

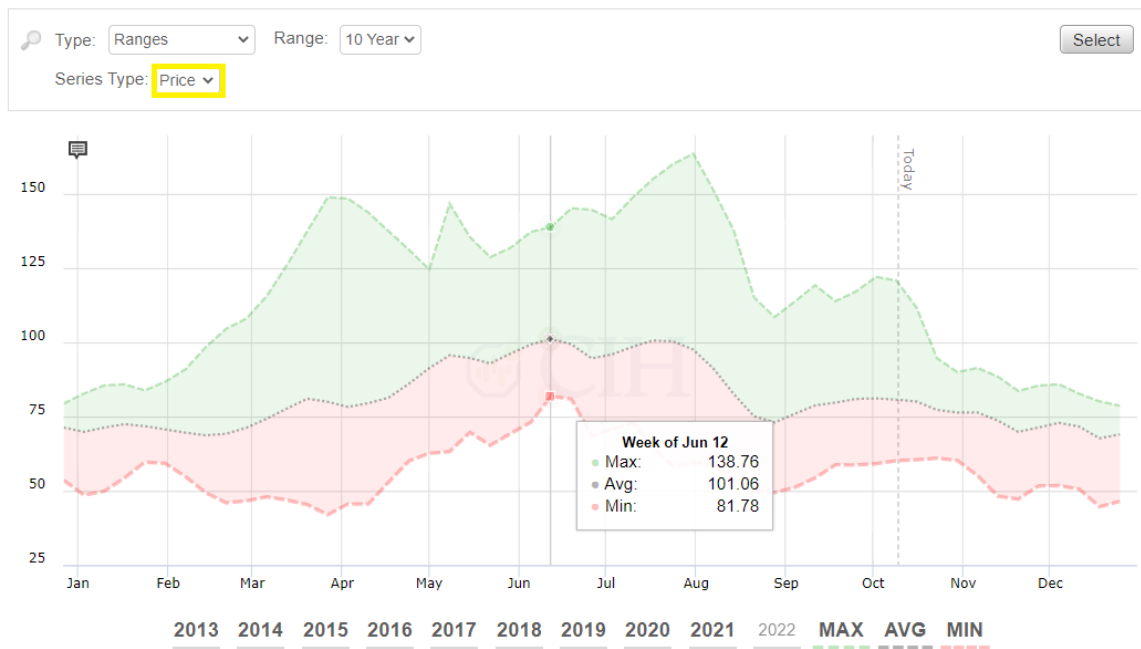
Pork cutout futures and options began trading at the CME Group in late 2020 and have witnessed growth in usage and application over the past two years. The instrument is designed to reflect prices paid for U.S. wholesale pork. These contracts are conveniently cash-settled to the CME Pork Cutout Index (PRK), which tracks USDA pork price reporting. We have clients, from packers and processors to food manufacturers and wholesalers, using the cutout contract (PRK) to project forward product price curves to better negotiate, plan, and budget within their business. The example below outlines how one such client type could hedge their future purchases and project input costs in both nearby and deferred periods.

### Pork Cutout Case Study

Consider a hypothetical food product manufacturer, Pizza Co., in need of purchasing sausage for their pizzas in June. The sausage is an equal mix of 72% trim and picnic cushion meat. Looking at the past decade of historical prices, Pizza Co. notes the 50/50 blend of trim and picnic cushion tends to increase in price in Q2.

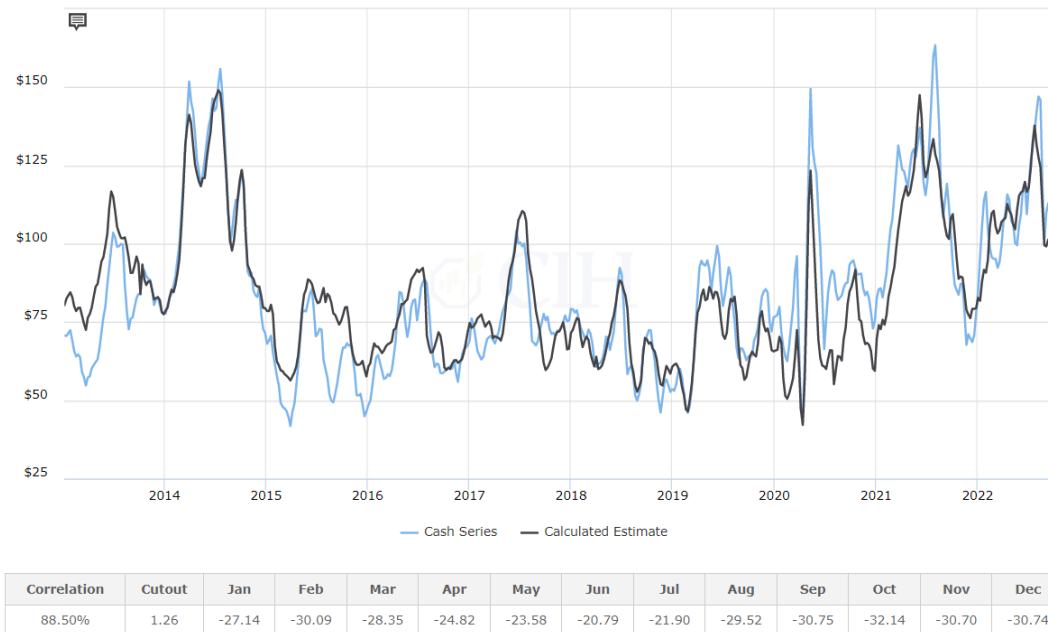
Figure 1. Historical Price Ranges of 50/50 Blend Sausage

#### 50/50 Blend



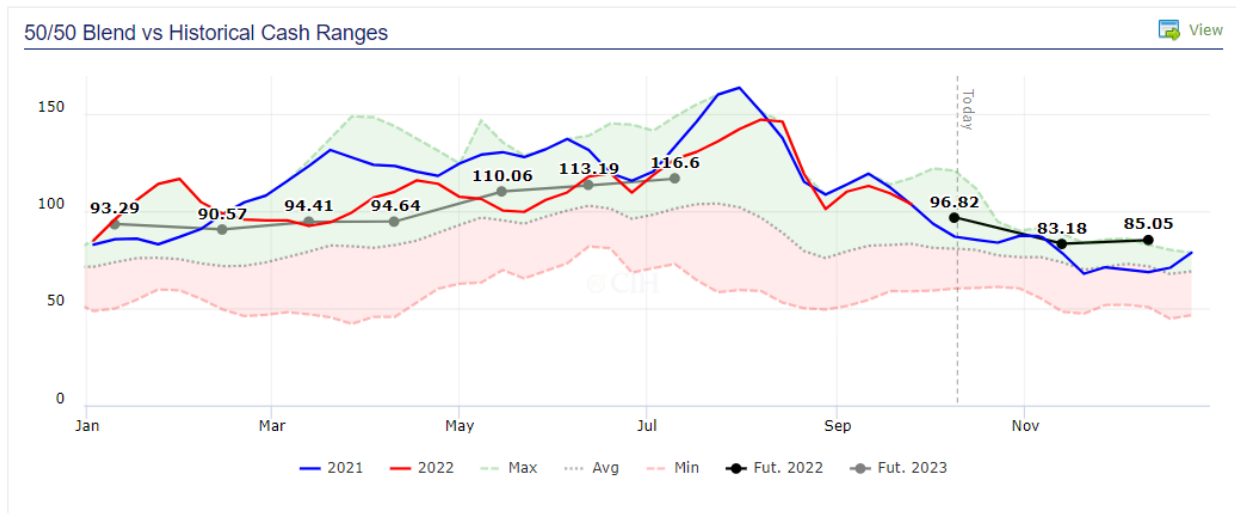
While historical price patterns can be helpful to gauge future purchase prices, supply chain disruptions and product-specific volatility over the past two years have created significant deviations between contemporary and historical price series in extreme periods. The introduction of cutout futures allows Pizza Co. to be more precise and methodical in their approach. Regression analysis can be used to examine the historical relationship between this specific ingredient and the PRK. Each pork product's price relationship to the cutout will vary. For this product, the summary of the regression for the 50/50 sausage blend is found below.

Figure 2. PRK and 50/50 Blend Sausage Regression



The actual ingredient price is blue and the calculated estimate of the product price from the regression is black. The smaller the deviation between the two lines, the higher the correlation and the more useful the cutout index will be to hedge. A statistically significant relationship is one with a correlation coefficient of 80% or greater. The correlation between these two series is 88.5%. The cutout coefficient from the regression of 1.26 informs our client they would need to purchase 1,260,000 pounds of pork cutout futures to hedge 1,000,000 pounds of the 50/50 blend sausage.

Figure 3. Implied Forward Curve for 50/50 Blend Sausage



Not only does a regression inform Pizza Co. on the optimal hedge ratio, or amount of cutout futures to purchase to offset adverse product price movements, it also aids in projecting an ingredient price curve forward out in time. Because pork cutout futures are trading throughout

2023, we can use the regression coefficients and historical monthly deviations to obtain an implied forward curve for the sausage through July 2023 in light grey below.

In the chart above, the dotted red and green lines represent the product's low and high price, respectively, since USDA mandatory price reporting started in 2013. Actual 2021 and 2022 price levels are highlighted in blue and red. Most importantly, the grey lines represents monthly 50/50 blend sausage price estimates based on the regression above. Based on historical relationships between the ingredient and the cutout, current PRK futures would indicate the 50/50 sausage blend would start the year around 93 cents per pound and increase to \$1.16 per pound next July. As fundamentals change over time, so too can the pork cutout futures values. As a result, their implied estimates of pork primal values would also fluctuate.

### **Hedge Example**

Let's say on December 15, Pizza Co. knows it need to purchase 1 million pounds of sausage throughout June to fulfill customer orders. Knowing prices tend to increase into the summer, Pizza Co. may also be bullish the pork complex and wary of price increases and wish to protect their price well-before taking ownership of the product. One method they can choose to protect a price forward out in time would be to purchase PRK contracts to help offset increases in the price of the 50/50 blend sausage product.

The first step is to determine the appropriate number of contracts to purchase. Each PRK contract's volume is 40,000 pounds. Using the cutout coefficient from the regression above of 1.26, we know for Pizza Co. to best manage the risk of increasing input costs, they will need to purchase 1.26 times the 1 million pounds of risk, or 1.26 million pounds of pork futures. This equates to 31.5 PRK contracts. The market participant can choose to hedge either 31 or 32 contracts. For the sake of this example, Pizza Co. will buy 32 June PRK contracts.

On December 15, let's assume June PRK futures are trading at \$104.65 per hundredweight. The forward curve derived from the regression above would indicate June 50/50 blend sausage to cost roughly \$111.04 per hundredweight. Recognizing futures are relatively low from a historical perspective and fearful of an increase in price between December and June, Pizza Co. decides to purchase 32 June PRK future contracts to protect a future spot sausage purchase.

As we fast forward to June, let's assume Pizza Co. lifts their hedge, or sells back their 32 contracts, and purchases the physical product in the cash spot market. In June, the PRK future price is \$111.95 per hundredweight. As Pizza Co. removes their futures position, they will realize a gain of \$7.30 per hundredweight on 32 contracts, or \$93,400. At the same time, Pizza Co. must purchase 1 million pounds of spot 50/50 blend sausage at a price of \$123.50 per hundredweight.

The expected spot price increased from December through June by \$12.46 per hundredweight, or \$124,600. The PRK hedge offset \$7.30 per hundredweight on each contract, or a total of \$93,440. In other words, the hedge helped offset 75% of the adverse price movement over the hedging timeframe.

Figure 4. Reconciliation Table

Cash	Brokerage	Net
6/1: buy 1 million pounds of sausage @ \$123.50/cwt.	12/15: buy 32 PRK futures @ \$104.65/cwt.	Cash + Brokerage
10,000 cwt. x \$123.50/cwt. <hr/> \$1,235,000	6/1: sell 32 PRK futures @ \$111.95/cwt.	Spot Cost: \$1,235,000
	\$111.94 - \$104.625 <hr/> +\$7.30	<u>Brokerage Gain: \$93,440</u>
	\$7.30 x 32 x 400 cwt. = +\$93,440	Net: \$1,141,560
		Net Sausage Price: \$114.16/cwt.

Pork cutout futures and options have the potential to revolutionize how meat buyers and sellers think about forecasting and budgeting. This forward price curve can be used by participants to negotiate forward pricing for next month or next year. Likewise, pork processors can use the curve as a benchmark to begin negotiating forward pricing. While the example above focuses on one specific ingredient, a similar exercise can be done on other pork products to obtain a forward-looking curve for them, as well. [Reach out to us](#) to run the math on your pork product procurement needs (or any other risk management needs) to provide insight on how the pork cutout index can assist your company in forecasting, budgeting, and taking control of your bottom line.

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