebased)



Source: Barclays Capital

MEMBERSHIP CHANGES ON INDEX DIVIDENDS

In general, survivorship bias could benefit index dividends compared with bottoms up, as companies doing badly and cutting dividends is more likely to be kicked out of an index than a company doing well and growing dividend payments. We note this was not the case for the September 2010 rebalancing of the SX5E and FTSE 100, so investors need to be mindful of the additional risk membership changes present.

Size of company and dividend yield determines effect on index

It is not always true that if a low yielding stock is replaced by a high yielding stock in an index that the index dividend yield must increase. The size of the company also has to be taken into account, as it affects the divisor. For example, if an index has two members:

- Company A of size €100mn with 4% dividend yield
- Company B of size €1mn with 0% dividend yield

Then the index of the two stocks has a dividend yield slightly under 4%. If company A is replaced by company C of size €1mn with 6% dividend yield, then the index consists of:

- Company B of size €1mn with 0% dividend yield
- Company C of size €1mn with 6% dividend yield

Effect of changing membership on an index dividend yield is not always intuitive

Despite the fact company A has a dividend yield of 4% and was replaced by company C with a higher dividend yield of 6%, the index dividend yield has now fallen from c.4% to 3%. This is an extreme example; if the index membership was determined by the largest stocks in the universe, then a large company A would not be replaced by a smaller company C. It does, however, show that the effect of changing membership on an index dividend yield is not always intuitive.

Dividend frequency can change index payout

When considering index membership changes, it is important to note the frequency of dividend payments. For example, in the September 2009 rebalancing of the Eurostoxx50, the entry of Unibail, which pays quarterly dividends, boosted SX5E 2009 dividend swaps because the company it replaced paid less frequent dividends and had already paid for 2009.

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DIVIDEND TRADING STRATEGIES

DIVIDENDS AS AN ALTERNATIVE TO EQUITY

If dividend yields are relatively stable (and do not fall to near zero or rise to infinity), then realised dividends should be highly correlated to the movement in spot. A similar argument can be made with regards the implied dividend divided by the spot (the implied dividend yield in the future). Hence, implied dividends should be correlated to spot. As dividends are usually cheap and highly correlated to equities, they are an attractive alternative to equity investment.

Beta of implied dividend usually increases with maturity

The further away an implied dividend is, the more investor's focus shifts from analyst forecasts towards dividend yield and hence spot

The near end of dividend swaps is determined by the announced dividends and analyst dividend forecasts; hence it has a low beta to spot. The longest dated dividend swap is purely traded on the basis of long-term dividend yield expectations; hence it has a beta very close to one. Therefore, the beta of implied dividends increases with maturity and should converge to one. We note that at times of distress and recovery (eg, Lehman bankruptcy), the beta of implied dividends can be greater than one.

Figure 14: SX5E beta of implied dividends versus spot during 2010

Implied dividend	2011	2012	2013	2014
Beta	0.69	0.82	0.90	0.91

Source: Barclays Capital

Implied dividends are usually less volatile than equities

When the volatility of realised dividends is compared with equities, it can be seen that dividends are less volatile than equities. We note that for shorter periods of time, implied dividends can be more volatile than spot as dividends often trade away from fundamental value for technical reasons (as the structured products sellers become longer implied dividend risk as spot declines, and they hedge this risk by selling dividends, which can cause implied dividends to over shoot on the downside). Over the longer term, we would expect implied dividends to be more stable than spot.

Figure 15: SX5E volatility of spot and dividend futures since launch in June 2008

Security	Spot	2011 dividends	2012 dividends	2013 dividends	2014 dividends
Volatility	33%	24%	27%	28%	30%

Source: Barclays Capital

TRADING DIVIDEND YIELD

Trading dividend yield is possible by investing in dividend swaps and shorting the equity risk for the same notional amount as the dividend swap. Going long dividends and hedging out the equity risk is a very popular method of extracting value from the cheapness of implied dividends, as it removes the mark-to-market swings related to the equity risk. In this way, it hedges the beta equity market risk, leaving the investor with a net alpha (cheapness versus forecast dividends) position.

Dividend yield trades are long dividends and short the underlying

Trading implied dividend yield can be structured by matching the total notional

To invest in implied dividend yield, an investor must go long implied dividends and go short the underlying index or single stock (or vice versa to sell dividend yield). Trading implied dividend yield can be structured by matching the total notional:

- Going long implied dividend of price D and size (or dividend swap notional) N. The total notional is therefore equal to D * N.
- Short the underlying equity exposure (usually using spot / futures) at price S_0 and size (or futures units) U equal to D * N / S_0. The total notional is therefore D * N (as total notional is equal to futures notional = S_0 * U = S_0 * [D * N / S_0]).

Intuitively, this makes sense as if both price and dividends go to zero, the trade breaks even.

Trading dividends versus futures is equivalent to trading dividend yield

$$\text{P \& L} = (\text{Performance long div - Performance short stock}) * \text{Total notional}$$

$$\text{P \& L} = (D_1 / D_0 - S_1 / S_0) * \text{Total notional}$$

$$\text{P \& L} = (S_1 / S_0) * ([D_1 / D_0] * [S_0 / S_1] - 1) * \text{Total notional}$$

$$\text{P \& L} = (S_1 / S_0) * ([D_1 / S_1] / [D_0 / S_0] - 1) * \text{Total notional}$$

$$\text{P \& L} = (S_1 / S_0) * (\text{Dividend yield}_1 / \text{Dividend yield}_0 - 1) * \text{Total notional}$$

$$\text{P \& L} = (S_1 / S_0) * \text{Dividend yield return} * \text{Total notional}$$

As the total notional = future notional at inception = S_0 * U (where U is the number of equity futures units traded) an alternate way of looking at the P&L is:

$$\text{P \& L} = \text{Dividend yield return} * \text{Futures notional at expiry}$$

where:

D_0	= Implied dividends at time 0
D_1	= Implied dividends at time 1
S_0	= Spot at time 0
S_1	= Spot at time 1
Futures notional at expiry	= S_1 * number of equity futures traded

Buying dividend yield is profitable if implied dividend rises

The profit is therefore equal to the return on dividend yield multiplied by the total notional multiplied by the change in spot (S1/S0). The change in spot (S1/S0) is not likely to be that significant (on average it is just the forward interest rate) compared with the effect of change in dividend yield (and it will not alter the sign).

Shorting futures is an alternative to shorting stocks or long-dated forward

While the short position could be carried out by shorting stocks, shorting all the stocks in an index is more time consuming and likely to be more expensive than trading a near-dated future. Rolling near-dated futures benefits from the tight bid offer spreads in the front month contract and also reduces the number of unknown dividends before expiry (compared with a far-dated future, which is more likely to have estimated dividends before expiry). The front month future therefore has less dividend risk than other futures. Equally, the interest rate risk for the front month contract will be relatively small.

TRADING DIVIDEND SPREAD/GROWTH (STEEPENERS)

A dividend steepener is when an investor goes long and short implied dividends of different maturities. Such a structure is useful for macro investors anticipating a turn in the markets, or for profiting from an imbalance in the dividend market. There are two ways to play an increase of dividends: 1) dividend growth – trading the implied dividend growth rate and; 2) dividend spread – trading absolute difference in dividend. Of the two, playing the dividend spread is by far the most popular and is also our favourite way of playing dividend growth as it should profit from a rise in dividends, which are usually cheap.

Dividend growth and dividend spread are different trades

A client believes longer-dated 2015 dividends at 100 points are cheap compared with near-dated 2012 dividends at 90 points. There are two potential trades:

- Dividend growth (trade identical total dividend notional = notional per point * dividend swap level)
- Dividend spread (trade identical notional per point)

1) Dividend growth (implied dividend growth rate)

To trade dividend growth, an investor trades an identical total dividend notional for the two dividend swaps (or futures). Dividend notional is equal to the notional per point multiplied by the dividend swap level. In the example where 2012 dividends are 90 points and 2015 dividends are 100 points, an investor would trade dividend growth by shorting, say, 50K of 2012 dividends and going long 50K*90/100 = 45K of 2015 dividends. If both dividends increase by the same percentage, the trade breaks even. In this case, the notional per point multiplied by dividend swap level is equal to 4,500K for both (4,500K = 90 * 50K = 100 * 45K).

Dividend growth is used to trade Compound Annual Growth Rate (CAGR)

Dividend growth can be traded fundamentally or technically

When looking at trading growth, looking at the Compound Annual Growth Rate (CAGR) is a useful way to identify opportunities. For example Figure 16 below shows the implied CAGR between two dividend swaps (or futures). An investor can either make a fundamental judgement as to which is the best opportunity, or a technical judgement by calculating the percentile over a one-year history to identify which growth rate looks attractive from a technical view point.

Figure 16: Dividend CAGR (Compound Annual Growth Rate) and percentile (1 year)

	2009	2010	2011	2012	2013	2014	2015
2010	-12.0%						
2011	-7.1%	-2.0%					
2012	-4.7%	-0.8%	0.3%				
2013	-3.5%	-0.5%	0.2%	0.1%			
2014	-2.7%	-0.2%	0.4%	0.5%	0.9%		
2015	-2.0%	0.1%	0.6%	0.8%	1.1%	1.3%	
2016	-1.6%	0.3%	0.8%	0.9%	1.2%	1.3%	1.3%

Historical Percentile
83-100%
67-83%
50-67%
33-50%
17-33%
0-17%

Source: Barclays Capital

2) Dividend spread (absolute difference in implied dividends)

To trade the dividend spread, an investor trades an identical notional per point for the two dividend swaps (or futures). In the above example, where 2012 dividends are 90 points and 2015 dividends are 100 points, an investor would trade the dividend spread by shorting 50K of 2012 dividends and going long 50K of 2015 dividends. If the absolute difference between the two dividends stays the same, the trade breaks even.

Long dividend spread = long dividend growth + small long dividend position

If dividend term structure is positive (as it normally is) then trading dividend spread is equal to playing dividend growth plus long dividend. In the above example, trading dividend spread is equal to trading dividend growth plus a small 5K of a naked long 2015 dividends. If dividends rise with growth rates staying identical, a long dividend spread trade will be profitable while a dividend growth trade will not. We prefer trading dividend spread to dividend growth as dividends are usually depressed and because trading dividend spreads is more common and liquid than trading dividend growth. The bid offer for trading dividend spreads is usually less than the spread of the longest maturity dividend traded (as the risk for the structure is less than for an individual dividend).

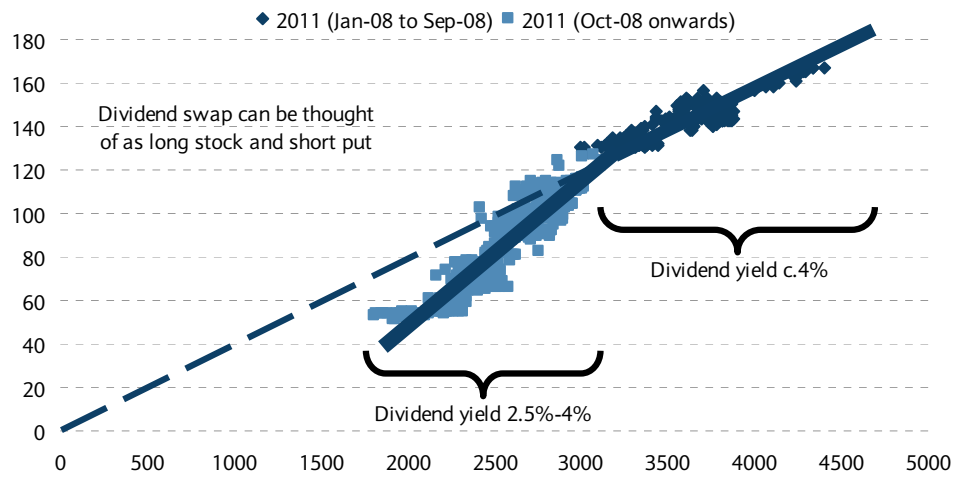
HEDGING DIVIDENDS WITH OPTIONS

Before the credit crunch, many participants believed that declines in the implied dividend market would always be less than the decline in the equity market (as most companies would be reluctant to cut dividends unless they were forced to). Because of this belief, a long implied dividend short equity position was seen as an attractive method of extracting the cheapness of implied dividends. During 2008, it became apparent that in a severe downturn, dividends could underperform spot, and that a long dividend position was effectively short a put. To hedge this risk, many investors now hedge dividend positions with puts.

Long dividend positions sometimes similar to being short a put

In a normal, gently rising market with the occasional correction, a company's dividends would be expected to be either flat line or rise slightly. The position was sometimes compared with being long stock (as dividends were expected to rise in line with spot) and long a put at the level of the previous year dividend (as dividends were not expected to be cut). While this assumption was a viable assumption as long as there were no significant declines in spot, the credit crunch showed investors they were actually SHORT (not long) a put as dividends were cut to zero for some stocks while equity prices did not reach zero. Figure 17 below shows the profile of the SX5E dividend swap, which had a relatively constant dividend yield of c.4% for values of SX5E above 3,000, but the dividend yield fell to 2.5% as equities bottomed. The position of the dividend swap is therefore similar to long stock, short put (of strike c.3,000).

Figure 17: SX5E 2011 dividends swap vs spot (2008 onwards)



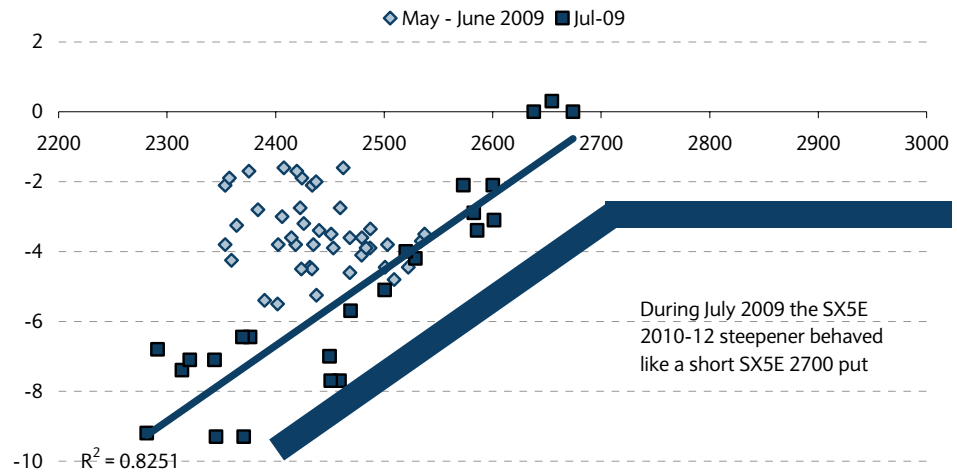
Source: Barclays Capital

Establishing strike of "embedded put" in dividend position is difficult

For high values of spot, dividends/steepeners should trade at a relatively stable yield/ growth rate

The short put embedded in long dividend positions can sometimes be better seen with dividend steepeners. As the long and short positions in a steepener remove most of the equity sensitivity, the remaining position is short put. In Figure 18 Below, it can be seen that there was an 83% correlation between the SX5E 2010-12 steepener and spot in July 2009. If it was assumed the steepener would level off for higher levels of spot (it did level off between -4 and 2 from August 2009 until the end of 2009) then the position is similar to a short SX5E c.2,700 put during that time. Determining the strike of the short put embedded position is non-trivial. While there was a high correlation between the steepener and spot in July 2009, establishing the 2,700 "strike" beforehand would have been extremely difficult as for identical levels of spot the steepener traded at far higher values in the previous two months.

Figure 18: SX5E 2010-12 steepener vs spot (May to August 2009)



Source: Barclays Capital

Strike of "short put" embedded in implied dividends changes over time

While a long dividend can trade in a similar fashion to a short put, the strike of this position is a factor of investor sentiment, exotic desk dividend overhang and fundamental analysis of how much pain a company will take before it cuts it dividend. As the factors determining the strike of this "short put" are very opaque, estimating how the implied dividend market will act should spot decline is very difficult. The profile will also change over time, as a significant driver behind the collapse in dividends should spot decline is the fact exotics desks' position in dividends increases as spot declines. The strike of the embedded "short put" can therefore change depending on how quickly spot has declined, and the risk appetite of investment banks at the time.

Traders prefer short dated OTM puts to hedge dividends

Three month 30 delta puts would be an appropriate hedge for a long dividend position

As dividends usually trade like a "short put" during sharp sudden declines in spot, traders prefer to hedge them with short dated (say three-month) puts. The strike is usually OTM, say 30 delta, in order to cheapen the hedge but still have a high enough strike to provide decent protection. The ratio of puts bought to dividends is best determined empirically, in our view, as it can be sentiment driven. As can be seen from the trend line in Figure 18 above, the SX5E 2010-12 steepener in July 2009 was c.-9 when spot was 2300 and c.0 when spot was 2700. An appropriate ratio for the put to steepener would appear to be c.2% (€9 point rally of steepener/€400 rally of spot).

DIVIDEND DISPERSION TRADING

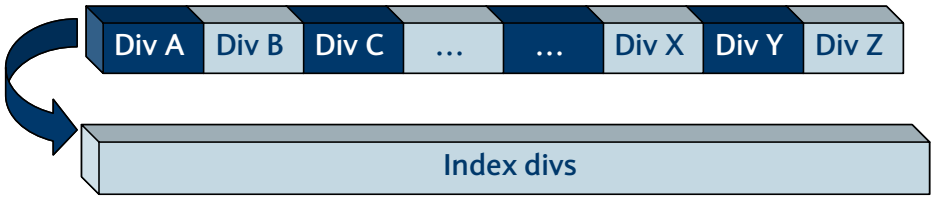
In order to trade dividend dispersion, the implied dividends of an index are traded against the implied dividends of the single stock members of that index. As index dividends usually trade cheap due to structured product flow, the typical trade is to buy index dividends and sell single stock dividends. As there is not normally liquidity for all members of an index, it is usually sufficient to trade the largest dividend payers in an index. The trade is not a perfect arbitrage as stock dividends in lieu of a cash dividend do count for single stock implied dividends, but (may) not for index implied dividends. Index membership changes can also spoil the arbitrage.

Single stocks dividend with greatest risk used to hedge index

Dividend positions with regulatory risk are often hedged out from a long index dividend position

Trading dividend dispersion by selling index dividends and buying single stock dividends became popular from 2008 onwards (although some market participants were trading dispersion a year or two beforehand) as investors became increasingly aware of the downside risks to long index dividend positions. The larger dividend positions or dividend positions with regulatory risk (Financials, Utilities, etc) were hedged out. As only the larger members of an index would have narrow bid offer spreads, often the dividend risk for a sector was hedged by using the largest stocks in the sector. By hedging the top risks in a long index dividend position, the cheapness of dividends was extracted.

Figure 19: Dividend dispersion trading



Source: Barclays Capital

Very few indices have liquid enough single stocks for dispersion

For dividend dispersion, a long position in index implied dividends would have to be hedged by short positions in implied dividends for all the singles stocks in that index. For large indices with 100 or more members, it is impractical to attempt a dividend dispersion trade. Even for smaller indices a dispersion trade will often only involve the largest dividend payers in an index. It is possible to trade dispersion on the SX5E and SMI, and potentially the IBEX. In the past, there have been dividend dispersion trades on the DivDAX and AEX, but not recently.

Dividend dispersion is not a perfect arbitrage

Volatility dispersion trading is effectively a position on the correlation between the different members of an index. Dividend dispersion trading does not trade correlation between the single stocks, as the sum of single stock dividends (assuming equal treatment of dividends) is exactly equal to the dividends an index pays out (there is also no need to change the weights of the single stock position as spot moves). Despite this mathematical relationship, a dispersion trade is not a perfect arbitrage for the below reasons:

- Changing membership of an index
- Stock dividends in lieu of an ordinary dividend are counted as a dividend for single stock implied dividends, but (may) not be for index implied dividends
- Lack of liquidity/too wide bid offer on the smaller members of an index

DIVIDENDS VS INTEREST RATES

For long-dated dividends, there is a correlation between interest rates and dividend yield. As dividend swaps normally trade cheap compared with realised dividends, this cheapness can be extracted by putting on a relative value pair trade of long dividend yield short interest rates. Shorting interest rates can be thought of as hedging interest rate risk (in the same way as trading dividend yields rather than dividends hedges equity market risk). By trading dividend yield against interest rate swaps, the investor is exposed to the "pure" cheapness of dividends and has hedged the equity and interest rate risk of a naked long dividend trade.

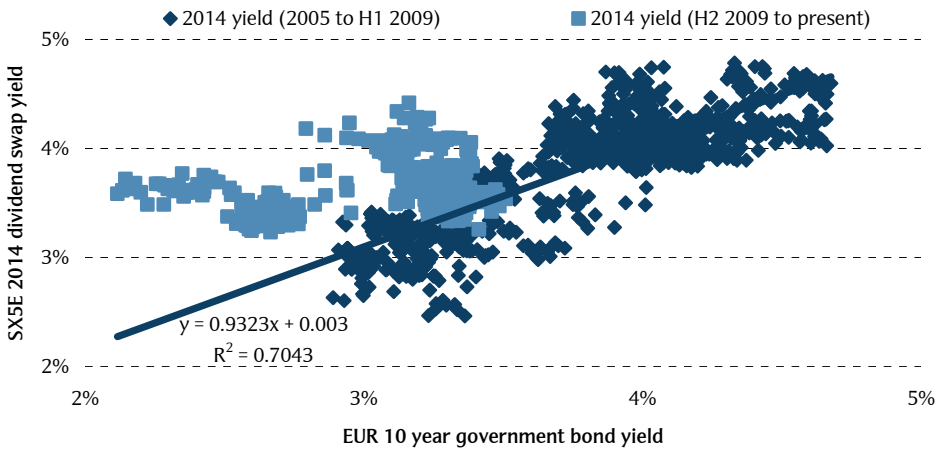
Dividend yield and interest rates are correlated

We believe that an interest rate relative value trade should assume that interest rates and dividend yield move in parallel

Many investors use the 10y government bond yield as a reasonable estimate for the risk-free rate to value equities using the dividend discount model. Plotting the SX5E 2011 dividend yield against the EUR 10y government bond yield for the past five years shows that until the middle of 2009, there was a strong c.70% correlation between them (there is a similar relationship for 5y government bonds). Since that time, the decline of long-dated yields to unprecedented lows has broken the relationship.

We also note that the gradient of the trend line (2005 to H1 2009) is very close to one. This gives empirical support to the assumption that interest rates and dividend yield should move in parallel (especially as the intercept is near zero). Given this result, we believe that when hedging dividend yield with interest rates the notional of the interest rate hedge traded should ensure that a 1% move in interest rates hedges a 1% change in dividend yield.

Figure 20: SX5E 2014 implied dividend yield against EUR 10 year government bond yield



Source: Bloomberg, Barclays Capital

Interest rate swaps can hedge interest rate risk

In our view, the best instrument for a relative value trade between dividend yield and interest rates is an interest rate swap. While government bond futures have a narrower bid offer spread than interest rate swaps, this is not sufficient to make this alternative method more attractive, in our view, as an investor's funding is closer to LIBOR than government bonds.

Dividend yield normally assumed to trade in parallel with interest rates

If an investor believes that dividend yields and interest rates move in parallel (ie, if interest rates rise by 1%, then dividend yields rise by 1% and vice versa), a position can be put on where cheap implied dividends are bought against a short interest rate position. The structure of the trade is given below:

- Go long dividend yield (ie, go long dividend swaps of price D and notional N and sell index futures at price P and size (or futures units) D * N / P).
- Short interest rates via interest rate swaps (pay floating and receive fixed) to hedge the interest rate exposure. A forward rate agreement (FRA) can be used instead of an interest rate swap. While the exact size of the trade is not trivial to calculate, a reasonable approximation is to match the notional of the interest rate swap or forward rate agreement to price of index * notional N of dividend swaps traded/price of implied dividend.

Size of short interest rate leg is not trivial to calculate

Pay floating and receive fixed interest rate swaps have positive convexity

If an annual interest rate swap or forward rate agreement is used (as opposed to the normal six-month or three-month swaps for EUR and other currencies), the payment date of the interest rate hedge can be made to match the annual payment of dividend swaps. However, no matter what frequency of interest rate payment is arranged, the discounting of cash flows complicates the calculation of the size of the interest rate hedge.

Profit and losses from the two legs must cancel

Payer interest rate swaps (or forward rate agreements) that pay fixed and receive floating have negative convexity. This is because received floating interest rate swaps do not receive the full benefit of interest rate rises (as the additional floating payment received is discounted by a higher interest rate, lowering the increase in net present value). As the payout of the interest rate hedge is to pay floating and receive fixed (receiver interest rate swaps), it has positive convexity. While positive convexity is a good thing, the position needs to be monitored and rebalanced to ensure the position remains perfectly hedged. In order for parallel moves in yield to be hedged, the trade needs to be structured so that the profit (or loss) of a 1% move in dividend yield exactly matches the loss (or profit) of an identical 1% move in the same direction for interest rates. To calculate the correct size of the interest rate hedge, the convexity must be taken into account when calculating the expected profit (or loss) from a 1% move in interest rates. For the sake of simplicity, we shall not take convexity into account in the following examples.

Approximate size of interest rate swap = price * dividend swap notional

A 1% increase in dividend yield is equal to a dividend swap increase of 1% * price of index. Hence, the profit from 1% increase in dividend yield = 1% * price of index * notional N of dividend swap. This leads to the below approximation for calculating the interest rate swap notional to hedge parallel movements in dividend yield and interest rates:

Notional of the interest rate swap ≈ price of index * notional N of dividend swap

We assume the years of the dividend swap to equal the tenor of the interest rate swap (or forward rate agreement).

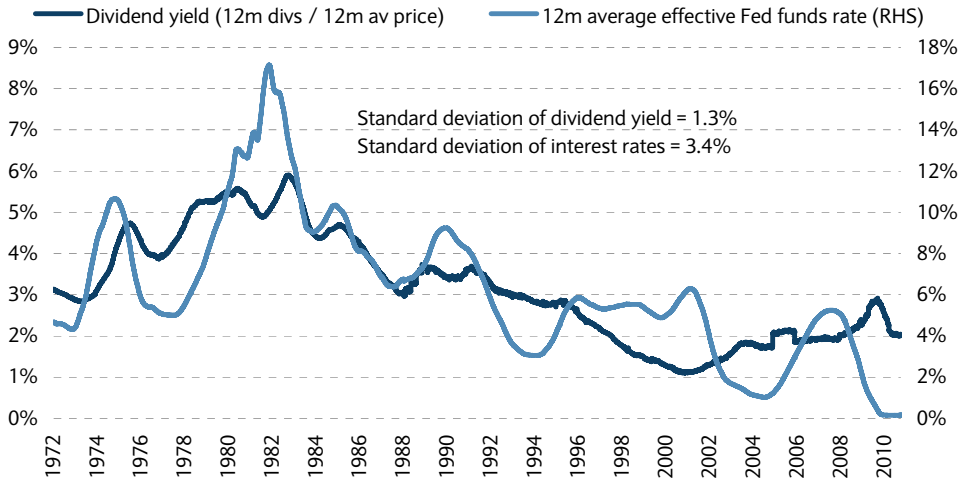
Example 1: For example, assume the implied dividend is 100 index points per year (every year) for an index trading at 2,500. Say an investor wants to trade €100K notional of the implied dividends in year five against a forward rate agreement (interest rate between years four and five). Then notional of the forward rate agreement should be = 2,500 * €100K = €250mn.

Example 2: If an investor wanted to invest €100K in each year between one and five (i.e. buy €100K of a year one dividend swap + €100K in year two dividend swap + … + €100K in year five dividend swap) then the notional of the five-year interest rate swap needed to hedge this position would be the same (€250mn). This is because in both cases, the length of the interest rate swap or forward rate agreement is equal to the length of the dividend strip traded.

Interest rates are more volatile than dividend yields

While trading dividend yield against interest rates swaps can be attractive, we would caution that, as dividends are less volatile than interest rates, there could be mark-to-market losses on a trade that is eventually profitable. This can be seen if you plot the dividend yield (dividends paid over the previous 12 months divided by average price over the past 12 months) against interest rates (12-month average of the effective federal funds rate). We used the S&P500 in order to have a large broad index and several decades of data to examine, but there are similar result for other indices (eg FTSE).

Figure 21: US interest rates vs S&P500 dividend yield since 1971



Source: Federal reserve, Bloomberg, Barclays Capital

DIVIDENDS AS INFLATION HEDGE

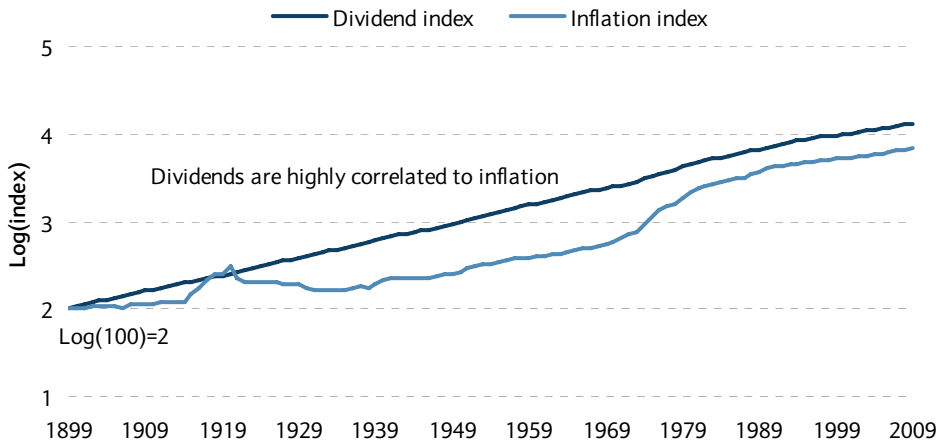
Historically, dividends, like equities, have had good inflation adjusted returns. A key difference between them is that dividends are usually far less volatile than equities, as companies are normally unwilling to cut dividend payments unless they have to. Other than an in economy subject to stagflation, which seems highly unlikely given current worries about deflation, dividends are an ideal "inflation proof" asset class.

Both UK and US dividends highly correlated to inflation

Correlation between dividends and inflation for both the US and UK is 96 and 98%, respectively

Looking at Barclays Capital UK dividend index (from our *Equity Gilt Study*, which is based on the FTSE 30 ex-Financials index), it can be seen that UK dividends since 1891 are highly correlated to inflation (see Figure 22 below). A similar relationship can be seen from comparing US dividends and inflation (data from 1871 is available from Robert Shiller). For this data, the correlation between dividends and inflation for both the US and UK is 96 and 98%, respectively.

Figure 22: UK dividends (FTSE 30 ex-Financials) vs inflation since 1891

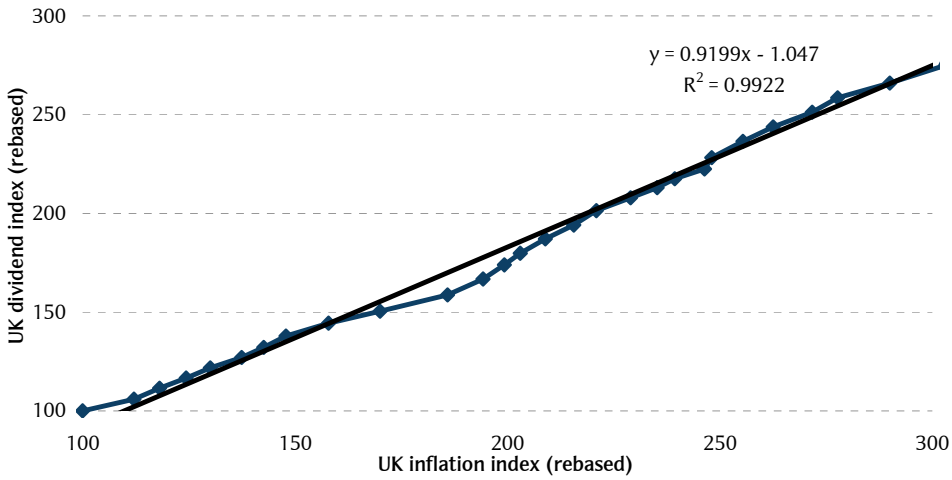


Source: Barclays Capital Equity Gilts Study

Dividends are an insufficient hedge against very high inflation

While dividends manage to keep pace with moderate inflation, they appear to struggle to keep up with exceptionally high rates of inflation. In the UK, the high double-digit inflation experienced in the 1970s was far in excess of the dividend growth rate, despite dividends managing to increase by more than 10% in one year (1974). Between 1970 and 1980, UK inflation of 265% was 3.4 times larger than the UK dividend growth of 77%. Since that time, the correlation of dividends to inflation has returned to normal, with a high 99% correlation (see Figure 23 below).

Figure 23: Correlation of UK dividends (FTSE 30 ex-Financials) vs inflation since 1980



Source: Barclays Capital Equity Gilts Study

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APPENDIX

DIVIDENDS SWAPS VERSUS DIVIDEND FUTURES

There are very few differences between dividend swaps and dividend futures, and traders will typically give the same quote for both. From an investor perspective the choice of which to trade is usually determined by which securities they can trade, or are comfortable trading. A dividend future is listed and has no counterparty risk, however the interest earned on margin is insignificant.

There are minor differences between dividend swaps and futures

Differences between dividend futures and dividend swaps are usually related to the counterparty risk (margining and interest on margin)

The differences between dividend futures and dividend swaps are usually related to the counterparty risk (margining and interest on margin). However, there are some differences in how they adjust for special events and corporate actions. As a dividend future no longer exists after expiry, it could not have the "dividend claw back" language that a dividend swap has. Therefore, if a company has a dividend that has gone ex before expiry and the pay date is after expiry, then if the dividend is cancelled due to bankruptcy (eg, Northern Rock) or other events (eg, BP) after the expiry date, the dividend swap takes into account the difference in payout by having a "claw back" payment after expiry. As there is no realistic mechanism for a dividend "claw back" with a listed future, a dividend swap should in theory trade just below a dividend future, but as the likelihood of this occurring is small compared with the bid offer spread, the prices are usually identical. We note that listed options or futures do not have a "dividend claw back" so from this respect, trading dividends via synthetics or futures is more similar to trading via dividend futures than dividend swaps.

Figure 24: Differences between dividend swaps and futures

Detail	Dividend swap	Dividend future
Expiry	December expiry or calendar year depending on region	December expiry (excluding NKY)
Dividend "claw back"	Yes	No
FX rate	Calculation agent (usually company value or WMCO if not available)	WMCO (4pm UK time, 5pm CET)
Value for stock dividend	First print of the stock on the ex-date (except for S&P which is same as future)	Closing price of the stock for the day before ex-date
Margining	Counterparty dependent but usually just under exchange (if listed as well)	Exchange dependent
Interest on margin	CSA dependent (usually OIS)	Near zero
Tax rate	0%	Usually 0% but FTSE uses 15% for Royal Dutch

Source: Barclays Capital

European indices tend to trade on December expiry

Dividend swaps on European indices tend to trade from December expiry to December expiry. However, some older dividend swaps on the SX5E were based on calendar year. A change in Spanish withholding tax from 18% to 19% led some Spanish dividend payments to be pulled forward to late 2009, leading to a difference in payouts between the two dividend swaps of 2.26 index points (a higher 117.98 for the older calendar year dividend swap versus the 115.72 for the more standard dividend swap). The 2009 dividend future was 0.01 lower than the OTC equivalent (115.71) as it correctly used the closing price the day before the BBVA stock dividend went ex (rather than the flawed method of using the opening price on the ex-date as is used in non S&P500 OTC contracts).

S&P500 dividend futures are likely to be listed soon

S&P500 dividend swaps are traded on a calendar year basis, but their quarterly and annual options trade on standard option expiries

While there are no listed dividend futures, the S&P500 boasts both quarterly and annual options on the S&P500. Listed S&P500 options on dividend trade on standard option expiries, ie, third Friday, unlike S&P500 dividend swaps, which are usually traded on a calendar year basis, ie, 31 December. While the CFTC have not yet approved S&P500 dividend futures, we believe that they will in the near future. We anticipate S&P500 dividend futures will trade on December expiries, and if this is the case, it is not clear if this will encourage dividend swap on the S&P500 to trade on a similar basis or if they will continue to trade on a calendar-year basis.

Nikkei dividend swaps have a non-standard expiry

In Japan, as in Korea, the shares of many companies can go ex-dividend before the corresponding dividend amount is announced. The payment of NKY dividends is the March of the following year to take this into account. This adds some room for upside surprises in Japanese dividends in good years, as the dividend is announced when future earnings are known.

Figure 25: Listed dividend futures on indices

Index	Bloomberg code	Dividend future prefix	Dividend index
Eurostoxx50	SX5E	DED	SX5ED
FTSE	UKX	UKD	F1DV
Nikkei225 (SGX)	NKY	MND	NKYDIV
Nikkei225 (TSE)	NKY	INT	NKYDIV
TOPIX	TPX	TDI	TPXDIV
TOPIX Core 30	TPXC30	TCD	TPXC30D
SMI	SMI	SMD	SMIDP
CAC	CAC	XFD	CACDI
DAX	DAXK	DKR	DXDIVPT
DivDax	DIVDAX	DVD	DDXDIVPT
Select Dividend 30	SD3E	DSD	SD3ED

Source: Barclays Capital

WHICH DIVIDENDS ARE INCLUDED

Dividend swaps and futures only include ordinary dividends and exclude special dividends. As dividend trading originated from trading synthetics or forwards, the decision on which dividends are considered ordinary and special is made by the index provider or exchange. This means that a single stock can, in theory, have multiple dividend swaps, although in practice the primary exchange is usually referenced. For indices, the decision to include (or exclude) a dividend is made by the index provider.

Single stock and index dividend swaps are different

One-off stock bonus issues are counted as a special dividend

The main difference between single stock and index dividend swaps is that typically a stock dividend in lieu of an ordinary dividend is a valid ordinary dividend payment for single stocks, but is not normally counted by index providers. Some of the smaller index providers (such as CAC and AEX) do include stock dividends, but the implied dividend market is not that liquid for these names. For both single stock and index implied dividends, one-off stock bonus issues are counted as a special dividend.

Primary exchange is referenced for single stock dividend swaps

Different exchanges have their own definition of which dividends are special, and which are ordinary. While we expect greater co-ordination in the future, in the near term, it is unlikely to see a complete unification of standards. An extreme example of different dividend treatment occurred with Unicredito's 18.239% stock dividend, which went ex on 18-May-2009. The dividend was treated in the below different ways by three different exchanges.

- **Eurex**: Considered the entire 18.239% dividend to be special
- **bClear**: Considered the entire 18.239% dividend to be ordinary
- **Idem**: Considered dividend to be special above 10% (ie, 10% ordinary, 8.239% special)

Scrip dividends are counted as ordinary dividends

A scrip dividend is a dividend where the investor has the right to either receive cash, or the cash equivalent in stock (sometimes at a discounted price). Scrip dividends are counted as an ordinary dividend, as you can receive cash; however, often the fact stock can be bought at a discount encourages the majority of shareholders to opt for stock (tax reasons can also encourage investors to prefer stock). Even if there is no discount (or tax advantage) from taking stock, a scrip dividend is more valuable than an ordinary dividend as the investor is effectively long the cash dividend and a call option on that stock dividend (ATM if no discount), which provides optionality. Despite the maturity of the call being identical to the period over which the investor has to decide which option to take (typically a couple of weeks), the optionality makes that scrip dividend more valuable than an ordinary dividend (although only the cash value of the dividend counts towards dividend swaps or dividend forwards).

WHY STRUCTURED PRODUCTS ARE AN OVERHANG ON DIVIDENDS

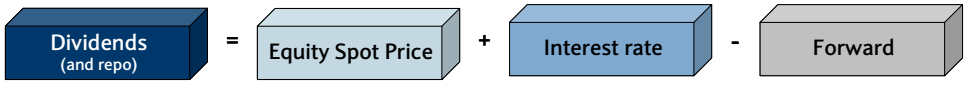
Structured products were the primary driver for the creation of an implied dividend market, as the investment banks that sell them typically end up with large implied dividend positions. In order to reduce their positions, and therefore be allowed to sell more high-margin structured products, investment banks created dividend swaps to allow them to pass on this risk to hedge funds or proprietary trading desks. While dividends are not as cheap as they were, the supply of dividends from structured product sellers can cause implied dividends to trade below reasonable estimates of future realised dividends.

Structured products sellers give performance on forward

Structured product sellers are long dividends and long repo

For major indices, the large amount of structured products issued on them was a driver for the creation of the dividend swap market. The reason why structured product issuance causes banks to be long dividends is because performance is usually given on a price return index, not a total return index (as a call on a price return index is cheaper). The investment bank is therefore short a forward, not short stock. In order to hedge this position, the investment bank will buy the underlying equities and hedge out the residual interest rate risk of the forward. The position leaves the investment bank long dividends and long repo, as Figure 26 below shows. A structured products seller will typically use the dividends on the equities they have bought to hedge themselves, to pay for downside protection or additional upside participation.

Figure 26: Position of structure products sellers



Source: Barclays Capital

Structured product overhang increases as spot declines

The sellers of structured products are long dividends, and their long position in dividends increases as spot declines. While there are many structured products in the market place, two popular structures are autocallables and capital protected notes. Both of these products result in a longer dividend position should spot decline.

Autocallables maturity increases as spot declines

Autocallables is the name given to a product that gives the investor a high coupon, but are (automatically) callable by the structured products seller if equities rise. Hence, they have a short maturity if equities perform well, but have a longer maturity if equities decline. This product is hedged by shorting a forward of identical maturity to the autocallable. However, as the maturity increases, so the short forward position has to be rolled to a later maturity. Increasing the maturity of the short forward by rolling, results in a long position in the dividends whose ex-date lies between the maturity of the two forwards (initial forward, and forward of the rolled position).

Capital protected notes hedging weighs on dividends as spot declines

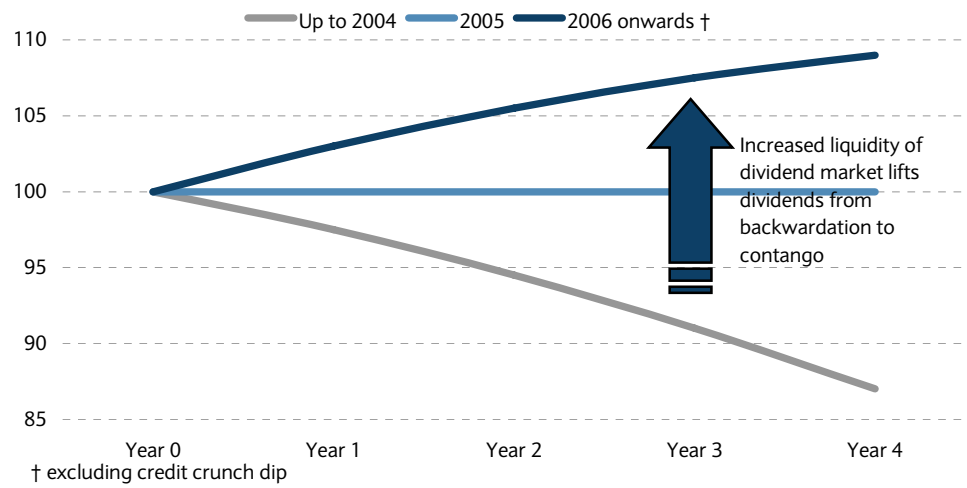
Capital protected products became popular in late 1990's and usually give the performance of a price return index, with the performance floored at some level. This product has an embedded far dated put (whose strike is set at the capital protection level), hence the structured product seller is short this position. Because of the long maturity of the structured product, typically the risk associated with being short a put (as the structured product investor is long the put) is hedged by the investment bank seller. As the short put position increases in delta as spot declines, the structured product seller has to sell futures (increasing the dividend position). Even if the structured product seller is able to pass on the risk of being short a long dated put, the counterparty this risk is passed on to would have to hedge in an identical manner.

Structured product sellers can afford to sell cheap dividends

Risk limits on implied dividends can restrict the issuance of further structured products

As different investment banks typically sell similar products (based on price return indices resulting in the structured product seller being long dividends), investment banks are structurally long implied dividend risk. The potential to offload this risk to other investment banks is limited, unless an investment bank does not have a significant structured product market share. As risk limits on implied dividends can restrict the issuance of further structured products, it can be in the interest of the structured products seller to sell cheap implied dividends to hedge funds to allow further structured products to be sold. For example, if dividends are between 2-5% of the overall product and if implied dividends were sold with a 10% discount, this would only reduce the margin of a structured product by 0.2-0.5%. For this reason, up to 2004 the implied dividend curve was inverted (far dated dividends trading at less than near dated dividends).

Figure 27: SX5E implied dividends over time (year 0 rebased to 100)



Source: Barclays Capital

Improved dividend swap liquidity lifted implied dividend term structure

SX5E dividends increased an average of 20% per year between 2003 and 2007

The creation of dividend swaps in the late 1990s allowed dividend risk to be easily traded by hedge funds and proprietary trading desks (some pension funds were also early adopters). This trading lifted some of the technical selling pressure from structured product desks, and caused implied dividend term structure to rise from the abnormal backwardation (ie, inverted or far-dated dividends below near-dated dividends) that previously occurred. Dividends could be expected to rise in line with increases in GDP, but the structured product overhang caused SX5E term structure to be inverted until 2004. During 2005, SX5E implied dividends were relatively flat and in 2006 both implied dividends and implied dividend term structure rose strongly given the massive 26% increase in dividends that year (SX5E dividends increased an average of 20% a year in the four years between 2003 and 2007). The effect of the increased dividend swap liquidity on SX5E term structure is shown in Figure 27.

Implied repo of forward can be seen from TRS market

If an investor is long a Total Return Swap (TRS), they get the total return (ie, including dividend) performance and usually pay LIBOR minus a spread. This spread should trade in line with borrow costs (and implied repo of a forward if the risk free rate/funding is considered to be LIBOR and the effect of taxation is ignored). If (say) the borrow cost for the shares underlying an index was 30bp then the TRS for that index should be LIBOR-30bp. If this is not the case, there is the potential for arbitrage, as can be seen in the example below. Hence, a long TRS position is short implied repo.

Example of cash and carry arbitrage

In the above example above, the borrow cost is 30bp, which means an investor in the shares of the index can earn 30bp on top of the total return of the index by lending out the shares. If the TRS was quoted at LIBOR-40bp then the investor who holds the underlying shares of the index should sell this position, and invest the proceeds at LIBOR. At the same time, the investor could enter into a TRS and pay LIBOR-40bp, hence earning 40bp (10bp more than the 30bp that was previously earned by loaning out the shares).

Example of reverse cash and carry arbitrage

Equally, if the price of the TRS was LIBOR-20bp an investor who would normally invest in a TRS would and pay LIBOR-20bp, which is equal to a - LIBOR + 20bp position. It is in that investors advantage to not enter into the TRS and instead borrow at LIBOR to buy the shares and lend those shares at 30bp. The end position is - LIBOR + 30bp (which is 10bp more than the original - LIBOR + 20bp position).

Dividends swaps/futures can reduce dividend risk, but not repo risk

The above examples of cash and carry (and reverse cash and carry) arbitrage for TRS show that implied repo is equal to borrow cost if everyone can fund at LIBOR/risk free rate, and that a long TRS is short implied repo. Cash and carry (and reverse cash and carry) can be applied to the forward market to show a long forward is short implied dividend and implied repo, although the trade is more complicated due to the interest rate component. While the sellers of structured products (who are short forwards) are able to dispose of the long implied dividend position via dividend swaps, they remain long implied repo.

Credit crunch caused implied repo on SX5E and NKY to go negative

SX5E implied repo went to c.-80bp and the NKY implied repo went to c.-120bp

While normally the implied repo is relatively stable (and equal to borrow cost) compared with dividends, the credit crunch caused turmoil on funded trades. As the availability for funding reverse cash and carry arbitrage disappeared, the cost of entering into non-funded TRS (or non-funded forward) rose. This particularly hit the SX5E and NKY as they are popular underlyings for structured products. The SX5E implied repo, which is usually c.30bp, went to c.-80bp and the NKY implied repo went to c.-120bp (which effectively meant negative dividends as they were trading at depressed levels at this time). We note that NKY repo is usually slightly negative as the index provider uses the last traded price of a stock (rather than zero) as the exit price for a company that goes bankrupt while being a member of the index (making it more beneficial to own the forward than the stock, reducing the repo).

While some investment banks were under pressure to reduce implied repo risk during this time, many were happy to keep this risk as it was a mispricing of the long dated forward. The short forward position was simply hedged by going long near-dated futures (and selling implied dividend risk via dividend swaps) rather than going long a far-dated forward. As the futures position was rolled up until the futures expiry, the position benefitted from positive carry, in a similar way to the negative repo trade described below.

Negative repo was used to cheapen long dividend trades

When repo became negative, many investors who were capable of putting on funded trades put on a long dividend and long implied repo trade by going short a far dated synthetic (and hence long dividend and repo) and going long a near dated synthetic. Synthetics were used to have a long dated listed instrument without counterparty risk. A typical trade that could be put on in early 2009 was short 2014 synthetic and long 2010 synthetic (the long synthetic could be replaced with long stock or futures, but as the negative repo was not that negative for short maturities the trade was more attractive playing the 2011 to 2014 strip of dividend and repo). This trade had the below position:

Short 2014 synthetic + long 2010 synthetic = long 2011 to 2014 dividends + (negative) repo + short 2011 to 2014 interest rates

As the investor in this trade is unlikely to want to remain short 2011 to 2014 interest rates at subdued levels, they would hedge the interest rate risk out with interest rate swaps.

DIFFERENCE BETWEEN FORWARDS AND FUTURES

While a future is simply a listed version of a forward, the difference in cash flows between the two can lead to differences in the price and delta of the two instruments. In practice, the presence of a Credit Support Annex (CSA) usually results in the cash flows of a forward being similar to a future, reducing the difference between the two.

The price of a future and forward are not always identical

A future is a listed forward with daily margining of the profit and loss. Because of this, there can be slight differences between the price of a future and forward due to interest rates. If the movements of stock prices are not correlated to interest rates, the price of a future and forward should be identical. However, if stock prices rise as interest rates fall, then a future should have a lower price than a forward as the interest earned on the cash is less than expected as interest rates are less than expected (and if stock prices fall as interest rates rise then the investor has to pay a higher interest rate on the cash delivered to the counterparty). If the market environment is such that stock prices are rising as interest rates are rising, then a future should have a higher price than a forward.

Future > forward if stock prices positively correlated to interest rates

Future = forward if stock prices independent of interest rates

Future < forward if stock prices negatively correlated to interest rates

The price of a forward is given below. It can be seen that if dividends increase, then the price of a forward decreases hence long forward = short dividend.

Price of a forward = $\underbrace{[S - \sum_i D_i e^{-rt_i}]}_{\text{Spot less NPV div}} \underbrace{e^{(r-\delta)T}}_{\text{Growing by risk free rate less borrow cost}}$

where:

S = spot

D_i = Discrete dividend payment number i

t_i = time of dividend D_i (ex-date)

r = risk free rate

δ = borrow cost

T = time to expiry

Daily margining means futures and forwards have different delta

As the daily margining of futures can be put on deposit and earn a rate of interest, there is a difference in the delta of a future and a forward.

Delta of future = $e^{(r-d)T}$

Delta of forward = e^{-dT}

Where:

d = dividend yield

In practice, as long as the risk free rate is greater than the dividend yield (and both are positive) then:

Delta future > 1 > delta forward

Presence of CSA causes future pricing to converge toward forward pricing

Although in theory a forward payout is at expiry, as forwards are often marked to market via a CSA (Credit Support Annex) the difference between futures and forwards cash flows is usually minor, and hence the pricing of a forward under a CSA is identical to the above method of pricing a future.

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- Call or put purchasing: The risk of purchasing a call/put is that investors will lose the entire premium paid.
- Uncovered call writing: The risk of selling an uncovered call is unlimited and may result in losses significantly greater than the premium received.
- Uncovered put writing: The risk of selling an uncovered put is significant and may result in losses significantly greater than the premium received.
- Call or put vertical spread purchasing (same expiration month for both options): The basic risk of effecting a long spread transaction is limited to the premium paid when the position is established.
- Call or put vertical spread writing/writing calls or puts (usually referred to as uncovered writing, combinations or straddles (same expiration month for both options): The basic risk of effecting a short spread transaction is limited to the difference between the strike prices less the amount received in premiums.
- Call or put calendar spread purchasing (different expiration months & short must expire prior to the long): The basic risk of effecting a long calendar spread transaction is limited to the premium paid when the position is established.

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Supporting documents that form the basis of our recommendations are available on request.

The Options Clearing Corporation's report, "Characteristics and Risks of Standardized Options", is available at *http://www.theocc.com/publications/risks/riskchap1.jsp*

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