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AMERICAN AGCREDIT
MONEY FOR AGRICULTURE

Adapting to Another Global Crisis

Russia's attack on Ukraine will have long-lasting implications for U.S. rural industries

EXECUTIVE SUMMARY

The Russian invasion of Ukraine has brought on a new set of economic conditions that are reshaping financial and commodity markets. For the remainder of 2022, global growth will be slower and most commodity prices higher than previously expected. Key agricultural inputs are in short supply and energy prices are near multi-year highs despite the biggest ever release from the U.S. strategic petroleum reserves.

These factors are amplifying already high inflation, and the Fed is poised to let air out of the easy money balloon more quickly. This will slow the U.S. economy and increase 2023 recession risks meaningfully. Businesses that are enduring higher commodity costs will soon face markedly higher interest rates as well.

This all paints a mixed picture for CoBank's customers. Agricultural commodity prices have more or less kept pace with input cost hikes, incentivizing producers to expand their operations despite record high costs. U.S. grain production will be critical for supplying the world as Ukraine struggles to plant, harvest, and ship its corn, wheat, and sunflower seed.

Both the agricultural and power sectors are wrestling with higher natural gas prices. And crude oil supplies are at a decade-low. The ripple effects are likely to expand in two directions: higher persistent costs throughout the economy and greater incentives to transition away from fossil fuels.

Once again, amidst a global crisis, U.S. rural industries are doing what they need to keep the lights on, water flowing, communications powered, and the world fed.

Topics In this Issue:

COBANK
KNOWLEDGE EXCHANGE

This quarterly update is prepared by the Knowledge Exchange division and cover the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries.

Inside this issue

Spotlight

RUSSIA CANNOT UNWIND GLOBALIZATION

By Dan Kowalski

A month ago, BlackRock CEO Larry Fink set off a debate about whether the Ukraine-Russia war has ended globalization as we've known it for the past three decades or more. The argument goes that deglobalization has been advancing for years as nationalist leaders turn countries more insular, the pandemic is causing a rethink of supply chains, and that the current war will lead to "balkanization" or fragmenting of the world into three ally groupings led by Russia, China, and the U.S. Many business and geopolitical leaders have written about why this is the new reality, declaring that we should prepare for markets to turn inward and deal with the disruption and higher costs associated with severing these global ties.

This debate is complex and can be argued from a number of credible perspectives. However, suggesting that Russia's actions in Ukraine are the tipping point for a new world order seems to be an overreach. Russia today accounts for a mere 1.7% of global GDP in dollar terms, limiting its clout to the energy sector. Other global powers, though, have had to choose how they will respond to U.S. sanctions and calls to ostracize Russia, which has led to new (perhaps temporary) alliances and neutral positioning.

Unquestionably, the war has forced many heads of state and business leaders to reassess their partnerships with Russia. And sanctions create dividing lines between countries. But neither the emergence of nationalist leaders around the globe, nor COVID have diminished the need for global trade, and neither will the war in Ukraine. Global trade set a new record in 2021 at $28.5 trillion. Supply chains are more complex than ever, which makes them vulnerable in times of crisis. And a reassessment of just-in-time supply chains is overdue. But a complete reversal of the global interdependencies that have been long established is very unlikely.

This is particularly true in commodity sectors. Agriculture, minerals, metals, and energy are produced where natural resources allow for it, and they are shipped where they do not. The emerging trend toward renewable energy will create new commodity interdependencies, but it will not enable most of the world to retreat into isolation.

The Ukraine-Russia war will undoubtedly have long-lasting and far-reaching implications. But an unwinding of global supply chains and world markets is unlikely to be one of them.

Macro Economic Outlook

ENGINEERING A SOFT LANDING WILL BE DIFFICULT

By Dan Kowalski

The transition from an easy money economy to an inflation-fighting one is happening now, but we're only beginning to see the effects. The economic fundamentals are still roaring — the unemployment rate is essentially back to its pre-pandemic level, consumers are spending, and wages are rising. But consumer dollars are going less far, and the Federal Reserve is determined to tame inflation, no matter the cost.

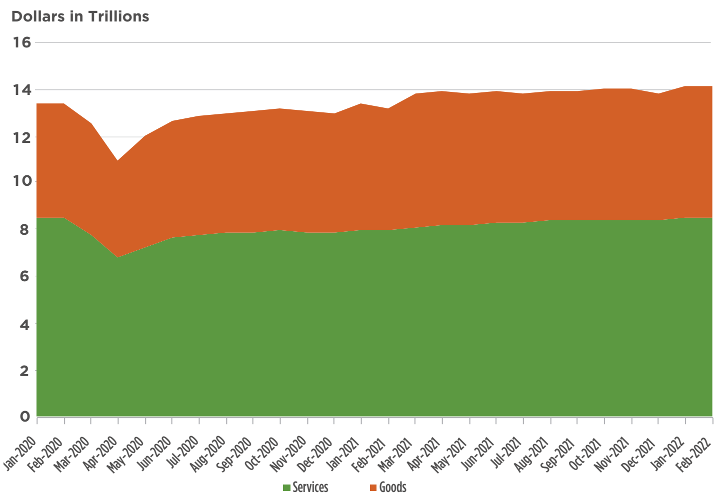
The bad news over the medium term is that the Fed has never avoided bringing on a recession when inflation has exceeded 5%. That has triggered the now robust discussion about a soft or hard landing, and expectations are migrating to the latter. For now, things look ok. There is still huge pent-up demand for services and excess savings from the pandemic are still in the trillions of dollars. Indicators point to rising consumer concerns but they are still willing to spend. Except when consumers do spend, their purchasing power is 2.7% lower than it was a year ago, and has been trending lower since late 2020. Wages are not keeping up with inflation.

Consumers are ramping up their use of credit cards to make up the difference, but with interest rates rising, that is a short-term solution. The only real solution to loss of dollar power is to tame inflation. To do that, the Fed is dependent on two things: higher rates cooling demand and workers returning to the labor force. Both of those will be challenging. Getting supply and demand to a better balance will be tricky for a couple reasons. First, supply is still being constrained by the effects of COVID. The current

1 Consumers' purchasing power is 2.7% lower than it was a year ago and wages are not keeping up with inflation.

2 The only real solution to loss of dollar power is to tame inflation.

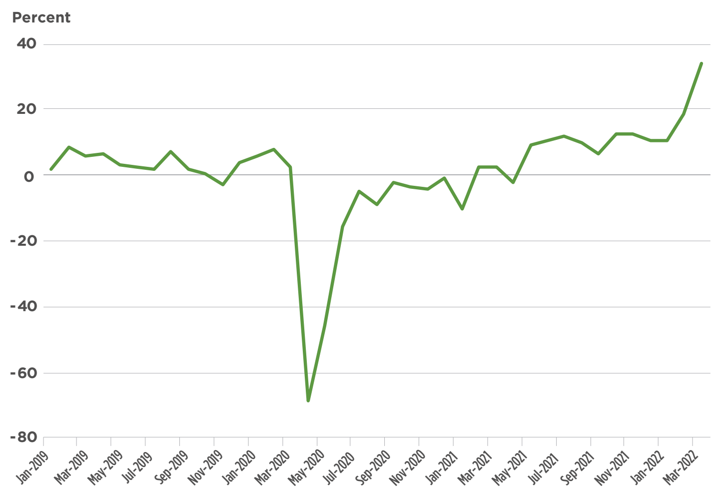
EXHIBIT 1: **Real Personal Consumption Expenditures**



Source: Federal Reserve Bank of St. Louis

EXHIBIT 2: **Consumer Revolving Credit Use**

Percent Change at Annual Rate



Source: Federal Reserve Bank of St. Louis lockdowns in China demonstrate that we are at least months, and probably years away from supply chains healing from the pandemic. Second, cooling demand will probably take more Fed action than most currently expect. While interest rates are rising, financial conditions are still quite loose relative to the level of inflation. Real (inflation-adjusted) rates remain deeply negative, maintaining a stimulative effect on the economy.

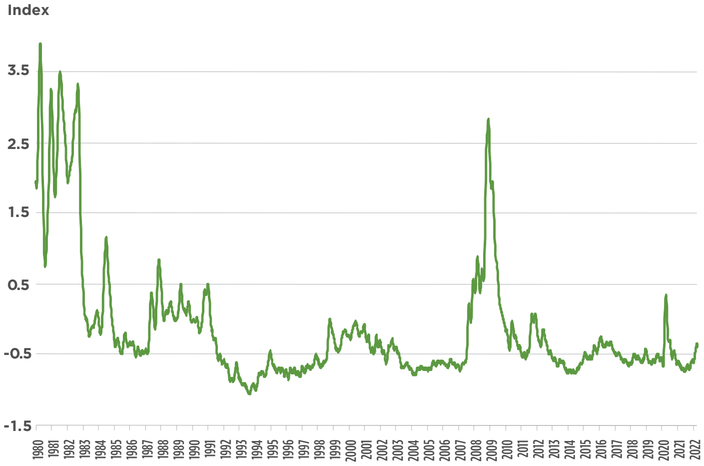
And while workers have been trickling back into the labor force, a recent survey suggests that about three million people will remain on the sidelines indefinitely. The labor shortage could be a longer-term issue than many have predicted.

Whether or not inflation has peaked, it should begin to decline by this summer. Base effects will play an increasing role in coming months, and the rise in commodity prices since the start of the Ukraine-Russia war should moderate. Trucking rates have come off their highs and some transportation bottlenecks have been easing.All of these are positive signs and likely signal that inflation is near its ceiling.

The persistence of elevated inflation through the remainder of the year, however, along with meaningful negative global effects of the Russia war, will trim U.S. GDP growth this year. Expectations are now in the 3% range, but risk is weighted to the downside as the Fed eyes multiple 50 basis point hikes and will likely begin shrinking its balance sheet in May. In total, we expect the Fed to raise rates by 250 basis points in 2022. But we won't be surprised if they need to do more.

3 In total, we expect the **Fed to raise rates by 250 basis points in 2022.**

EXHIBIT 3: **National Financial Conditions Index**

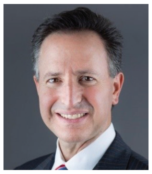


Source: Federal Reserve Bank of Chicago

Note: Positive values indicate tighter-than-average financial conditions, negative values indicate looser-than-average financial conditions.

Grains

RUSSIA, UKRAINE ARE DRIVING GLOBAL GRAIN TRADE



By Kenneth Scott Zuckerberg

The unprecedented levels of Q1 commodity price volatility stemming from Russia's military invasion into Ukraine has reignited the grain price rally of 2020-21. The Black Sea region is a major exporter of grain and fertilizer and the war's timing (so near to the normal planting calendar) creates significant risk for crop production and grain exports. Planted acres of wheat, corn, barley, and sunflowers will be fewer, the result of damaged infrastructure, losses of agricultural equipment and machinery, and labor shortages. Moreover, interrupted supplies of fuel, fertilizer, seed, and crop protection chemicals are sure to negatively impact yields.

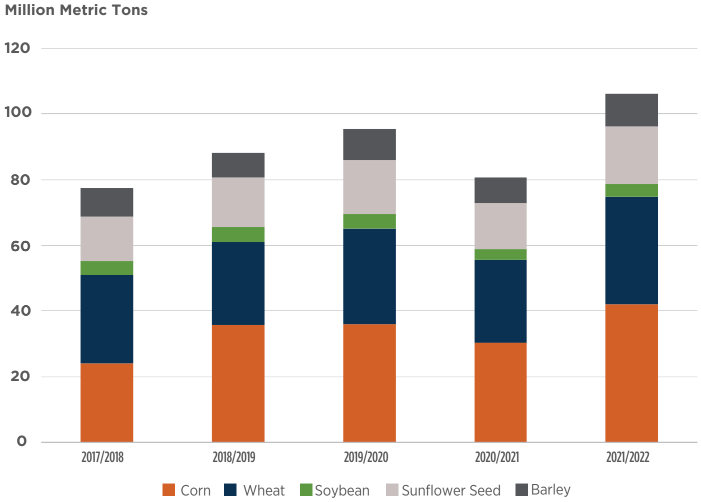
Due in no small part to uncertain Ukraine and Russia export availability, the U.S. grain sector's export activity for the quarter was very good (except for wheat) based on daily flash export sales reports and inspection activity:

- Soybean oil, sorghum, and soybeans (to China and unknown destinations), were especially strong, and are running 20%, 16%, and 7% respectively ahead of the seasonal pace needed to reach USDA's current 2022-23 export forecast.
- Corn exports were comparatively weaker but still 4% ahead of the pace needed to meet USDA's forecast.

1 Russia's invasion of Ukraine roiled global grain trade and contributed to unprecedented volatility in wheat, corn, and soybeans during Q1.

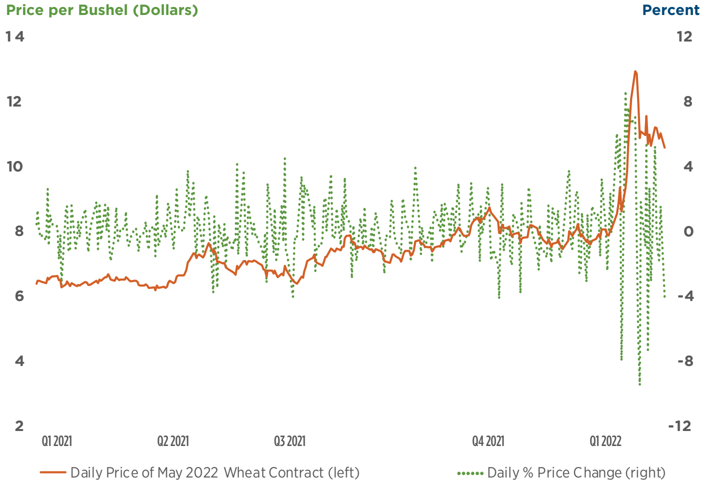
2 Amid disruptions in planting, harvesting, input application, labor, and transportation, the market could be volatile for multiple years.

EXHIBIT 1: **Ukraine Crop Production Mix**



Source: USDA Foreign Agriculture Service

EXHIBIT 2: **Wheat Prices and Volatility**



Source: BarChart.com

- Wheat exports have been lackluster due to limited supplies and high prices, which make U.S. wheat less competitive globally. We believe that wheat exports could continue to be slow, as recent USDA crop progress reports note the recent drought may reduce expected yields for winter wheat.

The quarter ended with continued grain price volatility following USDA's annual Prospective Plantings and Grain Stocks reports published on March 31. Compared to average trade estimates immediately prior to March 31, the report showed shortfalls of 2.5 million acres for corn and 400,000 acres for wheat (bullish price signal) and 2.3 million more than expected soybean acres (bearish price signal) (Exhibit 3).

The unexpectedly large increase in soybean acres relative to trade expectations suggests that the parabolic rise in fertilizer prices has negatively impacted farmer psychology to the point where their concerns about managing risk and cash flow outweigh the opportunity to capture potentially higher profits from corn production. The modest shortfall in wheat acres relative to pre-report expectations suggests that U.S. farmers may not see as strong an opportunity for exports next year, despite global supply-demand imbalances stemming from the Russian/Ukraine conflict.

3 Grain prices continued to zig-zag into quarter-end. USDA's Prospective Plantings report had bullish implications for corn and wheat, and a bearish surprise for soybeans.

4 For only the third time in history, U.S. farmers are expected to plant more acres of soybeans than corn: 91.0 million vs. 89.5 million.

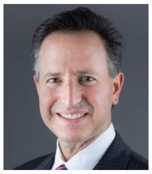
EXHIBIT 3: **Prospective Plantings Report Variance Analysis**

Acres in Millions	2021/2022 Final Figures	2022/2023 Estimates USDA Outlook Forum	2022/2023 Trade Average Estimates	USDA 3/31/2022	Variance vs. Consensus
Corn	93.36	92.00	92.00	89.49	-2.5
Soybeans	87.20	88.00	88.73	91.00	2.3
Wheat	46.70	48.00	47.77	47.35	-0.4
Subtotal	**227.26**	**228.00**	**228.50**	**227.84**	**-0.7**

Source: USDA and Reuters

Farm Supply

FERTILIZER PRICES HIT DECADE HIGHS



By Kenneth Scott Zuckerberg

While we predicted continued fertilizer inflation and crop protection chemical shortages into the first quarter, the Russia/Ukraine war has pushed prices to decade highs. Russia, Ukraine, and Belarus are usually major exporters of nitrogen, phosphate, and potash fertilizers and natural gas (the key feedstock for nitrogen fertilizers), but are now thwarted by the associated port/production shutdowns and export restrictions.

Regardless of when a cease-fire occurs, we now believe that fertilizer prices could remain "higher for longer." Long-term stiff financial sanctions on Russia are likely and although fertilizer is exempt from the sanctions, severe restrictions on access to financial and transportation networks will hobble Russia's exports. Also, as leverage, Russia could withhold fertilizer exports intended for key growing regions (such as Europe, Brazil, and Argentina).

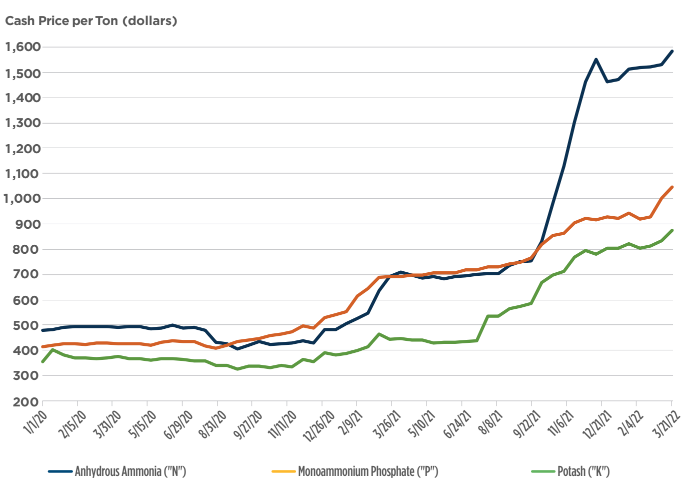
Though drought remained ever present in the first quarter, March concluded with rains and cooler temperatures across most of the U.S. heartland. Corn planting in Texas is ahead of the five-year average and Louisiana also is making good planting progress. Several extension services' crop budgets suggest margins for corn will be both positive and superior to soybeans this planting season, even with the higher anhydrous and urea fertilizer prices (both are used for corn but not soybeans). A similar CoBank analysis for Nebraska and Northern Kansas found a similar outcome for irrigated acreage, but for non-irrigated acreage, soybeans are more profitable.

1 Prices for major fertilizers increased 8%-13% in Q1, and most gains came after Russia invaded Ukraine.

2 While most ag retailers have adequate nutrient supplies this spring, that may not be so this fall and spring 2023.

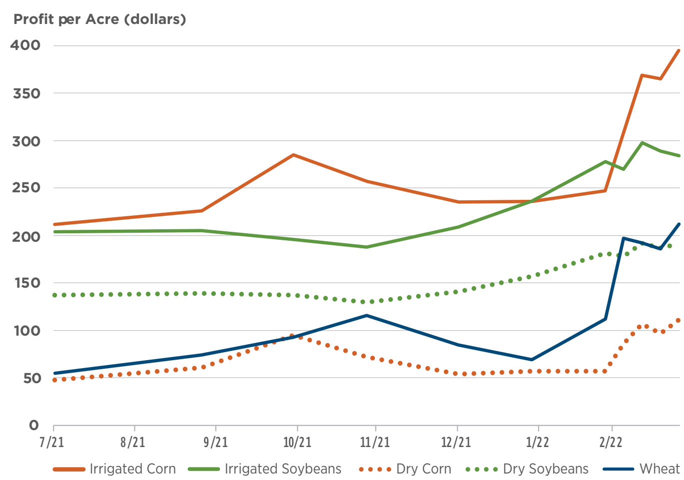
3 Corn is still expected to exceed soybeans' budgeted average margins, despite the steep rise in nitrogen fertilizer prices.

EXHIBIT 1: **Comparison of Major Granular Fertilizer Costs in Iowa**



Source: USDA-AMS

EXHIBIT 2: **Comparative Expected Crop Farmer Margins in Nebraska and Northern Kansas**



Source: Central Value Ag

Biofuels

NATURAL GAS PRICES MAY CUT INTO ETHANOL MARGINS

By Kenneth Scott Zuckerberg

Q1 was generally favorable for the U.S. ethanol complex, with reasonably steady production at 15.8 billion gallons annualized (near-pre-COVID levels). Operating margins averaged $0.38/gallon for the full first quarter vs. $0.27/gallon in 2020 and 2021.

Ethanol producers have maintained positive margins since the outbreak of the Ukraine war, but the situation may reverse in 2Q. Ethanol prices rose 8% from the day of the invasion (Feb. 24) through March 31, exceeding the 5% increase in corn feedstock costs. In that period, U.S. natural gas prices increased 19%, driven largely by increasing U.S. liquefied natural gas exports and a sluggish domestic production response. Because ethanol refineries generally use natural gas-fueled boilers, producer margins will suffer if U.S. natural gas prices remain at these unusually high levels.

On the flipside, two recent developments are providing a tailwind in the short-run. First, U.S. ethanol exports to Brazil may see a near-term "relief rally" based on some late quarter news by USDA: Brazil may suspend its 18% tariff on U.S. produced ethanol fuel until the end of 2022. The tariff was set to expire at the end of 2020 but Brazil kept it, and U.S. ethanol exports to Brazil in 2021 fell by 59% to 76 million gallons. Brazil mandates a 25% ethanol blend in retail gasoline and may temporarily increase its imports of U.S. ethanol to help reduce customers' costs. Second, to help lower gas prices for U.S. consumers, the Biden administration announced it would suspend a federal rule and permit the sale of higher ethanol blended gasoline during the summer months. Moving from 10% ethanol blend to 15% would increase demand for ethanol and thus corn, all else being equal.

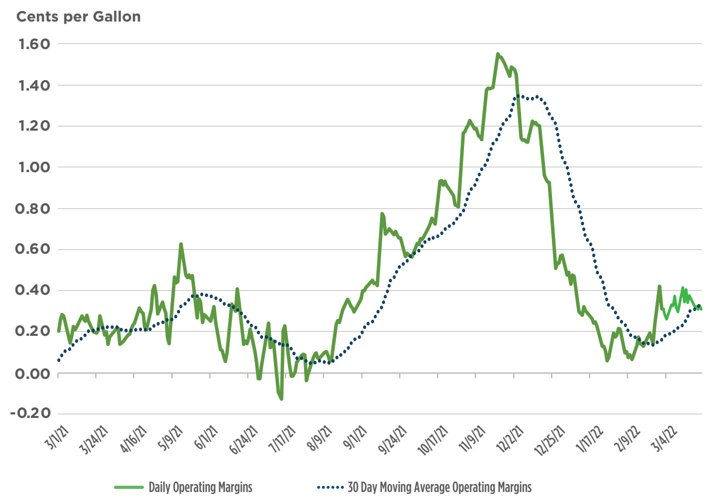
1 First quarter ethanol production was fairly steady at 15.8 billion gallons, slightly exceeding the five-year average.

2 Ethanol refineries fuel their boilers with natural gas, so high U.S. natural gas prices are bad news for margins.

EXHIBIT 1: **U.S. Fuel Ethanol Production**

Source: U.S. Energy Information Administration (EIA)

EXHIBIT 2: **Fuel Ethanol Plant Operating Margins**



Source: Iowa State University

Animal Protein

ESCALATING FEED COSTS STIFLE GROWTH TREND DESPITE STRONGER PRICES

By Brian Earnest

Livestock and poultry producers began 2022 by facing numerous challenges. Drought concerns for Western cattle feeders, higher feed costs on reduced South American output, a labor supply crunch, and higher energy prices all suggested an expectation of moderately lower output despite rising meat prices. Feeding challenges have most recently been exacerbated by the risk to global grain stocks due to Russia's invasion of Ukraine. However, prices for livestock, meat, and poultry have all continued higher, promoting cautious optimism for producers.

With the exception of beef, protein output has failed to advance in the early stages of 2022. Labor continues to play a role in reduced pork production as 2022 throughput is down 6% YoY and 7% below 2020 levels. Weather issues complicated cattle processing early in January, but the weekly slaughter has picked up pace since then and is now up 1% YoY. Likewise, broiler harvest has been advancing moderately, up 1% YoY, but still remains 3% below 2020 levels.

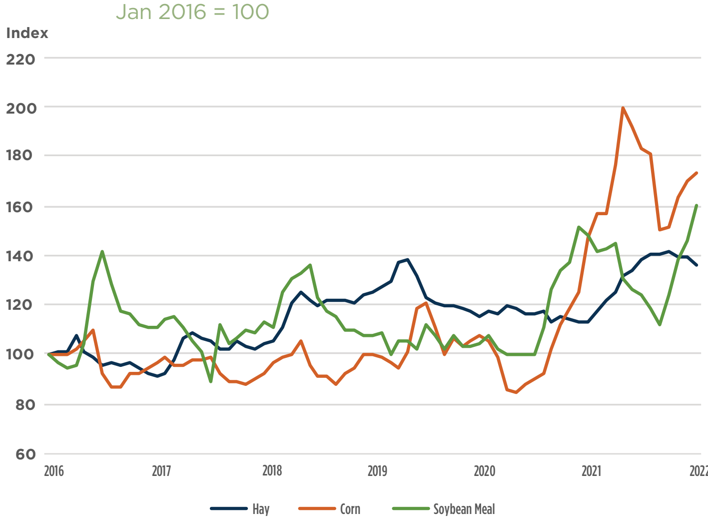
Demand from the food service sector finally looks to be finding consistency after recovering from the omicron wave. And as grilling season begins, robust demand is expected to continue pressuring supply despite average retail meat and poultry prices rising 10% in the 12-month period ending February. U.S. protein export values jumped by 22% during 2021 and while China's imports of U.S. pork have slowed down, we expect exports to be strong again this year as Mexico continues to buy record levels of pork and China keeps buying more U.S. beef.

1 Drought conditions for Western cattle feeders and tightening feed supplies increase risk to animal protein output from now on.

2 As COVID restrictions ease, wholesale markets remain volatile as retail grocery and food service battle for limited supply.

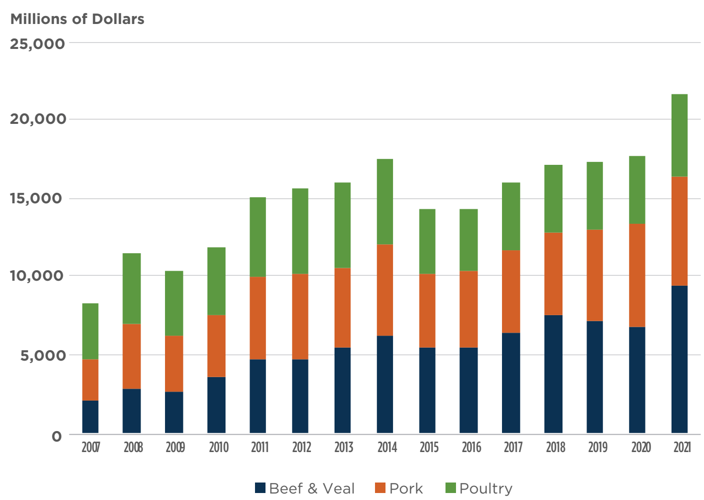
EXHIBIT 1: **Animal Feed Cost Index**

Jan 2016 = 100



Source: USDA

EXHIBIT 2: **U.S. Protein Export Value**



Source: USDA-FAS

Chicken

Led by tight supplies and strong demand, broiler meat values took off at the start of 2022. Values climbed 19% from Q4 2021 and are up 57% YoY. Chick placements have been trending slightly lower YoY, despite the broiler layer flock growing by about 0.5% YoY. Broiler harvest is down about 2.5% from peak levels reported in early 2020, suggesting excess plant capacity. With labor still tight and layer productivity remaining dampened, meaningful growth in front end supplies is not likely to occur before 2023. As a result, we expect prices will remain firm throughout the summer, continuing on a prolonged path of profitability despite rising feed costs.

Chicken prices have firmed, with limited downside from historically high levels:

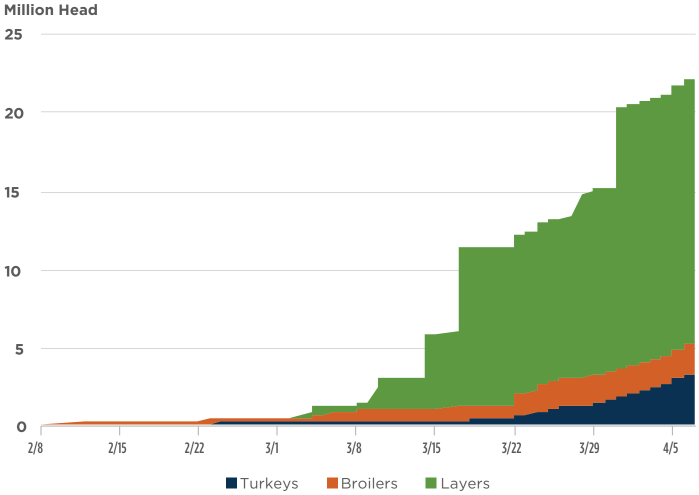
- Boneless/skinless breasts are up $1.25/lb. YoY and have risen $0.75/lb. since the year began.
- Export leg quarters are down about $0.05/lb from where they were for much of 2021, but up $0.05 from the five-year average of $0.40/lb.
- After starting the year in the $2.70s, wing prices lost momentum and are now hovering just above $2.00/lb. which is still a $0.50 premium to the five-year average.

After minimal impact over the past five years, Highly Pathogenic Avian Influenza (HPAI) has again been reported in U.S. commercial poultry flocks this year. It has claimed more than 20 million head so far, the largest total since 2015. Losses to date have primarily been for turkey and table egg producers. While there has been minimal disruption to broiler supply, export sales are at risk, with destinations such as China imposing import bans from specific states where outbreaks have occurred.

1 Stagnant chick placement levels will temper broiler supply growth through the second quarter and has prompted a $1.25 premium for breast meat prices.

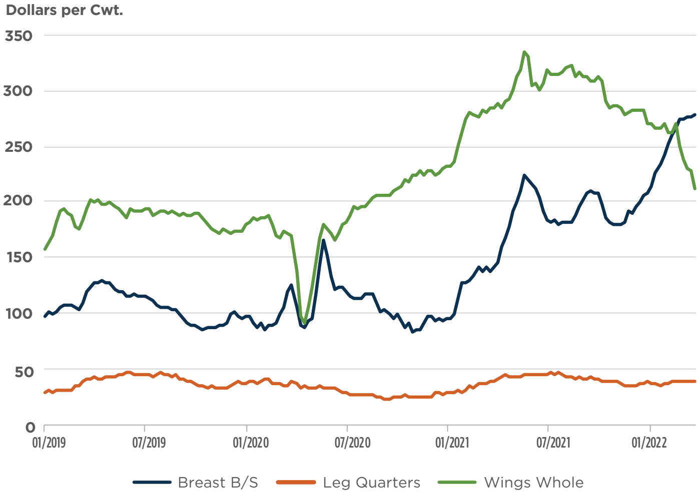
2 The spike in breast meat prices has paved a path of profitability through the second quarter despite higher feed costs.

EXHIBIT 3: **Commercial Flock Depopulation for Highly Pathogenic Avian Influenza**



Source: APHIS

EXHIBIT 4: **USDA Chicken Prices**



Source: USDA AMS

Beef

Domestic and export demand for U.S. beef has surged over the last 24 months, supporting prices through the first quarter. Slaughter capacity appeared maxed out in 2021, which limited the sector's ability to effectively work through market-ready cattle. However, following weather disruptions to start 2022, weekly slaughter rates have been impressive lately. February slaughter rates were the strongest since 2000, pushing cumulative harvest up 1% YoY and up 3% from 2020.

With throughput improving, demand for cattle is improving. However, higher feed prices and prolonged drought conditions remain a concern for ranchers and cattle feeders, which is encouraging feedlot placements. During February, net placements in feedlots were up 9% YoY, leading to a record on-feed total, up 1% from a year ago per USDA's latest Cattle on Feed Report.

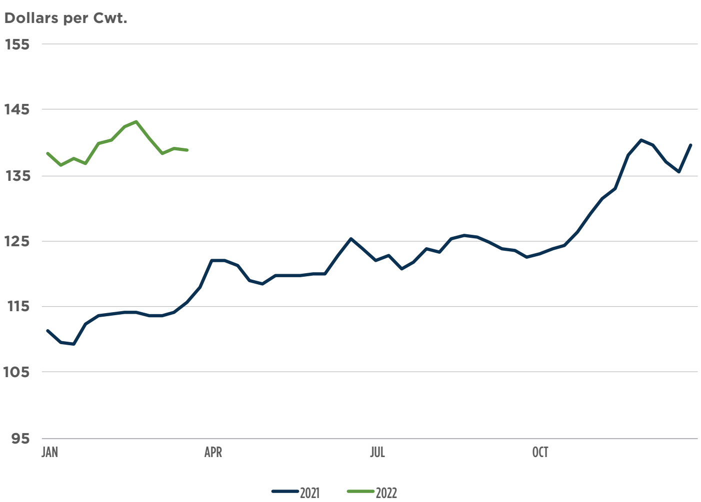
Given the historically large cattle totals in feedlots, one would expect that live cattle prices would be heading lower. However, as the industry diligently worked through a massive backlog of cattle in the back half of 2021, prices have been up more than 20% YoY through the first quarter. We expect higher values as seasonal interest grows.

Trade has become a larger part of the balance sheet in recent years. Increased exports to Japan, Korea and China contributed to a 17% increase in U.S. beef exports in 2021. We expect exports to remain elevated in 2022, contributing to higher cattle prices for U.S. producers. Overall, domestic per capita beef consumption rose by nearly one pound in 2021 and is only expected to drift moderately lower this year because of shrinking supplies.

1 Cattle on feed were record large on March 1. But beef supplies are expected to be slightly lower this year, resulting in higher prices amidst strong demand.

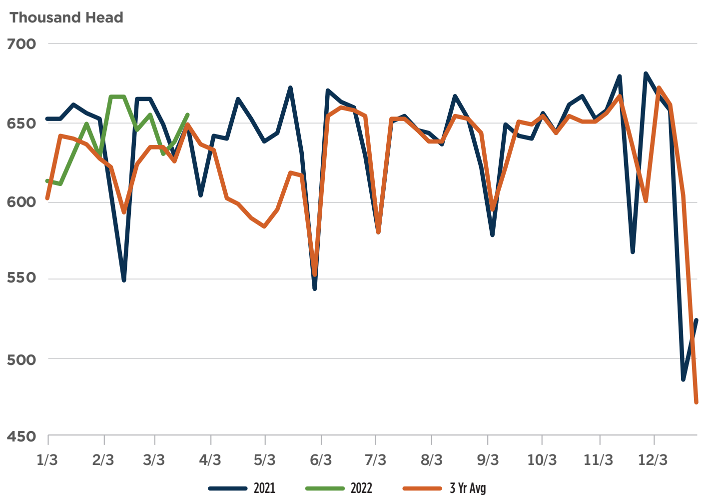
2 Despite these expectations, cattle prices were up 20% YoY during Q1 overall.

EXHIBIT 5: **Slaughter Steer Prices**
Market Weighted Average, Weekly



Source: USDA, LMIC, CoBank

EXHIBIT 6: **Weekly Cattle Slaughter**



Source: USDA-AMS

Pork

2021 was a phenomenal year for pork. At one point, live hog value as a percent of retail pork value (the portion that the producer received from prices paid by consumer) was nearly 35%, a level not seen since the highs in 2014. Fundamentally, this year appears set to return similar if not better results, as retailers scramble for affordable protein options and exports continue to pressure supplies.

While feed costs were up 17% YoY for hog farmers, Iowa State University estimates that farrow-to-finish operations posted a $21.36 per head profit for the month of February, up $15.73 per head YoY and a $24.24 per head gain over the prior month. Hog values have gained about $8/cwt. since February, helping to offset escalating feed costs.

USDA's March 1 Quarterly Hogs and Pigs Report was moderately bullish but continued in line with the last report in terms of implications for the market. The U.S. hog inventory total was down 2.3% YoY, which was more than analyst expectations and the lowest total since 2018 for the same period. Of note, the breeding portion of inventory total was down nearly 2% YoY, a five-year low of 6.1 million head, which will limit production growth in late 2022 and into 2023.

From a trade standpoint, at least near term, U.S. exports remain robust, but with China's hog prices plummeting to start 2022, China's share of export sales has declined. Mexico remains a key destination, and took 43% of U.S. exports during January. With EU pork production struggling, and China hogs in liquidation phase, we expect global opportunity will remain robust.

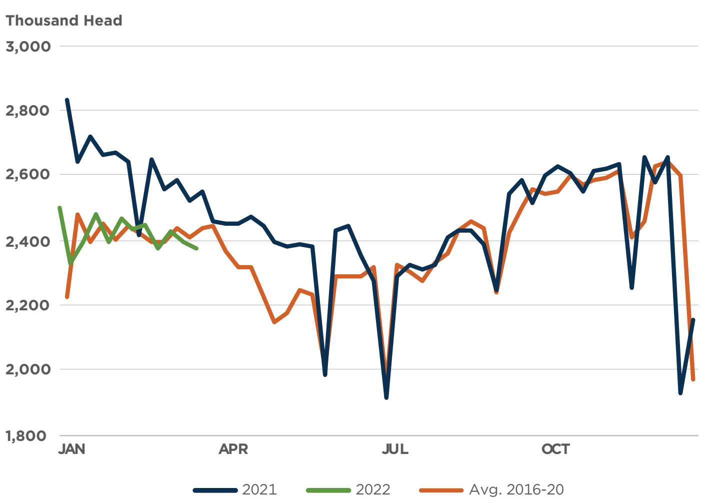
1 Waning domestic hog supplies are supporting hog prices, which have already eclipsed $100/cwt. this year.

2 U.S. pork exports to Mexico were at a record high in January, accounting for 43% of all U.S. pork exported.

EXHIBIT 7: **CME Hog Values**

Source: CME Group

EXHIBIT 8: **Hog Slaughter**
Federally Inspected, Weekly



Source: USDA AMS

Dairy

COST INFLATION HAMPERS U.S. DAIRY HERD EXPANSION

By Tanner Ehmke

Production

Milk supplies tightened further last quarter as rising production costs continued to burden U.S. dairy producers. Milk production in February fell to 17.5 billion pounds, down 1% YoY with the Northern Plains the only region reporting an increase. Class III milk futures rose 25% for the quarter to end March at $23.85/cwt, while Class IV milk futures also climbed 25% to $24.84/cwt.

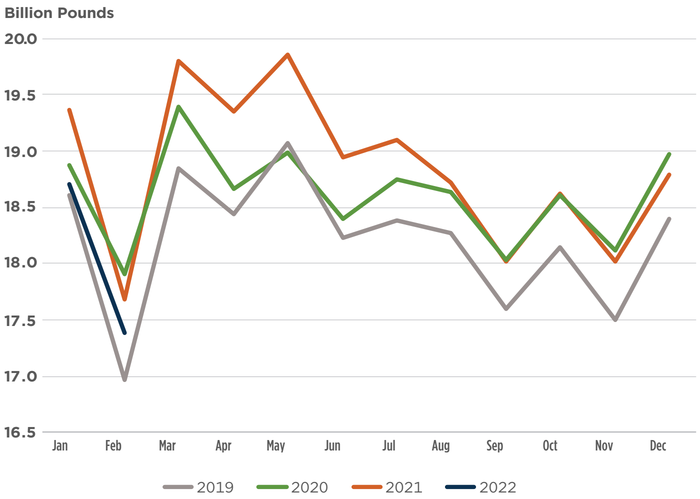
High milk prices have stopped the contraction of the U.S. dairy herd. Cow numbers grew modestly in February to 9.37 million cows, stopping an eight-month slide in herd size. However, the U.S. dairy herd size is still smaller than a year ago after the loss of more than 100,000 cows since last summer. The number of dairy farms continues to contract, now numbering less than 30,000. Historically high prices for feed, labor, and replacement heifers remain powerful headwinds pushing against expansion of the U.S. dairy herd. Heifer inventories are especially tight and at decade lows.

At its Ag Outlook Forum in February, USDA predicted only modest herd growth in 2022 as producers grapple with ever-growing cost pressures. Rather than add more feed-consuming cows while prices for corn, soybean meal, and hay are high, producers are instead focusing on improving productivity of the existing herd and culling or replacing low-performing cows. Persistent drought conditions across the western half of the U.S. portend another tight year for premium alfalfa — and another year of historically high hay prices. Surging grain prices resulting from the Russian invasion of Ukraine in an already tight year for world grain inventories hint at even higher feed costs in 2022.

1 High feed, heifer, and labor costs continue to constrain U.S. dairy herds. Producers are focusing instead on improving productivity of their existing herds.

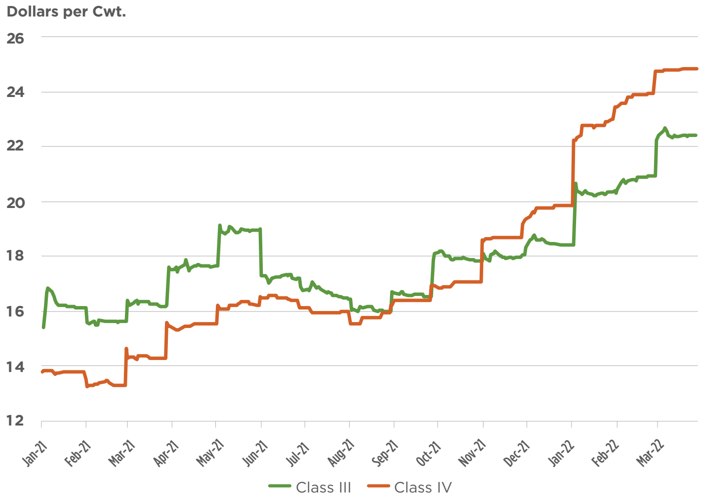
2 Mailbox prices have been boosted by higher dairy product prices, particularly butter and nonfat dry milk, as inventories of both are dwindling.

EXHIBIT 1: **U.S. MILK PRODUCTION**



Source: USDA-NASS Milk Production

EXHIBIT 2: **MILK PRICES**



Source: CME Group

These cost pressures, however, are an international problem, and milk production among exporting countries has been declining since September 2021. In New Zealand, milk collections in February fell 8% YoY on exceptionally dry pasture conditions while the EU dropped 0.7% YoY. If the lower production and higher prices hold for the remainder of 2022, dairy farms should enjoy solid profitability this year.

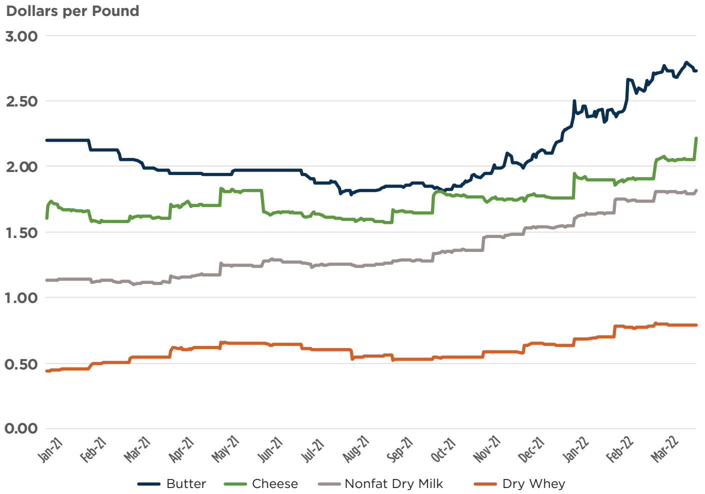
Processing

Dairy processors continue to struggle with extremely tight labor and some dairy processors and handlers report that severe labor shortages are impacting normal operations. Although automation and technology may solve labor issues in the long term, lead times on acquiring new equipment are 18 to 24 months. The struggle to quickly automate in a tight labor market is slowing the processing pace. The ongoing shortages of truck drivers and rising fuel costs are additional constraints. Processing plants have not been able to operate at full capacity in regions with declining milk collections, particularly U.S. manufacturers of butter and nonfat dry milk.

Butter and nonfat dry milk prices continued their lofty ascent last quarter on slowed production and strong exports. Butter inventories in cold storage fell 25.8% YoY in February, while cheese stocks rose a modest 2.3% YoY. However, as the spring flush commences and tightness in milk supplies eases, processors anticipate dairy product prices will peak and allow for steadier production schedules. The strong international demand for dairy products amidst falling global supplies, though, continues to pull on U.S. exports, signaling strong support for dairy product prices in the months ahead. Chinese demand will be a central focus in the quarter ahead as policy makers for the world's largest importer of commodities struggle to contain escalating food prices. Efforts to stockpile commodities may translate into new demand for U.S. dairy products.

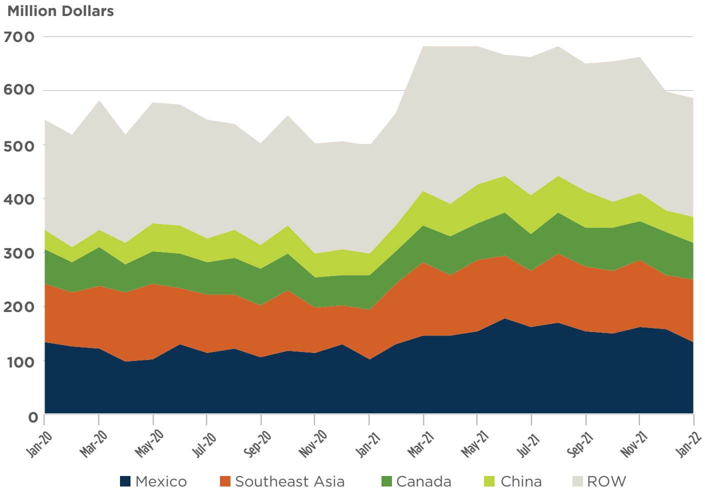
3 Processors continue to struggle with tight labor supply and lack of truck drivers, which is constraining processing capacity and product delivery.

EXHIBIT 3: **DAIRY PRODUCT PRICES**



Source: CME Group

EXHIBIT 4: **U.S. DAIRY PRODUCT EXPORTS**



Source: USDA-FAS Global Agricultural Trade System

Cotton, Rice and Sugar

COTTON PRICES HINGE ON WEST TEXAS WEATHER, RICE MISSES OUT ON BROAD COMMODITY RALLY

By Rob Fox

By Tanner Ehmke

Cotton

Cotton prices were initially slow to react to the invasion of Ukraine, but nearby futures did eventually climb to $1.40/lb, the highest since 2011. Although competing crops, oil prices, and global GDP expectations will factor into cotton prices, we believe the weather will be the primary driver of U.S. cotton prices in 2022 — specifically the rainfall levels in West Texas. West Texas cotton crops, concentrated in the southern Texas panhandle, accounts for roughly 35% of total U.S. production. And the U.S. provides more than 40% of global cotton exports.

Currently most of West Texas cotton ground is in what the National Oceanic and Atmospheric Administration defines as extreme or exceptional drought, characterized by major or widespread crop losses. About 50%-60% of acreage in the region has some degree of irrigation capabilities. Most farmers rely on rainfall to supplement their irrigation pumps, but they have received less than half of normal rainfall thus far in 2022 and water tables are lower and pumping costs will be higher.

Annual rainfall was about normal in 2021, but it fell almost entirely in the May-October growing season. This resulted in an abandoned acreage rate of 17%, well below the decade average of 29%. Yields too, were right on trend (695 lbs/acre), which is very good given the low abandonment rate.

The difference between poorly timed rains in 2020 versus adequate rain in 2021 in West Texas led to a 3MM bale increase in cotton production, which is equivalent to 6.5% of all global exports.

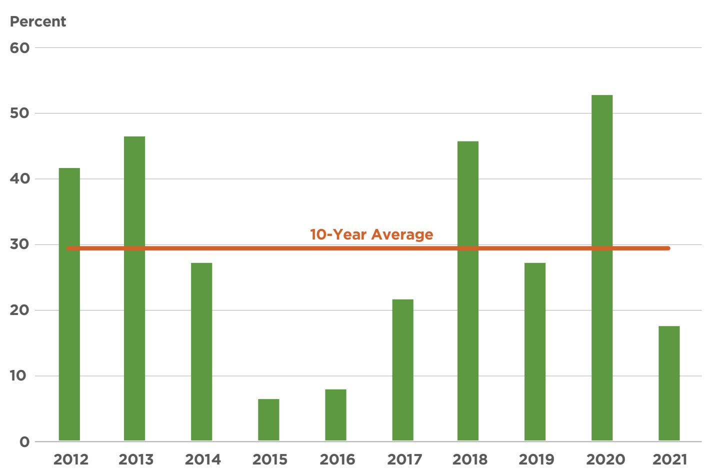
1 West Texas rain will play a major role in determining 2022 global cotton prices.

2 U.S. rice acreage is expected to fall yet again in 2022 amid competing crops and ongoing Western drought.

Rice

As more acres shift to soybeans, USDA's Prospective Plantings report predicts 2022 long-grain rice planted acreage in the U.S. to fall to 1.94 million acres, particularly in the chief rice-producing state of Arkansas. For the first time since 2007, acres planted to long-grain rice are expected to decline for two consecutive years as world rice prices remain tepid compared to other crops. Indian rice, which is highly subsidized by the state, continues to saturate export markets. Fears of global wheat shortages following

EXHIBIT 1: **Abandoned Cotton Acres in Texas**



Source: USDA-NASS

Russia's invasion of Ukraine, though, raise concerns of governments protecting rice which could eventually provide price support.

USDA also predicted medium- and short-grain rice planted acreage to fall for the third consecutive year to 509,000 acres, the lowest on record. California rice prices have touched 13-year highs amid ongoing drought.

Sugar

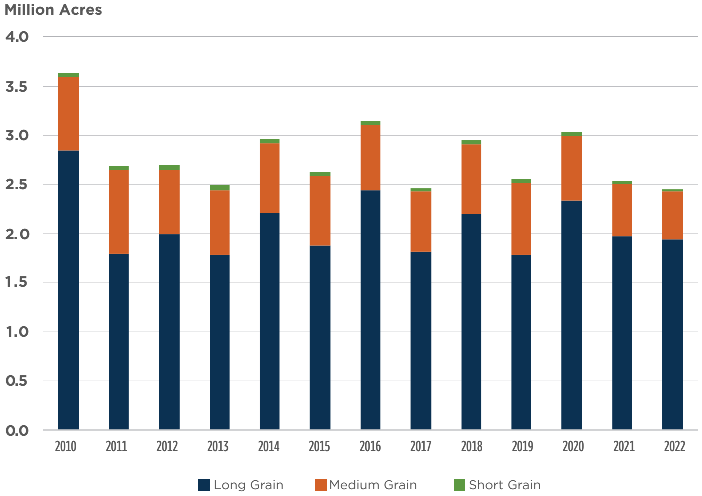
The broader commodity market mayhem caused by the invasion of Ukraine has left sugar prices relatively unscathed. World sugar prices have increased by only 6% since the invasion in late February, while the U.S. #16 raw futures contract barely budged, moving up about one cent to 37 cents/lb.

To the consternation of sugarbeet growers and sugar program administrators, refined cane sugar's 10-cent premium continues unabated. Historically, cane sugar only commanded a 2-3 cent price premium over beet sugar. We believe this is primarily a result of food manufacturers using the "pure cane sugar" term as a marketing angle — other sweeteners, particularly high fructose corn syrup, have fallen out of fashion with consumers looking for natural and "healthy" options. Cane sugar prices are also being supported by tighter supplies due to modestly lower Louisiana crop yields (on a refined basis), perhaps as a result of Hurricane Ida last August.

With the relatively weaker beet sugar prices, total crop payment to beet growers is expected to be in the $50/ton range. Over the past two decades, sugarbeet prices have not kept up with competing crops (corn, soybeans, and wheat), but yields have increased by about 35% during the same timeframe. This is in part due in large part to the introduction of genetically modified seed in 2007. As a result, on a per acre basis, sugarbeet revenues have held up well relative to other crops.

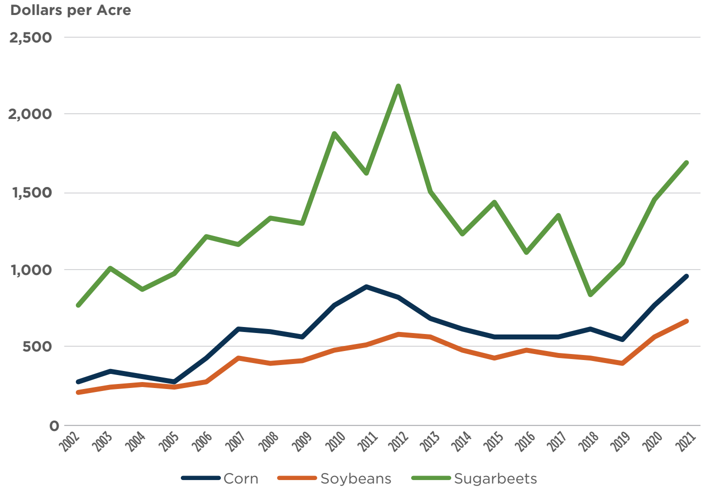
3 Increasing yields are keeping sugarbeet crops competitive.

EXHIBIT 2: **U.S. Rice Planted Acreage**



Source: USDA-NASS Prospective Plantings

EXHIBIT 3: **Gross Crop Revenue in Northern Plains**



Source: USDA-NASS

Specialty Crops

WESTERN GROWERS FACE ANOTHER YEAR OF LIMITED WATER FOR IRRIGATION

By Tanner Ehmke

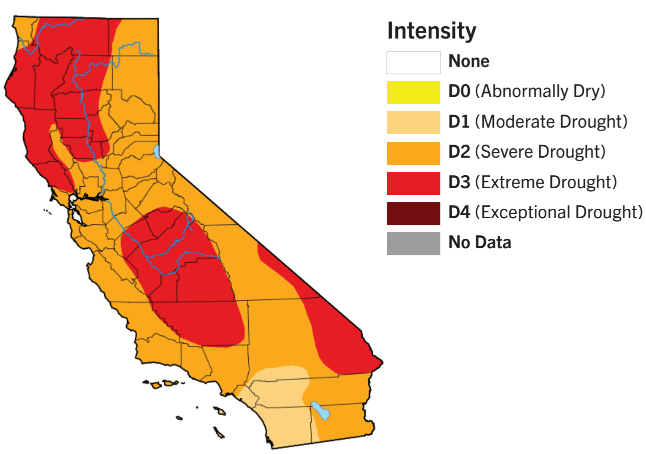
The drought plaguing the Western U.S. intensified last quarter with January, February, and March the driest on record following record snowfall in December. Snowpack in the Sierra Nevada mountain range also melted faster than normal in the off-season, and the California Department of Water Resources reports snowpack at 38% of average as the wet season comes to a close. Growers are now likely facing a year with no state water allocations amid historically low reservoir levels. Row crop producers who do not have sufficient groundwater for irrigation will likely fallow fields, though some will benefit from indemnity payments on no-plant crop insurance. Those with groundwater reserves may profit by selling water to growers with permanent crops like fruits and tree nuts. Record high prices for processing tomatoes, pima cotton, and potatoes may retain steady acreage for those crops.

Freezing temperatures in February further reduced prospects for the 2022 California almond crop. Temperatures fell below freezing for several hours just as almond trees were blooming. Freeze damage was greatest in the northern Central Valley with temperatures falling to record lows. Early estimates put frost damage at roughly 10%. Fortunately, walnuts and pistachios saw minimal frost damage. Nut prices have been hurt as transportation and logistics issues slow exports, raising the likelihood of record carryout at the end of the marketing year on July 31. Total almond exports for the current marketing year are down 21% YoY; shipments to China

1 Following a record dry January, February, and March, California specialty crops growers are bracing for third year of drought.

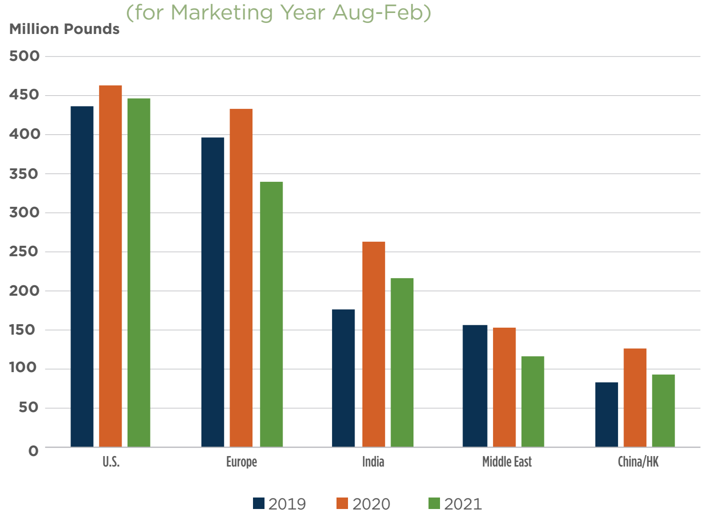
2 Tree nuts' slow shipping pace amid snarled logistics is building up inventories, raising concerns of a record carryout at the marketing season end.

EXHIBIT 1: **Drought in California**



Source: U.S. Drought Monitor

EXHIBIT 2: **U.S. Almond Shipments**
(for Marketing Year Aug-Feb)



Source: Almond Board of California

in particular are down 27% as logistical logjams have delayed deliveries past the Lunar New Year peak consumption period. Uncertainty is also growing over European demand with inflation rising for consumers there following Russia's invasion of Ukraine.

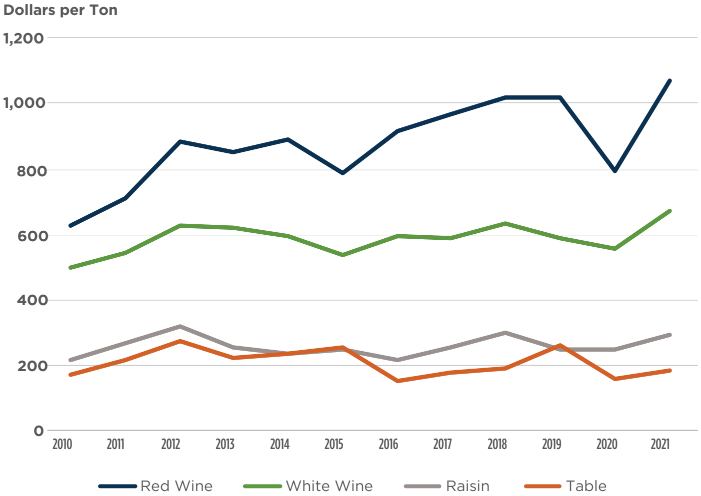
California's grape crush is rebounding from two years of poor harvests, which is lifting grape prices especially for wine grapes. Total grape crush in the state totaled 3.88 million tons last year, according to the California Department of Food and Agriculture's preliminary report, with wine grapes accounting for 3.63 million tons. While the grape crush has improved over recent years, the volume is still below the 4.0 million tons crushed in 2019 when vintners struggled with oversupply. As at-home wine consumption has increased during the pandemic and with restaurant sales rebounding, wineries are looking for fruit. Wine grape prices rose more than 20% YoY in 2021. Upward price momentum is expected to carry through 2022 as the drought raises concerns of ongoing limited grape supplies amid resilient consumer demand.

USDA estimated Florida's orange crop at a meager 41 million boxes — the smallest Florida orange crop since 1943 as the Orange State continues to struggle with citrus greening disease. Florida orange production has collapsed since peaking in 1998 at 244 million boxes. Imports of fresh pack oranges, meanwhile, continue to climb. Supply chain issues for fruits and vegetables have not been as severe since most imports are cross-border trades with neighboring Mexico. The Russia-Ukraine conflict could also divert more fruit exports from countries like Argentina and South Africa that were previously destined to the Black Sea region to the U.S., putting downward pressure on citrus prices.

3 Wine grape crush recovered modestly in 2021, but two consecutive years of low production are driving wine grape prices higher in 2022.

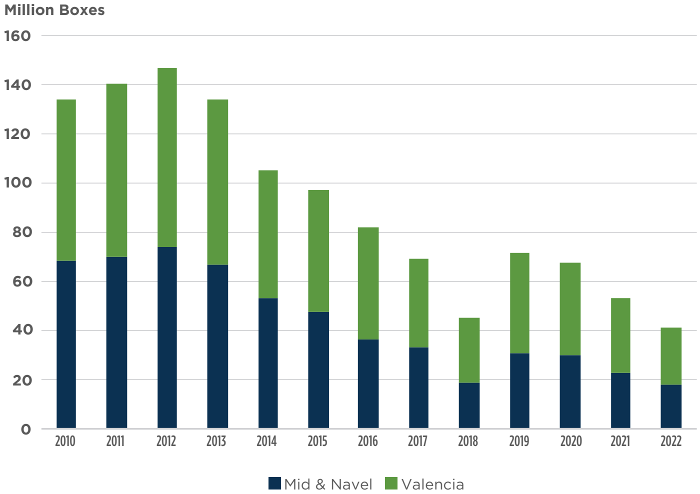
4 Florida is pinning hopes on the citrus under protective screens (CUPS) program, as citrus greening has led to the smallest orange crop since 1943.

EXHIBIT 3: **California Grape Prices**



Source: USDA-NASS California Grape Crush

EXHIBIT 4: **Florida Orange Production**



Source: USDA-NASS Citrus Forecast

Power, Energy and Water

BIDEN ATTEMPTS DELICATE REBALANCE AT THE PUMP WITH SPR RELEASE

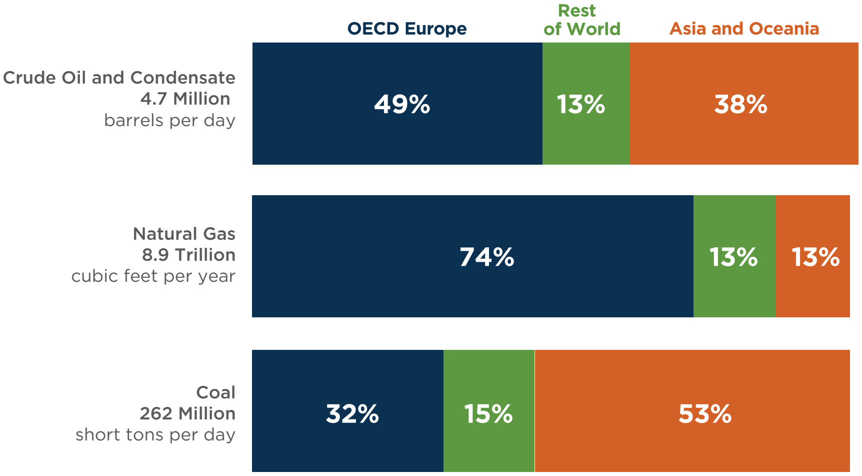
By Teri Viswanath

Americans are now facing a once in a lifetime cost-of-living shock — an oil embargo coupled with rapid inflation, a combination that hasn't occurred since the mid-1970s. Rising energy prices have been a primary driver of inflation for more than a year, accounting for roughly one-third of the headline gain. Recent international sanctions to curb the trade of Russian oil, natural gas, and coal seems to be perpetuating a longer cycle where high energy costs could keep elevating inflation pressures.

As the world's largest exporter of oil to global markets, Russia's disrupted trade may prove most relevant from a U.S. economic perspective. Early estimates suggest that as much as 3 million barrels a day (mb/d) of Russian oil production or about 3% of global production has been removed from the market. If correct, this shortfall represents the fourth largest global disruption on record. By comparison, the 1978 Iranian revolution took an estimated 5.6 mb/d from the market while the 1973-74 OPEC embargo and the 1990-91 Persian Gulf War removed 4.3 million barrels. Much like the disruptions of the 1970s, oil prices could remain elevated for an extended time, multiplying the effect of higher transportation costs on the U.S. economy.

1 To combat rising energy prices, President Biden has pledged the largest drawdown in the 45-year history of the nation's Strategic Petroleum Reserve.

EXHIBIT 1: **Selected Energy Exports from Russia, 2021**



Source: U.S. Energy Information Information Administration graph, based on Global Trade Tracker statistics

To combat rising energy prices, the Biden administration announced the largest-ever Strategic Petroleum Reserve (SPR) release of 1 mb/d of oil for the next six months. "The scale of this release is unprecedented: the world has never had a release of oil reserves at this 1 million per day rate for this length of time. This record release will provide a historic amount of supply to serve as a bridge until the end of the year when domestic production ramps up," the administration said in a statement.

Established following the 1973 energy crisis, the U.S. SPR was intended to maximize the nation's long-term protection against a national energy supply shortage that could cause "major adverse impact" on the national economy. In the 45 years of its operation, the current release represents 3 ½ times the next largest draw, which just took place last November. Following the U.S. pledge, the balance of the International Energy Agency's member countries agreed to a new release of oil from emergency reserves, underscoring a strong and unified commitment to stabilizing global energy markets.

Yet, while the global oil markets entered the month on the heels of the largest weekly loss in more than two years, it is too early to predict that a scenario different from the 1970s will play out. From a practical perspective, the release and sale from the SPR will no doubt cause some amount of physical congestion on the U.S. Gulf Coast that could limit an even greater short-term rebalance. And, as IEA acknowledges, the coordinated response is taking place "against a backdrop of commercial inventories that are at their lowest level in about a decade, with limited ability for oil producers to fill the gap in the short term." Consequently, a worsening supply crunch could be forthcoming without a greater response by the world's biggest oil exporters — namely, OPEC, along with its allies, including Russia.

2 The global coordinated effort to bring down oil prices might be fruitless without greater cooperation of the world's largest exporters (including Russia).

Communications

THE BATTLE BETWEEN CABLE AND WIRELESS IS HEATING UP

By Jeff Johnston

Cable operators that offer wireless service via a Mobile Virtual Network Operator (MVNO) business model are reporting impressive subscriber growth. In Q4 2021, Comcast added 312,000 mobile lines, Charter added 380,000 and Altice USA — which is just beginning to emphasize its service — added 5,000. In total, U.S. cable operators represented 29.2% of wireless industry phone net adds in Q4, up from 20.9% in Q3. Both Charter and Comcast's wireless businesses are now profitable as standalone businesses, which is an important milestone. Their profitability should increase as their subscriber bases grow and cable operators begin to offload wireless traffic to their own networks in urban and other high traffic markets. And it's not just the tier one cable operators that are entering the wireless market, as WOW! recently announced its plans to offer WOW! mobile powered by Reach Mobile. Bundling cable and wireless service plans gives cable operators a competitive response to the wireless operators' efforts to take broadband share via their wireless/fixed wireless offerings.

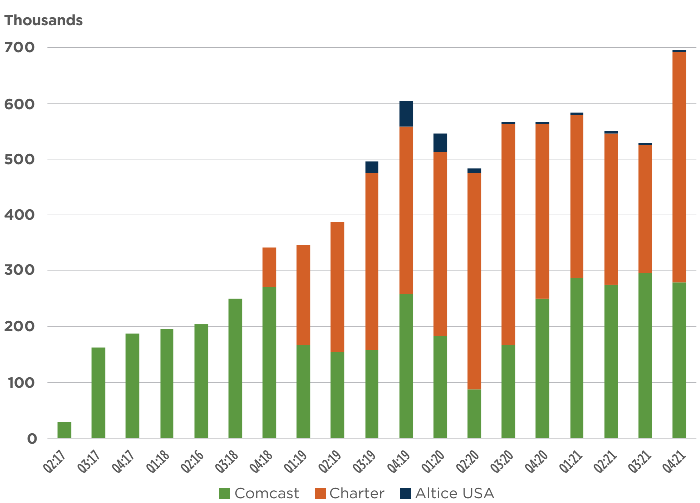
Both Verizon and T-Mobile have been aggressively building out their fixed wireless 5G networks as they look for growth beyond traditional smartphone service plans. T-Mobile is off to an impressive start, ending 2021 with 646,000 fixed wireless customers, up from approximately 100,000 at the end of 2020. T-Mobile aims to have 7 million-8 million customers by 2025. Verizon expects to sign up 150,000 customers in Q1 2021 — up from approximately 75,000 in Q4 — and to have 4 million–5 million customers by the end of 2025.

1 Cable operators' wireless phone additions in Q4 2021 represented 29.2% of the industry's net additions, up from 20.9% in Q3.

2 Comcast and Charter's mobile businesses are now profitable standalone businesses.

3 T-Mobile ended 2021 with 646,000 fixed wireless customers, up from 100,000 at the end of 2020, and expects 7 million to 8 million by 2025.

EXHIBIT 1: **Net Wireless Phone Additions**



Source : Company Reports, MoffettNathanson estimates

This quarterly update is prepared by the Knowledge Exchange Division and covers the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries.

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