# Material Misrepresentations in XIV's Prospectus Led to $700 Million in Losses

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## Executive Summary

Credit Suisse's XIV Exchange Traded Note (ETN) linked to the inverse of short term VIX futures prices lost 97% of its value or approximately $2 billion in a single day on February 5, 2018. Credit Suisse announced the following morning that it would redeem all outstanding XIV shares at the Closing Indicative Value on February 15, 2018.[1]

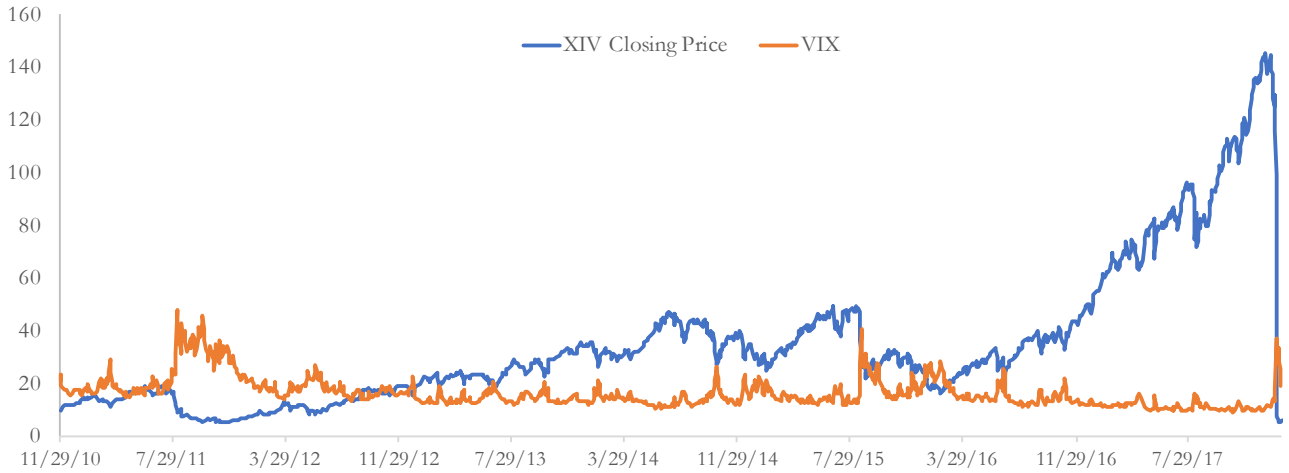
Figure 1 reports the daily closing price for XIV from its inception in November 2010 to its demise in February 2018. The run-up in 2017 corresponds to a lengthy period of low stock market volatility.

Credit Suisse's latest Pricing Supplement for the XIV can be accessed by clicking here. Credit Suisse represented in the Pricing Supplement that it would publish an estimate of the current economic value of XIV shares every 15 seconds based on real time VIX futures prices but, in fact, did not. On February 5, 2018 the difference between what Credit Suisse said it would do and what is actually did was enormous because Credit Suisse effectively stopped updating its estimate of the current economic value of XIV shares at 4:10 pm when VIX futures prices were changing significantly.

From 4:10 pm to 5:09 pm on February 5, 2018 Credit Suisse was materially misrepresenting the true economic value of XIV. Investors were buying XIV between 4:15 pm and 5:08 pm at prices as high as in the $80s when Credit Suisse was representing to the public that the economic value of the notes was $24.6961 but had to know that the true economic value was aready between $4.22 and $4.40.

By 4:13 pm or shortly thereafter sophisticated market participants would know that Credit Suisse was certain to redeem

**Figure 1:** XIV from November 29, 2010 to February 15, 2015



XIV for $4.22 or a little more per share. Investors paid $823.6 million to purchase 28.8 million shares after 4:15 pm at an average price of $28.60. Those aftermarket purchases at inflated prices transferred $700 million from unsophisticated, poorly-informed buyers to sophisticated, well-informed sellers.

In addition to the problem with Credit Suisse's Pricing Supplement prospectus we identify, we find that extraordinary trading in two critical futures contracts in the last minutes of trading before 4:15 pm on February 5, 2018 pushed up the futures' prices and triggered the XIV liquidation. The primary beneficiaries of this manufactured liquidation of XIV are Credit Suisse and the traders who had previously sold XIV short.

The problems we identify herein are not unique to XIV but are found in other ETNs tied to the S&P VIX futures indices.

## Intraday Indicative Value and Closing Indicative Value

XIV trades at prices that are determined by supply and demand just like other exchange-traded securities. However, Credit Suisse also calculates and publishes an estimate of the value of XIV called the "Intraday Indicative Value" throughout the day and once a day a "Closing Indicative Value".[2]

On page 5, XIV's Pricing Supplement states "The "Intraday Indicative Value" for each series of ETNs is designed to approximate the economic value of such series of ETNs at a given time.... the calculation is based on the most recent intraday level of such Index at the particular time. The Intraday Indicative Value of the ETNs will be calculated every 15 seconds ..."

On page PS-30, the Pricing Supplement says "The value of each [S&P VIX futures] Index will be published by Bloomberg in real time and after the close of trading on each Index Business Day under the following ticker symbols: ..." and "The intraday level of each of the Indices is calculated in real time by S&P ... applying real time prices of the relevant VIX futures contracts."

Credit Suisse's representations in the Pricing Supplement that the Intraday Indicative Value 1) approximates the economic value of the ETNs, 2) is updated every 15 seconds based on the most recent levels of the Indices which are 3) calculated by S&P in real time from 4) real time prices of VIX futures contracts were false.

Credit Suisse was using a Standard & Poor's Index it knew or should have known was not being updated every 15 seconds "applying real time prices of the relevant VIX futures contracts."

Credit Suisse's misrepresentations are not trivial. The XIV Pricing Supplement includes the following.

> … Paying a premium purchase price over the Indicative Value of the ETNs could lead to significant losses in the event the investor sells such ETNs at a time when such premium is no longer present in the market place or such ETNs are accelerated (including at our option, which we have the discretion to do at any time), in which case investors will receive a cash payment in an amount equal to the Closing Indicative Value on the Accelerated Valuation Date (each as defined herein). Investors should consult their financial advisors before purchasing or selling the ETNs, especially for ETNs trading at a premium over their indicative value. …[January 29, 2018 Pricing Supplement, p.2]

Credit Suisse also describes potential early redemption of XIV if the daily Indicative Value decline exceeds 80%:

> … If the **price of the underlying futures contracts** increases by more than 80% in a day, it is extremely likely that the Inverse ETNs will depreciate to an Intraday Indicative Value or Closing Indicative Value equal to or less than 20% of the prior day's Closing Indicative Value and will be subject to acceleration if we choose to exercise our right to effect an Event Acceleration of the ETNs. …[January 29, 2018 Pricing Supplement, PS-28; emphasis added]

This excerpt from the Pricing Supplement demonstrates that Credit Suisse knew, independent of any calculation by Standard and Poor's, that an 80% or slightly greater increase in the price of the February and March VIX futures contracts would cause the Indicative Value to breach the threshold which would give Credit Suisse the option to redeem all XIV shares.[3]

## VIX Futures Prices Up 96% by 4:15 PM, Ensured Credit Suisse Would Liquidate XIV

XIV's Closing Indicative Value is found by applying the negative % change in the closing VIX futures' settlement values from the previous days' VIX futures' settlement values (with a minor adjustment for fees and interest) to the previous day's Closing Indicative Value. The VIX futures' settlement values are calculated by the CBOE as an average of the inside bid and ask quotes for each futures contract at 4:15 pm. The difference between the VIX futures' settlement values and the most recent futures trade prices at 4:15 pm is de minimis because bid-ask spreads are small in near-to-expiration VIX futures contracts. Thus, even if bid and ask quotes for VIX futures contracts were not observable in real time – they are – VIX futures trade prices at 4:15 pm are an excellent indicator of the VIX futures settlement values.

The last trade by 4:15 pm on February 5, 2018 in the February contract was at $33.20 and the last trade in the March contract was at $27.95. These prices were 112.5% and 86.8% higher than the previous day's settlement values for the February and March contracts. The weights to be applied on February 5, 2018 to these two daily changes were known to be 0.35 and 0.65 so the weighted average increase in the relevant futures settlement values was certain to be 95.77% give or take a trivial amount as a result of using the average of bid and ask quotes at 4:15 pm instead of last trade prices and because of the very tiny daily accrual of interest and fees. See Table 1.

It was thus known to Credit Suisse and other sophisticated market participants by 4:15 pm that XIV's Closing Indicative Value would decline by 96% from the previous day's Closing Indicative Value and that Credit Suisse would redeem the notes for pennies on the dollar.

Investors paid approximately $823 million at an average price of $28.60 after 4:15 pm when the true Indicative Value was between $4.2217 (Credit Suisse's revised calculation) and $4.4064 (our calculation as of 4:15pm) although Credit Suisse was reporting the Indicative Value as approximately $24.8933 until 5:08 pm. Credit Suisse knew or should have known that these unfortunate purchasers were certain – not just likely, certain – to lose virtually everything they were paying the instant they were buying the securities.

If the true Indicative Value, updated every 15 seconds based on the most recent Index levels calculated from real time futures prices as represented by Credit Suisse in XIV Pricing Supplement, at 4:15 pm was $24.8933 XIV would not have been liquidated because that would have only been a 77% decline from the previous day's Closing Indicative Value. The February and March VIX futures prices have declined since February 5, 2018 and so XIV shares would have increased in value if XIV had survived the events of February 5, 2018. In that case, they would be worth approximately $30.88 as of March 6, 2018. Instead, Credit Suisse paid investors $5.99 per share based on XIV's Closing Indicative Value on February 15, 2018.[4]

**Table 1:** By 4:15 pm, XIV's Closing Indicative Value Was Certain to Decline More Than 95%

| **Settlement Value Summary** | | | | |
|---|---|---|---|---|
| | **February** | **March** | **Weighted Average** | **XIVIV** |
| **2/2/2018** | $15.625 | $14.975 | $15.2025 | $108.3681 |
| **2/5/2018** | $33.225 | $27.975 | $29.8125 | $4.2217 |
| | | | 96.1% | 3.90% |
| | | | | |
| Based on Last Trade Prices | | | | |
| 4:15pm | $33.200 | $27.950 | $29.7875 | $4.415 |
| | | | 95.94% | 4.07% |

## XIV Indicative Value Did Not Track Relevant VIX Futures Prices in Real Time

Table 2 lists the spot VIX, the February and March VIX futures trade prices, the S&P Index (SPVXSPID) Credit Suisse used to calculated XIV's Indicative Value and XIV's Indicative Value. The first row in Table 2 labeled "February 2, 2018" contains the closing values for the VIX, settlement values for the February and March VIX futures contracts and a weighted-average of those two futures contracts' settlement values and Credit Suisse's Closing Indicative Value on February 2, 2018. The rest of the rows in Table 2 summarize our recreation of XIV's Indicative Value from 4:00 pm to 5:11 pm.

The Last February Futures Trade is the most recent trade price each second. For example, there was a February futures trade at $23.10 and a March futures trade at $18.90, both at 3:59:59 pm. S&P's Short-term VIX Futures Index assigned a .35 weight to the February contract and a 0.65 weight to the March contract on February 5, 2018 because 65% of the current roll period had elapsed. Applying those weights to the last trade price each second, we derive a weighted average futures price; $20.37 at 4:00 pm.

Credit Suisse reported the same $27.0855 Intraday Indicative Value at 4:10, 4:11 and 4:12 pm. There were significant changes in the real-time prices of the relevant futures contracts and so it is clear Credit Suisse was not updating the Intraday Indicative Value every 15 seconds, based on an Index which was being recalculated in real-time based

**Table 2:** Recreation of XIV's Indicative Value from 4:00 pm to 5:011 pm

| | VIX | Last February Futures Trades | Last March Futures Trades | Weighted Futures Price | SPVXSPID | XIV Indicative Value | SLCG XIV Indicative Value |
|---|---|---|---|---|---|---|---|
| February 2, 2018 | 17.31 | 15.63 | 14.98 | 15.2025 | 49.4322 | 108.3681 | 108.3681 |
| 16:00:00 | 32.98 | 23.10 | 18.90 | 20.37 | 65.7500 | 72.5937 | 71.5348 |
| 16:01:00 | 35.02 | 24.75 | 19.67 | 21.45 | 69.1000 | 65.2501 | 63.8508 |
| 16:02:00 | 35.02 | 25.00 | 20.10 | 21.82 | 70.4400 | 62.3127 | 61.2348 |
| 16:03:00 | 34.55 | 26.60 | 22.05 | 23.64 | 73.8400 | 54.8594 | 48.2083 |
| 16:04:00 | 35.31 | 26.50 | 21.70 | 23.38 | 76.1300 | 49.8396 | 50.0794 |
| 16:05:00 | 35.31 | 25.82 | 21.13 | 22.77 | 74.4900 | 53.4346 | 54.4168 |
| 16:06:00 | 35.31 | 26.75 | 21.66 | 23.44 | 74.7300 | 52.9085 | 49.6410 |
| 16:07:00 | 38.24 | 26.90 | 22.06 | 23.75 | 76.9500 | 48.0420 | 47.4135 |
| 16:08:00 | 38.80 | 27.17 | 21.99 | 23.80 | 77.1200 | 47.6694 | 47.0642 |
| 16:09:00 | 38.80 | 29.20 | 22.69 | 24.97 | 79.6600 | 42.1014 | 38.7565 |
| 16:10:00 | 37.32 | 32.15 | 24.75 | 27.34 | 86.5100 | **27.0855** | 21.8523 |
| 16:11:00 | 37.32 | 32.50 | 28.80 | 30.10 | 86.5100 | **27.0855** | **2.2146** |
| 16:12:00 | 37.32 | 30.80 | 26.10 | 27.75 | 86.5100 | **27.0855** | 18.9655 |
| 16:13:00 | 37.32 | 30.00 | 26.00 | 27.40 | 86.8600 | 26.3182 | 21.4246 |
| 16:14:00 | 37.32 | 31.45 | 27.10 | 28.62 | 87.5100 | 24.8933 | 12.7106 |
| 16:15:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:16:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:17:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:18:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:19:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:20:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:21:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:22:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:23:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:24:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:25:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:26:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:27:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:28:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:29:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:30:00 | 37.32 | 33.20 | 27.95 | 29.79 | 87.5100 | 24.8933 | 4.4064 |
| 16:31:00 | 37.32 | 33.10 | 27.55 | 29.49 | 87.5100 | 24.8933 | 4.2299 |
| 16:32:00 | 37.32 | 32.55 | 27.59 | 29.33 | 87.5100 | 24.8933 | 4.2537 |
| 16:33:00 | 37.32 | 33.00 | 26.55 | 29.46 | 87.5100 | 24.8933 | 4.2349 |
| 16:34:00 | 37.32 | 32.55 | 27.00 | 28.94 | 87.5100 | 24.8933 | 4.3085 |
| 16:35:00 | 37.32 | 31.20 | 26.75 | 28.31 | 87.5100 | 24.8933 | 4.3992 |
| 16:36:00 | 37.32 | 30.25 | 25.00 | 26.84 | 87.26 | 25.4414 | 4.6092 |
| 16:37:00 | 37.32 | 30.00 | 25.30 | 26.95 | 87.09 | 25.8140 | 4.5939 |
| 16:38:00 | 37.32 | 29.75 | 25.05 | 26.70 | 87.44 | 25.0468 | 4.6296 |
| 16:39:00 | 37.32 | 30.00 | 25.85 | 27.30 | 87.60 | 24.6961 | 4.5428 |
| 16:40:00 | 37.32 | 30.30 | 26.30 | 27.70 | 87.60 | 24.6961 | 4.4860 |
| 16:41:00 | 37.32 | 30.65 | 26.95 | 28.25 | 87.60 | 24.6961 | 4.4082 |
| 16:42:00 | 37.32 | 30.55 | 27.25 | 28.41 | 87.60 | 24.6961 | 4.3853 |
| 16:43:00 | 37.32 | 30.90 | 27.17 | 28.48 | 87.60 | 24.6961 | 4.3752 |
| 16:44:00 | 37.32 | 31.65 | 27.40 | 28.89 | 87.60 | 24.6961 | 4.3164 |
| 16:45:00 | 37.32 | 32.15 | 27.95 | 29.42 | 87.60 | 24.6961 | 4.2403 |
| 16:46:00 | 37.32 | 32.00 | 27.65 | 29.17 | 87.60 | 24.6961 | 4.2757 |
| 16:47:00 | 37.32 | 32.10 | 27.50 | 29.11 | 87.60 | 24.6961 | 4.2846 |
| 16:48:00 | 37.32 | 31.90 | 27.40 | 28.98 | 87.60 | 24.6961 | 4.3039 |
| 16:49:00 | 37.32 | 32.25 | 27.45 | 29.13 | 87.60 | 24.6961 | 4.2817 |
| 16:50:00 | 37.32 | 32.35 | 27.45 | 29.17 | 87.60 | 24.6961 | 4.2767 |
| 16:51:00 | 37.32 | 32.00 | 27.50 | 29.08 | 87.60 | 24.6961 | 4.2896 |
| 16:52:00 | 37.32 | 31.80 | 27.25 | 28.84 | 87.60 | 24.6961 | 4.3228 |
| 16:53:00 | 37.32 | 31.45 | 27.15 | 28.66 | 87.60 | 24.6961 | 4.3496 |
| 16:54:00 | 37.32 | 31.15 | 26.55 | 28.16 | 87.60 | 24.6961 | 4.4203 |
| 16:55:00 | 37.32 | 30.55 | 26.75 | 27.43 | 87.60 | 24.6961 | 4.5246 |
| 16:56:00 | 37.32 | 30.05 | 25.00 | 26.77 | 87.60 | 24.6961 | 4.6192 |
| 16:57:00 | 37.32 | 28.95 | 24.70 | 26.19 | 87.60 | 24.6961 | 4.7021 |
| 16:58:00 | 37.32 | 29.00 | 24.65 | 26.17 | 87.60 | 24.6961 | 4.7042 |
| 16:59:00 | 37.32 | 28.75 | 24.60 | 26.05 | 87.60 | 24.6961 | 4.7214 |
| 17:00:00 | 37.32 | 28.60 | 24.75 | 26.10 | 87.60 | 24.6961 | 4.7149 |
| 17:01:00 | 37.32 | 28.70 | 25.00 | 26.30 | 87.60 | 24.6961 | 4.6867 |
| 17:02:00 | 37.32 | 28.60 | 25.00 | 26.26 | 87.60 | 24.6961 | 4.6917 |
| 17:03:00 | 37.32 | 28.25 | 25.00 | 26.14 | 87.60 | 24.6961 | 4.7092 |
| 17:04:00 | 37.32 | 28.55 | 25.00 | 26.24 | 87.60 | 24.6961 | 4.6942 |
| 17:05:00 | 37.32 | 28.40 | 24.75 | 26.03 | 87.60 | 24.6961 | 4.7249 |
| 17:06:00 | 37.32 | 28.10 | 24.55 | 25.79 | 87.60 | 24.6961 | 4.7585 |
| 17:07:00 | 37.32 | 27.90 | 24.50 | 25.69 | 87.60 | 24.6961 | 4.7732 |
| 17:08:00 | 37.32 | 27.81 | 24.20 | 25.46 | 87.60 | 24.6961 | 4.8055 |
| 17:09:00 | 37.32 | 27.90 | 24.25 | 25.53 | 87.60 | **24.6961** | 4.7964 |
| 17:10:00 | 37.32 | 27.75 | 24.05 | 25.35 | 96.9378 | **4.2217** | 4.8225 |
| 17:11:00 | 37.32 | 28.10 | 24.10 | 25.50 | 96.9378 | 4.2217 | 4.8003 |

on the most recent trade prices in therelevant futures contracts. Credit Suisse did not report the Closing Indicative Value of XIV until 5:09:05 pm on February 5, 2018, 7 seconds after S&P set the daily close level of SPVXSP which XIV tracks at 5:08:58 pm. The Intraday Indicative Value dropped from $24.6961 to the Closing Indicative Value of $4.2217 at the same time, i.e. 5:09:05 pm.

Credit Suisse reported the $24.6961 Indicative Value until 5:08 pm despite the fact that futures trades at 4:15 pm support a $4.40 Intraday Indicative Value and futures quotes support a Closing Indicative Value of $4.22. Credit Suisse was posting Intraday Indicative Values but they were not based on indices "calculated in real time by S&P … applying real time prices of the relevant VIX futures contracts" as Credit Suisse represented in XIV's Pricing Supplement.

## By 4:10 pm XIV's True Intraday Indicative Value Had Declined More Than 80%.

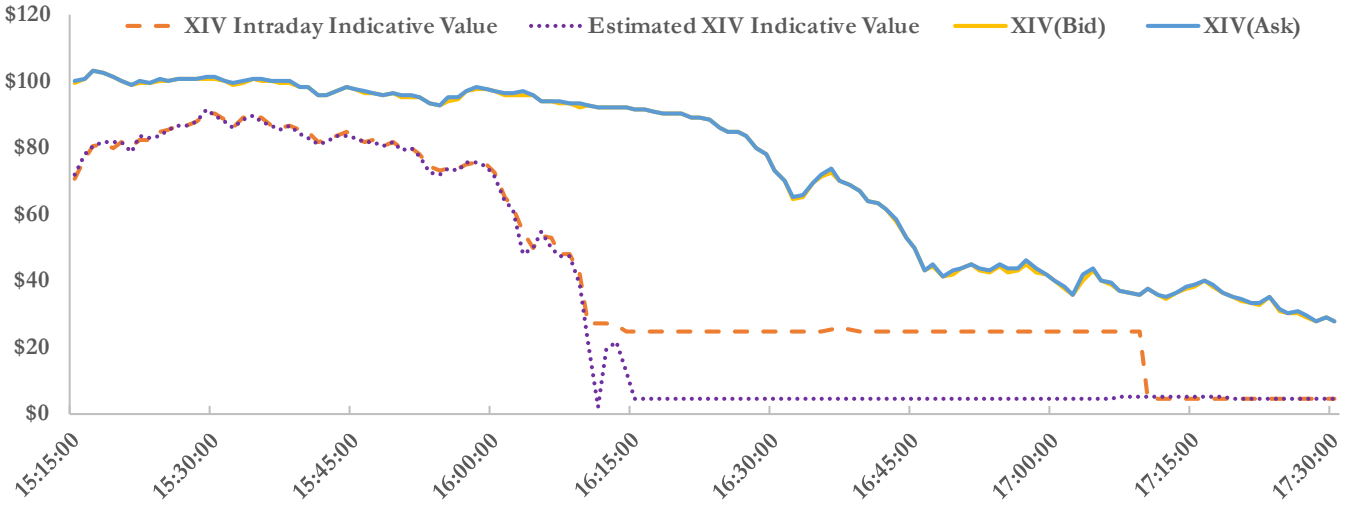
At 4:10, 4:11 and 4:12 pm, we estimate the Intraday Indicative Value to be $21.8523, $2.2146 and $18.9655. Such low Intraday Indicative Values and the true Intraday Indicative Values at 4:12, 4:13, 4:14 and 4:15 pm as well would have triggered an unwind of XIV if they had been the Closing Indicative Value that day since they are all more than 80% less than the previous days' $108.3681 Closing Indicative Value.

Our recreated Intraday Indicative Value matches Credit Suisse's Intraday Indicative Value closely throughout the day but at 4:09 pm Credit Suisse's reported Intraday Indicative Value began to deviate significantly from the true Indicative Value which might have put investors on notice that XIV was failing. Figure 2 plots XIV bid and ask quotes with Credit Suisse's reported Intraday Indicative Values and corrected Intraday Indicative Values based on the latest trade prices in the relevant futures contracts.

## Late VIX Futures Trades Appear to Have Intentionally Triggered XIV Unwind

The spot VIX in Table 2 was 90% higher at 4:10 pm on February 5, 2018 than it had closed the previous day. Consistent with the general observations that VIX futures prices move with the spot VIX but with less dramatic swings, the weighted average last futures trade price at 4:10 pm had increased 34% from the previous day's closing average futures trade price. Between 4:10 pm and 4:15 pm something extraordinary happened; the spot VIX increased 13% but the weighted average futures price increased 46% or 3.5 times as much as the increase in the VIX and 8 or 10 times as much as we would have expected given the 13% increase in the VIX.

**Figure 2:** Investors Bought XIV at Inflated Prices While Credit Suisse Delayed Reducing Reported Indicative Value



Heavy trading in the February and March VIX futures contracts in the last few minutes before 4:15 pm drove their prices up and beyond the threshold at which XIV would be liquidated. Figure 3 plots the % increase in the weighted average VIX futures trade prices from their previous day's closing levels and the 80% level at which Credit Suisse would be entitled to liquidate XIV. The average futures price had increased from the previous close only 34.5% by 4:00 pm on February 5, 2018. By 4:09:44 pm average futures price had increased from the previous close by over 80%. In fact, it appears that the Intraday Indicative Value hit $0 at 4:10:56 pm.

It is unlikely that the heavy VIX futures trading shortly before the setting of the VIX futures settlement value at 4:15 pm resulted from benign hedging activity by Credit Suisse. Credit Suisse could alter its hedging position well before or after the critical 4:15 pm marker and not impact the likelihood XIV would be unwound and the price Credit Suisse would pay investors for the outstanding notes.

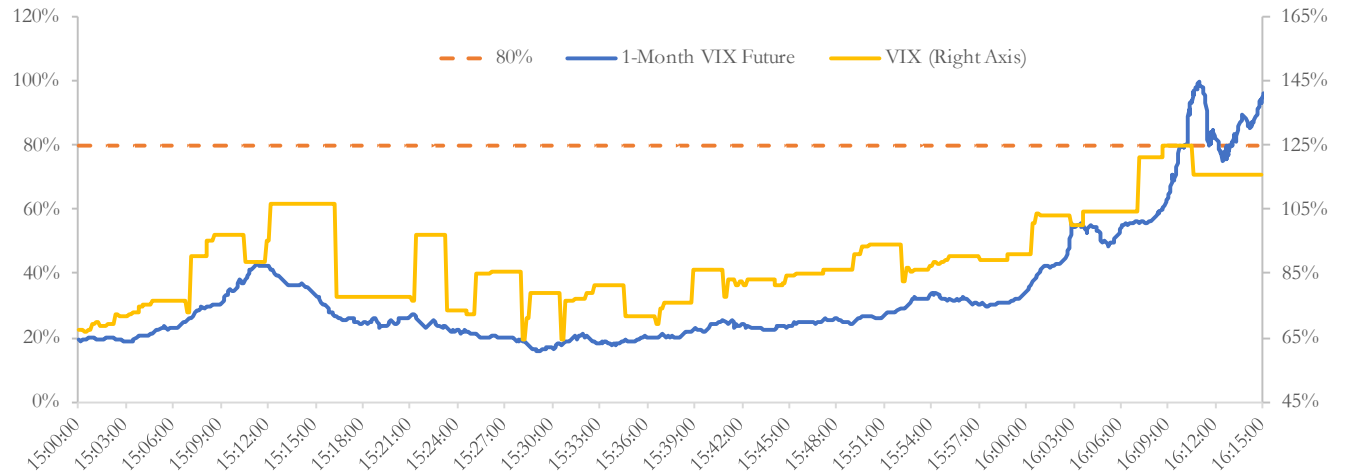
The extraordinary increase in the February and March VIX futures prices late on February 5, 2018 did not result from manipulation of the spot VIX calculation by placement of quotes or trades in deep out of the money put options on the S&P 500. There has been some evidence of manipulation of the VIX for a few seconds surrounding the fixing of VIX levels for settling futures and options.[5] There were no VIX futures settling on February 5, 2018. The increase in VIX was large and not fleeting. The increase in futures prices in the last few minutes preceding 4:15 pm was far greater than the increase in the VIX. Other than provoking a liquidation of XIV the potential payoffs to VIX manipulation was no higher on February 5, 2018 than on other days and much less than on days when VIX futures and options settle.

Futures prices change substantially less than one-for-one with changes in the spot price so it would be nearly impossible to move the VIX futures price by manipulating quotes on S&P 500 options. Direct purchases of the February and March VIX futures by Credit Suisse or Barclays or some large investors with short XIV positions account for VIX futures prices increasing much more dramatically than spot VIX levels in the last few minutes before 4:15 pm. XIV had a contingent settlement triggered if the February and March futures prices could be held 80% above their February 2, 2018 settlement values. It appears someone who would benefit from XIV being liquidated on February 5, 2018 was in the market heavily buying February and March contracts between 4:10 and 4:15 pm.

## Barclays Has the Same Problem with VXX.

We have focused on Credit Suisse's misrepresentations and conduct because of the dramatic and permanent losses suffered by investors in XIV on February 5, 2018 but the issue we identify is more widespread. Barclays Prospectus for its VXX ETN (available here) makes similar false statements about how the Indicative Value is calculated. Page PS-3 of the current VXX Prospectus states "First, intraday indicative value is based on the most recent Index level published by the index sponsor, which reflects the recent reported sales prices for the Index components, …" is materially false. The VXX intraday indicative value is not based on an index that reflects the most

**Figure 3:** Weight Average VIX Futures Price Increase Hit 80% Trigger by 4:10 pm



recent sales prices for the futures contracts included in the index construction.

Also, Barclays conduct on February 5, 2018 was similar only not as consequential as Credit Suisse's conduct. Barclays published an indicative value of $59.0679 from 4:14 pm until 4:36 pm and of between $58.7892 and $59.1272 until 5:10 pm on February 5, 2018 when it abruptly increased it to $65.4354. The true VXX indicative value at 4:15 pm was approximately $65.38. Investors bought over $500 million of VXX shares between 4:15 pm and 5:10 pm when Barclays updated the Indicative Value to something approximately correct on February 5, 2018.

Both Credit Suisse and Barclays updated their ETN's Intraday Indicative Values in part with reference to a Standard and Poor's VIX futures index but the error here is not primarily with Standard and Poor's. It appears that virtually every day through these ETNs' nearly 10 year history both Credit Suisse and Barclays posted Intraday Indicative Values which did not reflect the most recent transaction prices in the relevant VIX futures prices updated in real time.

## Endnotes

1. See Credit Suisse press release "Credit Suisse AG Announces Event Acceleration of its XIV ETNs" here https://www.credit-suisse.com/corporate/en/articles/media-releases/credit-suisse-announces-event-acceleration-xiv-etn-201802.html

2. An ETN's Indicative Value is the amount the issuer, Credit Suisse in the Case of XIV, would pay if the notes were redeemed that day after deducting a 0.05% early redemption fee. The price of an ETN on the other hand is determined by relative buying and selling pressure. ETNs' prices don't usually deviate much from their Indicative Values because issuers provide an opportunity for sophisticated investors to arbitrage differences between market prices and Indicative Values. Intraday Indicative Values are calculated from recent futures trade prices and the Closing Indicative Value is calculated from the mid-point of the bid ask spreads on futures contracts at 4:15 pm.

3. Although Credit Suisse is not required to accelerate the redemption of XIV if the Indicative Value closes 80% or more below the previous closing Indicative Value it is certain that it would chose to redeem the notes. The notes are a liability of Credit Suisse. The cost to Credit Suisse of paying off that liability drops with the Indicative Value of XIV. Anytime XIV's Indicative Value drops by more than 80%, Credit Suisse can reap an enormous windfall by immediately redeeming the notes.

4. Credit Suisse's February 14, 2018 Press Release is attached to this 6-K as Ex. 99-1. www.sec.gov/Archives/edgar/data/1053092/000095010318002069/dp86855_ex9901.htm

5. Griffin, John M. and Shams, Amin, Manipulation in the VIX? (May 23, 2017). Available at SSRN: https://ssrn.com/abstract=2972979 or http://dx.doi.org/10.2139/ssrn.2972979


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