SPX-Options-Trading: The Kir Strategy

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Kir is a popular French cocktail made with a measure of crème de cassis (blackcurrant liqueur) topped up with white wine. Originally called blanc-cassis, the drink is now named after Félix Kir (1876–1968), mayor of Dijon in Burgundy. The reinvention of blanc-cassis (post 1945) was necessitated by the German Army's confiscation of all the local red Burgundy during the war. Faced with an excess of white wine, Kir renovated a drink that previously was made primarily with the red. Besides the basic Kir, a number of variations exist: Kir Royal – made with Champagne. Kir Breton – with Breton cidre.


Abstract:
In March 2012 I developed a GARCH option model with filtered historical simulation (see [1]). In a first step this model was further improved. The intention of this model was to improve options strategies by incorporating information from a real-measure. Although the features of the GARCH-model are statistically attractive, the information did not improve options trading strategies. The idea was dropped and replaced by the simple Implied Volatility Term Structure (IVTS). Adding the IVTS information improves the trading strategies significantly.

Revision-1:
In Revision-1 the time range is extended to the last 5 years. Additionally a Put-Spread strategy called the Kir Communard is added. The Kir strategy survives the 2008 crash without major damage. The strategy is on time out of the market. It also “smells” the flash-crash beforehand. The new results confirm the initial results. The initial paper was left unchanged. Revision-1 is added with new paragraphs at the end of the original paper.

Revision-2:
In Revision-2 the Kir criterion is compared to a strategy which is presented in [7]. The strategy is a Put-Spread. It uses a stop-loss. I have sent Revision-1 of this paper to one of the authors, Univ.Prof. G. Larcher. Prof. Larcher was so kind to sent me his paper back. There is no clear cut answer if the Kir or the Larcher criterion is better. The Kir seems to work better for a hedged position, the Larcher for a naked strategy.
Acknowledgment:

Revision 1 was suggested by Joe Fritz. According to Joe, there are a lot of strategies around, which perform in the originally considered time range reasonable. But all capsize in 2008. Joe Fritz provided me also with the extended VXV time series. Additionally he suggested to the test a Put-Spread strategy.

The Realized-GARCH funeral:

The purpose of GARCH-models is to generate from the underlying (e.g. the SPX) the volatility distribution. In practically all existing models the GARCH parameters are not directly estimated from the underlying, but are fitted – in a rather tricky way – to the implied volatility surface. It is an old idea of mine to avoid the second step and to use just the information of the underlying. In mathematical finance one speaks of the real- and the risk-neutral-measure.

The general idea was to find situations, where options are priced too high and it pays off to sell them short. One could also think the other way round, but it is well established that the implied volatility of index options is most of the time above the realized volatility. So only the first case seems to be interesting.

For this end the GARCH model in [1] was reworked. In the first step I was satisfied with the statistical properties of this model. In normal times the GARCH-volatility was indeed lower than the implied-volatility. Also the distribution of volatility-forecasts looked reasonable. The model generated also a structural similar smile. But to my dismay I could not find any way to use this information for relative straightforward options strategies.

After a lot of trials and the same amount of errors I dismissed (forever) this idea. It is frustrating to follow for a long time an idea and to realize at the end that it does not work. But one could have known it beforehand. There is consensus in theoretical finance that the implied volatility contains already all the available information. I could have believed this as a fact. Instead I have learned it the hard way. One could make another try with risk-neutral GARCH models. But I can see no point to do this. This is in my view just an academic exercise to model observed market behavior. The basic idea of the realized measure model was to be ahead of the market. I decided to sip a glass of Kir Chrilly (Kir with cidre from my own apple- and pear-trees) and to start afresh with a new concept.

The Implied-Volatility-Term-Structure (IVTS):

The IVTS is the ratio between the 1-month and 3-month implied volatility index. \[ \text{IVTS}(t) = \frac{\text{VIX}(t)}{\text{VXV}(t)}. \]

The IVTS was applied successfully in several trading strategies (see [2],[3],[4]). The IVTS measures different market regimes. It is certainly more useful than using the VIX (or VXV) alone. One can consider the division by the slower moving VXV as a sort of normalization. The VXV measures the general level of volatility, the VIX reacts to the current situation. The IVTS is for this reason a better measure of the current market regime than a VIX threshold alone.
The Kir Strategy:

The general Kir strategy is KISS. Be in the market if IVTS is less than 1.0 and go out (or stay on the sideline) if IVTS is greater equal 1.0. I have tried several other IVTS thresholds, but the value of 1.0 is intuitive appealing and showed also the best results.

This simple rule does of course not work for all possible option trading strategies. But it works quite well for the strategies described below. The basic idea of all these strategies is to sell index insurance. One cashes in the risk-premium. As long as the IVTS is below 1.0, the risk is acceptable, for a higher IVTS its better not to burn the fingers on the hot stove-plate.

The Options-Data:

For calculating the strategies 5 years of daily SPX options data were bought. The data were cleaned and I developed data-structures to access this large amount of data effectively. The data range from 2007-12-11 to 2012-12-11. Unfortunately I have only VXV index data from 2010.08.17 onwards available. Additionally the – initial – GARCH computations take quite a long time. So I restricted the time range of the historical simulation to the last 2 years from 2010.12.11 to 2012.12.11. This time range contains a major crash in Aug. 2011 and a rally in Feb-March. 2012. It should be an acid test for any risk-selling strategy (see Graphic-1).

One could calculate the VXV directly from the options data. But I had already spent considerable effort for the GARCH part, so I did not follow this idea further.
Graphic-1: S&P-500 from 2010.12.11 to 2012.12.1

Graphic-2: Implied-Volatility-Smile
Kir Chrilly and Kir Breton:

It is well known that SPX OTM-Puts contain a high risk premium. For academics this a puzzle. Hundreds of articles were published about this phaenomen. The explanation for this puzzle seems to be straightforward. The market is generally the S&P long and there is a high demand for portfolio-insurance. This demand drives the prices up. Additionally the implied volatility underestimates tail risk. The higher implied volatility of OTM-Puts compensates the shortcomings of the Black-Scholes model. Graphic-2 shows the implied volatility smile at 2010.12.21 (orange), 2011.06.15 (yellow), 2012.06.20 (blue) and 2012.11.21 (purple) for a maturity of 21 trading days. The smile is actually an (almost) linear relation. It is as expected highest for far OTM-Puts and lowest for OTM-Calls. The slope of the line differs from date to date.

Kir Chrilly:

The brute-force way to cash in this premium is to sell naked OTM-Puts. This is the extra drey Kir Chrilly (the Waldviertel-Highland has a very harsh climate. The cidre tastes accordingly). Starting at 2010.12.11 one sells 10 OTM Puts with a maturity of 21, 31, 42, 63 or 94 trading days. OTM is measured by the options delta. The difference of the strike to the current SPX-value depends hence also on the current implied-volatility. OTM-Puts with a strike 0 modulo 25 are more actively traded (if the S&P is at 1400, the 1275P has a much higher volume than 1280P or 1270P). Therefore only strikes with 0 mod 25 were considered. Only for options which are relative close to ATM all possible strikes can be traded. The optimizer considered all deltas between -0.1 (far OTM) and -0.5 (ATM) with a step size of 0.025. Additionally one can sell the option back 10, 5 or 0 trading days before expiry. An additional criterion was: One sells the option back, if the price falls to 66%, 50% or 0% of its initial price. With other words, one closes the position premature, if one has cashed in either one third or half of the possible win. The combination 0,0 means: Keep the Put till expiry.

But one closes the position always according the Kir criterion if IVTS is greater equal 1.0. Of course one does also not open a new position in such a situation. If one has selected an option with a maturity of 21 trading days, one keeps the option on the sideline till 10 remaining trading days. If maturity is less equal 9 trading days, the option is not traded at all. For a maturity of 31 trading days, the option is active till 22-, for a maturity of 42 to 32- and for 63 trading days till a maturity of 43-trading days.

The optimizers tries – for a given maturity – all possible combinations to select the best performing parameter setting. But there are different performance measures. I tried the Sortino-Ratio (Win/Semivariance), the Sharpe-Ratio (Win/Variance) and Win/Maximum-Drawdown. The results are similar. This is not very surprising for the Sortino- and Sharpe-Ratio. But there is also a close relationship between the Sharpe- and the Win/max-Drawdown Ratio. Max-Drawdown depends under realistic assumptions in
first order on the variance (see [5]). The picture changes of course dramatically, if one defines the Win as the performance measure.

Graphic-3 shows the performance of a naked Put with a maturity of 42 trading days (approx. 2 months in calendar days). The volume is 10 short options per maturity. But the options are traded overlapping. One has usually a position of 20 options open. The options have initially a delta of approximately -0.1. Due to the Kir criterion the strategy performs during the crash in Aug. 2011 surprisingly well. The Maximum Drawdown of 14.100$ happens on 2012.06.01 and not during the August 2011 crash. The strategy starts with an arbitrary value of 500.000$. After 2 years the capital has increased to 632.250$. Graphic-4 shows the same strategy. But in this case without the Kir criterion. One is always in the market. Max. Drawdown is now at 2011.08.08. It has increased by one order to 141.000$. The drawdown at 2012.06.01 has the same value than above. But it is due to the different scaling almost not visible. But the final value is with 694.220 $ higher than before.
Kir Breton:

For the Kir Breton (cidre from Breton) one delta-hedges the Puts. The rehedge is done daily at the close. The hedge-ratio is determined by the delta of the Black-Scholes formula. The Kir criterion avoids like above the Aug. 2011 crash. But the drawdown at 2012.06.01 reduces due to hedging to 3.368$. The performance chart is remarkable smooth. But the win is also almost halved. One ends with 575.258$. But due to the greater smoothness one could increase the volume per maturity to 20 options and gets a higher profit with still less drawdown. I have also tried to hedge with the delta from the GARCH-model. One calculates the option-price of the GARCH-model and plugs this value into Black-Scholes to calculate the delta. The GARCH-price is usually smaller than the market-price. Hence also the (absolute value) of delta is smaller. One hedges with less units of the underlying. The performance of this hedge is between the naked-Put and the BSM-based hedge. The drawdown is larger, but also the final win improves.

It does not really pay to use the more complicated GARCH-hedge.

One can also play the Kir Breton (and Kir Chrilly) with 31-days maturity. The best initial delta is in this case -0.15. The final index value is 594.448$ and max. Drawdown is 6.471$. Due to the (absolute) higher delta, the win but also the drawdown is higher. The maturities around 6 calendar weeks seems to be the best choice. The performance
Graphic-5: Hedged-Put, Delta -0.1, Maturity 42 trading days.

Graphic-6: Hedged-Put, Delta -0.1, Maturity 42 trading days. Without Kir.
ratios are similar. Generally the strategies perform similar for the two maturities. Around 6 calendar weeks seems to be the best choice.

Graphic-6 shows the same strategy without the Kir criterion. The hedge does not really help against the Aug. 2011 crash. In the Black-Scholes model one can hedge perfectly because the model assumes a constant volatility and continuous rehedging. The maximum Drawdown is 67.894$ at 2011.08.11. This is about half the value than in the naked-Put case. In the Kir strategy one watches Aug. 2011 from the sideline. The final value is in this case also lower than for the Kir.

**The Inverse Kir Breton:**

Trading long Puts is in the long run for a speculator not profitable. Puts are an insurance, one looses the risk-premium. But one can turn the Kir Breton around. The Kir Breton is in times of troubles out of the market and avoids in this way losses. The Inverse Kir Breton buys when the IVTS is greater equal 1.0 long Puts and hedges them. The strategy stays in normal times, when the IVTS is below 1.0, on the sideline.

Graphic-7: Hedged-Long-Put. Delta -0.4, Maturity 31 trading days.
The strategy is only a short time in March 2011 (Japanese earthquake) and in the August 2011 crash in action. The Puts are relative close ATM. The final value is 544.063$, max Drawdown is on 2011.08.17 14.0226$. At this date the SPX made a significant counter-move. The Inverse Kir Chrilly does not work. The strategy wins a large amount during the crash, but looses this money again in the recovery phase when the IVTS is still above 1.0. Setting the threshold higher (e.g. to 1.03) does not work either, because in this case one enters the market too late. The Puts are already too expensive. The Inverse is an interesting idea, but it is probably too risky to play it in real live.

Kir Tarantino:

Kir Tarantino is also known as "kir-beer". It's chassis with lager or light ale. Personally I would not recommend this, but tastes differ said the man when he kissed his cow. As can be seen in Graphic-2 the implied volatility decreases for (OTM) Calls. The market fears the bears. Bulls are welcome. There is (almost) no insurance-premium. Additionally the tails are on the upside twig. Kir Tarantino are hedged Calls. The Kir criterion is also in this case useful, because hedged Calls loose also in a crash.

Graphic-8: Hedged-Call, Delta 0.1, Maturity 42 trading days.
Graphic-8 shows the best performing setting for a maturity of 42 trading days. The strategy does not keep the position till expiry. It is always closed 10 trading-days (2 weeks) before expiry. Additionally the position is closed, if one has won 50% of the maximum possible win. Or in other words, if the price of the option has halved. If one inspects graphic-8 more closely, one sees, that the strategy is also under normal market conditions sometimes out of the market (the index is flat). The final index value of 544.510$ is not spectacular. But max. Drawdown is with 4.704$ also modest.

Kir Royal:

Kir Royal is the best known Kir variant. The white wine is replaced by Champagne. The Kir Royal is a hedged OTM Strangle with the Kir criterion.

Graphic-9: Hedged Strangle, Delta +/- 0.1, Maturity 42 trading days.

The Kir Royal looks similar to the Kir Breton aka Put. The performance is relative smooth. The performance is in fact dominated by the Put. A Put with a delta of -0.1 is due to the implied volatility smile more expensive than a Call with the equivalent delta of 0.1. Most of the profit is cashed in by the Put. The hedging costs are usually less. As long
as the underlying does not move too strong in one direction, the deltas cancel each other (almost) out. The final index value is 626.133$ with a maximum drawdown of 8.916$.

Graphic-10 shows the same Strangle unhedged. The overall performance is similar to the

Hedged Strangle (yellow line). But the performance is much more wiggly. The maximum Drawdown is at 2012.09.14 20.800$. The S&P-500 peaked at this date. The Call came into the money.

Kir Cardinal:

The Kir Cardinal is the original recipe with red wine. For our trading purposes it is a Condor with the Kir criterion.

Note: In the Catholic church different ranks dress in different colors. The color of the Cardinals (two ranks below God) is red. The color of the pope is white, the color of God is undefined.

As already discussed above, the strikes are for all the strategies so far at 0 modulo 25 (e.g. 1275P, 1450C). For the Condor the wings are 25 away. One goes e.g. 1275P short and 1250P long. On the Call side 1450C short and 1475C long.
Graphic-11: Hedged Condor, Delta +/- 0.15, Maturity 31 trading days

Graphic-12: Naked Condor, Delta +/- 0.10, Maturity 31 trading days
The same rules are used in an interesting book about Condor strategies [6]. But the author did not know about the Kir criterion. Instead he tried to survive in crashes by moving the Condor up and down. This worked relatively well in the book examples, but I have my doubts, that it really works that fine in real world situations. The Kir criterion seems to be much simpler and effective.

The wings of the Condor are by itself a hedge. Together with the Kir criterion even an unhedged Condor has a relatively smooth performance path. Graphic-11 shows a Condor with an initial delta of $+/-0.15$. The final index value is 548.108$ with a max. Drawdown of 6.729$. The naked Cardinal in Graphic-12 has an initial delta of $+/- 0.1$. The performance is 544.300$ with a max. Drawdown of 4.780$.

Graphic-13 shows an extreme naked Cardinal. Delta is $+/- 0.5$. The condor has no body, just the wings. The strategy sells back the Condor 5 trading days before maturity. The position is also closed, if the value of the Condor drops below 66%. Or with other words, one has cashed in at least 1/3 of the maximum possible win. The final value is with 656.646$ much larger than than for the OTM-Condors. But the drawdown grows accordingly to 27.550$.

Graphic-13: Naked Condor, Delta $+/- 0.50$, Maturity 42 trading days
I have my doubts that the 66% sellback rule works in practice as fine as in the simulation. I spent considerable effort to eliminate cheating possibilities. Sometimes the wing Put or Call is according the data more expensive than the body Put/Call. E.g. 1250P has a higher price than 1275P. This is in practice impossible. The effect happens especially in times of high volatility or if the underlying moves a lot. One compares stall-prices with each other. Using the mid-prices between bid and ask does not help either. There are sometimes unrealistic asks. E.g. a price of 990 for a 1075P. But sometimes this absurd price was even paid. As a remedy the value of the wing was clamped to the value of the body. In case of an impossible large or small value, yesterdays value was used instead. This is still not very realistic, but it is next to impossible to find good rules which do not introduce its own problems. If an optimizer has enough freedom he always finds such cheating possibilities. Entering the market at a fixed maturity and closing the position either at expiry or 5/10 trading days before avoids to a large extent the cheating problem. Close the position when a third or half of the possible gain is reached was also for other strategies sometimes slightly preferable. Due to the cheating-problem I report here the more reliable results. But this rule is also specified in [6]. It should be also in real-trading-life sometimes applicable.

I have tried a bunch of other strategies. Covered-Calls, Ratio-Spreads, Calendar-Spreads. But these strategies are clearly inferior to the ones covered so far.

A Note on Hedging:

The historic simulation assumed that one can hedge directly with the S&P-500. This is in practice not the case. One can either hedge with the SPY or E-mini futures. The E-minis are probably more convenient. This has 2 consequences for the hedge. The E-mini futures have a multiplier of 50$. Hence hedging is more granular. The different granularity has only a small effect on the performance. Sometimes it's slightly worse, sometimes it's slightly better. If one increases the options volume e.g. to -20 the difference disappears almost completely. The second effect is the futures carry. This effect is especially for OTM options which are traded 1.5 to 2 months also rather small. These effects should not change the results in a significant way. As I have “lost” already a lot of time with the GARCH model I did not want to fuss around with these nasty details.

Conclusion:

The simple Kir criterion seems to be quite effective to reduce the risk of short options positions. One could calculate the IVTS by oneself. But this makes no sense for SPX-options. For another underlying one would have to calculate an own 1- and 3-months volatility index. One has of course also to test, if the results can be transferred to other indexes or assets-classes.
From the considered strategies the Kir Royal aka OTM Strangle seems to have the best profit/risk ratio. Delta-Hedging has some costs, but it reduces the risk additionally. If one wants to avoid the hedge, the Kir Cardinal aka the Condor is a viable alternative. But it should be noted, that the Cardinal has considerable higher trading costs (which are not considered in the simulation). It could be also difficult to set up the position. The selected maturity is best between 6 to 8 weeks. This agrees with the conclusions in [6]. Closing the position premature if 50% of the possible win has been gained, reduces the risk further.

**Revision-1:**

In Revision-1 the strategies are calculated for 5 years from 2007.12.11 till 2012.12.11. The other parameters are left unchanged. Only the most interesting strategies are recalculated. The restriction is only for presentation purposes. The paper is already quite long. The time for recalculation is no issue.

Graphic-14 shows the IVTS from 2007.12.11 till 2013.03.01. The IVTS is on the left side, in 2008 and 2009, higher than on the right side. The Kir is hence most of the time out of the market. Note that the Kir can also be at the sideline, when the IVTS is below 1.0. A position which was stopped by the Kir criterion is not entered again.
Kir Chrilly:

Graphic-15 shows the naked Put aka the Kir Chrilly. The original results are displayed in Graphic-3. The drawdown is in the 2008 crash rather modest. The strategy goes on 13. September 2008 on the sideline and stays there for some time. In fact there is till 2010 not much trading action and the performance is mainly flat. The overall win is 141.950$ with a max. Drawdown of 22.900$ at 2010.06.30.

Kir Breton:

Graphic-16 shows the hedged-Put aka Kir Breton. The original results are displayed in Graphic-5. The overall picture is the same then for the Kir Chrilly. The performance is just somewhat smoother. The overall win is 130.153$ with a rather small drawdown of 7110$ at 2010.07.26.
Kir Royal:

Graphic-17 shows the hedged Strangle aka Kir Royal. The original results are displayed in Graphic-9. The overall win is 196.699$ with a max. Drawdown of 26.190$ at 2010.06.29. There was a sharp drop in the S&P-500 around this date. The drawdown is larger than in the original time-series. Here the max. Drawdown is 8.916$. But it seems to be still an acceptable risk. The naked Strangle has practically the same overall win. Interestingly max. Drawdown is slightly smaller than with the hedge (Graphic-18).
Graphic-17: Hedged Strangle, Delta +/- 0.1, Maturity 42 trading days.

Graphic-18: Naked Strangle, Delta +/- 0.1, Maturity 42 trading days.
Kir Communard:

The Kir Communard is the Kir Cardinal with only one wing on the left. One trades only the Put-Spread of the Condor. For an SPX of 1500 one would go e.g. the 1425 Put short and the 1400 Put long. The volume is besides the sign the same.

Note: Kir Communard and Kir Cardinal are two different names for the same drink.

The Kir Communard was not considered in the original paper. It was suggested by Joe Fritz (and baptized by Chrilly). As already noted above for the Cardinal, it is the Put-Wing which is for most of the credit responsible. The implied-volatility is for Calls much lower. Or with other words: Even the Cardinal has a much stronger left than right wing. As a consequence one can think about to drop the Call side completely.

Graphic-19: Hedged Put-Spread, Delta +/- 0.1, Maturity 42 trading days.

The Communard has with 39.212$ a modest win. But the max. Drawdown is also with 3.247$ at 2012.05.23 very small. One would trade the Communard with a higher volume.

The long Put hedges to a certain degree the position. At least if the drop is not too sharp. But in case of a sharp drop one closes the position anyway by the Kir criterion. So one can think about to trade a naked Communard (Graphic-20). But the win is with 40.000$ not significantly higher. The Drawdown increases to 6.600$.
One can trade also an extreme version of the Communard. The delta of the short-Put is -0.5, one trades an ATM-Put. The long strike is as before 25 Points below. But one closes the position 10 trading days before expiry or if one has already won one third (34%) of the maximum possible wind. One could call this rule a Stop-Win. There is of course additionally the Kir Stop-Loss Criterion. The result can be seen in Graphic-21.

The performance is with a win of 168.086$ and a max. Drawdown of 12.400$ at 2008.06.06. quite interesting.

But I have some doubts if this strategy could be realized in the same profitable way in real trading. The result is relative reliable in quiet times. But some of the Stop-Win exits are in times of troubles. It happens, that the price of the long Put is even higher than the price of the short position. This is in real trading almost impossible. The data contain the last trading-price at a given day. The trades are usually done at different times and at a different state of the SPX. In case of a crash the ATM Put wanders in the money. The volume for ITM Puts is rather low. So one compares illiquid stalled prices. The historic-simulator exploits these effects. Some simulations use for this reason the mean of the bid-ask price. In this case, the quotes are indeed from the Close. But this rule does not improve things. Some of the asks are completely absurd. E.g. for a strike of 1100 a price
of 999. Some of the bids are also much too low. The cheating problem would even be worse.

Closing the position at 10 tradings-days before expiry is much less critical. There can be also impossible values at this date. But the chance of running into this problem is much lower. The result is also not biased. Sometimes the long, sometimes the short price is too high or low. But in case of the Stop-Win the simulator systematically searches all the time for a quote to it's own advantage. There is hence a strong bias and the chance to find such a combination is much higher.

Conclusion for Revision-1:

The new analysis has confirmed the initial results. The Kir has survived surprisingly well the 2008 Crash. Profits are during this critical period low, because the strategy is most of the time out of the market. This is definitely better than being drowned.

The Kir Communard is an interesting extension to the Kir Strategy. The aggressive Communard with ATM Puts performs in the simulation very well, but it is questionable if one can realize this kind of performance in actual trading.
Revision-2:

Revision-2 compares a strategy developed by G. Larcher et al. in [7]. The authors compared a total of 31584 different parameter settings. For comparison I implemented the most recommended one. It should be noted, that there are several general differences in the historic simulation. Larcher et. al. use the weighted mean of the bid- and ask-price as a proxy of the transaction price. This study uses the last sell-price. The problems of both approaches have been already described above. This study uses also a fixed volume of (short) 10. The Larcher paper uses a dynamic volume, which guarantees for a single contract, that the trading account does not run out of money due to margin calls. This criterion would result to a larger volume than 10.

The position runs always from 3rd Friday to 3rd Friday. There is hence at most one contract open. The trading strategy can be closed at any time. The authors have – like in this study – only daily data. They have to make assumptions about the available prices. In this study trading is only done at the Close (this is also done in real trading live of the Sibyl-Fund).

The time range of [7] is 1990 to 2010. For this study is like above from 2007.12.11 to 2012.12.11.

For the Larcher strategy is simulated within the overall framework and rules of this paper. It would simply be too much work to change the simulation environment. I think the comparison is nevertheless fair, because the overall conditions are for both strategies the same.

The Larcher strategy is similar to the Communard. One sells a Put short and hedges with a lower long position. In the Communard the strike of the short Put is defined by its delta. Additionally the strike must be for liquidity reasons on 0 mod 25. The strike of the long hedge is 25 below the short strike. In the Larcher strategy the short strike is at

\[ K_1 = (1.0 - 0.002 \times \text{VIX}) \times \text{SPX} \]

Note: in the original paper the factor is 0.2. This makes with the usual VIX-values no sense. The usual VIX is the implied volatility in percent. The authors use in their formula the implied and not the scaled up VIX.

The actually traded strike is the nearest strike below \( K_1 \). For an SPX of 1500 and a VIX of 20, the strike would be 1500*0.96 = 1440. The strike of the long Put is

\[ K_2 = 0.93 \times K_1 \]

\( K_2 \) would be 1440*0.93 = 1339.2, the actually traded strike is 1335.

With other words, \( K_1 \) is nearer to the money than in standard Communard. But the gap between \( K_1 \) and \( K_2 \) is considerably larger. \( K_2 \) is a protection against a deadly margin call. The hedge against normal trading losses is relative low. On the other side, the credit of such a position is considerably larger than in the Communard.
The Larcher strategy uses 2 stop losses. If the SPX falls below K1, the position is closed. Additionally the position is closed, if the position is at least 10% of the account under water (in the current setting this is the value of the index, which starts with 500.000$). The volume is – as already noted – in the current simulation lower. I used therefore a loss threshold of 4%. I tried several thresholds, 4% seems to be the best.

Graphic-22: Larcher-Strategy, Maturity 21 trading days. Orange hedged, yellow naked. The blue drawdown is for the hedged strategy.

The selected maturity of 21 trading days is similar to the original paper. The hedged version has a win of 51.256$ and a max. Drawdown of 50.355$. The unhedged version performs in the last 2 years rather nice (this fact was noted by Joe Fritz in the conversation which lead to revision-1). The final win is 119.620$, but it's performance is in times of troubles not for the faint heart-ed. Note that the ups and downs are in the original strategy due to the higher volume even more pronounced.

In Graphic-23 the two stop-loss rules were replaced by the Kir criterion. Otherwise the setting is identical. The hedged version works reasonable well. The overall win is 75.950$, max.Drawdown is 23.295$. The performance is certainly superior to the original strategy. But the naked version is a disaster. The 2 stop-loss rules are clearly better. The differences can be explained relative easily. Hedging is relative immune to drifts.
in the underlying. It is the volatility which counts. The Kir criterion is a volatility stop-loss rule. The Larcher rules are mainly drift related. The first stop rule is a drift only, the second rule is a mixture of drift and volatility.

I tried a combination of the Kir and the two stop-loss rules, but found no reasonable working parameter setting (this does not mean, that such a setting does not exist).

Graphic-24 and 25 show the same results for a maturity of 31 trading days. The overall picture is the same. The hedged Larcher -strategy has an overall win of 75.293$ with a max. Drawdown of 37.700$. The naked strategy has a win of 121.050$, but the up- and downs are quite pronounced. The hedged Kir is again smoother, with an overall win of 98.750$ and a max. Drawdown of 23.670. The naked version does not work at all.

Graphic-26 and 27 show the same results for a maturity of 42 trading days. It's the same story again. The hedged Larcher strategy has an overall win of 67.637$ and a max. Drawdown of 51.236$. The naked has a win of 146.850$. The hedged Kir performs smoother and better. The win is 85.557$, max. Drawdown is 15.708$. The naked Kir is again not competitive.
Graphic-24: Larcher-Strategy, Maturity 31 trading days. Orange hedged, yellow naked.

Graphic-25: Kir-Larcher, Maturity 31 trading days. Orange hedged, yellow naked.
Graphic-26: Larcher-Strategy, Maturity 42 trading days. Orange hedged, yellow naked.

Graphic-27: Kir-Larcher, Maturity 42 trading days. Orange hedged, yellow naked.
Conclusion for Revision-2:

The Kir is a volatility based stop-loss criterion. The 2 stop-loss rules of the Larcher strategy are mainly a drift based stop-loss. It is hence not very surprising, that the Kir seems to work better for hedged positions, the rules of the Larcher paper perform clearly better for a naked strategy. The overall setting of the Larcher strategy is also more aggressive than the Kir-Communard (which is despite it's name a rather conservative strategy).

The comparisons have of course to be considered with a grain of salt. Every historic simulation is based on some assumptions. These assumption influence the final result. But the overall picture of this simulation can be reasonably explained too. One could think about to marriage the Kir with the 2 stop-loss rules. But I have found so far no reasonable combination which worked.

References: