Producer's Roundtable

January 21, 2021

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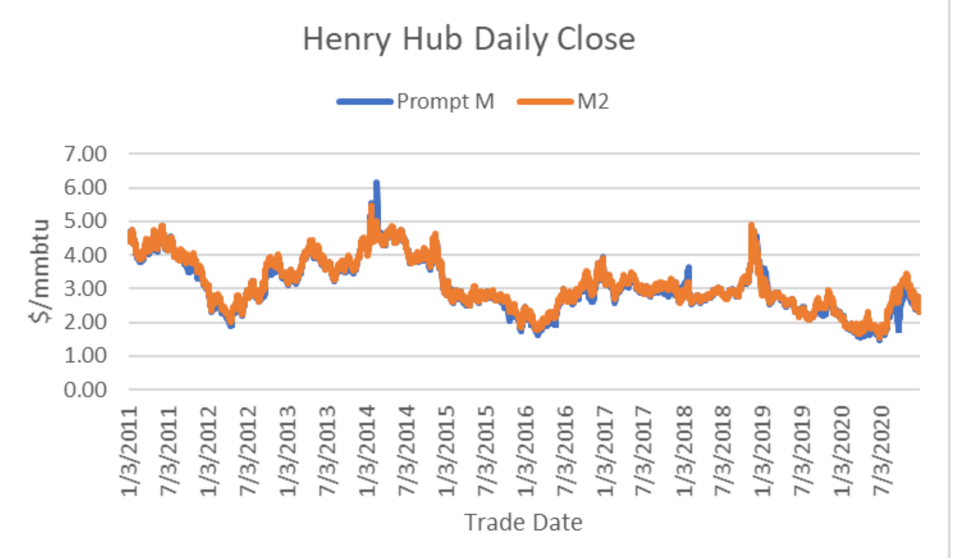
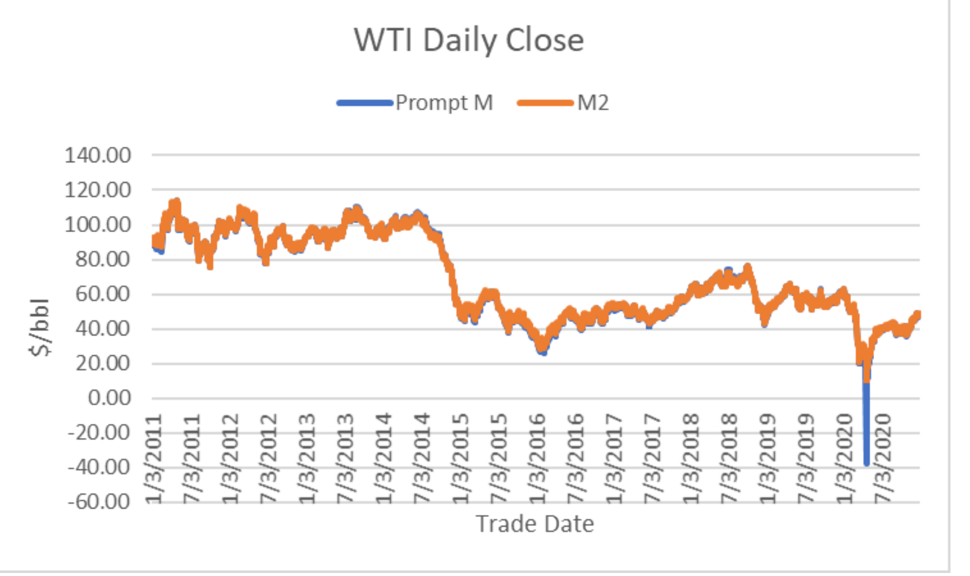
The pandemic made 2020 feel unique…it wasn't

- The events of 2020 emphasized the importance of the commercial function within E&P strategy.
- To be sure, the pandemic caused an economic crisis that only spotlighted what we already knew. It did not change anything about how one should manage risk.
- Consider the range in daily close for the second month for each NYMEX Henry Hub and WTI futures over the 10 year period from Jan 1, 2011 through year end 2020. The range of prices, peak to trough, was wider in 2014 than in 2020:

	Range of M2	
	Henry Hub	**WTI**
2011	1.858	38.56
2012	2.039	32.08
2013	1.388	22.55
2014	2.569	53.13
2015	1.342	26.19
2016	2.131	26.6
2017	0.906	17.69
2018	2.319	33.42
2019	1.206	19.38
2020	1.925	51.47

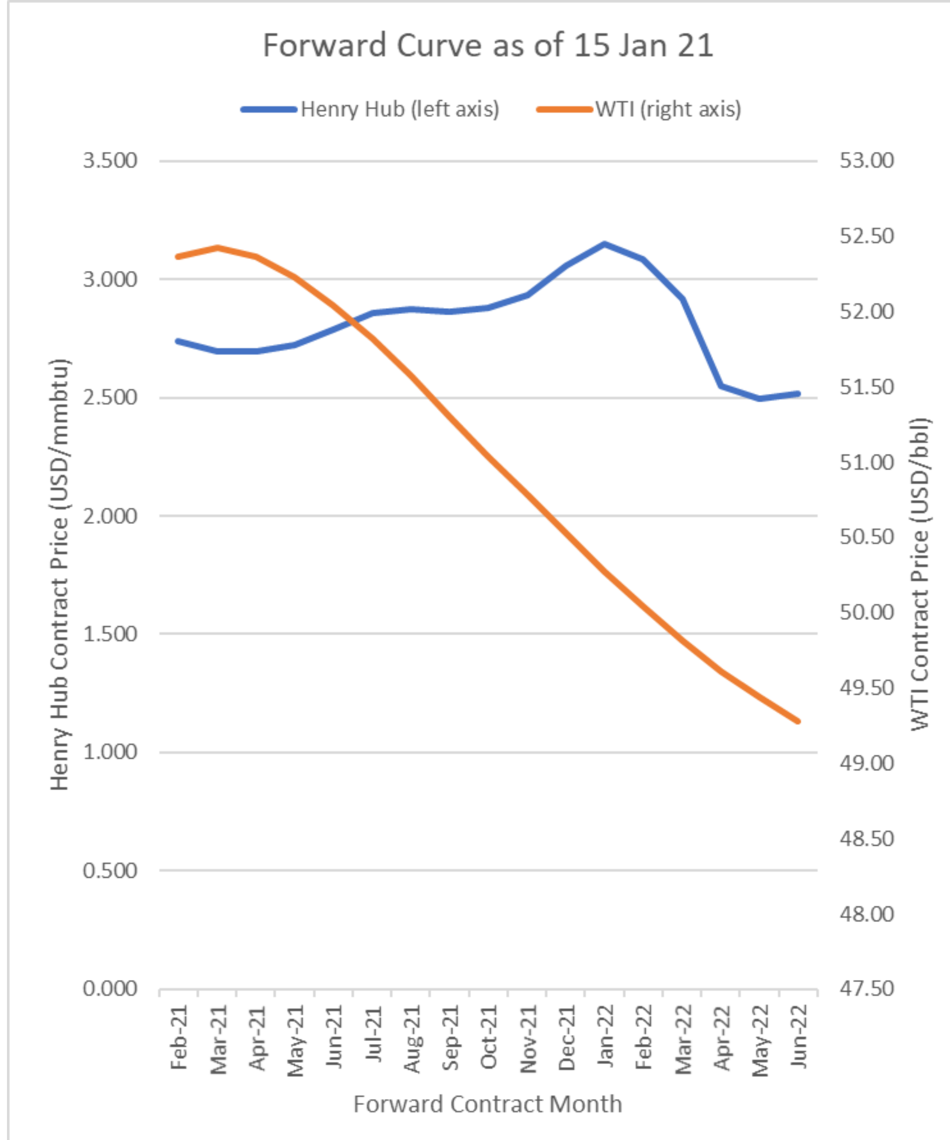
- In short, good risk management strategy may not predict curve shifting evens like the pandemic, but it provides cushion for the fall, further providing companies time to adapt.





2021 starting off on tentatively good footing

- 2021, so far, looks pretty normal from a risk management perspective:
  - "Cautiously optimistic"
  - Storage surplus in crude falling
  - Production stabilizing (for now)
  - Curve in backwardation
- Macro-driven recovery in oil products, dependent on return to normal travel and economic cycle.
- Investment flows still in question…cash flow is king narrative. Will major players be responsible? History tells us they won't.
- Natural gas sees more typical volatility, slight upward bias.
- Basis risk as important as benchmark prices.

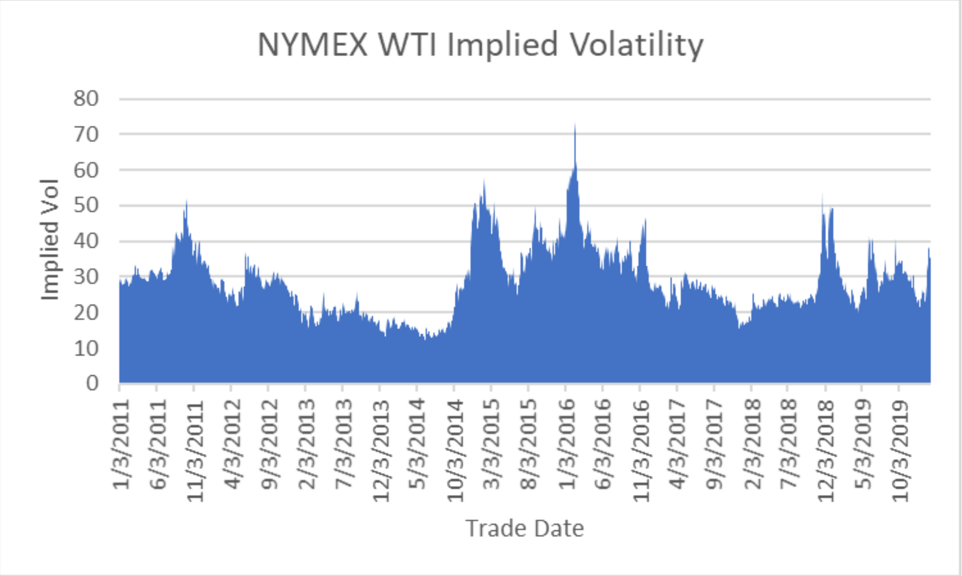


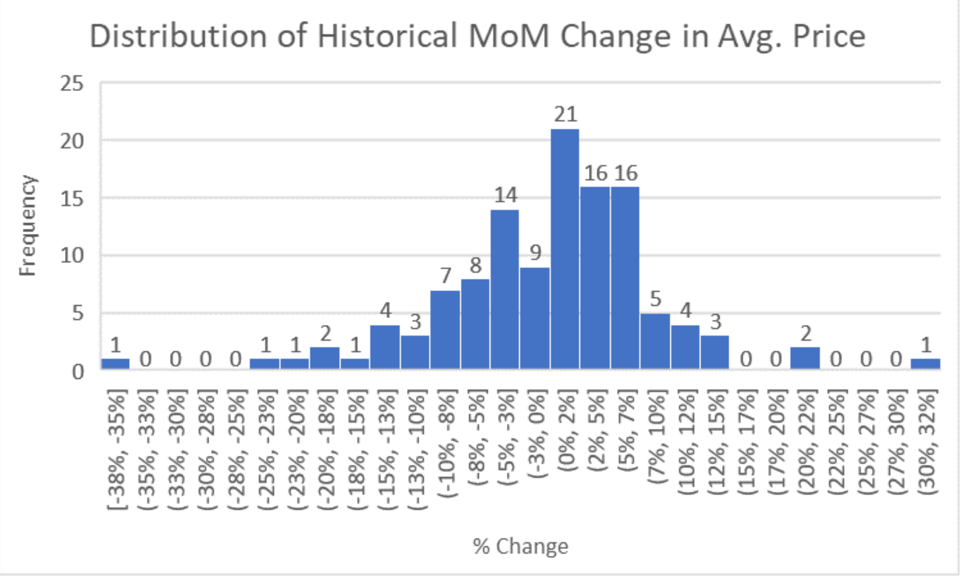
If this is normal, what does a producer do?

Define risk tolerance v. risk appetite	What are you trying to accomplish? What are you willing to sacrifice in order to improve the probability of success?	Compose strategy guidelines
Quantify how sensitive your portfolio is to price risks	Benchmarks, basis, volume? Tradeoffs (premium/opportunity cost)?	Develop a menu of instruments and portfolios that meet the stated goals of risk management
Determine how far out you should/can hedge	To whom and when are you obligated? How do volatility scenarios affect this?	Create a range of acceptable tenures within the strategy guidelines
Establish and manage relationships	From whom do you need support?	Lenders, market makers, physical traders, and consultants

Hedging against volatility – what do we really mean?

- Everyone says they want to hedge against volatility.
- Over the last 10 years, WTI vol has traded around a mid point of approx. 28. This means, on any given day the price of oil may change by +/- 2%, in a given month +/- 10% (rough approximation)
- Since Jan 2011, about 77% of the time, the change in average price from one month to the next has been in line with this estimate – 99 out of 119 times the average price changed by +/-10%
- To define your risk tolerance, what we really want to know is how much volatility can you withstand (emotionally and financially).
- In reality, you only care about that volatility which:
    - Is of a sufficiently large and negative level to impact either your desire to maintain your strategy or your ability to delivery on your commitments to your stakeholders
    - Alternatively, that results in a price that is sufficiently low to cause one or both of those changes, especially if low prices persist for longer than it takes you to adjust operations





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First, gain access to markets

- Lenders
  - Tends to be the most expensive route, but often necessary for small hedgers (<1 NYMEX equivalent market)
  - They'll also often provide credit to avoid posting cash margin below a certain threshold
- Over-the-counter market makers
  - Traders, major banks/i-banks, etc.
  - Direct access to OTC markets reduces transaction costs, but may come with less support.
  - Credit may be provided or your lender may provide an intercreditor agreement.
- No matter with whom you choose to execute your hedges, you will go through the "KYC" process
  - Fancy name for anti money laundering compliance and prevention of funding of terrorism
  - Each counterparty will have onboarding documents and processes, but they all ask for the same information.
  - Total time required depends on how organized you are, typically no more than half a day.
- Sign an ISDA (or bilateral agreement), supporting docs

Know Your Client

- [ ] Register for Legal Entity Identifier (LEI) number
- [ ] Certificate of incorporation (or equivalent)
- [ ] Authorized signatory list
- [ ] Shareholder structure or registry (if applicable)
- [ ] Identify directors w/proof of residency
- [ ] Identify beneficial owners with >25% holding in the company w/proof of residency
- [ ] Audited financials (if applicable)
- [ ] Banking instructions
- [ ] W9 forms

What if you hedge against a greater than normal (>10%) move with a swap?

Hedge

- Sell 1,000 barrels per month fixed price swap at $52.25

Tradeoff

- You are protected against price falling below $52.25, but sacrifice any price above $52.25.

Cash Costs

- $0 up front premium
- Margin $20,150 max* (Most OTC counterparties extend credit to cover initial margin)

Embedded Costs

- Bid/ask spread – when you sell a fixed price swap, the counterparty pays a price just below market value. The more parties between you and the market, the higher this cost. It can be a few cents, it can be >$0.50.

Noncash Resources

- Access. Setting up the accounts and connecting with counterparties requires paperwork and patience.
- Risk tolerance. In our example, we assume a tolerance for 10% negative variance from prevailing market price.
- Management. Plan for ½ day to 1 day per month to manage post-trade processes and settlement.

What if you hedge against a greater than normal (>10%) move with a put?

Hedge	• Buy 1,000 barrels per month 10% out of the money put, $47 strike
Tradeoff	• You pay premium up front for insurance against prices falling below $47/bbl
Cash Costs	• $2 up front premium
Embedded Costs	• Bid/ask spread – when you buy a put, the counterparty charges a price just above market value. The more parties between you and the market, the higher this cost. It can be a few cents, it can be >$0.50.
Noncash Resources	• Access. Setting up the accounts and connecting with counterparties requires paperwork and patience. • Risk tolerance. In our example, we assume a tolerance for 10% negative variance from prevailing market price. • Management. Plan for ½ day to 1 day per month to manage post-trade processes and settlement.

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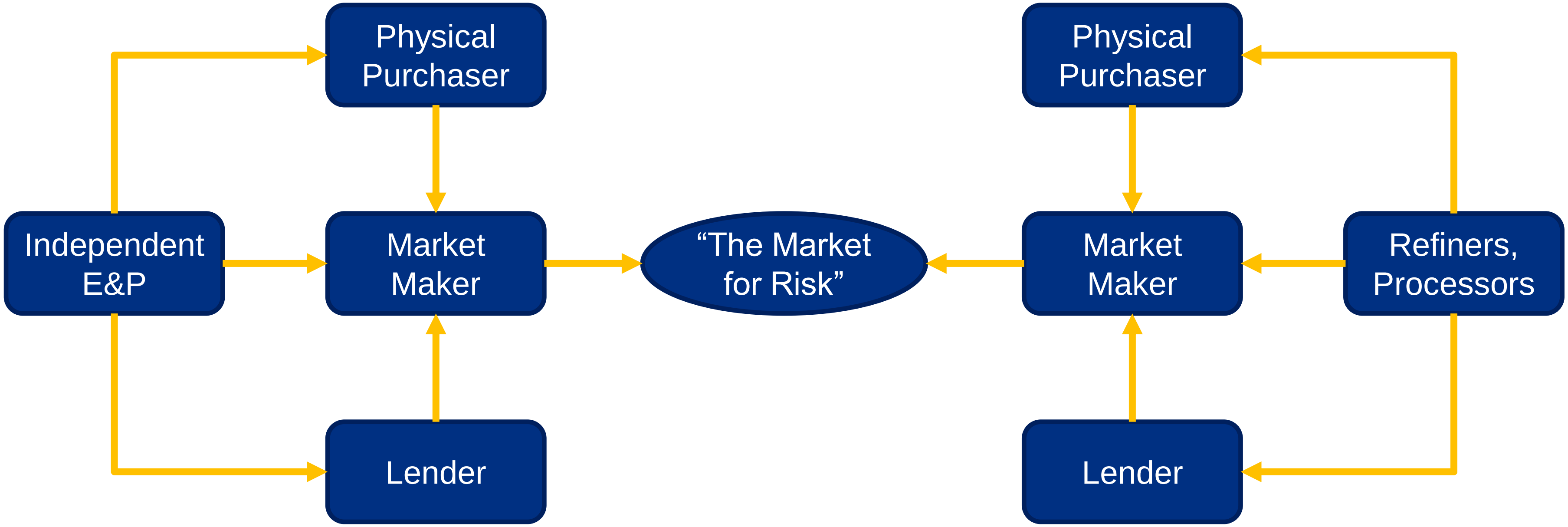
What if you hedge against a greater than normal (>10%) move with a collar?

Hedge	• Buy 1,000 barrels per month 10% out of the money put, $47 strike • Sell 1,000 barrels per month of a call to make the net premium $0, $55 strike
Tradeoff	• You accept a range of prices between $47 and $55
Cash Costs	• We assumed $0 premium
Embedded Costs	• Bid/ask spread. You pay a price just above mid market for the put and get paid a price just below mid market for the call, but pay net $0. The net price is typically similar to that of a vanilla put or swap. • Skew. Notably, puts and calls have different implied costs, as demonstrated by the volatility. Often, calls are cheaper than puts for equivalent distance from the money. In our example, your put is 10% out of the money, while the call is a little more than 5% OTM.
Noncash Resources	• Access. Setting up the accounts and connecting with counterparties requires paperwork and patience. • Risk tolerance. In our example, we assume a tolerance for 10% negative variance from prevailing market price. • Management. Plan for ½ day to 1 day per month to manage post-trade processes and settlement.

The market needs all 3 types of participant for the risk transfer to work



Natural Long
- Exposed to falling prices
- Can transfer risk by selling fixed price or hedging with financial instruments

Market Participants
- Natural risk not directional. Will accept risk for return, subsequently "lay it off" in the market.
- Purchaser pays fixed, collects bid/ask. Process/resell crude. Often hedges internally. Tends to be the most expensive way to hedge because it requires the longest chain, but minimizes the number of counterparties you have to manage.
- Market maker provides hedge, often cash-settled, lays risk off according to portfolio. May also provide support services, such as credit. Some work required to set up, but tends to be the most cost effective means of accessing the market.
- Lender accept risk of default, may encourage you to hedge and offer access. Smaller institutions typically back-to-back, similar to broker, and collect implicit fee in expanded bid/ask. Likely offer credit and possibly more attractive borrowing terms.

Natural Long
- Exposed to rising prices, relative to finished product
- Can transfer risk by buying fixed price or hedging with financial instruments

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