

A Panel Discussion on Commodities

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Moderator: Commodities can be puzzling. Despite their status as one of the decade's worst-performing asset classes, commodities markets have continued to grow. In fact, open interest — the number of commodities contracts outstanding — has been booming on futures exchanges in recent years. What can explain this puzzle? Is this a good time for investors to increase their portfolio allocation to commodities?

Welcome to our panel discussion on commodities. Its purpose is to provide an objective look into the complex and rapidly changing world of commodities with an emphasis on commodity investing. Today's panel consists on the co-editors and several contributing authors of *Commodities – Markets, Performance, and Strategies* published by Oxford University Press. Let's welcome our panelists: Tom Barkley, Hunter Holzhauser, Dianna Preece, and Andrew Spieler.

This panel discussion examines some important topics about commodities using a question and answer format. It starts by offering a brief historical background on commodities and then turns to commodity investing. Next, the discussion turns to commodity returns and performance followed by commodity trading with special emphasis on energy markets. Financialization and the role of technology are then examined followed by views about current and future trends in commodities.

Historical Background on Commodities

Moderator: Let's begin with a background question: How did commodity markets develop?

Barkley: Commodity markets have been around for centuries. These markets existed in a crude form as far back as the Sumerians between 4500 and 4000 BC, when clay tokens were made and sealed in clay vessels, representing a number of sheep or goats to be delivered at a time in the future. Derivative contracts on sesame seeds existed in Mesopotamia as early as 1809 BC. The Amsterdam Stock Exchange, often considered the first stock exchange, originated as a commodities market in 1530. Formal futures markets originated in the Dutch Republic during this time, and early futures contracts were traded on tulips at the peak of the Dutch Tulipmania in 1636. Despite these instances, some historians reckon that the first recognized futures trading exchange was established by Japan in 1710 for the trading of rice futures. Finally, many view the listing of the first-ever standardized "exchange-traded" forward contracts in 1864, by the Chicago Board of Trade (CBOT), as the beginning of modern-day commodity futures markets.

Harris: As Tom said, the U.S. markets developed as risk management tools for farmers during the mid-19th century. The CBOT offered farmers a place to reduce their price risk—farmers could fix the price they expected to receive for crops grown in the future, which greatly helped in reducing the risks of farming. Once a forward contract price was determined, the farmer could then concentrate on managing costs to come in below the revenue targets.

Of course, the agricultural markets have this long and storied history, but the massive growth in commodity trading has occurred during the past 40 plus years when financial commodities began to trade. The current commodity markets have come to be dominated by financial commodities like equity index products, individual equities, interest rates, and currencies. These financial commodities have comprised somewhere between 80% to 90% of volume and open interest around the world during this past decade. The risk management function that commodity derivatives serve are not only valuable for farmers and miners, but also help in managing risk in financial markets.

Commodity Investing

Moderator: As previously discussed, commodities have a long and fascinating history. Let's now turn to several questions involving commodity investing. Do investors actually hold physical commodities or use derivatives to access commodity exposure?

Spieler: The majority of commodity investments are indirect either through derivatives or mutual fund and exchange-traded fund (ETF) structures. Larger institutional investors such as investment firms and large end users such as airlines may invest directly. One example is Delta, which acquired refining assets in 2012 and now buys crude oil, refines the crude, and sells the excess in the open market. Another example is when the market for crude oil is in contango, which occurs when a commodity's futures price is above the expected spot price. Under this condition, investors buy crude oil and absorb the storage cost to leave on tankers. A search of Google "Oil Tanker Armada Singapore" results in a satellite image of such oil tankers sitting between Malaysia and Singapore.

Barkley: Whether investors actually hold physical commodities or use derivatives to access commodity exposure may depend on the size of the investment. Institutional investors may have divisions dedicated to the purchase, storage, trading, and sale of various physical commodities, which is often the case for large agricultural companies or wholesale energy marketers. These investors may also use various derivative contracts such as forwards, futures, commodity swaps, and options to gain exposure to or hedge the price of the underlying commodity. Retail investors, conversely, are likely to use derivatives particularly futures, investments in ETFs, and investments in shares of companies that produce the relevant commodity to gain this same exposure. Institutional investors and more sophisticated retail investors might also use a Commodity Trading Advisor (CTA) for recommendations about commodity futures.

Preece: I agree that situational factors affect whether investors hold physical commodities or use derivatives to access commodity exposure. Some investors, especially institutions, invest in the physical commodity but most use derivatives as a means to gain exposure. The problem with owning physical commodities is the cost of carry. If investors buy the physical commodity, they must transport and store it. In the case of agricultural commodities like corn or soybeans, the risk of spoilage is possible. Sometimes insuring physical commodities is needed, which is also part of the cost of carry. These costs erode potential commodity returns. Investors can avoid these costs by using derivatives to gain access to the asset class.

Harris: In my view, some level of distrust has existed in commodity markets. For example, farmers have long been skeptical of counterparties who do not hold or use physical commodities. In fact, the Commodity Futures Trading Commission's (CFTC) Large Trader Reports parse out non-commercial trader positions from commercial trader positions to shed light on what financial investors might be doing in commodity markets. And certainly, investors who do not hold or use physical commodities have been under scrutiny by regulators whenever prices seem to move in unexpected directions.

Moderator: Conventional wisdom suggests that investors should commit a relatively small percentage of their portfolios to commodities, but some investment professionals disagree. What are your views on the following question: Why are commodities desirable in a well-diversified portfolio? That is, what are the benefits of commodity investing?

Barkley: Commodity investing offers six major benefits: diversification, inflation protection, hedge against event risk, liquidity, trading on lower margin, and high potential returns.

Spieler: I agree. All these are potential benefits of having commodities in a portfolio. Besides diversification, perhaps the most important benefit is likely the positive correlation with inflation.

Moderator: In recent years, the United States has experienced a rise in interest rates after years of artificially low rates. Are commodities still an inflation hedge?

Spieler: The effect of increasing interest rates, primarily due to inflation, on commodities is unclear. Rising inflation increases the cost of carry and the desire to carry inventories of commodities at higher interest rates decreases. Higher interest rates can lead to higher supplies of commodities. For example, miners may want to mine now rather than the future.

Moderator: An important consideration when investing in any security or asset is risk. What are the major risks associated with commodity investing?

Barkley: Two of the more important risks associated with investing in commodities are the volatility of commodity prices and tendency for mean-reverting prices. More specifically, commodity prices can fluctuate substantially based on supply and demand in the market for a particular commodity. For instance, decisions made by the Organization of Petroleum Exporting Countries (OPEC) regarding production affect crude oil prices. Over time, prices in commodity markets tend to revert toward a mean. Thus, unlike stocks that might grow in value over time, when prices rise, new technologies emerge that allow greater production of the underlying commodity.

Spieler: Aside from the traditional risks, shifts in consumer demand can dramatically affect input commodities such as copper and the increasingly popular lithium used for batteries. Another risk is the increasing number of international mergers and possibility of poor integration and even accounting fraud. Examples include Caterpillar and SQM, a Chilean copper mining company.

Harris: For long-term investors, one risk in using derivatives for commodity exposure is in the uncertain roll yield, where expiring contracts have to be renewed. For some products like commodity ETFs, the cost of rolling out of expiring contracts and into more distant contracts can substantially erode returns and the risk of executing long-term strategies with shorter-term contracts presents new and unique risks to commodity investors seeking exposure through these vehicles.

Moderator: Having discussed risks associated with investing in commodities, let's now turn to another question. What ways are available to invest in commodities?

Barkley: Four major ways are available to invest in commodities. One method is direct investment, which involves buying, holding, and selling the physical product. The second method is to own stock of natural resource companies by buying, or short-selling, shares in a firm that directly produces the commodity. A third way is to invest in commodity mutual funds and ETFs. However, ETFs often have lower fees than mutual funds. The fourth method is through commodity futures where investors seek a return from trading through an exchange, often speculating on the direction that prices will take.

Commodity Returns and Performance

Moderator: Next, let's turn to commodity performance. When the financial media presents commodity returns, what is being reported? In particular, for commodity futures, can you explain how commodity futures returns include collateral returns, spot returns, and roll returns?

Preece: Several sources of return are available to commodity futures investors. First, many futures investors invest the full notional amount of the contracts as collateral, which is called a collateralized futures position. Because commodity futures are leveraged, investors can have considerable cash tied up in collateral, which gets invested in other assets, usually risk-free assets such as Treasury bills. The return that is generated from the collateral investment is called the collateral return. The collateral return is also called the Treasury-bill return, the cash return, or the collateral yield.

The spot price of a commodity is the current price. The spot return reflects changes in the underlying commodity price. The roll yield results when a commodities investor wants to hold a long position in futures over a long period. The investor must sell or "close out" positions in futures contracts that are expiring and reinvest in longer-term contracts. The roll return is the gain or loss associated with rolling a futures contract forward. When the market is in contango, the roll yield is usually negative because longer-date contracts are more expensive than shorter-date contracts. When the market is in backwardation, the roll yield is usually positive because longer-date contracts are less expensive than shorter-term contracts. Backwardation is the market condition wherein the price of a commodities' forward or futures contract is trading below the expected spot price at contract maturity.

Moderator: How have commodities performed during periods of stress – and has this changed in the post-financial crisis of 2007-2008 period?

Preece: Before the financial crisis of 2007–2008, also called the global financial crisis (GFC), a passive investment strategy in commodities generally meant equity-like average returns. It also meant a hedge or at least a partial hedge against inflation and negative return correlations with stock and bond returns. But during the crisis, commodities did not perform well. Returns were more positively correlated with traditional asset classes than expected. Commodity prices fell from peak levels after the financial crisis to a bottom in 2011. Since the financial crisis, commodity performance has been generally weak. In late 2015, investors started paying attention to commodities again, expecting a turn around. Investors are finally believing we have hit a post-crisis bottom. But by early 2018, some commodities had not lived up to the bullish expectations while others, such as metals, performed well. When it comes to commodities, there really is no "commodities." You have to consider the individual commodity because agricultural commodities may be performing poorly while oil or metals are performing well.

Spieler: Picking up on the individual nature of commodities, the wide variety of commodities and instruments makes generalizing difficult. For example, gold and oil spiked around the GFC. Crude oil peaked around \$147 and subsequently plunged to under \$30. Copper experienced large gains tied to strong Chinese growth but these gains have retreated. Perhaps the more interesting part of commodities markets is the emergence of lithium and liquified natural gas (LNG). As battery and solar power becomes more commonplace and affordable, the demand for lithium should rise.

Commodity Trading and Energy Markets

Moderator: Our next set of questions focuses on commodity trading and energy markets. Who are the biggest commodity traders in terms of companies and countries?

Holzhauser: The firms that trade the most commodities are still investment banks such as Goldman Sachs, JP Morgan, and Citibank. That said, the biggest commodity traders are often countries. For example, China remains a large oil importer. Yet, since the financial crisis of 2007-2008, the United States has gone from importing to exporting millions of barrels of refined oil per day. As for growth, commodity trading among developing nations, such as China, is obviously growing at a faster pace than in the United States or the European Union. Between 2005 and 2015, commodity trading in China grew by 55% compared to just 28% for the Americas and 16%

for Europe, Middle East, and Africa (EMEA). In fact, trading commodities, especially via derivatives, has never been easier or more popular. In 2015, derivative volume increased by 20% and trading volume increased by 26%. With over 4 billion contracts traded, commodities passed single stock options as the most traded class of derivative contracts.

Spieler: Many large investment houses are shedding their direct ownership of commodities and related assets partly due to the Volcker rule, which prohibits banks from using their own accounts for short-term proprietary trading of commodity futures, as well as options on any of these instruments. The rule was enacted because these speculative trading activities are not in the best interest of bank customers. As for countries, the largest suppliers of key commodities are Saudi Arabia and the United States. Natural gas is most abundant in Russia and Qatar and, due to fracking, in the United States. The Chinese government has been aggressive in acquiring oil assets in Nigeria. Canada, New Zealand, and Australia's economies are also heavily tied to natural resources.

Moderator: Speaking of the Volcker rule, how have regulation and deregulation affected commodity traders?

Spieler: As mentioned previously, the Volcker rule as a part of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank) have spurred the sale of commodity assets from the bulge bracket banks, which are massive, multinational corporations. This change has opened up potential opportunities for hedge funds and managed futures (commodity trading advisors) to provide investment advice and execution. In the United States, the lack of regulation on fracking has dramatically increased capital investment and output. A need exists for pipelines for transmission. Many jobs have been created, particularly in North Dakota.

Holzhauser: In the wake of the financial crisis of 2007-2008, financial markets around the world increased regulation. Legislation such as the Dodd Frank Act in the United States and the Basel III/CRD IV in the European Union has affect commodities. These regulations created a mass exodus of banks for the commodity trading business as regulations squeezed margins tighter and tighter. Banks have increasing difficulty making a profit in trading commodities if they have to physically hold them. Moreover, regulation has become a double-edged sword for banks in the commodity trading business. Regulation is not only cutting their bottom line, which means they are losing clients, but also taking away their best employees as top talent leaves banks to join trading houses or start their own firms. As for deregulation, although President Trump may have rolled back more federal rules and regulations than any modern president, years are likely to pass to see if his policies have had any material impact on the commodities industry.

Moderator: Now let's turn to energy markets. How do energy markets compare to other commodity markets?

Barkley: According to the most recent CME Group Leading Products report, crude oil (WTI) and natural gas futures and options rank first and third respectively in terms of average daily volume traded and open interest, excluding financial products. Exhibit 1 shows these values at the end of 2018.

As shown in charts on the Trading Economics website, WTI Crude Oil (USOIL) and the S&P GSCI Index (SPGSCI) are highly correlated over time, demonstrating the relative importance of crude oil in the measurement of the commodity index. Exhibit 2 shows a chart comparing the two lines between 2014 and 2018.

Although these trades can be conducted using physical commodities that can be stored/warehoused, this is not possible with electricity, which must be used as it is generated. Hence, a need exists for regulated electricity grids throughout the country to make sure that demand is always balanced with supply.

Energy Contracts	Future		Options	
	ADV Notional (\$millions)	Open Interest	ADV Notional (\$millions)	Open Interest
Crude oil (WTI)	\$69,452	2,255,749	\$10,297	3,988,348
Natural gas	\$11,584	1,623,201	\$2,376	2,112,429

Exhibit 1: Average Daily Trading Volume and Open Interest

Spieler: The need for transporting LNG is increasingly important. Derivatives on LNG are quite small and are likely to increase dramatically.

Moderator: What salient features appear in investments in energy markets?

Barkley: Many energy commodities are derived from crude oil, so prices of gasoline, heating oil, and natural gas move in tandem with those of crude oil. The prices of these distillates, which are outputs of refineries, are highly correlated with the input's prices, namely crude oil. Consequently, returns derived from investments in the by-products largely depend on the returns in the underlying raw input.



Exhibit 2: WTI Crude Oil versus the S & P GSCI Index

As discussed previously, to the extent that the supply of oil globally is largely determined by the OPEC cartel, prices and returns are tied to decisions made by leaders of these countries. As described by the U.S. Energy Information Administration (EIA), the U.S. has been able to increase production of oil through more cost-effective drilling technology, leading to an increase in the global supply.

Spieler: Markets for weather derivatives also exist based on temperature, rainfall, and snowfall.

Moderator: What methods do firms use to manage energy risk?

Barkley: Energy companies use various approaches to manage and mitigate risk. Here are some methods used to manage market risk, credit risk, and operational risk.

- Market risk. Energy companies often use financial instruments for hedging market risk: exchange-traded futures contracts, OTC forward contracts, commodity swaps, call and put options on various spreads, and exotic options. In particular, when refineries are concerned about the spread between crude oil input prices and gasoline output prices, known as the crack spread, they use option contracts or swaps that relate specifically to this spread to hedge. Similarly, power plant managers care about the spread between fuel input prices and wholesale electricity output prices, known as the spark spread, when the input fuel is natural gas, the dark spread when it is coal, and the quark spread when it is uranium. Again, commodity swaps and options are available on these spreads.
- Credit risk. Energy companies can use specific contract arrangements for mitigating credit risk. These arrangements include margining agreements, collateral, credit limits, guarantees from parent companies, and netting agreements. Netting arrangements allow for multiple contracts between two entities to be settled with one net unilateral payment. In each case, the objective is to reduce the exposure to a default by the counterparty to the contract – whether the counterparty is taking or delivering energy.
- Operational risk: Finally, energy companies often use additional facilities to manage operational risk, particularly peaker plants, which are power plants that generally run only when the demand for electricity is highly. These plants allow power generators to increase the production of electricity quickly when the demand increases, and to ramp down when it subsides. Generally, these are turbine plants fueled by natural gas in which the ramp-up time might be only three to four hours.

Financialization

Moderator: How has financialization affected commodity markets?

Harris: Commodity markets have extensive histories with financial firms taking on some of the risks. As noted earlier, farmers have long viewed financial players with suspicion – perhaps rightly so. Probably as a result, the CFTC produces reports on the positions of “non-commercial” traders in the U.S. markets. More recently, financialization has been used to describe long-only commodity index funds that increased commodity futures positions substantially between 2002 and 2008. Some commentators claim that this recent financialization represents excessive speculation that destabilizes prices and unwarranted volatility in commodity markets. Although a few research papers model how this might happen, the bulk of the evidence suggests the opposite. In agriculture markets, for instance, long-only index funds provide a solid set of counterparties that stand ready and willing to buy commodity futures from producers or

farmers. Other studies show that the increase in index fund participation has little or no effect on prices or volatility. Still other studies show that hedge fund participation has led to more stable commodity markets with lower volatility.

Overall, I think regulators are right to scrutinize new market developments such as financialization to ensure commodity markets are fair for all traders. These markets are important sources of price discovery for many commodities used every day. When the view of financialization shifted from concerns about traditional speculators like managed futures funds or hedge funds to long-only commodity index funds, the CFTC began collecting data and producing reports on index investing. This type of transparency has provided researchers with data to directly examine whether and how financialization has changed commodity markets. So far, this recent round of financialization apparently has not proven to be problematic.

Role of Technology

Moderator: How are changes in technology such as fracking and algorithmic trading affecting the commodity industry?

Holzhauser: Fracking is interesting because many view it as a negative for the environment, but a positive for the commodity trading industry. One huge concern with fracking is whether it, especially the wastewater from fracking, can contaminate fresh drinking water. Finding safer and more environmentally-friendly methods for extracting natural gas will likely become imperative, especially if fracking becomes more heavily regulated. Regulations may also force us to rely even more on alternative and renewable sources of energy, develop better batteries for storing energy, and create more efficient desalination water systems. Seeing what solutions can be created as technology becomes more advanced should be fascinating.

Spieler: Because fracking has increased the supply of crude oil and natural gas, it has affected OPEC's monopoly pricing. There are some other subtle effects of fracking and its concomitant supply effects. Consider the impact on commodity indices used for ETFs and benchmarking. As the supply changes, so does the weighting in the index. Algorithmic trading will lead to developing further advanced quantitative strategies. Additionally, the use of high frequency and non-structured data can be incorporated into trading strategies.

Holzhauser: Technology has produced a continuous supply of fundamental and technical analysis. As trading becomes more data driven, technology such as algorithms will make all financial markets, including the commodities market, more efficient. However, what is seen as a good change for the commodities market, may not be a good change for all commodity traders. Some commodity traders are doing better than ever and taking full advantage of the changing technology. Yet, the landscape for commodity traders is becoming both more competitive and specialized, especially for commodity traders preferring to trade without algorithms. In fact, many commodity traders are being pushed to either work at large multinational firms that can afford top commodity traders that essentially manage algorithms or at smaller, specialized firms on complex deals in niche areas where algorithms are scarce.

Current and Future Trends in Commodities

Moderator: Is the U.S. commodity industry likely to continue to grow in the near future? Why or why not?

Holzhauser: In general, yes, the U.S. commodity industry is likely to grow in the near future. In fact, in a recent survey, commodity traders stated that North America has the highest growth potential. However, the specific commodities that experience the most growth are likely to depend on prices, which are based almost entirely on supply and demand. For example, predicting the growth of the crude oil market can be difficult due to the volatility of crude oil prices. Since the 2008 recession, the United States has increased its oil production due to the shale boom. Thanks to areas such as the Permian Basin, the United States is now the world's leading producer of oil. Moreover, the Energy Information Administration predicts that the United States may be a net exporter of "all" energy products (not just oil) sometime between 2020 and 2040. Once again, the wide range is based on the natural volatility of energy prices. One huge positive for the U.S. commodity market has been the employment growth across several industries including not only energy but also metals, recyclables, agriculture, livestock, and even the financial markets for commodity traders.

Spieler: Fracking will increase the supply of crude oil and natural gas as well as the use of derivatives for LNG. A growing need also exists for lithium in rechargeable batteries. However, the supply of lithium is largely in politically unstable countries, so commodity derivatives will be useful in managing risk in these industries.

Moderator: How are demographic trends such as climate change and population growth affecting commodities?

Barkley: As global populations increase, the demand for commodities is likely to increase proportionately. Countries such as China and India are using vast amounts of raw materials in their production processes, with consumption demand from their citizens fueling this – and that does not account for exports for many manufactured goods. At the same time, the evidence of global warming and environmental degradation has caused many governments to limit carbon emissions as they are deemed to be destructive to the ozone layer. New markets have opened up for the trading of carbon credits, which is a permit or certificate allowing the holder to emit carbon dioxide or other greenhouse gases. The trading of these carbon credits imposes a cost on companies that are greater pollutants of the atmosphere, as they are required to buy more credits to match their production levels when these exceed certain caps. Similarly, firms that pollute less benefit from the sale of their excess (unused) carbon credits.

Holzhauser: Many areas of the globe, especially highly populated and growing areas such as Asia and Africa, are depleting their supplies of freshwater while their demand is growing. Part of the problem is that roughly 75% of all freshwater is in glaciers and snowfields, which required improving desalination technology. Climate change is likely to lead to new regulations on commodity markets – even if the market is undergoing a temporary reprieve from regulations while President Trump remains in office.

Although regulations are disrupting the supply of certain commodities, a growing population disrupts the demand for certain commodities. Most global population forecasts have the global population rising from 7.5 billion people to a range of 9 to 13 billion people by the end of the 21st century. Advances in fertility practices and healthcare in general are also increasing both birth rates and life expectancy rates. As countries become more developed, their population growth may decrease, but their demand for commodities may actually increase. In fact, the United States and Europe still lead the way in terms of global consumption. Thus, current emerging markets such as those in Asia and Africa may take over the market share of demand for commodities in the future. Commodities that will likely be in high demand include base metals and raw metals to build infrastructure, energy resources for electricity and transportation needs, and agricultural and livestock for food.

Moderator: Which global regions have the most growth potential for commodity trading?

Holzhauser: Each area of the globe has its own growth story. That said, most commodity traders seem to favor North America in terms of growth potential for commodities, but that is mainly on the supply side – especially with energy. However, there are different areas of growth for different commodities. For example, in terms of livestock and agriculture, the United States, China, and India are still the top food producing countries and this is unlikely to change anytime soon. China leads in the production of rice and pork whereas the United States leads in producing milk, chicken, and beef. India is right behind these countries in several categories. Brazil is probably a good fourth country to mention because it produces sugarcane, coffee, and fruit due to its warmer climate.

As for demand, the United States and Europe still lead the way in consumption and the U.S. is often – sadly - cited as the country that throws away the largest amount of food. However, countries with fast growing populations and economies – especially Asian countries such as India and African countries such as Ethiopia – will drive up the future demand for commodities.

Finally, diversification may spur its own growth potential. For years, the statistics show that developed countries tend to be more diversified in their exports than developing countries. Seeing more diversification and less concentration of specific commodity markets would be nice as many emerging markets become more developed. This diversification would allow these countries to develop more stable economies and probably create a more stable commodities market in general.

Moderator: What trends are likely to evolve regarding commodities?

Holzhauser: Several trends in commodities are worth mentioning. The most publicized issue is probably the ongoing tariff situation with China. This issue actually relates to another relevant trend, which is China's general shift to a more consumer-led economy instead of a manufacturing economy. China represents roughly 40% of the global demand for metal commodities, but it is lowering demand for foreign steel by increasing its production of cheap steel. In fact, China has shut down more than 40 million tonnes of global steel-making capacity. Many have scolded China for its debt practices with poorer African countries. China is basically giving some African countries billions of dollars in shady loans that they know these countries cannot repay, which allows China to later exploit the countries for their natural resources.

Like the rise in tariffs and other issues with China, more government interventions appear on the horizon. These interventions will be across the board and likely range from mandated trade measures to renewable energy credits to constraints on foreign investments to even specific operating policies for government agencies. The most obvious example might be OPEC, which continues to try to influence the supply and demand of crude oil. Another good example involves the steel industry where governments continue to issue subsidies for inefficient steel facilities and some countries even continue to build new steel facilities. Agriculture is another commodity industry heavily influenced by government regulations and tariffs.

Finally, government interventions in the financial sector can also affect commodities. The most relevant example may be that our business and economic cycles are lengthening largely due to Federal Reserve policies including quantitative easing and changing interest rates. The United States has undergone one of the longest bull equity markets in its history. Has this bull run its course or is it a sign of things to come? Either way, the economic progress in the wake of the 2008 recession has increased demand within the commodity markets and is likely to disrupt commodity markets if and when the good times come to an end.

Spierer: I would say trends include incorporating high frequency, unstructured data, non-traditional data sources. An increase in the use of lithium and LNG derivatives is likely to occur. Global warming will also have an impact. Increasing human population increases the need for agriculture and livestock, which are active commodities, and reduces freshwater, which is a rapidly dwindling natural resource.

Moderator: Let's conclude our session by thanking the panelists for their insights about commodities, which have helped to make them less puzzling.