Insight in Risks

June 2020

How to use soybean price volatility to estimate your cash-flow exposures

Soybean market in the EU

Three types of soybean products are actively traded on the market: soybeans, and the processed products soybean meal and soybean oil.

According to the most recently published report of the USDA[i] (June 2020), the expectation is that production of soybeans will grow 8% in season 2020/2021, to a level of around 363 million metric tons, almost back to the same volume as in 2018/2019.

Soybean meal and soybean oil are expected to grow by 4%.

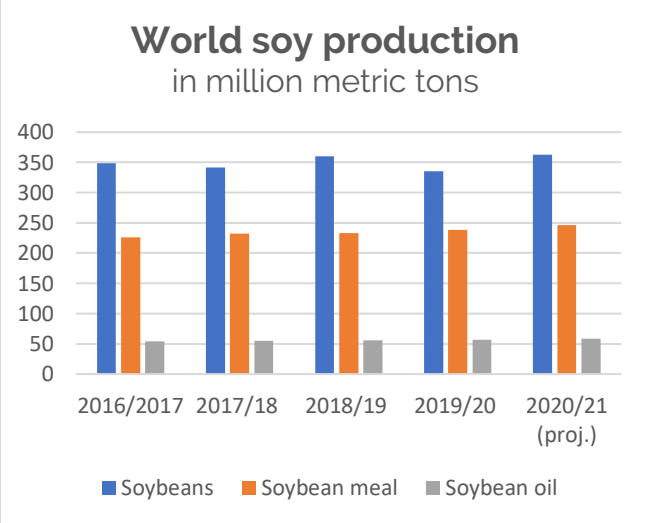


Figure 1: *World soybean, soybean meal and soybean oil production. Source: USDA June 2020*

Prices soybean

The following graph shows the price development in March-June 2020 for soybeans, as published by Barchart[ii]. The Covid-19 situation was the reason for the price drop in March-April, as demand in China weakened. The global lockdown caused some supply issues too – resulting in the price increase from May onwards.

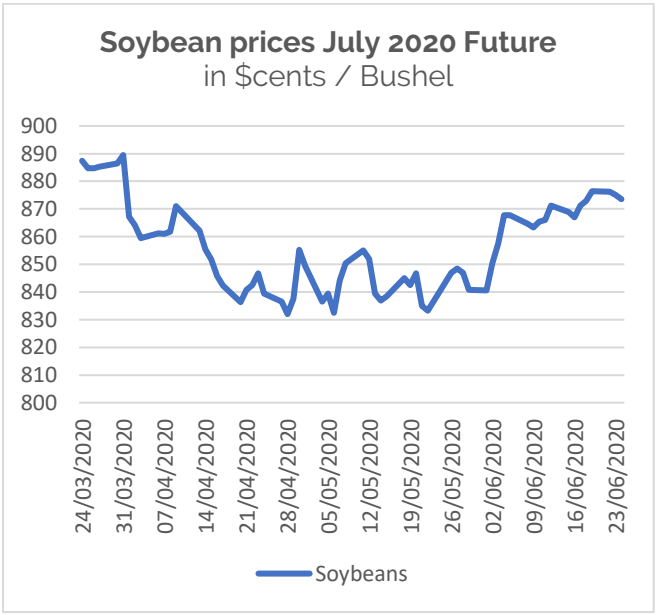


Figure 2 *Price development soybeans - Source Barchart*

High volatility

To be able to calculate a potential distribution of cash-flows you also need the volatility. Volatility is not a standard percentage, but moves over time depending on how much and how quickly prices go up and down. The level of volatility also depends on the contract traded. Below we present data on the nearby future contract, but for a potential 2021 cash-flow distribution we look at all products traded.

Volatility soybeans	
20 years of soybean trading – volatility calculated over historical window of 24 months	
Highest volatility	39%
Lowest volatility	17%
Average	25%
Current	18%

KYOS

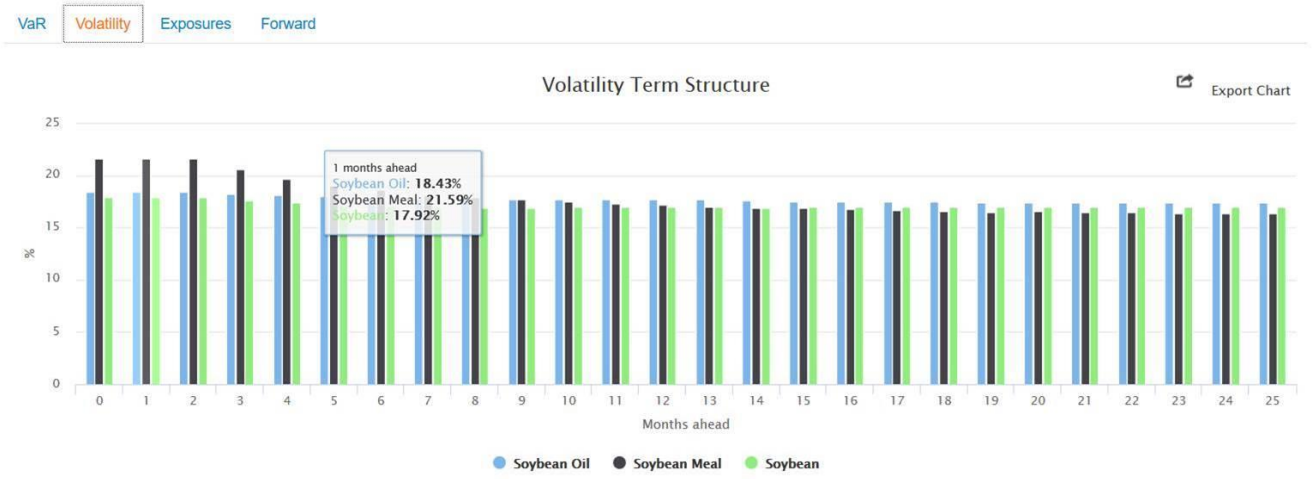


Figure 3 *Volatility soybeans - Source KYOS Portfolio and Risk Management System*

The above figure is taken from the KYOS Portfolio and Risk Management system. It shows the volatility for the different maturities of all three soybean products. The current volatility of soybean prices is around 18% for the July 2020 contract. Soybean oil is moving by around 17% whilst soybean meal is the most volatile (22%). These calculations are based on a historical forward window of 24 months. Compared to the Euro Dollar volatility, it is 3-4 times higher.

But what else do you need to know about this market? Although volatility is an important number for risk management, let's go to the basics and see what actual price levels and price movements there have been in the soybean market:

Some interesting facts – 20 years soybean trading	
Prices in $cents / Bushel	
Highest price	1,790 July 2012
Lowest price	398 Oct 2001
Average	901
Current	853
Highest price incr in 24 hrs	84
Largest drop in prices in 24 hrs	– 110
Price changes > 10.16	47.9%
Price changes > 30	4.3%

Your commodity exposure

Suppose in 2021 you consume an annual volume of the following basket of soy products:

Commodity	Amount
Soybean meal	12,000 MT
Soybean oil	12,000 MT (= Lbs 26,455,440)
Soybeans	12,000 MT (= Bushel 440,924)
Total	**36,000 MT**

Your annual cash-flow based upon current market prices (prices taken 17th June 2020) would be around $ 15.2 million at the end of 2021.

What is the Cashflow-at-risk?

If you do not hedge this "floating priced" position, your 95% cashflow-at-risk (=CfaR) for 2021 can be presented as the potential cash-flow difference between:

- Sourcing at today's market prices
- Sourcing in the short-term market and ending up in the 5% worst case (i.e. highest) price scenario

KYOS calculated the current CfaR at $ 3.0 million

Management Information

- What is the maximum level of acceptable costs?
- Which percentage of certainty is workable?
- How does CfaR helps your organization?

Cash-flow distribution

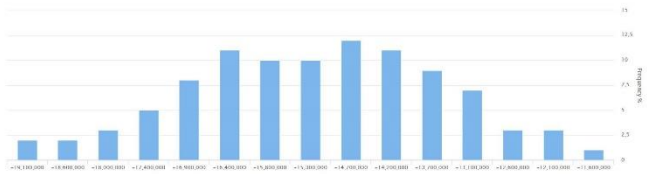


Figure 4 Distribution of cash-flows - Source KYOS

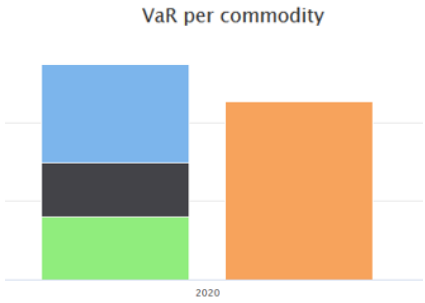
This means that if you leave your position open:

- With 95% certainty your cash-flow (costs) will be lower than $ 18.2 million
- Be aware that this is not the maximum

Value-at-Risk

Cashflow-at-Risk is a measure for risk over a somewhat longer horizon, typically 1 or 2 years. For a short-term risk calculation, you can use Value-at-Risk. It measures the 'worst-case' change in the market value of your position over a short period of time, such as 1 day or 1 week

The graph underneath shows the Value-at-Risk: left for the individual soybean items (oil, meal and beans), right for all three together. Do you notice the difference?



- Value-at-Risk 1 day $218,000
- With 95% certainty the potential costs will not rise with more than $218,000 in a single day for this portfolio.

A holiday break of 10 days more than triples that potential price movement (=VaR) to $ 673,000 (95%). With this information, you have determined your starting point for the desired hedging strategy. Is this potential cost increase acceptable, or do you prefer to keep it much lower? The final choice is yours but with these calculations, you are for sure better prepared to make the right hedging decisions!

[i] https://apps.fas.usda.gov/psdonline/circulars/oilseeds.pdf
[ii] https://www.barchart.com/

Advantages KYOS Portfolio and Risk Management System

Short term versus Long term

KYOS software is used globally by procurement teams, risk managers and CFOs, to manage short- and long-term price risks.

Short term risks can be calculated using stress tests and/or using Value-at-Risk (=VaR) calculations. The main drivers for the Value-at-Risk are (i) the positions and (ii) the price volatility of commodity markets. The VaR model shows both the positions and the volatility per month, giving full insight in the risk drivers.

The standard VaR model in the KYOS Analytical Platform is based on the variance-covariance matrix. It is referred to as parametric VaR, normal VaR or varcovar VaR. It is easy to use and to interpret results.

As alternative methodologies, KYOS offers the Monte Carlo simulation approach and the historical simulation approach. Especially when the market price returns do not have a very nice normal distribution, this may be more accurate.

Most industrials have a forecasting horizon of 2 to 4 years. The Monte Carlo simulation model can also be used for long term risk calculations and to assess a potential cash-flow distribution over a longer horizon.

Accumulators - embedded options

Many clients in the food & beverage industry use accumulators to manage the price risk. KYOS has developed software to verify price valuations. It enables our clients to have an independent calculation of the value as well as the MtM. It also enables clients to play with the strikes to find their optimum.

KYOS adds value

To help you understand price risks and improve your company's cash-flow prediction, KYOS has developed risk management software to effectively manage any commodity portfolio. This software is tailor-made to reflect your specific requirements. The KYOS commodity portfolio & risk management system captures years of industrial experience in managing budgets, commodity contracts, physical and/or financial hedging, market price analysis and sophisticated cash-flow forecasts.

For whom

Are you still using different spreadsheets to calculate your numbers? Whether you are in Procurement, Sales, Finance or Treasury – every department needs good, dependable figures. A good cash-flow forecast will make your life easier.

Please do not hesitate to contact us so we can discuss how we can help you save time – and probably money too.

Interested to learn more? Contact us at info@kyos.com

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