

From the Desk of Jeppe Ladekarl - “Brexit”



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Another singular topic has been capturing the attention of markets, commentators and “ordinary folks,” and our inboxes are yet again overflowing with more or less relevant information, which we consume almost as rapidly

as the next flurry of tweets from Donald Trump. True to form, we have adopted tortured but memorable phrases to signal that we are “in the know.” This time around, “Brexit” and “Bremain” are the chosen words that adorn headlines, and my own subject line follows suit.

How might the concern around Brexit impact your investments? We are of the view that the uncertainty and potential risks associated with the referendum are unusually large, and that the Brexit vote has the potential to dominate all other drivers of the pound (and to some extent currency markets generally), at least until the referendum occurs, but possibly longer depending on the outcome. As such, we believe the Brexit impact on your investments is not limited to a move on the day following the referendum. Rather, the impact is already present and is expected to be felt at least through the week following the referendum — and potentially longer.

We also find a high degree of potential sensitivity to the event outside of pure currency portfolios. Even your US equity investments have exposure to the event – and this is the case even if you assume that a “Brexit” scenario only impacts currency values and currency market risk. Currency risk is not just an abstract concept without short-term implications, even for a US investor in US equity assets, as I will show later.

“SHOULD I STAY OR SHOULD I GO NOW?
IF I GO, THERE WILL BE TROUBLE
AND IF I STAY, IT WILL BE DOUBLE”

THE CLASH

To frame the discussion, it might be useful to review what’s going on. Essentially, the Brits have done it again. Just as we thought we were past the self-induced political event risks emanating on the British Isles – remember the Scottish referendum? – we find ourselves engulfed in yet another market-moving event. This time it’s a referendum on the role of the UK in the EU. Specifically, on Thursday, June 23rd, 2016, voters will answer with a simple “yes” or “no” the question “Should the United Kingdom remain a member of the European Union or leave the European Union?” While the Act backing the referendum is silent on the ensuing actions, if the result of the vote is “no,” then British Premier David Cameron has indicated he will invoke Article 50 of the Treaty of the European Union, which would trigger a two-year period during which the EU and its member states are obligated to try and negotiate an orderly exit. There are all sorts of wrinkles in this, and in principle, the UK could also just unilaterally withdraw from the Union. In any case, a “no” result (“Brexit”) would

Past or simulated performance is no guarantee of future results. Potential for profit is accompanied by possibility of loss.

spell an extended period of political, economic and market uncertainty around not only the UK, but the members of the European Union, along with potential global ramifications.

Unsurprisingly, the markets have already reacted to the heightened uncertainty. In particular, currency markets seem to have anticipated the event, at least in the form of hedging activity as embedded in implied volatility and risk reversals (a measure used to indicate the option market's preference for a short or long position in a currency – here, they are signaling a strong shift away from the pound).

The graph below shows the 25 delta risk reversal for the British pound against the USD. The 25 delta risk reversal is calculated as the volatility of 25 delta calls minus the volatility of 25 delta puts, both with a similar maturity date. In essence, this number shows the relative cost of buying or selling protection against a depreciation of the pound. When the number is negative, then it is relatively expensive to buy protection; while a positive number shows it is relatively cheap.

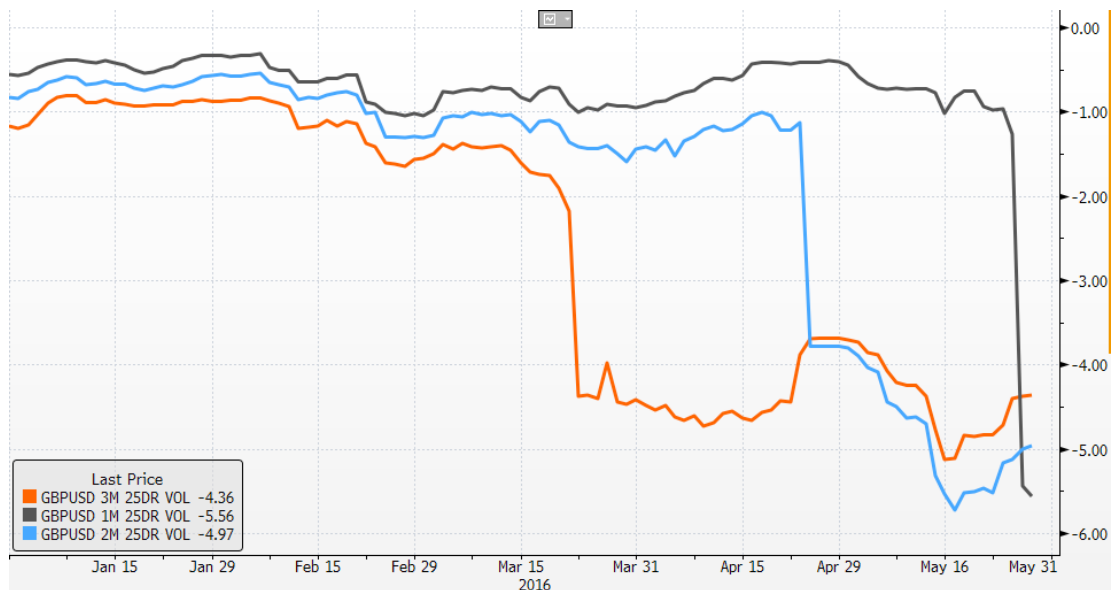
The 25 delta risk reversal¹ wasn't even this low during the Global Financial Crisis. We are seeing an extraordinary willingness to pay to hedge against GBP depreciation compared to

the price for protection against GBP appreciation in the market. It is very interesting, or at least I think it is interesting, that the willingness to pay a lot for protection is related to the referendum event as clearly seen in the evolution of the implied volatility for the risk reversals. As soon as a contract maturity date includes June 23rd, the implied volatility drops dramatically. There is some elevated desire to buy protection ahead of the event, but protection at or after the event becomes much more expensive.

This shows, if nothing else, that the event has captured the attention of large groups of market participants - enough to lead to actual action, and not just complacency. This brings me to an important point of view: that the referendum has the potential to be more than just a digital event that will be over and resolved as soon as the results are announced by the "Chief Counting Officer" (yes, there apparently is such a person) at Manchester Town Hall on the evening of June 23rd.

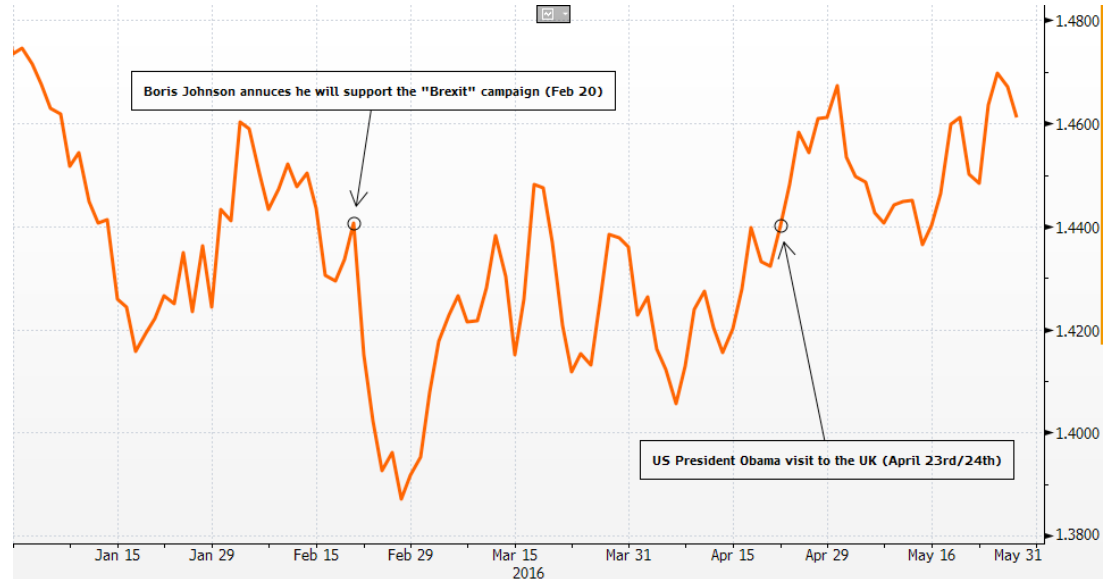
First, the uncertainty and hedging activity have already been reflected in asset prices, and some would argue, in more subdued macro-economic activity in the UK, as investments are withheld and consumer sentiment is impacted by the higher level of uncertainty about the future.

FIGURE 01 - GBPUSD 25 DELTA RISK REVERSAL IMPLIED VOLATILITY FOR 1, 2 AND 3-MONTH MATURITY (JANUARY 2015 - MAY 2016)



Source: Bloomberg, LLC

FIGURE 02 - GBPUSD SPOT PRICE
(JANUARY 2015 - MAY 2016)



Source: Bloomberg, LLC

The fluidity of the situation and lack of clear direction from the polls, as shown in the chart above, have led single events to dominate market price action: poll releases, changes in odds on bets on remain or exit², remarks or actions from politicians – including comments from the US President about the potential for re-negotiations of a bilateral trade deal – have all had noticeable impact on the value of the British pound.

Secondly, if the outcome – against the expectations of the betting markets – is Brexit, we will enter uncharted territory, not only for the UK but also for the EU and, to some extent, the rest of the world. In the assessment of the IMF, Brexit would “precipitate a protracted period of heightened uncertainty, leading to financial market volatility and a hit to output” and a substantial long-term negative impact on the UK economy, leading to a loss of output on the order of 1 to 9%.³

Whether you agree or disagree with the ramifications of a Brexit result, you may ask: “What does this have to do with my portfolio? I don’t have any or very little exposure to the British pound or even the UK equity markets.” I

would urge you not to be so sanguine, however. These days, asset markets are linked.

One way of showing the linkages is by stress-testing different investments through scenario analysis.⁴ In Table 01 (next page), I estimate the impact on the MSCI EAFE, Russell 2000 and the International Treasury Bond (all using iShares ETFs) of two entirely made-up Brexit scenarios.⁵

Scenario 1: 10% depreciation of the British pound against the USD; 8% depreciation of the British pound against the euro; 15% increase in currency volatility (DB CVIX 3-month implied FX volatility index).

Scenario 2: In addition to the changes in scenario 1, VIX up 15%; VDAX up 25%; interest rate cut in the UK resulting in a 25 bp shift lower in the 2-year point (Treasury Curve – all – GBP decrease by 25 bps on 2-year); FTSE 100 (UKX) down 10%.

Before I review the results, I should stress the normal warnings about reliance on hypothetical scenarios, etc. The scenarios I have chosen to use are just two of many potential scenarios that could be used to stress-test the portfolio. The real market movements after a Brexit will almost

TABLE 01 - "BREXIT" SCENARIO ANALYSIS
(MAY 2016)

(Percentage change in value)	EUR		USD		GBP	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
MSCI EAFE	-5.08	-8.27	-7.08	-10.27	2.92	-0.27
Russell 2000	-1.33	-5.03	-3.31	-7.00	6.67	2.97
International Treasury Bond	-0.03	-0.49	-2.03	-2.49	7.97	7.57

Note: Scenario analysis based on holdings in iShares MSCI EAFE ETF (EFA), the iShares Russell 2000 (IWM) and iShares International Treasury Bond ETF (IGOV).

Source: Bloomberg

certainly be different. In addition, the results are completely dependent on the assumptions embedded in the risk models, and these, likewise, will not hold in the event of Brexit.

Despite what one could expect to be a limited impact given the changes assumed, the actual impact of these scenarios is not trivial at all and reverberates across the portfolio. The base currency matters for the unhedged investor, as the US-based investor absorbs the largest hit when overseas assets fall in value in USD terms, followed by the EUR-based investor. The UK-based investor, in Scenario 1 at least, is able to benefit from the currency effect of having assets

abroad which mitigates the indirect effect that drives local market values down. Even a US-based investor holding Russell 2000 investments can't escape the second-round effects as, in particular, energy stocks in the index incur large losses.

Even investments in government bonds cannot, for non-UK investors, compensate for the impact of the changes in currency values and volatility. The UK holdings are of course hit, but holdings in countries sensitive to changes in currency volatility — such as high-yielding or oil-sensitive currencies — are hardly immune.

Currency and currency-based effects are felt broadly in the stress scenarios. The table

FIGURE 03 - SCENARIO ANALYSIS FOR RUSSELL 2000
(JANUARY 2015 - MAY 2016)



Name	P&L% (Brexit Scenario 1)	P&L% (Brexit Scenario 2)	% Wgt
ISHARES RUSSELL 2000 ETF (IWM US)	-3.31	-7.00	100.00
United States	-3.31	-7.01	97.12
Financials	-3.14	-6.39	25.98
Information Technology	-3.37	-7.33	16.81
Health Care	-2.79	-6.57	13.36
Industrials	-3.58	-7.50	13.02
Consumer Discretionary	-3.41	-7.18	12.90
Materials	-4.44	-8.87	4.08
Utilities	-2.06	-4.98	3.87
Consumer Staples	-2.54	-5.77	3.57
Energy	-6.97	-12.54	2.48
Telecommunication Services	-2.73	-6.03	1.03
Bonds	0.00	0.00	0.02
United Kingdom	-2.94	-6.30	0.69
Bermuda	-3.43	-6.77	0.40
Netherlands	-3.27	-6.67	0.34
Ireland	-3.41	-7.37	0.22
Cash	0.00	0.00	0.21
Norway	-5.79	-9.85	0.14
Puerto Rico	-3.94	-7.98	0.14

Note: Analysis based on iShares Russell 2000 ETF (IWM) holdings

Source: Bloomberg, LLC

FIGURE 04 - SCENARIO ANALYSIS FOR INTERNATIONAL TREASURY BOND (JANUARY 2015 - MAY 2016)

11) View ▾ 12) Actions ▾ 13) Settings ▾ 14) Trade Simulation ▾ Portfolio & Risk Analytics									
Intraday		Holdings	Characteristics	VaR	Scenarios	Tracking Error/Volatility	Performance	Attribution	⚙
Main View		Scenario Summary		Best & Worst		Scenario Navigator			
Port	ISHARES INTER	vs	Default (None)	by	Country of Dor	in	EUR	As of	05/26/16
Scen	All Scenarios	Model	Bloomberg Ris						
Name	P&L% (Brexit Scenario 1)	P&L% (Brexit Scenario 2)	% Wgt						
ISHARES INTERNATIONAL TREASURY BOND ETF (IGOV US)	-0.03	-0.48	100.00						
United Kingdom	-7.11	-7.28	5.00						
Australia	-2.70	-3.66	4.40						
Norway	-2.33	-2.78	1.78						
Canada	-1.77	-2.54	4.56						
Sweden	-1.03	-1.24	2.99						
Italy	-0.10	-1.05	6.51						
Spain	-0.01	-0.88	4.57						
Denmark	0.16	0.04	3.92						
Ireland	0.17	-0.56	4.64						
Switzerland	0.19	0.09	1.60						
Portugal	0.22	-0.47	4.70						
France	0.28	-0.43	6.60						
Austria	0.30	-0.40	4.12						
Finland	0.32	-0.26	4.01						
Belgium	0.35	-0.61	4.28						
Netherlands	0.39	-0.24	4.56						
Germany	0.40	-0.24	5.02						
Japan	1.77	1.86	22.63						
United States	2.00	2.00	0.04						

Holdings as of: 5/24/2016 Submitted at: 17:58:24 Zoom 100%

Note: Analysis based on iShares International Treasury Bond ETF (IGOV) holdings
Source: Bloomberg, LLC

above clearly shows the impact of both asset and currency diversification which, depending on your base currency, may be either positive or negative. We would argue that the broad reach of this impact (by an event with, initially, a shock in the currency markets alone) offers compelling signs that you should worry about and manage currency risk. But that is a topic for a different note.

In the end, we may find that the Brexit or Bremain discussion of 2016 turned out to be just noise in the grander scheme of things. And, if you close your eyes, put the UK exposures into a lockbox and then open the box when you get back from summer vacation, this will all have been a tempest in a tea cup – or more relevant, in this case, as the British would say, “a storm in a tea cup” - and we will return to focusing on the massive UK twin deficit and its potential implications for the UK. This narrative is far more likely, however, if the voters choose to “Bremain.” And then, the UK’s European partners may end up heeding the warning from the chorus of the British punk rock band the Clash’s (only) number-

one single “Should I Stay or Should I Go?": “If I go, there will be trouble, and if I stay, it will be double.”



Endnotes

¹The 25 delta risk reversal shows the volatility of 25 delta calls minus the volatility of 25 delta puts, both with a similar maturity date.

²Yes, there are indeed signs that the “mighty” currency market is getting wacked around by punters betting on the outcome of the referendum on various sites offering bets on political events. For the curious, the odds from different betting services can be found here <http://www.oddschecker.com/politics/british-politics/eu-referendum/referendum-on-eu-membership-result>. Though, I assume, your companies internet policy will block access.

³The Wall Street Journal, “IMF Doubles Down on “Brexit” Warning”, May 13, 2016.

⁴Bloomberg has a convenient function that allows for the stress testing of different types of portfolios based on user specified scenarios. As expected, you get different results based on the risk model specified, but the results are not too dissimilar.

⁵The scenarios are run on the iShares MSCI EAFE ETF, the iShares Russell 2000 ETF, and the iShares International Treasury Bond ETF.



Index Definitions

The **FTSE 100 Index (UKX)** is a capitalization-weighted index of the 100 most highly capitalized companies traded on the London Stock Exchange. The equities use an investibility weighting in the index calculation. The index was developed with a base level of 1000 as of December 30, 1983.

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The **S&P/Citigroup International Treasury Bond Ex-U.S. Index** is designed to reflect the performance of bonds issues by non-U.S. developed market countries.

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The **MSCI EAFE Index** (Europe, Australasia, Far East) is a free float-adjusted market capitalization index that is designed to measure the equity market performance of developed markets, excluding the US & Canada. The MSCI EAFE Index consists of the following 22 developed market country indices: Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.

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The **VDAX** (also known as the VDAX-NEW and V1X) is the volatility index that displays the implied volatility (i.e. the expected range) of the DAX stock index for the next thirty days. As such, the VDAX is used by DAX traders to determine the expected daily range of the DAX stock index and futures market.

The **VIX (CBOE volatility index)** is the ticker symbol for the Chicago Board Options Exchange (CBOE) Volatility Index, which shows the market's expectation of 30-day volatility. It is constructed using the implied volatilities of a wide range of S&P 500 index options. This volatility is meant to be forward looking and is calculated from both calls and puts. The VIX is a widely used measure of market risk and is often referred to as the "investor fear gauge."

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