AGRICULTURE ANALYST

Higher Barriers to Trade, Lower Barriers to Shocks: Hormuz, Black Sea and a Super El Niño

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- Agriculture markets entered 2026 with relatively comfortable inventories, but we see the **upside tails of agriculture prices thickening as three geopolitical and weather risks build in an increasingly inward-looking market**.
  - **#1 Hormuz.** Continued diesel and fertilizer disruptions may raise input costs across agriculture, while renewed energy-security concerns could encourage major crop exporters to divert more crops into domestic biofuel production and reduce exportable supply.
  - **#2 Black Sea.** Renewed Russia-Ukraine tensions in the Black Sea—the world's most important grain corridor—put up to 15-20% of global grain trade at risk. The disruption comes during the Black Sea's peak wheat export season, with seaborne wheat exports from Russia and Ukraine already running sharply below normal levels. If disruptions continue when Black Sea corn exports typically pick up from October onward, risks could broaden from wheat to global corn markets.
  - **#3 Super El Niño.** A strengthening El Niño has a greater than 90% probability of reaching "super" El Niño conditions and is forecast to be the strongest on record. A super El Niño could simultaneously disrupt multiple crop regions through severe droughts and floods, while potentially creating transport disruptions by reducing water levels in key shipping routes like the Panama Canal.
- **But the larger risk is that these simultaneous shocks are hitting an increasingly inward-looking agriculture market.** Even small supply disruptions may now generate larger and more persistent price spikes than in the past, as trade barriers may rise more quickly in response to supply risks amidst greater policy focus on domestic supply resilience since 2020. Higher barriers to trade may lower barriers to shocks because (precautionary) export restrictions and stock building can remove far more supply from global markets than the original disruption itself, while the resulting market fragmentation reduces traded liquidity and amplifies price volatility.

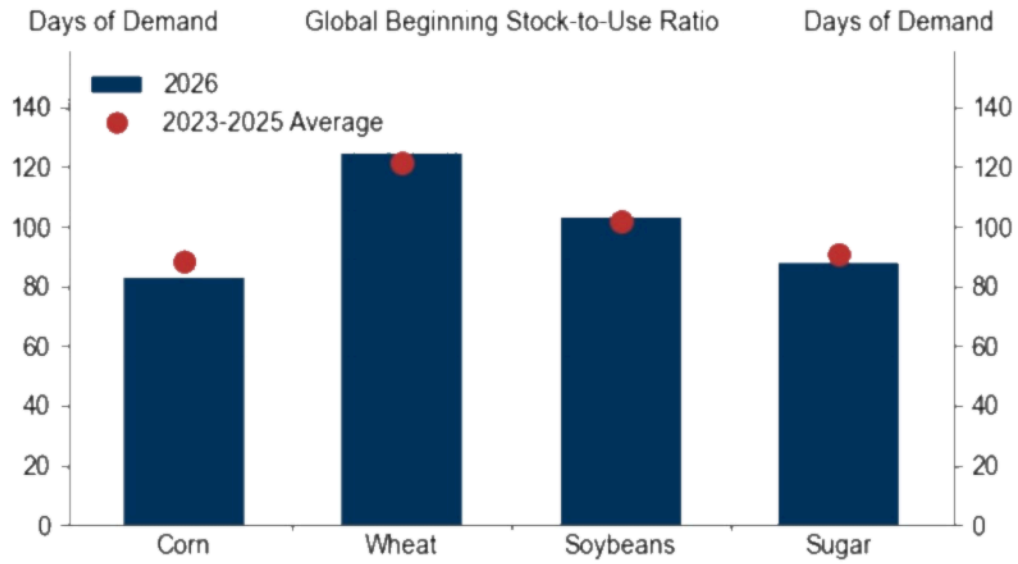
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Higher Barriers to Trade, Lower Barriers to Shocks: Hormuz, Black Sea and a Super El Niño

Agriculture markets entered 2026 with relatively ample supplies (Exhibit 1), but we see the **upside tails of prices thickening as three geopolitical and weather risks build in an increasingly inward-looking market**.

Exhibit 1: Agriculture Markets Entered 2026 With Relatively Ample Supplies



Source: USDA, Goldman Sachs Global Investment Research

As these risks begin to take hold, the BCOM agriculture spot index has risen 24% year-over-year, led by a 41% increase in wheat prices (Exhibit 2).

Exhibit 2: BCOM Agriculture Spot Index Has Risen 24% YoY, Led By a 41% Increase in Wheat Prices



Source: Bloomberg, Goldman Sachs Global Investment Research

#1 Hormuz

The ongoing Middle East conflict could tighten agriculture markets in three ways. On the

supply side, continued **fertilizer** and **diesel disruptions** may raise input costs across agriculture. On the demand side, renewed energy-security concerns could encourage major exporters to divert more crops into domestic **biofuel** production.

Fertilizer flows via the Strait of Hormuz — a chokepoint for about one-third of global fertilizer trade — have fallen following the July re-escalation (Exhibit 3).[1] The risk to crops differs by fertilizer type:

- **Nitrogen fertilizers**[2]—critical for grains such as corn, wheat, and rice—have an immediate and direct impact on yields and must be applied each season, making timing critical and supply disruptions particularly damaging.[3] The renewed escalation coincides with the Q3 procurement window for major nitrogen fertilizer importers ahead of planting, including Brazil corn, India rice and sugarcane, and EU winter wheat (Exhibit 4).
- **Phosphate fertilizers**[4], by contrast, can be drawn down from soil reserves in the short term, limiting the immediate impact on yields, but sustained under-application depletes these reserves and gradually weakens soil quality, crop resilience, and productivity. This is particularly relevant in Brazil soybeans (accounting for 62% of global exports), where import dependence on phosphate fertilizers is high (~80%). The July re-escalation came during the key June-July fertilizer procurement window for Brazilian soybean growers ahead of September planting, keeping phosphate prices elevated.[5] With affordability of phosphate fertilizers already constrained since the 2022 Russia-Ukraine disruption, the latest shock risks keeping Brazilian soybean farmers under pressure, potentially prolonging under-application and raising longer-term risks to Brazilian soybean production.

[1] The Hormuz disruption tightens supply through two channels: directly, via reduced exports of finished nitrogen and phosphate fertilizers, and indirectly, through constrained access to key upstream inputs — including sulfur for phosphate and ammonia and natural gas for nitrogen— limiting substitution across regions.

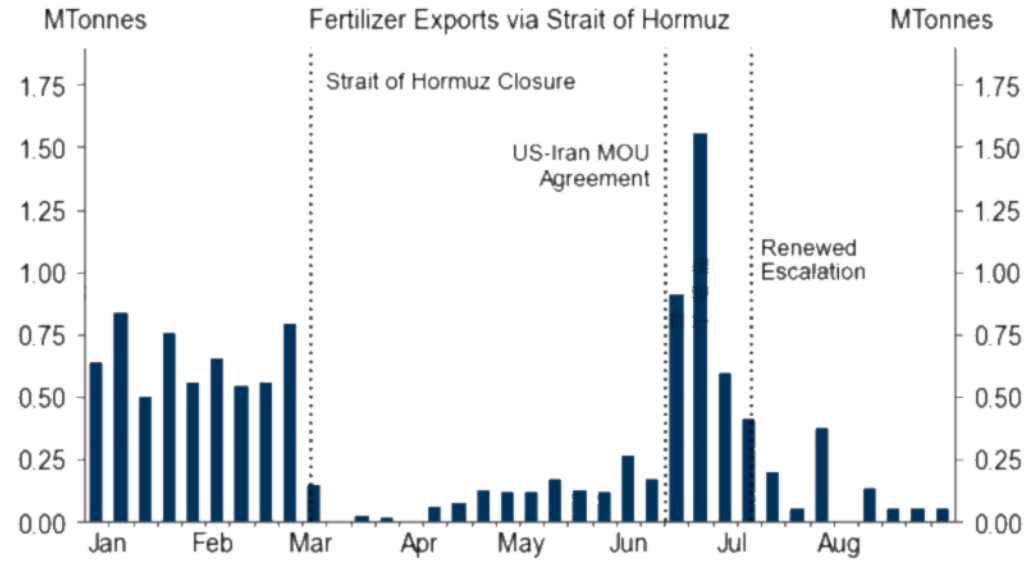
[2] In 2024, roughly 34% of global urea trade and 23% of global ammonia trade passed through the Strait of Hormuz. Urea is the world's most widely used nitrogen fertilizer, while ammonia is a key input into urea production.

[3] The Q2 disruption to flows through the Strait of Hormuz was therefore relatively contained, as it occurred during a seasonal lull—after Northern Hemisphere farmers had largely secured supply and before the next procurement cycle began.

[4] In 2024, roughly 18% of global MAP and DAP trade and 49% of global sulfur trade passed through the Strait of Hormuz. MAP and DAP are widely used phosphate fertilizers, while sulfur is a key input into phosphate production.

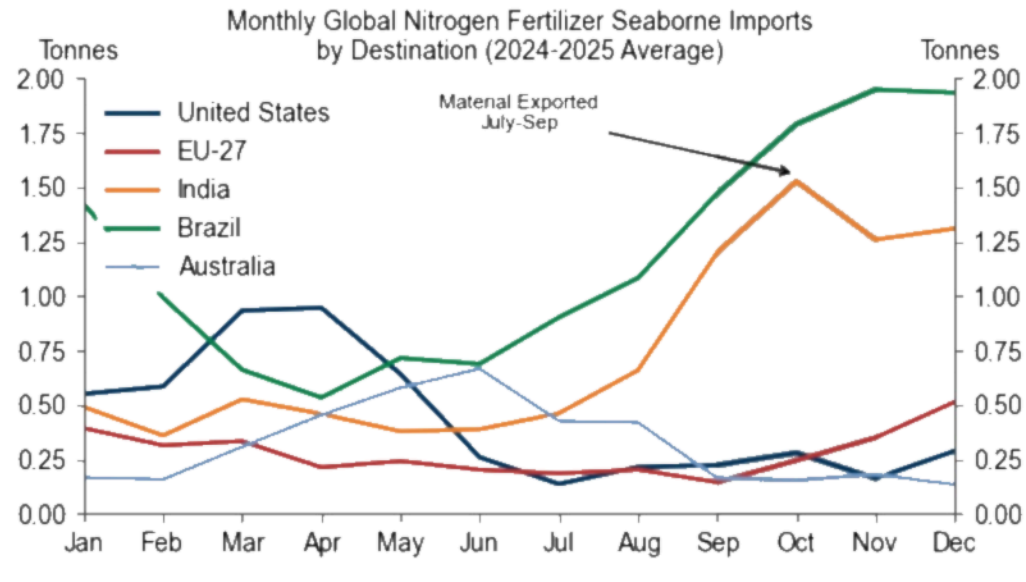
[5] Brazilian soybean growers had secured only ~68% of expected fertilizer demand by mid-June (vs. ~75% historically).

Exhibit 3: Fertilizer Flows Out of the Strait of Hormuz — a Chokepoint for About One-Third of Global Fertilizer Trade — Have Fallen Since July



Source: Kpler, Goldman Sachs Global Investment Research

Exhibit 4: The Renewed Nitrogen Disruptions Coincide With a Time When Major Nitrogen Importers Procure for Planting



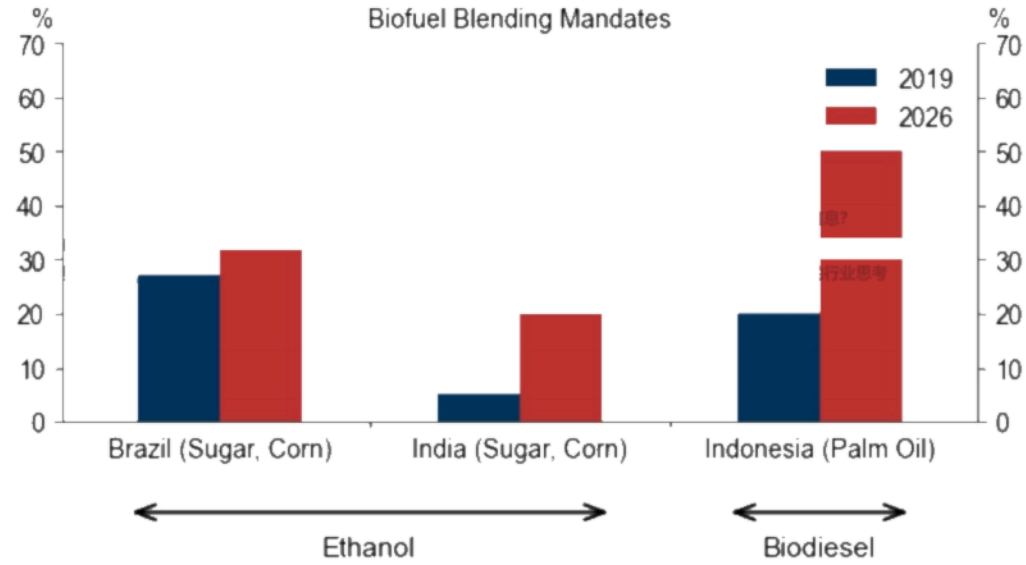
Source: Kpler, Goldman Sachs Global Investment Research

Diesel prices reached record highs on Friday (September 4) as disruptions around Hormuz (~10% of global diesel exports) continue to constrain product flows while refinery outages in the Middle East and Russia further tighten already-stretched refining capacity. Because diesel powers farm machinery, harvesting equipment, and agricultural transportation, sustained high diesel prices could further pressure farmer margins and raise agricultural production costs.

At the same time, renewed energy-security concerns could encourage major exporters to divert more crops into domestic biofuel production. Brazil and India (sugar/corn) have recently raised ethanol mandates, while Indonesia (palm oil) has raised biodiesel

mandates, reducing the exportable surplus of crops (Exhibit 5).

Exhibit 5: Renewed Energy-Security Concerns Have Prompted Higher Biofuel Mandates in Several Major Crop Exporters

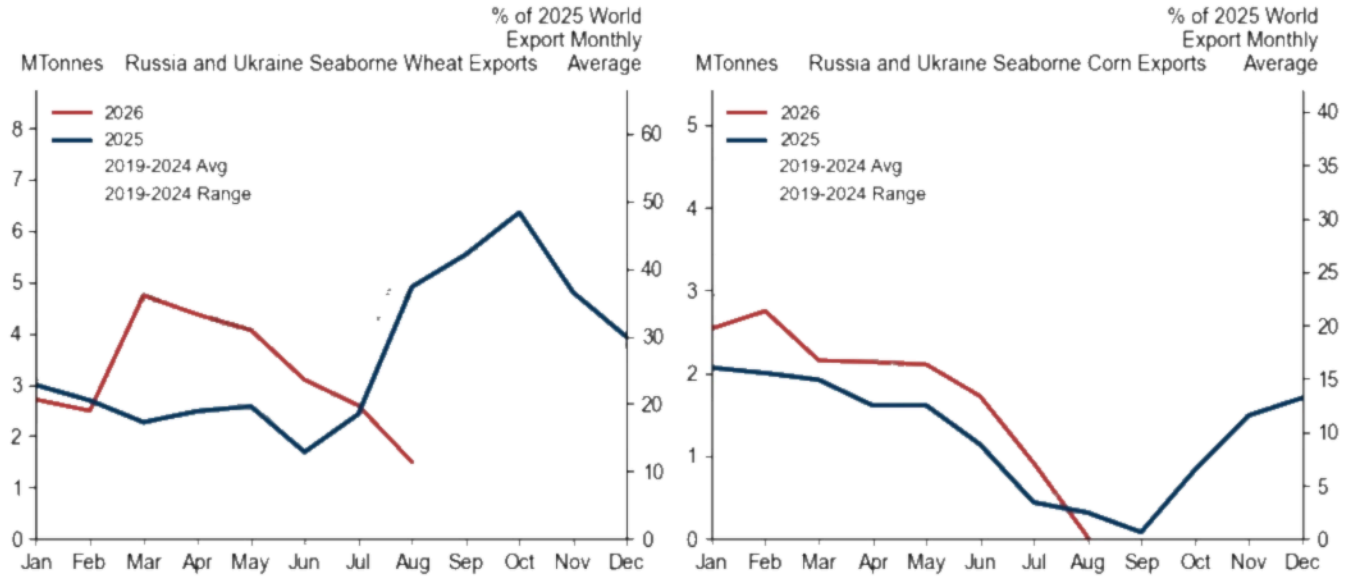


Source: Reuters, Goldman Sachs Global Investment Research

#2 Black Sea

Renewed Russia-Ukraine tensions in the Black Sea—the world's most important grain corridor—put up to 15-20% of global grain trade at risk. The disruption comes during the Black Sea's peak wheat export season, with seaborne wheat exports from Russia and Ukraine already running sharply below normal levels (Exhibit 6) and helping lift wheat prices by ~20% since the escalation began in early July. Seaborne corn exports from Russia and Ukraine have also fallen sharply, although August is seasonally a low-export period. If disruptions persist as Black Sea corn exports typically pick up from October onward, risks could broaden from wheat to global corn markets.

Exhibit 6: Renewed Black Sea Tensions Have Pushed Russian and Ukrainian Wheat Exports Sharply Below Normal Levels During the Peak Export Season

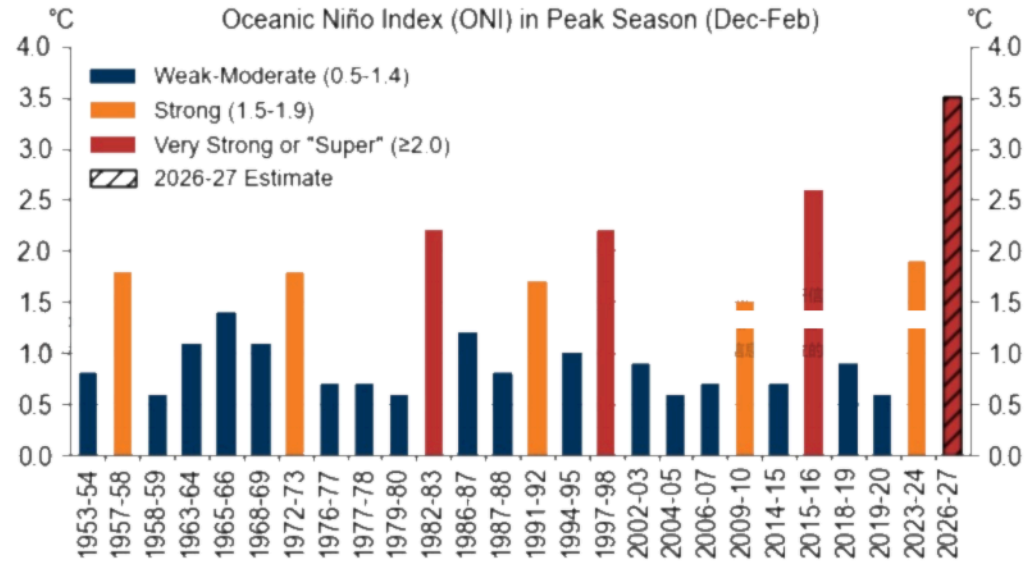


Source: Kpler, Goldman Sachs Global Investment Research

#3 Super El Niño

The National Oceanic and Atmospheric Administration (NOAA) assessed that El Niño conditions are present with a greater than 90% probability of developing into a very strong ("super") El Niño into the 2026-2027 winter. While El Niños typically occur every 2 to 7 years, super El Niños are more unusual — occurring just three times over the past 75 years. The current El Niño is forecast to be the strongest on record (Exhibit 7).

Exhibit 7: The Current El Niño Is Forecast to Be the Strongest on Record

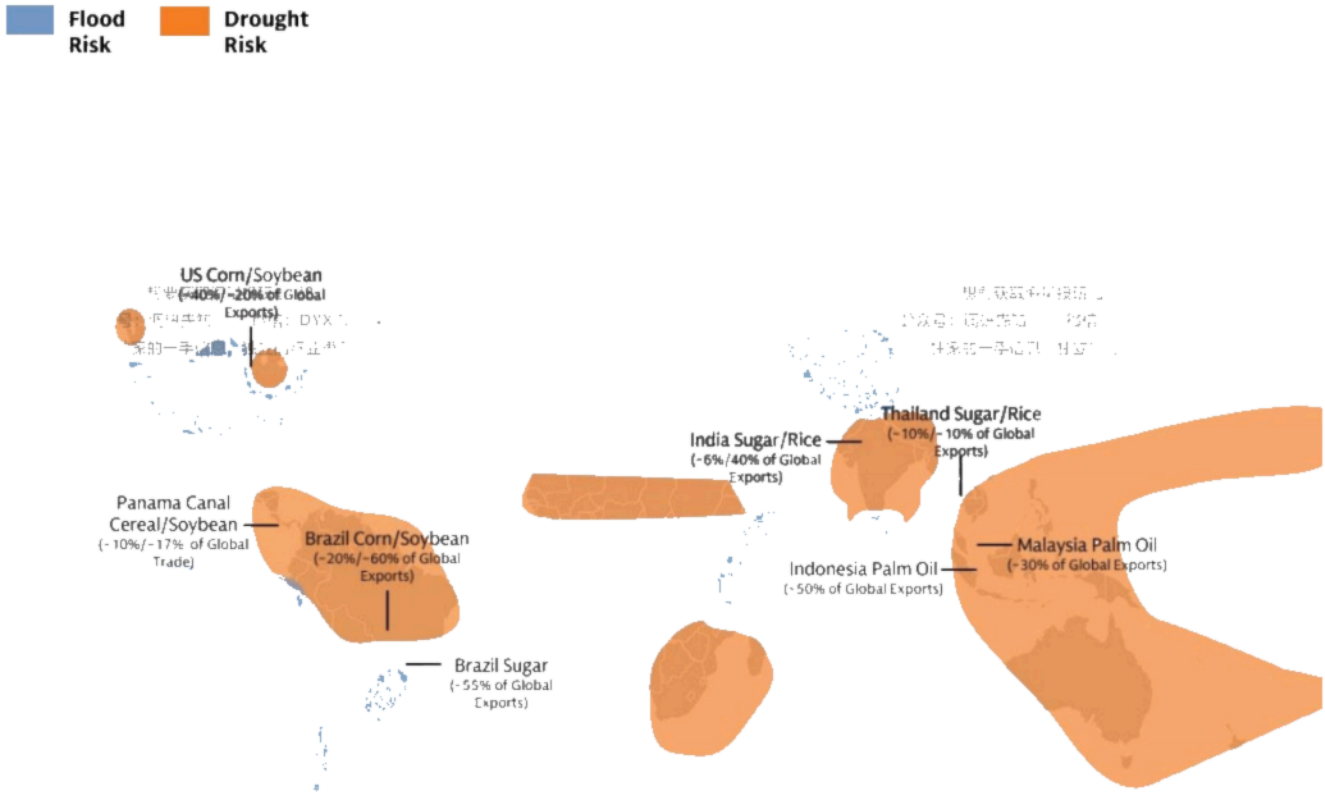


The Oceanic Niño Index (ONI) measures the three-month running average of sea surface temperature anomalies in the Niño 3.4 region of the equatorial Pacific (5°N–5°S, 170°W–120°W). An El Niño event is defined when the ONI exceeds +0.5°C for five consecutive overlapping three-month periods. The strength of the event is determined by the magnitude of the anomaly: +0.5°C is considered weak, +1.0°C moderate, +1.5°C strong, and +2.0°C very strong. Climatically, stronger El Niño events tend to produce more pronounced global impacts, with peak effects typically observed in Northern Hemisphere winter (December–February). The 2026-27 estimate is the multi-model median forecast from The Climate Brink.

Source: National Oceanic and Atmospheric Administration, Goldman Sachs Global Investment Research

A super El Niño could simultaneously disrupt multiple crop regions through severe droughts and floods (Exhibit 8). We recently highlighted how a super El Niño could particularly tighten sugar markets as global sugar exports are heavily concentrated in El Niño-sensitive regions, including Center-South Brazil, India and Thailand.

Exhibit 8: A Super El Nino Could Simultaneously Disrupt Multiple Crop Regions Through Severe Droughts and Floods

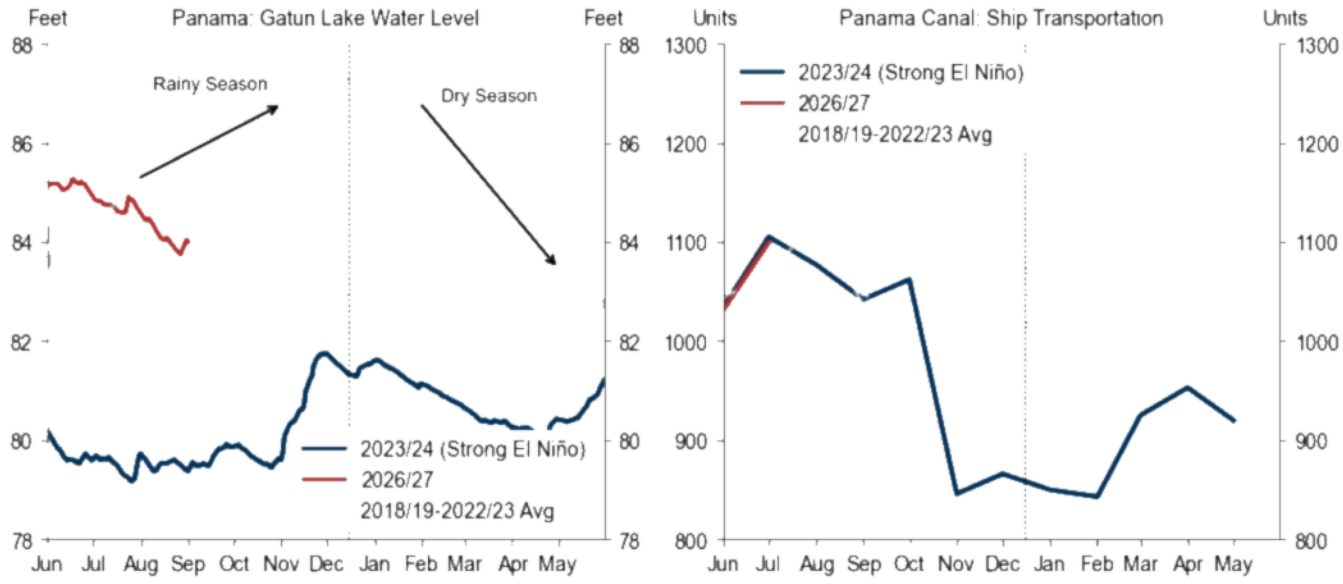


Source: Goldman Sachs Global Investment Research

A Super El Niño may also disrupt agricultural trade by reducing water levels in key shipping routes like the Panama Canal, which handles 10% of global cereal trade and 17% of global soybean trade. While the canal entered this El Niño with comfortable water levels, reservoir levels have so far declined rather than rebuilt during the current rainy season (Exhibit 9, Left Panel). If reservoirs remain insufficiently replenished by the start of the January-May dry season, canal authorities may need to further restrict vessel transits to conserve water like in 2023/24, as each ship passage consumes freshwater from the canal (Exhibit 9, Right Panel).[6]

[6] On August 20, 2026, the Panama Canal Authority reduced transit capacity as weaker rainfall lowered reservoir levels needed to support vessel traffic through the canal.

Exhibit 9: Panama Canal Water Levels Are Falling Rather Than Rebuilding During the Current Rainy Season, Raising the Risk of Further Shipping Restrictions Later This Year



Source: Haver Analytics, Goldman Sachs Global Investment Research

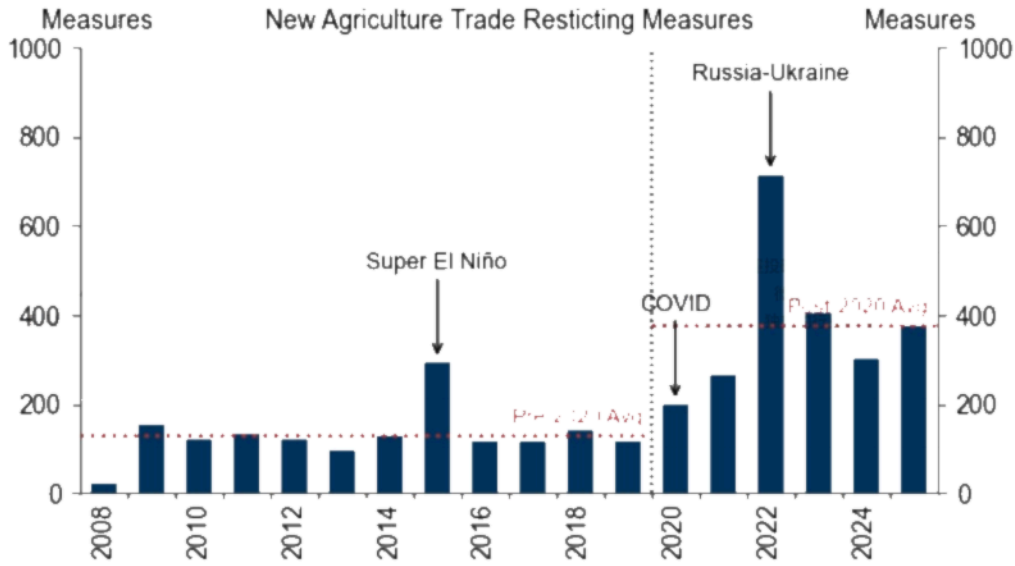
But the Larger Risk Is That These Simultaneous Shocks Are Hitting an Increasingly Inward-Looking Agriculture Market

Even small supply disruptions may now generate larger price moves than in the past, as trade barriers rise more quickly in response to supply risks.

Following the pandemic-related disruptions and the food-and energy crisis of 2022, policy in several economies has signaled greater focus on security of food and energy supply, reflected in the increased use of tariffs on commodity imports, export controls, rising biofuel mandates, and the buildup of government-held inventories (Exhibit 10).

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Exhibit 10: The Annual Pace of New Agriculture Trade Restrictions Has Roughly Doubled Since 2020

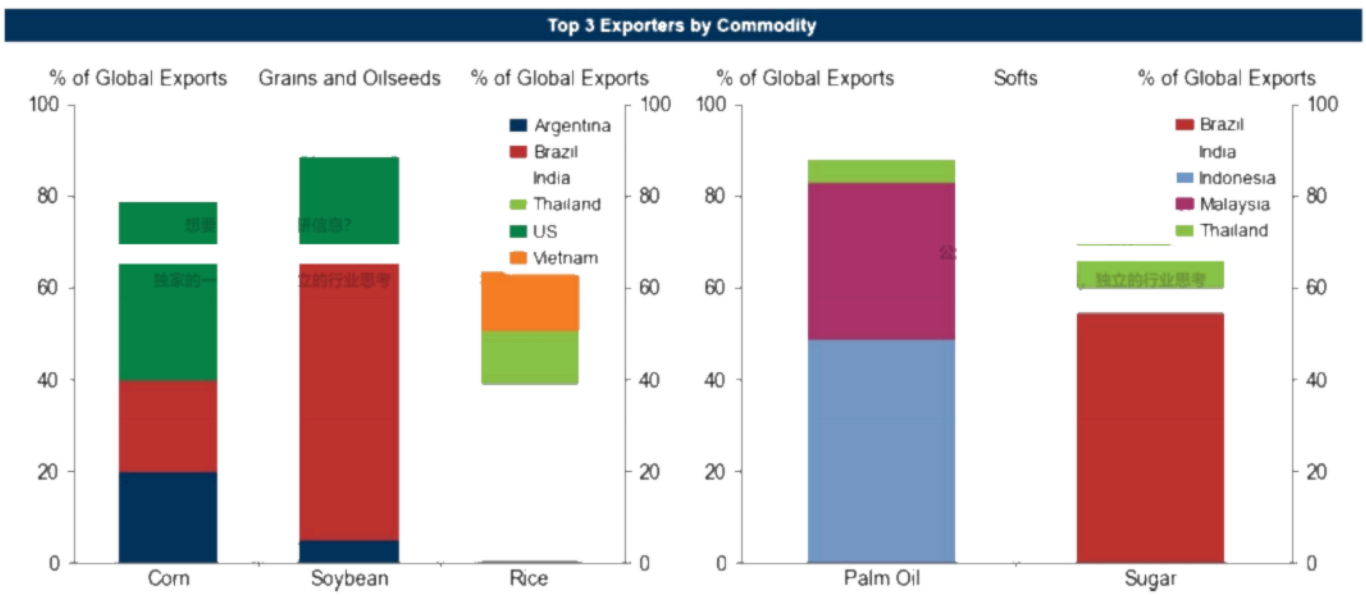


Source: Global Trade Alert, Goldman Sachs Global Investment Research

Higher barriers to trade may lower barriers to shocks because:

1. Small supply shocks can trigger much larger losses of exportable supply. With global agriculture trade highly concentrated among a handful of major exporters, a small physical disruption — or even the risk of one — in a key exporting country can trigger (precautionary) export restrictions that remove far more supply from the global markets than the original disruption itself (Exhibit 11). During the food price crises of 2008 and 2022, successive export bans on grains and edible oils amplified global price spikes. India's rice export ban ahead of the 2023/24 strong El Niño removed about 40% of global rice trade from export markets and contributed to a sharp increase in prices, even though Indian rice production ultimately proved resilient.

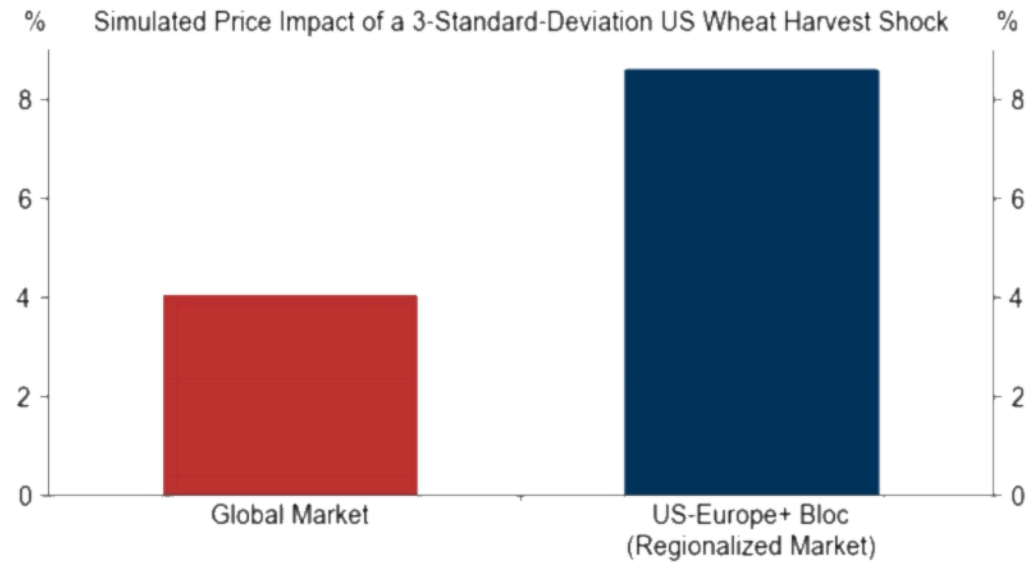
Exhibit 11: Global Agriculture Trade Is Highly Concentrated Among a Handful of Major Exporters



Source: USDA, Goldman Sachs Global Investment Research

2. While the higher trade barriers and precautionary stock building are ultimately aimed at improving domestic resilience, they likely also **fragment global markets, reduce traded liquidity and raise price volatility**. We estimate that the price impact of an external disruption (e.g. weather shock in agriculture markets) depends on its size relative to the market that absorbs it; if a regional bloc is half the size of the global market, the same shock delivers twice the price impact compared to a global market (Exhibit 12).[7] Measures that lead to fragmentation can therefore generate outcomes that differ from their intended objective of managing disruption risk.[8]

Exhibit 12: The Price Impact of a Disruption Depends on Its Size Relative To the Market That Absorbs It; If a Regional Bloc Is Half the Size Of the Global Market, the Same Shock Delivers Twice the Price Impact



The US accounts for about 7 percent of global and 15 percent of US-Europe+ bloc wheat production. A three-standard deviation US harvest shock corresponds to about 60 percent of US wheat production, or 4 percent of global output, with wheat prices held constant. The exercise uses a price elasticity of supply of 0.2 and a price elasticity of demand of -0.85 (see Alvarez et al., 2023). Lower elasticities would lead to higher price impacts, and fragmentation would still double the price impact in this example.

Source: USDA, FAO, IMF, Fally and Sayre (2019), Alvarez et al. (2013), Goldman Sachs Global Investment Research

[7] The key intuition for the greater price effect in fragmented markets is that the price impact of a disruption is inversely related to the size of the market that absorbs it; if a regional bloc is half the size of the global market, the same shock delivers twice the price impact.

[8] Historically—including during the 2022 energy and food crisis—governments have often responded to disruptions in essential goods by subsidizing households to ease the burden. But when many countries pursue similar measures simultaneously, the outcome can diverge from the intended objective. It is akin to a seated theater where one person stands to get a better view; soon everyone must stand, yet no one is better off than before.