

# Brexit and European volatility behavior

Over the years I've written about European volatility related to specific events such as the June 2016 Brexit referendum and various European elections and market corrections relative to the VSTOXX® volatility index. As specific known events, such as an election gets closer to their event date, the unknown outcome of the occurrence may increase the sense of market uncertainty. Thus causing at least a short-term spike in a specific futures expiration as noted in the VSTOXX® Futures forward curve.

The VSTOXX® volatility index measures the implied volatility 30 day forward of EURO STOXX 50® Index options and then annualizes the volatility. The index tends to rally when equities decline with a correlation of approximately –0.60 to –0.95 about 90 percent of the time, based on a 20-day

rolling correlation.<sup>1</sup> The EURO STOXX 50® Index represents the performance of the 50 “blue-chip” stocks of up to 11 Eurozone countries.<sup>2</sup> Futures and options are available for the VSTOXX® volatility index.

**Figure 1: VSTOXX® Futures yearly volume and open interest as of December 2019**

	Total volume	YOY change	Daily average volume	Open interest
2019	15,924,750	2.2%	62,696	190,199
2018	15,575,481	16.0%	61,563	185,382
2017	13,428,807	33.2%	52,662	255,706
2016	10,085,067	39.6%	39,242	221,853
2015	7,226,833	3.8%	28,452	108,132
2014	6,962,188	30.8%	27,519	173,986
2013	5,324,708	36.5%	21,046	184,900
2012	3,901,530	106.5%	15,300	224,061
2011	1,889,492	337.7%	7,352	68,088
2010	431,669	2,833.5%	1,686	58,700
2009	14,715	12.0%	58	1,304

Source: Eurex Monthly Statistics December 2019

About 70% of the time, the VSTOXX® Futures volatility index curve tends to be in contango. Several past events experienced spikes in the forward curve and as the expiration month becomes the front month, the curve often shifts from a contango structure to backwardation or a “semi-backwardation” formation. As more event-specific items happen, there tends to be a common re-occurring behavior of market sentiment displayed in the VSTOXX® Futures volatility index curve as noted in the below examples.

Examples of forward curve behavior include:

- 1) Brexit referendum vote 23 May 2016
- 2) French vote spring 2017 (possible Frexit) 1st round 23 April 2017; 2nd round 7 May 2017
- 3) Italian elections March 2018
- 4) Uncertainty of UK hard exit or soft exit 2019

<sup>1</sup> Shore, M. (2014). Noisy short-term correlations in global volatility index futures: why trading one regional index futures market may not be enough. Retrieved from: <https://www.eurexchange.com/exchange-en/products/vol/vstox-outlook/noisy-short-term-correlations-in-global-volatility-index-futures-144312>

<sup>2</sup> <https://www.stoxx.com/document/Bookmarks/CurrentFactsheets/SX5GT.pdf> as of 30 September 2019

<sup>3</sup> Shore, M. (2018). Is the recent low European volatility an anomaly? Retrieved from <https://deutsche-boerse.com/exchange-en/products/vol/vstox-outlook/Is-the-recent-low-European-volatility-an-anomaly-1420224>

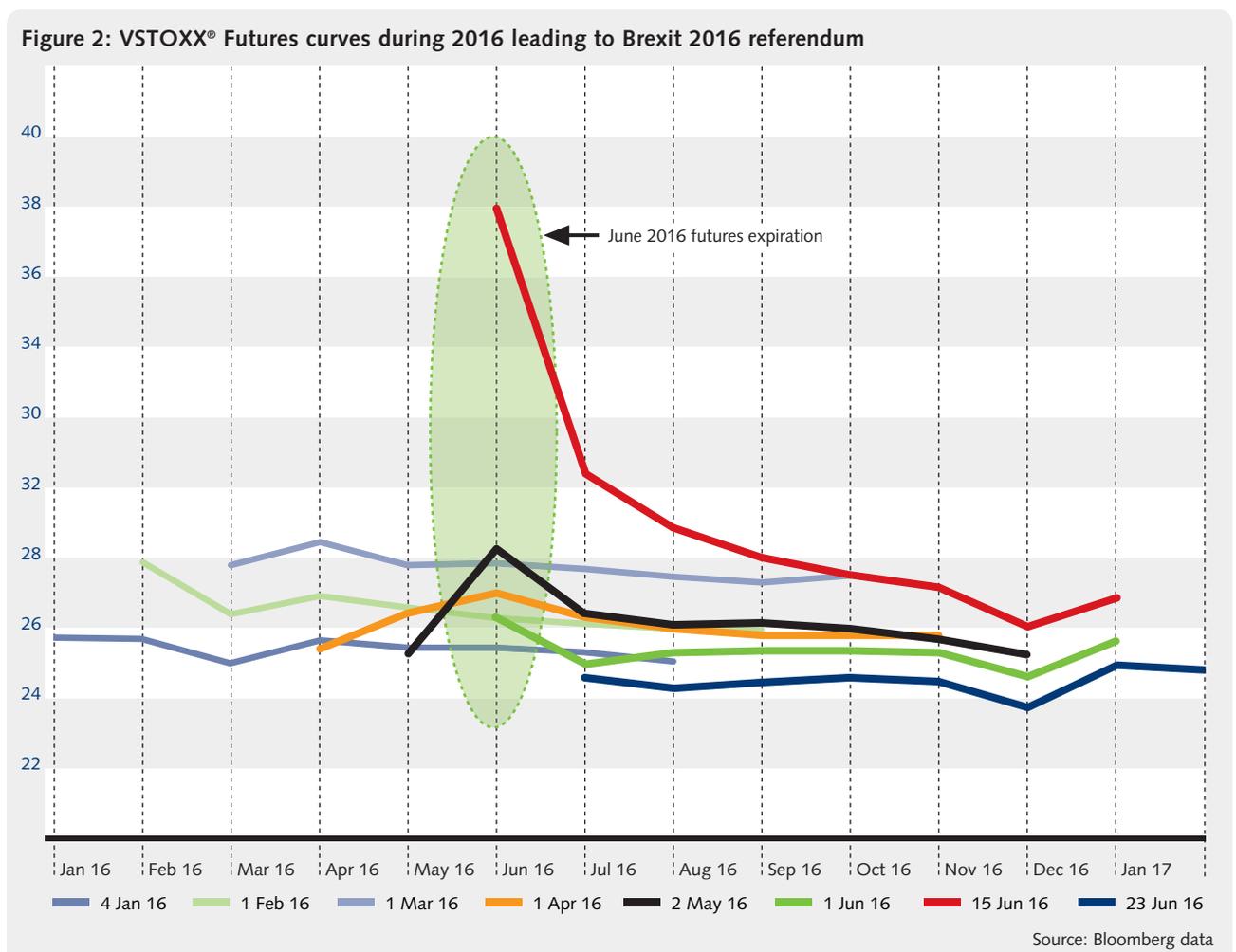
### Brexit referendum vote 2016:

The UK joined the EU in 1973 when it was known as the European Economic Community (EEC).<sup>4</sup> In 1975 the results of a UK referendum found 67 percent of UK voters wanted to remain in the EEC, however, the relationship ebbed and flowed over the years.<sup>5</sup> 41 years later, 23 June 2016, the UK Brexit referendum to leave the EU passed with 52 percent of UK voters.<sup>6</sup> Prior to the 2016 vote, polls and betting sites were forecasting a “No” vote.<sup>7</sup> Causing more uncertainty when the “Yes” result was announced. At the time of the referendum, the actual deadline for departure from the EU was almost three years away, 29 March 2019, thus a future problem to resolve.

Each color in Figure 2 represents the VSTOXX® Futures curve at various times leading up to the Brexit referendum on 23 June 2016. The green dashed oval represents the June

expiration. These forward curves are snapshots taken mostly at the beginning of each month. On 1 April 2016 (orange), a kink in the forward curve appeared in the June expiration. On 2 May 2016 (black), the June expiration spiked about 3 volatility points above the front-month causing the curve to follow a predominantly backwardation configuration.

On 1 June 2016 (green), June expiration is the front-month and although the entire curve was lower than it was a month earlier, the front-month (June) was still higher than the rest of the curve. On 15 June (red) the entire curve was higher than the previous curves and the front-month (June expiration) was almost 8 volatility points higher than the nearby month (July) and the curve structure was in backwardation. By 23 June (blue), the day of the referendum, the curve had declined to the mid-20s and relatively flat.



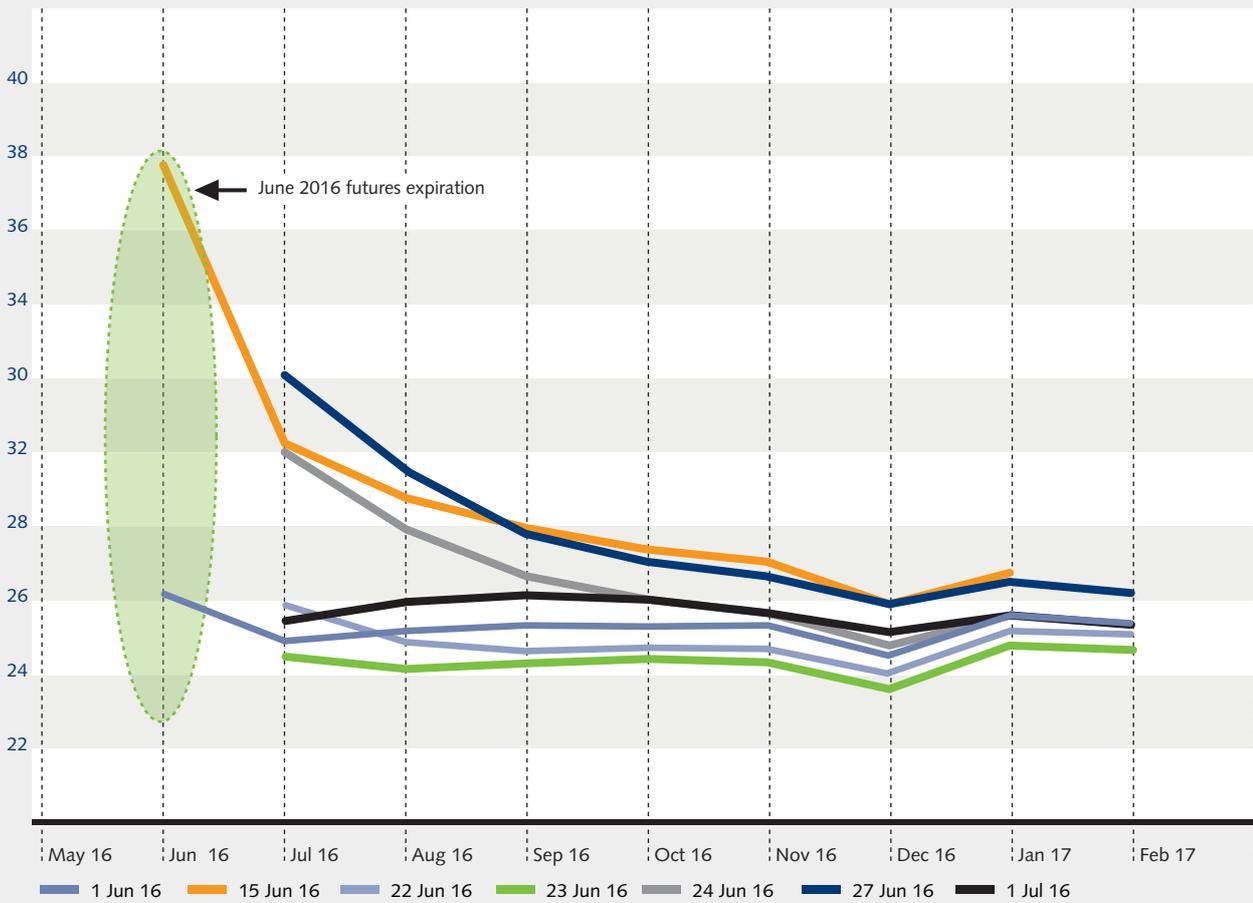
<sup>4</sup> Brexit: All you need to know about the UK leaving the EU. (2019, October 3). Retrieved from <https://www.bbc.com/news/uk-politics-32810887>.

<sup>5</sup> The United Kingdom's tortuous journey in and out of the EU. (2018, December 18). Retrieved from <https://uk.reuters.com/article/uk-britain-eu-timeline/timeline-the-united-kingdoms-tortuous-journey-in-and-out-of-the-eu-idUKKBN1OH0XE>

<sup>6</sup> [https://www.bbc.com/news/politics/eu\\_referendum/results](https://www.bbc.com/news/politics/eu_referendum/results)

<sup>7</sup> Shore, M. (2017). Mark Shore on VSTOXX Derivatives Part 2: VSTOXX®/VIX volatility spread behavior during recent volatility events. Retrieved from [https://www.eurexchange.com/resource/blob/247554/71d658e21cf29490a1adb55bf0b7a4c2/data/20170123\\_Mark-Shore-VSTOXX-Series\\_en.pdf](https://www.eurexchange.com/resource/blob/247554/71d658e21cf29490a1adb55bf0b7a4c2/data/20170123_Mark-Shore-VSTOXX-Series_en.pdf)

Figure 3: VSTOXX® Futures curves near the Brexit 2016 referendum



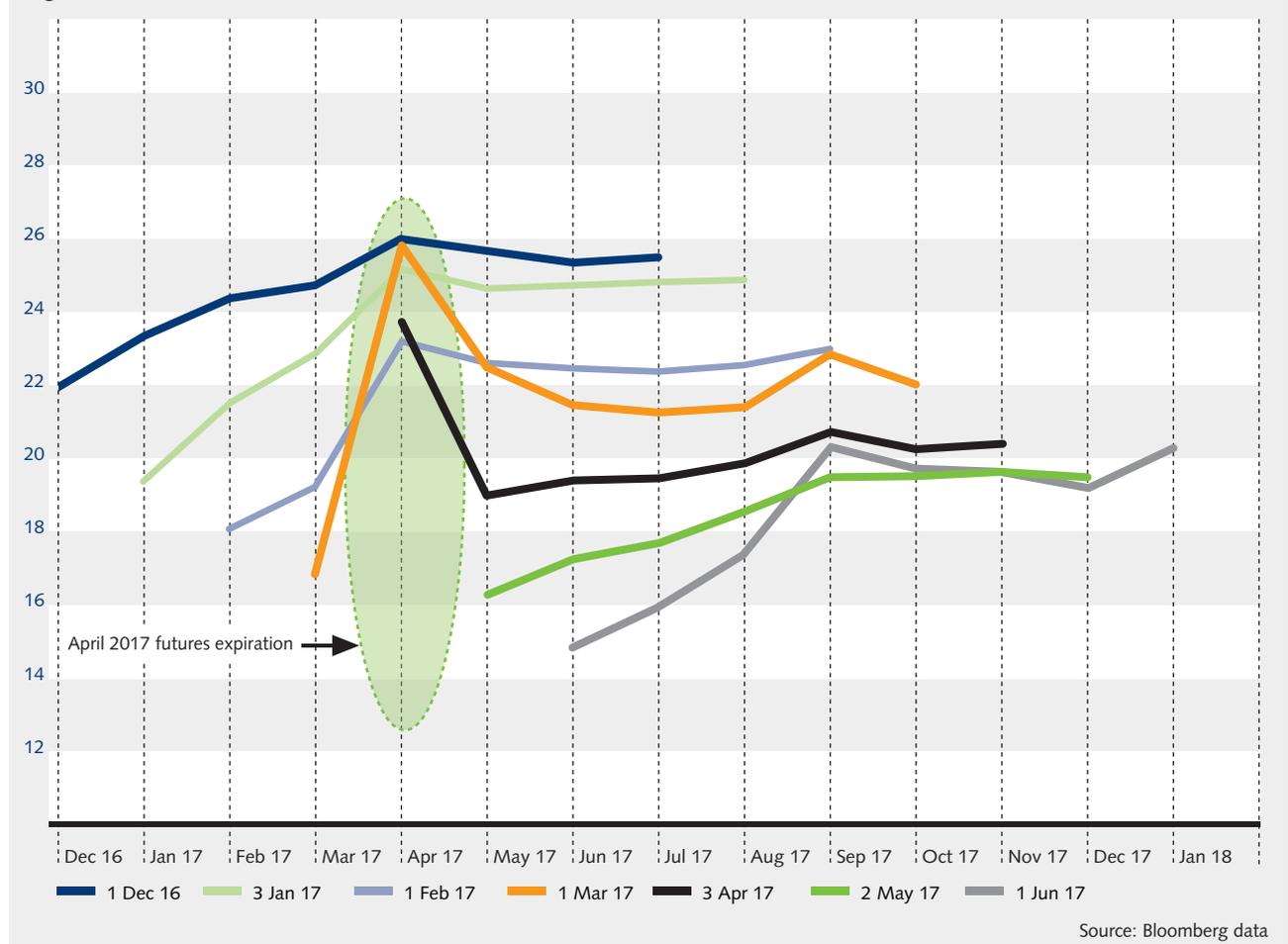
Source: Bloomberg data

Figure 3 illustrates a micro view of the VSTOXX® Futures volatility curve behavior in the last days before the referendum and immediately post the election as the curve moved from a spiked backwardation on 15 June (orange) to a relatively flat curve at lower volatility level on 23 June (green). Therefore the implied volatility peaked about three weeks prior to the vote.

With the referendum resulting in a "Yes", the forward curve temporarily moved higher on 24 June (grey) and 27 June (blue) with the July front-month reaching 32. By 1 July (black) the curve was back to a relatively flat formation in the mid-20s.

## French Election (possible Frexit) 2017:

Figure 4: VSTOXX® Futures curves in 2016 & 2017 relative to the 2017 French election



The first round of the French elections was set for 23 April 2017. Since a single candidate did not receive the majority of the votes, a run-off election occurred for the two top candidates (Macron 24 percent and Le Pen 21.3 percent) on 7 May 2017. The vote was less than a year after the Brexit referendum and French President Candidate Le Pen was calling for France to leave the EU (Frexit).<sup>8</sup>

As of 1 December 2016 (blue), the volatility forward curve was showing a spike in the April futures expiration. As time moved closer to the April expiration, the April kink in the curve became more apparent. For example, 1 March 2017 (orange), the April expiration is almost 10 volatility points higher than the March expiration. This reflects the market's increased risk premium and it creates a negative roll yield. 3 April 2017 (black) also shows the spike at the April expiration.

Once the 23 April results were known with a run-off between Macron and Le Pen, the polls showed Macron with a large lead of at least 60 percent of the votes.<sup>9</sup> The forward curves moved lower and back into contango formation as illustrated with the 2 May curve (green) and the 1 June curve (grey).

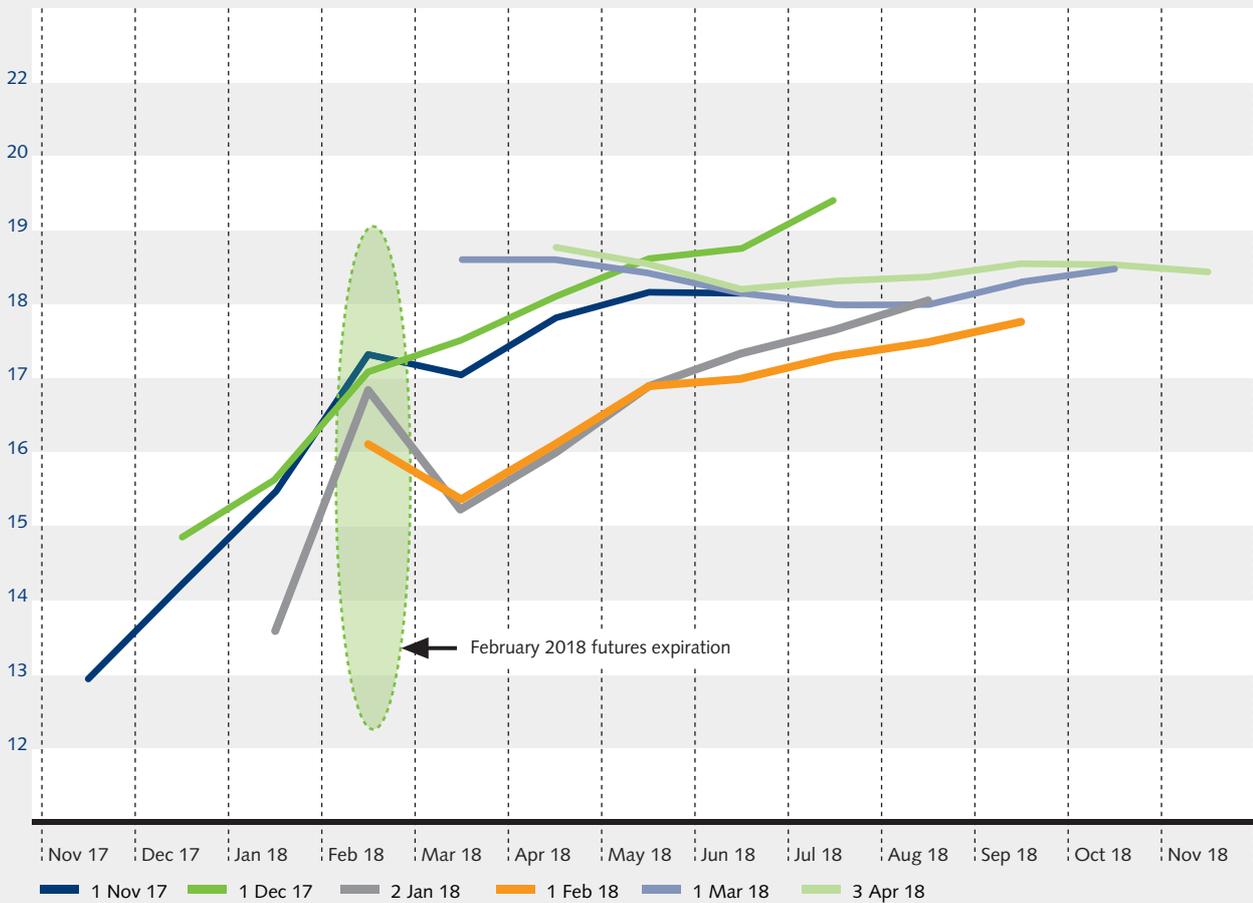
1 June 2017 (grey) the forward curve spikes at the September expiration. 24 September the date of the French Senate election and the German Federal election. The two largest EU economies show the sentiment of increased uncertainty via the spike in implied volatility prior to the election.

<sup>8</sup> Stothard, M. (2017, March 14). Could France's Marine Le Pen deliver Frexit? Retrieved from <https://www.ft.com/content/d37b6d90-fdd1-11e6-8d8e-a5e3738f9ae4>.

<sup>9</sup> French election poll tracker retrieved from <https://www.bbc.com/news/world-europe-39641442>

## Italian Election 2018:

Figure 5: VSTOXX® Futures curves in 2017 & 2018 relative to the 2018 Italian election



Source: Bloomberg data

28 December 2017, the Italian President Sergio Mattarella dissolved the Italian parliament triggering a new general election set for 4 March 2018 in the euro zone's third-largest economy. However this topic was debated in previous weeks, therefore possibly not a complete surprise when the election was announced.<sup>10</sup>

Once again, the forward curve experienced a spike prior to the election on 2 January (grey) and 1 February (orange) suggesting a market perceiving increased uncertainty.

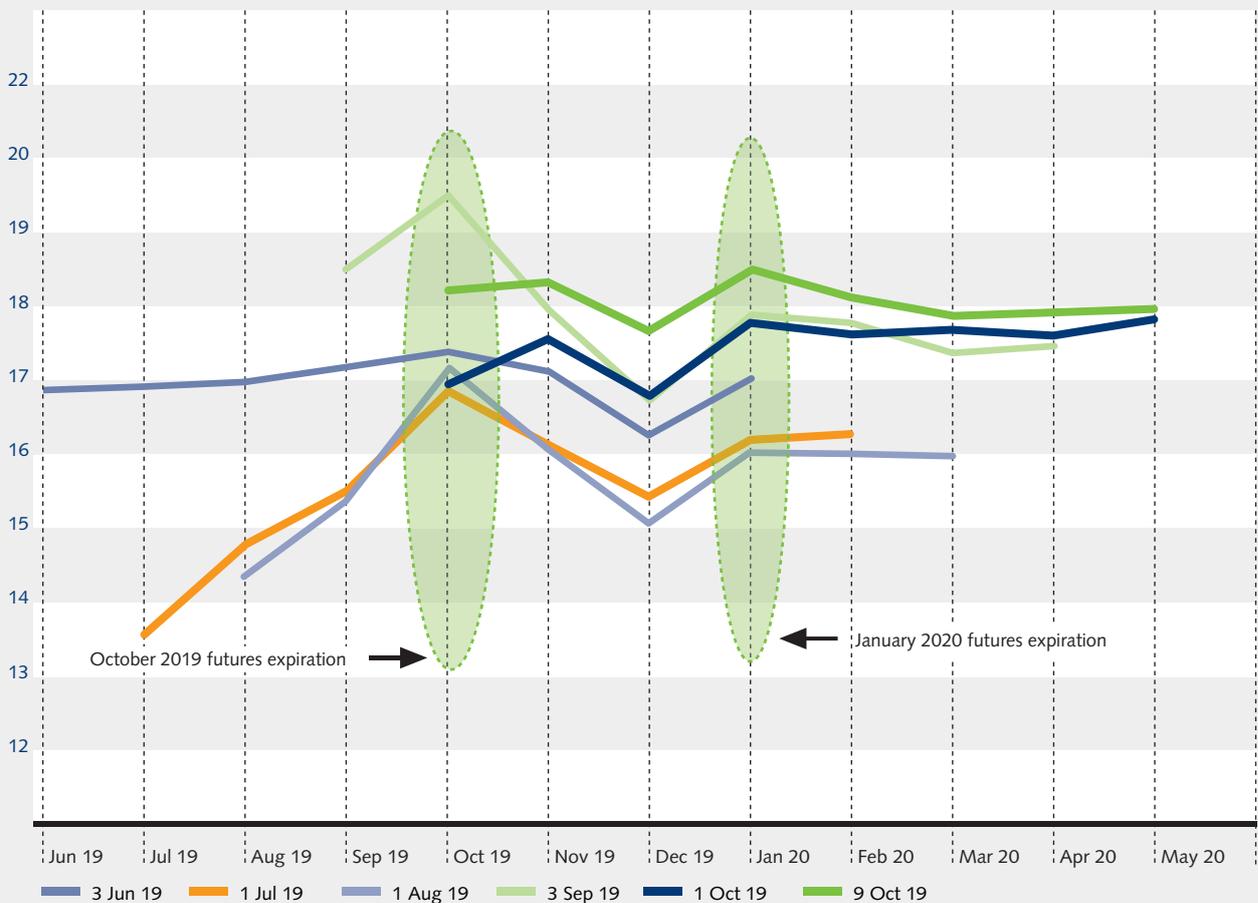
Prior to the 1 June 2018 formation of a Five Stars and League coalition government, rumors were hovering of a potential new election in the July and August period.<sup>11</sup> But the uncertainty did not materialize in the forward curve.

<sup>10</sup> <https://www.reuters.com/article/us-italy-election/italy-to-vote-on-march-4-with-hung-parliament-feared-idUSKBN1EM193>

<sup>11</sup> Reynolds, G. (2018, June). Vol Opportunities Surface As New Italian Government Ushers In Eurozone Risk. Retrieved from <https://eqderivatives.com/commentary/vol-opportunities-surface-as-new-italian-government-ushers-in-eurozone-risk>.

## Uncertainty of UK hard exit, soft exit or delay 2019:

Figure 6: VSTOXX® Futures curves in 2019 relative to the 2019 Brexit October deadline



Source: Bloomberg data

One may ask the question if UK stocks are not constituents of the EURO STOXX 50® Index and the VSTOXX® volatility index is derived from EURO STOXX 50® Index option prices, why would Brexit impact EU market volatility? First, the VSTOXX® volatility index may be a volatility proxy for several European markets. FTSE 100 spot price has a daily correlation to the EURO STOXX 50® Index and VSTOXX® volatility index of 0.85 and -0.67 respectively.<sup>12</sup>

Second, there is an economic impact that could vary between countries and within countries. When analyzing the economics of any country, the results may appear heterogeneous across the regions of a given country. Meaning some regions of a country may be economically impacted by Brexit, while other regions of a given country may not be impacted. The UK has the most economic exposure to Brexit and regions of the Republic of Ireland face similar levels

of exposure. Regions of countries in the EU most likely to experience the largest negative economic impact from Brexit are Germany, the Netherlands, Belgium, and France.<sup>13</sup> The level of economic impact is likely to be a decision-making factor in the final outcome of Brexit.

In the VSTOXX® Futures volatility forward curve, a spike appeared in the October futures expiration beginning with 1 July (orange), several months in advance of the 31 October Brexit deadline. As the discussion of delaying Brexit until 31 January 2020, a spike occurred in the January expiration as noted on 1 October (blue) and 9 October (green). However, prior to the March 2019 deadline, a spike in the forward curve did not emerge. A kink in the curve will not always happen with every known upcoming event.

<sup>12</sup> Shore, M. (2016). Utilizing a European volatility index for Pan-European volatility. Retrieved from <https://deutsche-boerse.com/exchange-en/products/vol/vstox-outlook/Utilizing-a-European-volatility-index-for-Pan-European-volatility-53658>

<sup>13</sup> Chen, W., Los, B., Mccann, P., Ortega-Argilés, R., Thissen, M., & Oort, F. V. (2017). The continental divide? Economic exposure to Brexit in regions and countries on both sides of The Channel. *Papers in Regional Science*, 97(1), 25–54.

As the 31 October deadline approached, UK PM Boris Johnson raced against the clock to find a deal. However, this past September Parliament passed The European Union (Withdrawal) (No. 2) Act 2019 also known as the “Benn” Act, which states the PM must send a request to the European Council President for a Brexit deadline extension if a deal is not agreed to or parliament has not agreed to a No Deal Brexit by 19 October. October came and went without a Brexit deal. This extended the Article 50 deadline to 31 January, hence a spike in the January 2020 futures expiration.<sup>14</sup>

Figure 7 demonstrates the shift from the 3 September (blue) when the October expiration was about 3 volatility points above January. 16 September (orange) the curve shifted to the January expiration to almost two points above the October expiration. As of 9 October (green), the January spike still appears, but the curve appears to have flattened, but higher than the previous curves.

**Summary:**

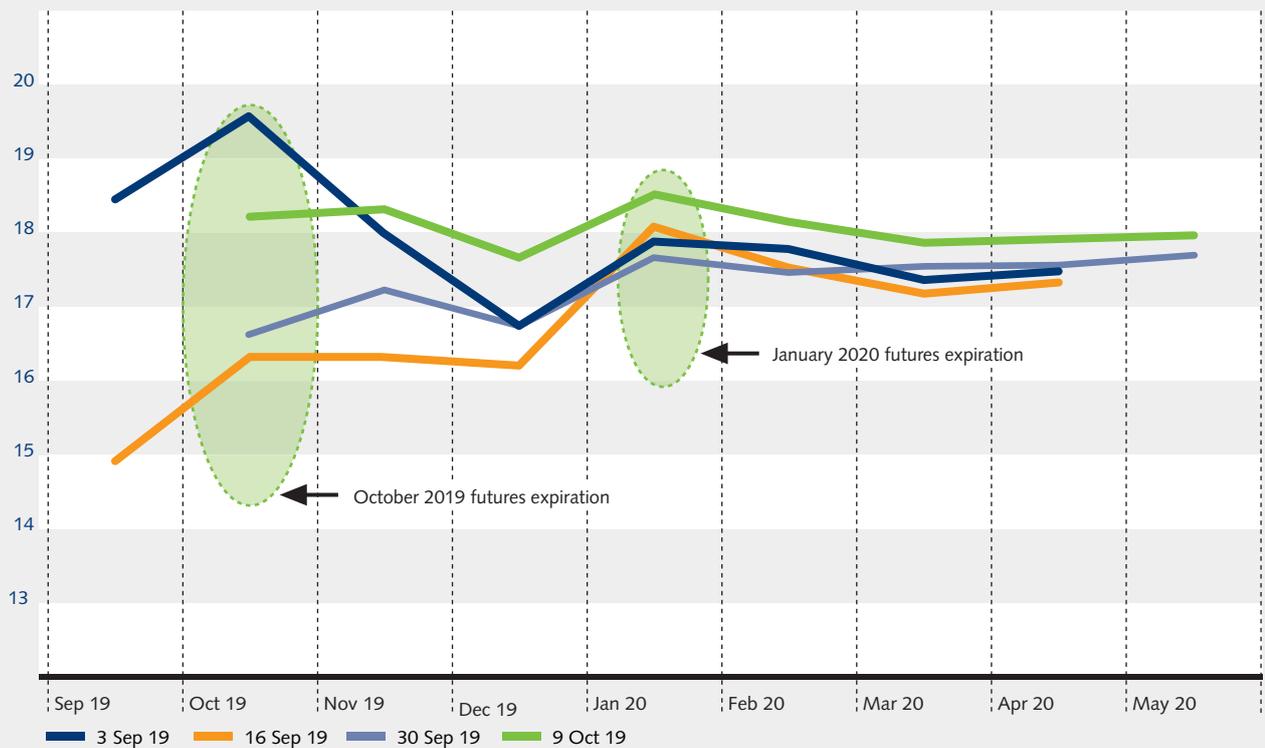
Examining some of the past and current known events, provides evidence of reoccurring market tendencies of the VSTOXX® Futures forward curve. The behavior characteristics include:

- 1) The forward curve tends to spike in the expiration month near the event causing a risk premium. This is a reflection of the market participants’ increased outcome uncertainty.
- 2) When the spiked month becomes the front month, the forward curve tends to be in backwardation or at least a “semi-backwardation” structure.
- 3) Post the event, the forward curve tends to adjust towards a flatter curve or back to contango.
- 4) The kink in the curve may cause an impact on roll yields.
- 5) The above tendencies may offer market opportunities.

For example:

- a. When a government announces an election date, the expiration month of the election date may spike above the forward curve. This situation may allow opportunities to go long the expiration month or to spread between expiration months.
- b. When the spiked expiration month becomes the front-month, the front-month often plateaus and the forward curve usually reverts back into contango. This allows potential opportunities to sell the expiration month and/or trade the nearby and back months as uncertainty may decay post the election date.

**Figure 7: VSTOXX® Futures curves in 2019 relative to the 2019 Brexit Benn Act**



Source: Bloomberg data

<sup>14</sup> Kraemer, D. (2019, October 8). Can a no-deal Brexit still happen? Retrieved from <https://www.bbc.com/news/uk-politics-49612757>.

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