Predicting Global Stock Market Index Price Activity with Precise Geospatial Intel

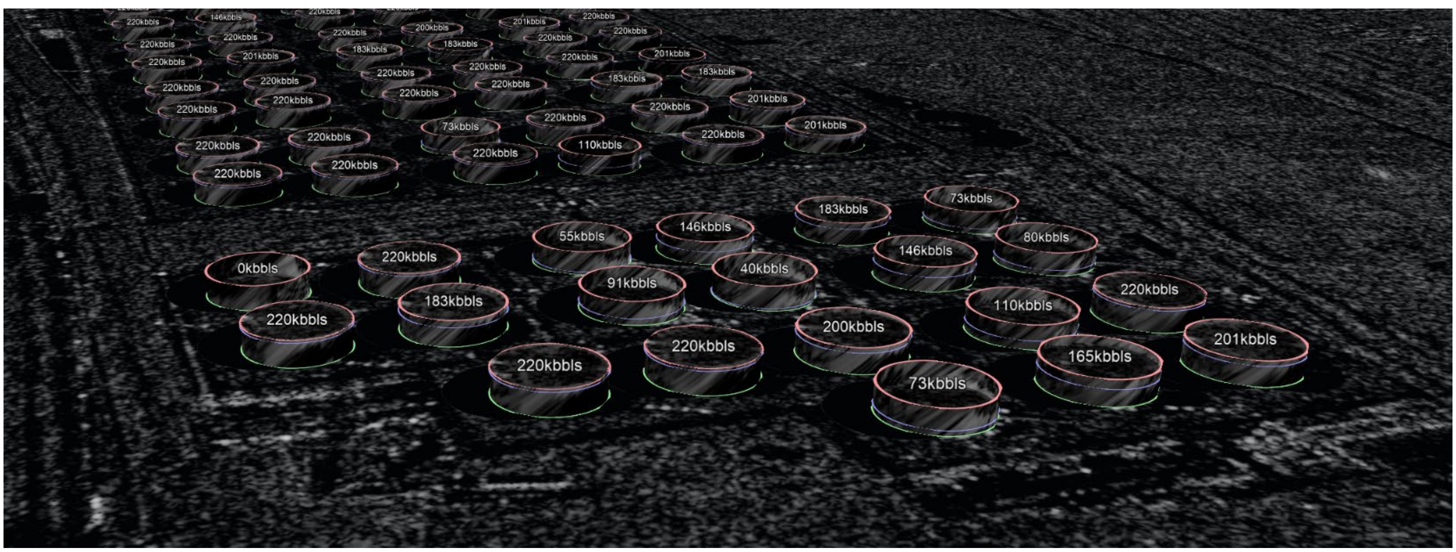
July 2019

This whitepaper represents an extension of our previous research demonstrating how Ursa's measurements of global inventories using satellite radar can generate alpha for investors. We recently showed how this dataset is a leading indicator to generate P/L on ICE Brent futures flat price movement, NYMEX WTI time spreads, single-name equities and exchange-traded funds (ETFs) in the energy sector.

This whitepaper focuses on using Ursa's crude oil inventory data to predict movements in global stock market indices – S&P500, Hang Seng, Nikkei and DAX – as a means to generate alpha by leveraging alternative data.

By leveraging our deep expertise in satellite radar technology – in particular Synthetic Aperture Radar (SAR) – Ursa is able to provide reliable weekly measurements across global supply chains day or night, regardless of clouds or fog, 24/7.

Direct Tank Measurements with Synthetic Aperture Radar (SAR)



Source: Ursa Space Systems

There are numerous macro and micro factors that influence the price activity of stock market indices (e.g. economic data releases, central bank announcements, geopolitical events, natural disasters, government policy, regulatory updates, corporate news, collective investor sentiment).

However, when isolating the relationship of Ursa's global crude oil inventories to stock market indices – *ceteris paribus* – **a strong inverse correlation emerges**.

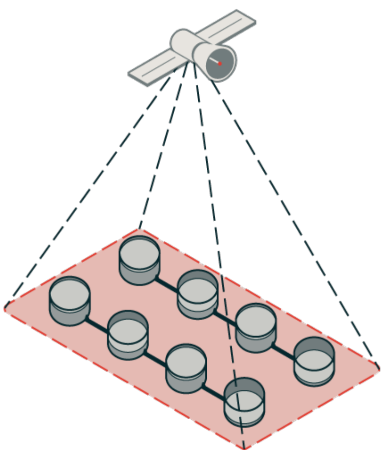
Let's look at a few examples for inventory and price correlations run from March 2018 through June 2019.

S&P500 Hypothetical Trading Scenario

The S&P500 Index – a market-capitalization weighted index of the 500 largest US publicly traded companies – is widely regarded as the best gauge of large-cap US equities and represents a common US stock market benchmark.

A basket of key North American sites within Ursa's coverage yields a strong inverse correlation of 73.3% to the S&P500 with 6-week predictability.

In other words, as Ursa's inventories measure stock drawdowns at these key North American locations, this serves as a leading indicator of a rising S&P500 six weeks out. As supplies fall, the S&P500 Index rises (and vice versa) with a 6-week leading indication.



A timing advantage of this magnitude can represent a large competitive advantage for market participants across the financial sector who are looking for a bellwether of the American stock market. For portfolio managers or long-term investors, Ursa's insights can be indicative of future trends, whether they may be upcoming headwinds or tailwinds.

Let's look at a S&P500 hypothetical trading scenario to generate P/L with this time advantage.

As you can see in Figure 1, a basket of key North American crude oil inventory sites has a clear, strong inverse correlation to movement in the S&P500 Index.

Suppose the sizeable build of over 8% measured week-over-week April 19-26, 2019 grabs your attention, and you keep an eye on Ursa's measurements over the next few weeks, looking for a trend to emerge. A trend of draws emerges over the next two weeks, leading you to have a bullish view on the S&P500 Index. On May 10, 2019 you decide to go long 50,000 shares of the Fidelity S&P500 Index Fund (ticker: FXAIX) – offering exposure to a basket of common stocks comprising the S&P500 Index – at a price of $100.27/share, with the intent of holding for a 6-week period (given the 6-week predictability outlined above).

Predicting Global Stock Market Index Price Activity with Precise Geospatial Intel

July 2019

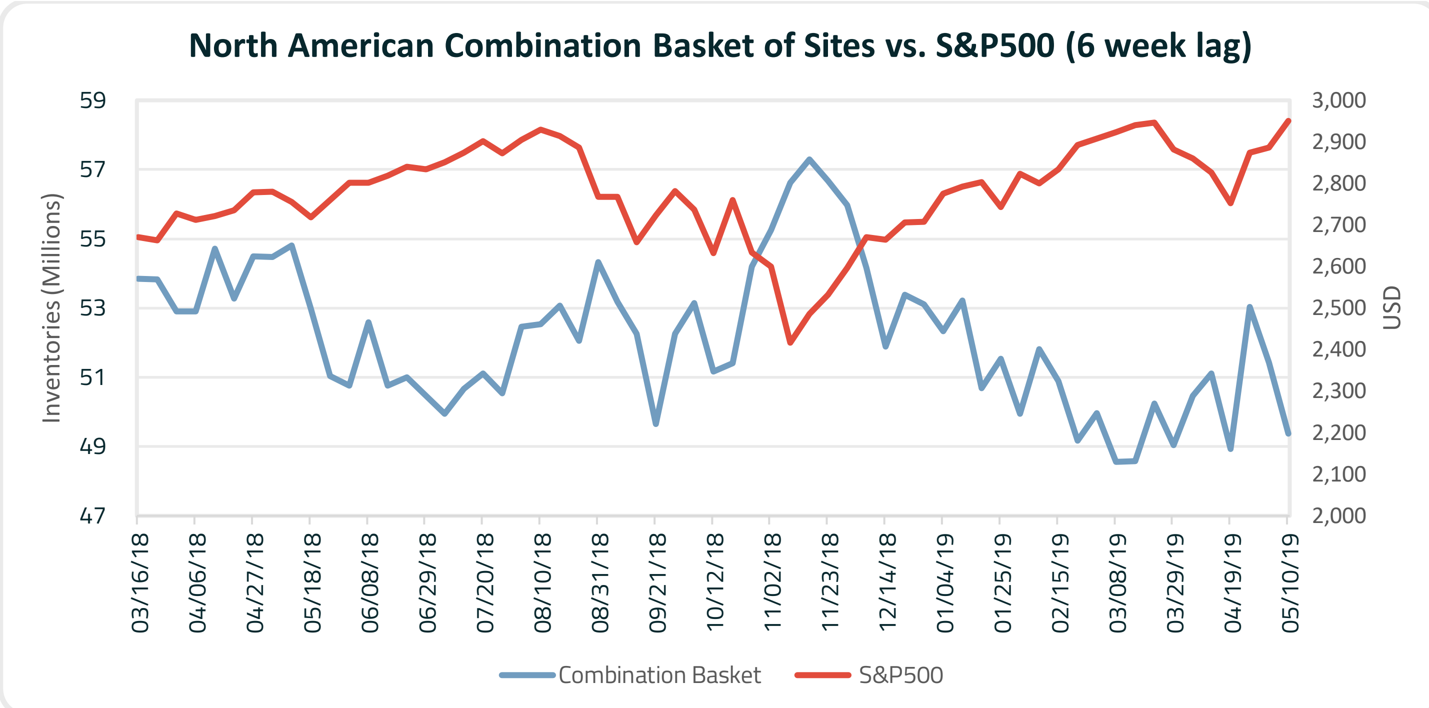


Figure 1: Ursa Inventory Data. Pricing Source: MarketView

Let's see how that long position of 50,000 shares of FXAIX would have performed. ***When you closed out your position at the end of the 6-week holding period, the FXAIX share price rose 2.67% (tracking the 2.40% rise in the S&P500 over the same period) to $102.95/share, and you would have realized a profit of $134,000.***

Hang Seng Hypothetical Trading Scenario

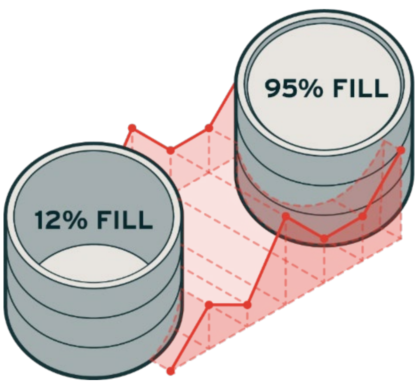
As the Chinese economy continues to move toward center stage in the global economy, many investors are looking for signals or insights into the overall health of the Chinese economy. The Hang Seng Index – a market-capitalization weighted index of the 50 largest companies traded on the Hong Kong Exchange – is the primary benchmark for the Chinese stock market and a widely quoted barometer for the Chinese economy.

A basket of key Chinese sites within Ursa's coverage yields a strong inverse correlation of 70.4% to the Hang Send with 6-week predictability.

In other words, as Ursa's inventories measure stock drawdowns at these key Chinese locations, this serves as a leading indicator of a rising Hang Seng six weeks out (see Figure 2). As supplies fall, the Hang Seng Index rises (and vice versa) with a 6-week leading indication.

A timing advantage of this magnitude can represent a significant competitive advantage. For portfolio managers or long-term investors looking for a bellwether of the Chinese economy, Ursa's insights can be revolutionary in their indicative nature.

Let's look at a Hang Seng hypothetical trading scenario to generate P/L with this time advantage.



Suppose the recent trend of inventories draws in mid-to-end of December 2018 leads you to have a bullish view on the Hang Seng Index six weeks out. At the end of December, you decide to go long 125,000 shares of the iShares China Large-Cap ETF (ticker: FXI) – composed of large-capitalization Chinese equities designed to track the performance of the Hang Seng Index – at a price of $39.07/share, with the intent of holding for a 6-week period (given the 6-week predictability outlined above). *When you closed out your position at the end of the 6-week holding period, the FXI share price rose 8.57% to $42.42/share, and you would have realized a profit of $418,750.*

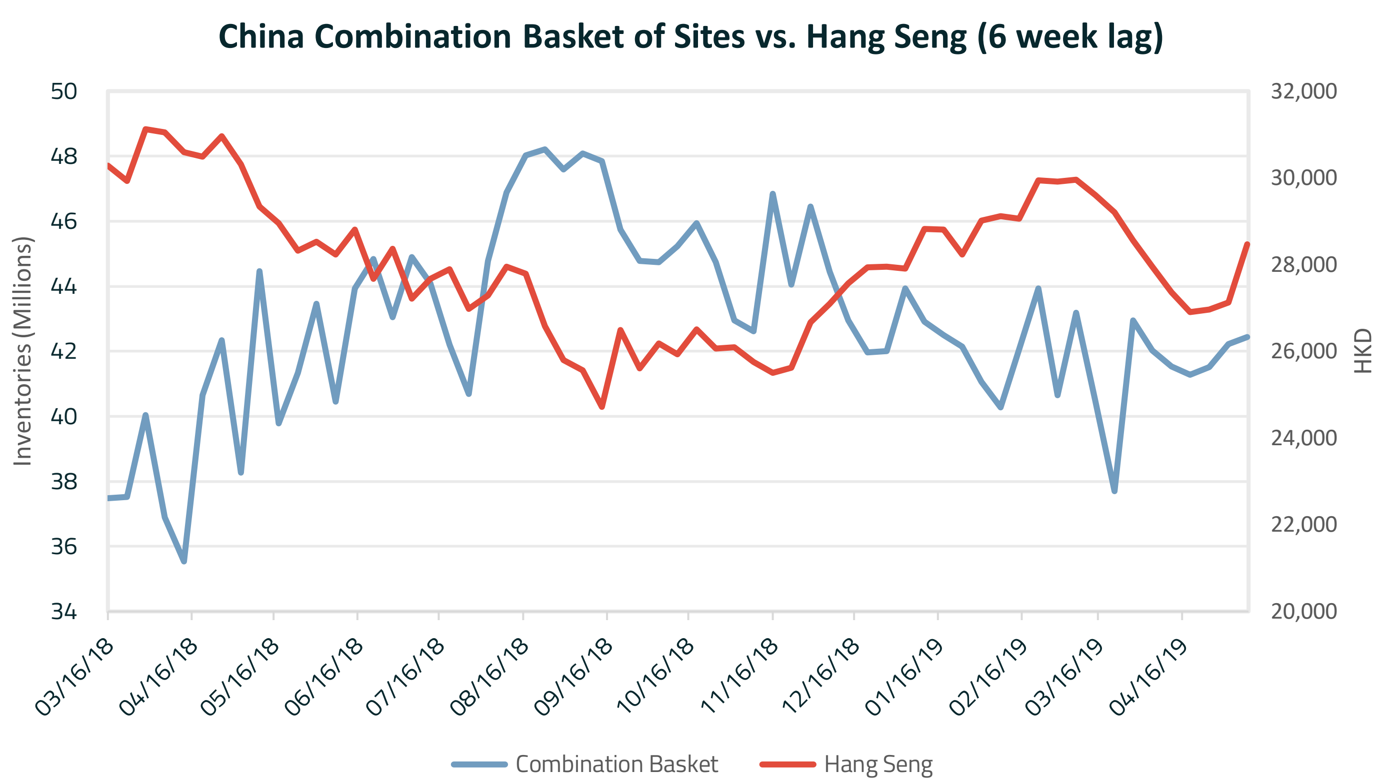


Figure 2: Ursa Inventory Data. Pricing Source: MarketView

Nikkei Hypothetical Trading Scenario

The Nikkei Index – the leading index of Japanese stocks, representing Japan's top 225 blue-chip companies traded on the Tokyo Stock Exchange – is a barometer of the Japanese economy and stock market.

From Ursa's portfolio of worldwide coverage, a basket of locations in Greater Asia (ex-China) has a strong inverse correlation of 67.9% to the Nikkei Index with 4-week predictability.

In other words, Ursa's measurement of stock drawdowns at these key locations serves as a leading indicator of a rising Nikkei four weeks out (see Figure 3). As supplies fall, the Nikkei Index rises (and vice versa) with a 4-week leading indication.

Investors looking to gain broad exposure to the Japanese stock market through investments whose underlying assets track the Nikkei Index can do so with exchange-traded funds (ETFs). In addition to monitoring performance of the Nikkei Index, investors should also consider exchange rate fluctuations between the Japanese Yen and US Dollar. Suppose the recent trend of inventory draws in mid-to-late May 2019 leads you to have a bullish view on the Nikkei Index four weeks out. You decide to go long shares of the WisdomTree Japan Hedged Equity Fund (ticker: DXJ) which deploys a currency hedge while providing exposure that tracks the Nikkei Index. On May 24, 2019 suppose you buy 100,000 shares of DXJ at a $48.11/share with the intent of holding for a 4-week period. ***After holding the position for four weeks – selling it on June 21, 2019 at a price of $48.71/share – you would have realized a gain of $0.60/share, or a profit of $60,000 in just four weeks.***

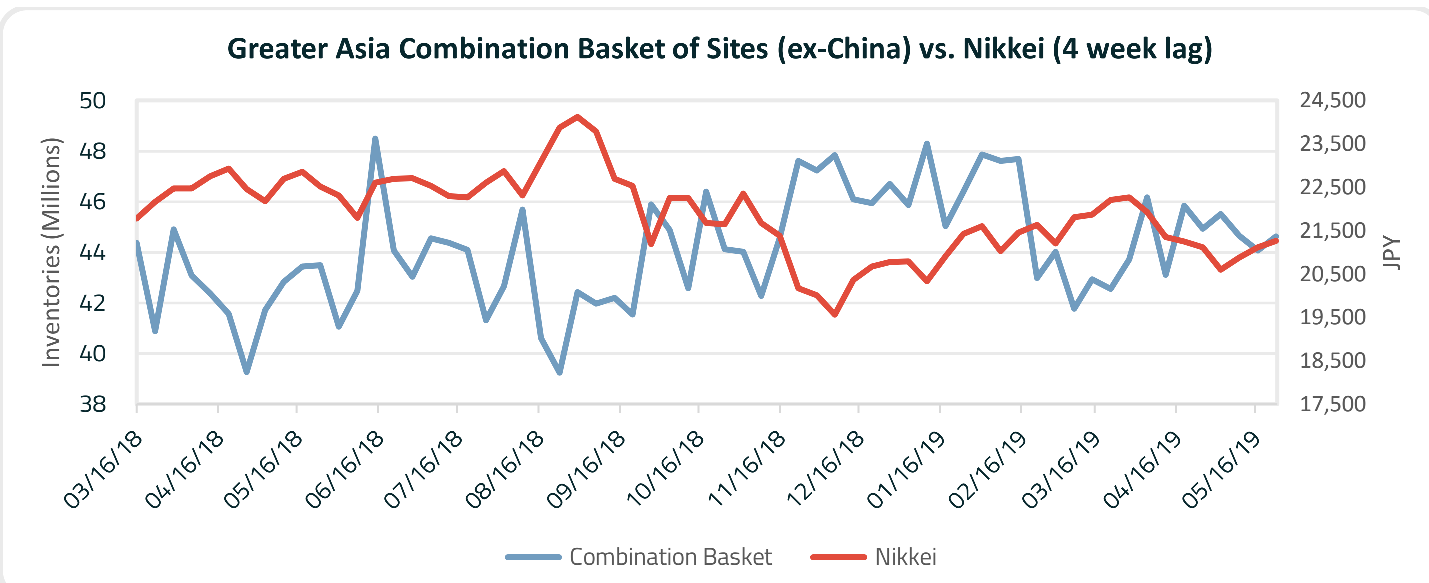


Figure 3: Ursa Inventory Data. Pricing Source: MarketView

DAX Hypothetical Trading Scenario

Many investors are looking for global diversification and exposure to European Union (EU) equities, oftentimes with a focus on the strongest economy in the EU and the fourth-largest economy worldwide as measured by nominal GDP[1] – Germany. The DAX Index is a blue-chip stock market index consisting of 30 of the largest German companies traded on the Frankfurt Exchange.

Ursa's coverage of Germany's Karlsruhe crude oil storage terminal yields an inverse correlation of 58.9% to the DAX Index with 1-week predictability.

In other words, Ursa's measurement of stock drawdowns at Karlsruhe serves as a leading indicator of a rising DAX one week out (see Figure 4). As supplies fall, the DAX Index rises (and vice versa) with a 1-week leading indication.

Suppose the recent trend of inventories drawing by nearly 9% in early June 2019 leads you to have a bullish view on the DAX Index one week out. Investing in a Euro-denominated fund involves foreign exchange (FX) risk. Thus, you decide to go long shares of BlackRock's Currency Hedged MSCI Germany ETF (ticker: HEWG) which aims to mirror the performance of the DAX Index while mitigating exposure to fluctuations between the value of the Euro and the US Dollar. On June 14, 2019 you buy 175,000 shares of HEWG at a $26.90/share with the intent of holding for a 1-week period. ***After holding the position for one week – selling it on June 21, 2019 at a price of $27.34/share – you would have realized a gain of $0.44/share, or a profit of $77,000 in a single week.***

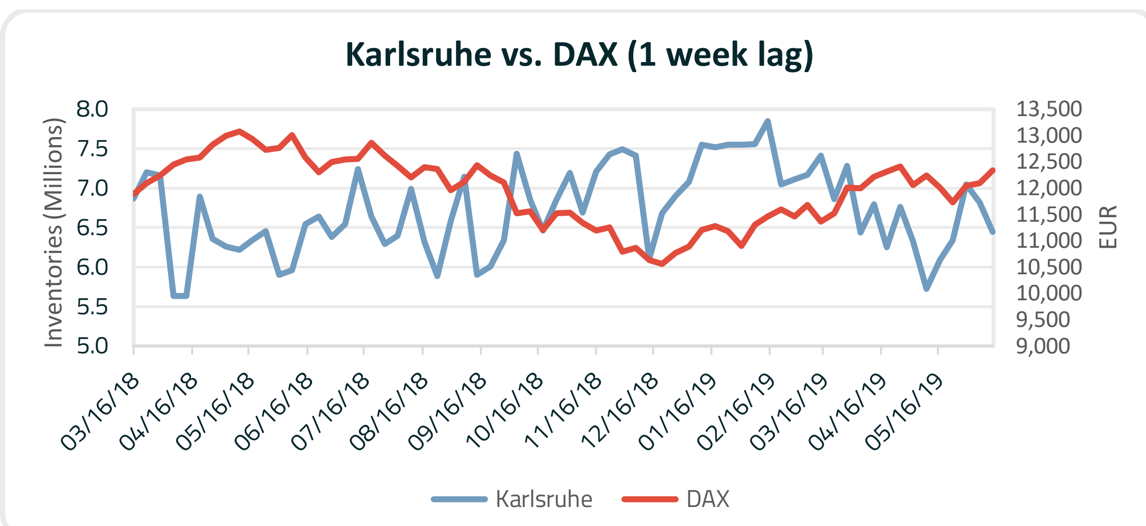


Figure 4: Ursa Inventory Data. Pricing Source: MarketView

[1] International Monetary Fund. *World Economic Outlook 2018.* https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/weorept.aspx?pr.x=104&pr.y=16&sy=2018&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=924%2C132%2C134%2C534%2C158%2C112%2C111&s=NGDPD&grp=0&a=

[Maximize your return on investment from Ursa reports by clicking here to sign up for an Evaluation]

Daniel Baruch is the Director of Global Energy Markets & Business Development at Ursa. His background is across energy commodity markets with experience in crude oil & NGLs at Glencore, natural gas & power at Morgan Stanley, and alternative investments portfolio management at AllianceBernstein. He can be reached at Daniel.Baruch@UrsaSpace.com