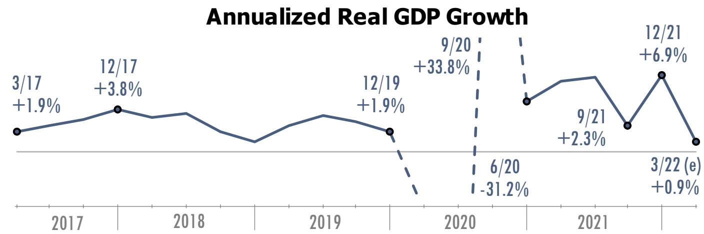
Bellwether CONSULTING

Your Quarterly Update on the Financial Markets
March 31, 2022

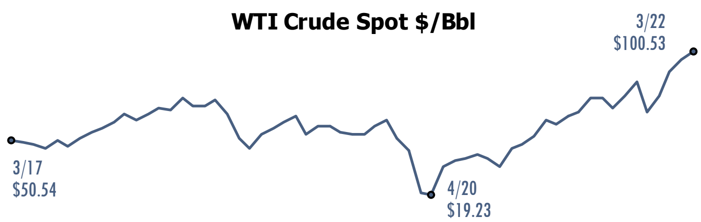
MARKET Recap

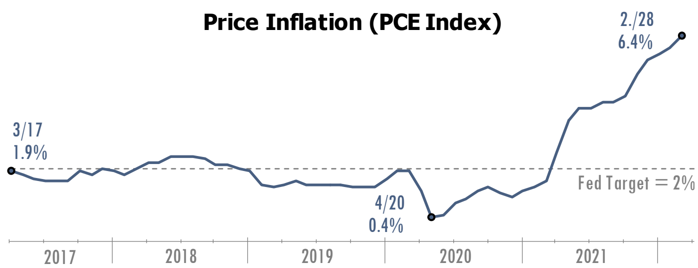
The US Economy: “Inflation, a Real Problem”

Real economic growth surged in Q4, driven primarily by a strong uptick in private inventory investment. Inventories can distort measured growth, particularly when there are supply shocks or supply chain disruptions, both of which were prevalent throughout 2021. Inventory investment is currently projected to fall for Q1 of 2022, fueling a much lower GDP forecast from the Atlanta Fed’s GDPNow model.



A better observation is that the economy grew 5.5% in 2021, a strong pace that is trending downward toward pre-COVID levels, in fits and starts. Labor price pressure has persisted and continues to push prices upward. Unemployment fell to 3.6% in March and the US economy added 431,000 jobs in March according to Labor Department figures. However, workforce participation continues to recover at a very slow pace; with labor supply constrained and demand increasing, wages increased 5.6% in 2021.



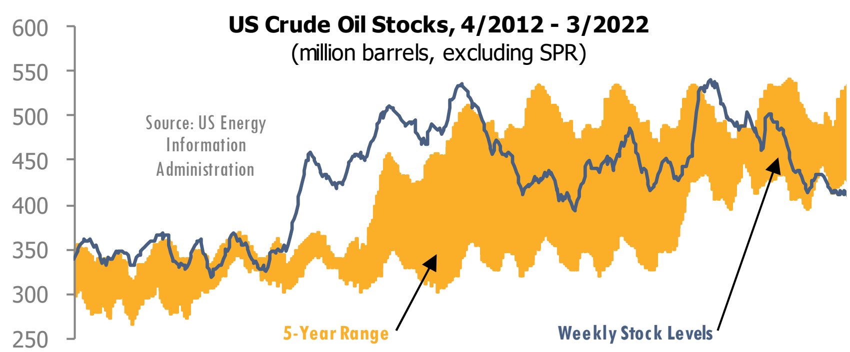


Unsurprisingly, the Federal Reserve was forced to act, announcing a 0.25% increase on March 16th. Increases are expected at essentially every meeting for the balance of the year, moving the short rates to 2% this year and 2.5% to 3% in 2023. What is not yet known is the Fed’s intended pace in reducing its holdings of longer-term bonds, an essential move to slow the flattening trend and head off a protracted yield curve inversion. A plan will be announced at an upcoming meeting; Chairman Powell noted it will look similar to past balance sheet reductions, but faster and earlier in the cycle.

The outbreak of war in Ukraine and widespread sanctions on Russia add another significant inflationary vector in the form of rising commodity prices. The impact has been much broader than oil, with prices of agricultural and base metal commodities moving broadly higher. Note, however, that US oil prices are far from the record-high levels experienced in 2008. In fact, we have experienced these price levels twice since then. In other words, commodity prices have room to run should the conflict and related sanctions intensify or broaden.

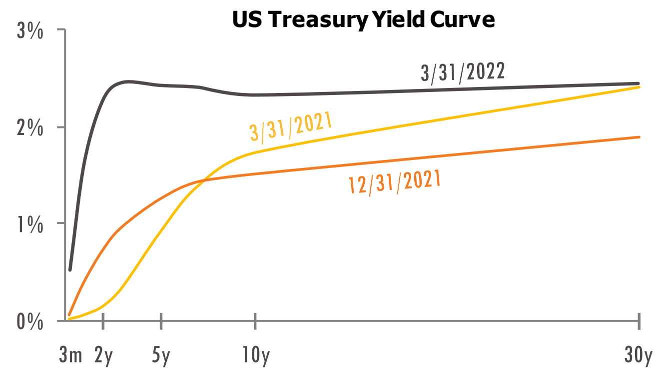
In light of the situation, the President authorized the release of 1 million barrels per day from the Strategic Petroleum Reserve (SPR) for 180 days, by far the largest release taken to date. The logic behind the move is that it is necessary to moderate prices until North American shale and sand production can ramp up in response to the supply shock. It also corresponds with the midterm election cycle; in addition to modestly reducing prices, the Administration avoids the charge of doing nothing as prices rise at the pump. Inflation is a political problem, not just a real problem.

The logic is sound, but price suppression does carry unintended consequences. Rising prices send signals which change the behavior of market participants. Conserve energy. Diversify sources. Seek out alternatives. Produce more. Innovate. These are valuable messages the Administration should send at this time, without waiting for more Russian aggression or an unexpected new shock. If prices are not the messenger the bully pulpit should be.



The US Bond Market

The opposing forces on interest rates from inflation concerns and war made for an ugly yield curve at the end of the Q1. Ugliness is neither a formal metric nor a closely followed quality of the yield curve. However, it does describe well the juxtaposition of an incredibly steep short end, slightly inverted belly, and flat long end. Investors look to the shape of the yield curve to presage a recession. The signal being broadcast here is hazy at best. If the threat of inflation and ramifications of Russia's invasion could each be viewed in isolation, the resulting yield curves would show stark contrast. In the former case, long rates should be higher. The latter might resemble the curve in Q1 of 2021.



As always, the front end is tied to the expected path of Fed rate hikes for the foreseeable future. One year ago, the Fed asserted an initial rate hike liftoff may not come until after 2023. As recent as November 2021, Fed committee members still believed any rate hikes would start in 2023 at the earliest. Now, expectations are priced in for increases of 50 basis points at the next two meetings, coming up in May and June. Thereafter, incremental hikes of 25 basis points are forecast for each of the following meetings until overnight rates are up to about 3%. Yet, the yield curve plateaus near 2.5%. The simple explanation is that the probability of a near-term recession is running high.

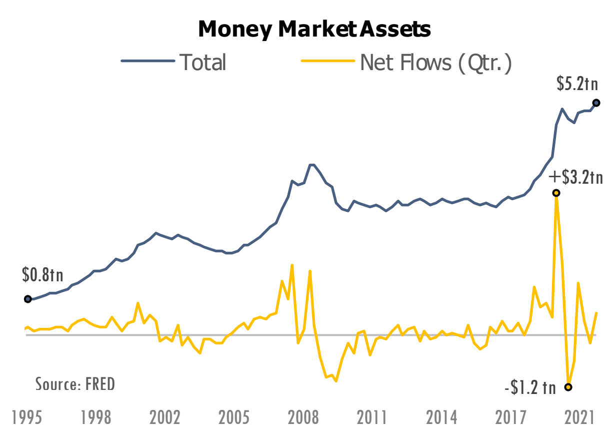
US Bond Index Returns	
Bloomberg Idx	**1Q22**
Aggregate	-5.93%
Short Gov't	-1.13%
Interm. Gov't	-4.19%
Long Gov't	-10.57%
TIPS	-3.02%
Municipal	-6.23%
Interm. Credit	-5.07%
Long Credit	-11.23%
High Yield	-4.84%
(CS) Lev. Loan	-0.10%
MBS	-4.97%

Ugly is also an apt characterization of US bond returns this quarter. Every major index suffered negative returns. Inflation fears caused double-digit losses in long-duration fixed income. Compare this to the first quarter of 2020, when long government paper posted a return north of 20%. Investors were unable to rely on a flight to quality debt to offset equity losses; and, they have also been unable to rely on US TIPS to protect against inflation. The only bond sectors to go mostly unscathed were those with little duration. Floating rate leveraged loans nearly avoided losses as the outlook for defaults in the US remains benign.

For a third consecutive quarter, credit spreads started near 3% and then broke higher; only, this time, they couldn't entirely claw their way back. As of January 20th, high yield option-adjusted spreads averaged 3.1%, unchanged from year end. Spreads rose at a steady pace to peak at 4.2% on March 15th before snapping back to 3.4% as of quarter-end. European high yield fared worse, starting at 3.3%, peaking at 4.9%, and ending the quarter at 4.0%.

Just before Russia's invasion of Ukraine, the high yield default rate forecast by Moody's at the end of 2022 was 2.4%. This represented a moderate increase from the 1.7% at the end of 2021 and a healthy discount from the 4.1% long term average. However, Moody's report did raise the estimate to 9.1% in the bear case under geopolitical disruption, inflation pressures, new variants of the coronavirus, and new regulatory policy out of Beijing. Until the first week of March, global credit rating upgrades had outpaced the number of downgrades for 62 consecutive weeks. US credits remain relatively insulated from downgrades thus far. While the Fed is tightening monetary policy, it does so at a measured pace. Sanctions against Russia and other international trade disruptions are of much less impact on the US than on Europe.

If there is any silver lining for investors, it is that some yield can now be picked up on shorter duration debt. Fans of cash and cash equivalent investments, such as money market funds, are likely to soon receive meaningful yield rather than pure opportunity cost. However, higher rates are unlikely to garner a massive inflow of assets. Investment in money market funds spiked in the first quarter of 2020 largely stayed in the vehicles despite a firm outlook of zero return. Rising short-term rates did prompt inflows leading up to the global financial crisis of 2008; and, to a lesser degree, this was also the case leading up to the pandemic. A brief increase in flows was seen just following the Russia invasion, but it quickly reversed. Cash levels in retail bank accounts have similarly seen a rise during the pandemic and remain at elevated levels.



The US Stock Market

The first quarter of 2022 ended with all major indices solidly negative, something not witnessed since the onslaught of the pandemic 2 years ago. Trends established in the latter half of 2021 extended and broadened. Returns got worse moving down the capitalization spectrum with investors continuing to seek the relative safety, such that it was, of more established firms.

US Stock Indices - Total Returns			
Largecap Stocks	**1Q22**	**Midcap Stocks**	**1Q22**
S&P 500	-4.60%	S&P Midcap 400	-4.88%
Russell 1000	-5.13%	Russell Midcap	-5.68%
Growth	-9.04%	Growth	-12.58%
Value	-0.74%	Value	-1.82%
Broad Markets		**Smallcap Stocks**	
S&P 1500	-4.64%	S&P Smallcap 600	-5.62%
Russell 3000	-5.28%	Russell 2000	-7.53%
Growth	-9.25%	Growth	-12.63%
Value	-0.85%	Value	-2.40%

Value outperformed growth, not only in the small- and mid-cap sectors but also decisively in large caps. The rotation has been building for a while and is directly linked to the US transitioning out of a decade-long suppressed interest rate environment. Low rates favor growth stocks since, by definition, they have a greater proportion of cashflows in the future. As the price of a stock is the present value of all expected future cashflows, discounting with a lower rate generates a higher present value. Not a surprise then that the 10+ years of near-zero rates correlate with a lengthy period of growth outperformance.

Returns of Russell 3000 Growth versus Value Indexes 2010 - 1Q 2022

Returns would have been worse but for a rally in the final weeks of March. Seemingly triggered by the Fed's 25 basis point rate increase, the turnaround was largely attributed to increased clarity on what to expect from the Fed for the rest of the year. Conventional wisdom holds that equity investors are put off by rising rates, but a Fed confident enough in the economy to meet inflation head-on proved intoxicating.

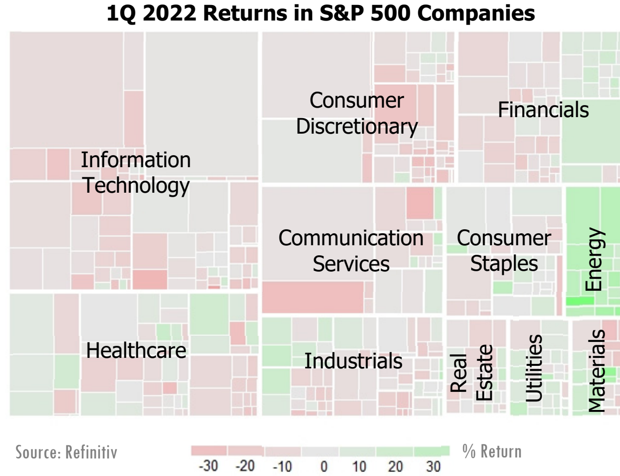
Looking broadly across the sectors, it seemed impossible to avoid negative returns – except in energy or utilities. The energy sector built on its 2021 rebound as oil prices hit a 14-year high in early March. However, closer examination of the underlying industries revealed a few bright spots. Indeed, the quarter saw notable performance dispersion in the financials, healthcare, and industrials sectors of the S&P 500. While banks, capital markets companies, and asset managers struggled, insurance companies, diversified financials (i.e., Berkshire Hathaway), and the major credit card companies (i.e., Visa, Mastercard, and American Express) posted solid returns. In healthcare, drug manufacturers and healthcare plans fared well even though the rest of the sector was challenged. The industrials sector saw strong performance from aerospace & defense as well as from farm & heavy machinery firms.

S&P 1500 Economic Group Components - Total Returns			
Sector	**1Q22**	**Sector**	**1Q22**
Energy	39.10%	Industrials	-3.24%
Utilities	4.45%	Real Estate	-5.46%
Materials	-0.89%	Info Tech.	-8.37%
Consumer Staples	-1.21%	Consumer Discr.	-9.58%
Financials	-1.60%	Comm. Services	-11.82%
Health Care	-2.96%		

Source: Morningstar

Performance of the market dominators which effectively masked late 2021 weakness in the rest of US largecaps also saw notable dispersion this quarter. Shares of Meta Platforms (Facebook) posted a return of -33.9% after seeing its largest ever 1-day drop of 26% on weaker-than expected revenue growth and its first ever quarterly decline in daily active users. While not nearly as dramatic, Microsoft returned -8.1% in Q1. The software giant is the second-largest company in the S&P 500, after Apple, and, with a valuation at 30 times estimated earnings, it has been more expensive than most peers.

1Q 2022 Returns in S&P 500 Companies



In contrast, Tesla notched a gain for the quarter after it announced plans to grow production capacity. While Apple, Amazon, and Alphabet had negative returns, they bested the broad market and handily beat their sector returns. As interesting as a dispersed and varied market may be, it creates a particularly challenging environment for active managers where the allocation to just a handful of names can have an outsized impact on even a reasonably diversified portfolio.

International Markets

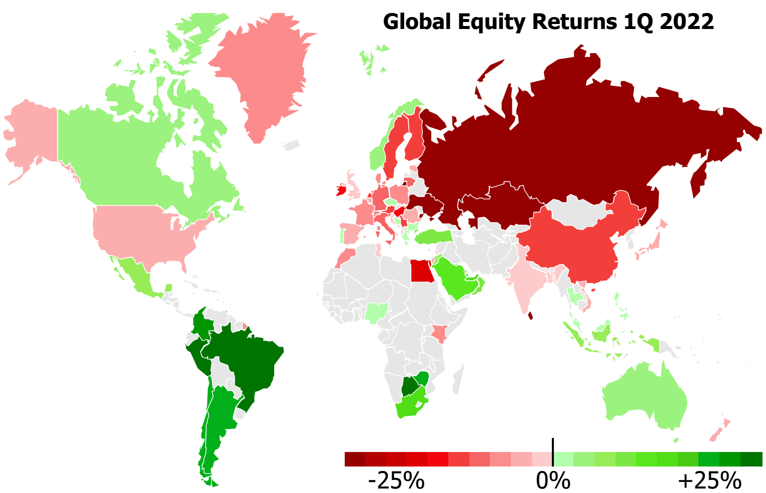
The quarter began with global markets showing steady, but slowing, growth. The pandemic appeared to be waning and central banks were working in concert to combat early signs of inflation. A commodity price spike brought on by Russian sanctions, renewed supply chain issues, and concerns of broadening Russian aggression increased volatility and weighed on markets. Most markets fell, but markets in commodity exporters surged.

Foreign Stock & Bond Indices - Total Returns

Stocks	1Q22	Bonds*	1Q22
MSCI ACWI ex-US	-5.44%	Global Aggregate	-6.16%
EAFE (Developed)	-5.91%	Pan-Euro	-8.27%
Emerging Markets	-6.97%	Asian-Pacific	-3.75%
Europe	-7.37%	Eurodollar	-4.79%
Japan	-6.61%	Euro-Yen	1.46%
China	-14.19%	Other Currencies	-0.35%
Latin America	27.26%	* Unhedged	

Europe

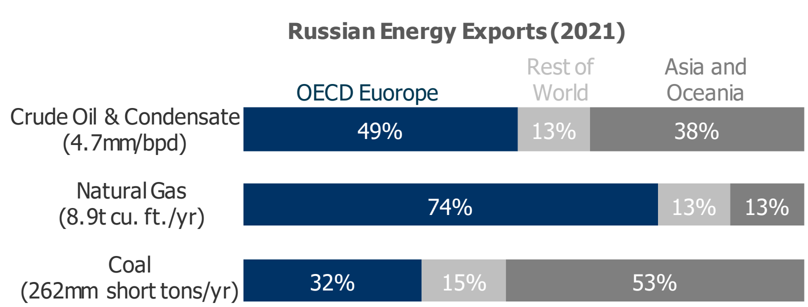
Russia's unprovoked military invasion has generated severe global economic and geopolitical implications. Russia and Ukraine account for just 1.7% and 0.2%, respectively, of world GDP, but serve a large role in the production of oil, natural gas, wheat, corn, sunflower oil, fertilizer, lumber, neon gas, aluminum, nickel, titanium, palladium, iron, and steel. Through mid-March the IHS Markit Materials Price Index advanced 37%, reaching a new high, before closing the quarter up around 23%. Analysts expect materials prices to peak in Q2 and retreat during the second half of the year on rising interest rates and softening demand growth. S&P's global market forecast for real GDP growth in 2022 was lowered to 3.3% from 4.1% in February. S&P attributes 0.3 percentage points of decrease to sharp contractions in Russia and Ukraine and another 0.3 percentage points to reflect slower growth in Western Europe as the region has been hard hit by the surge in prices of oil, natural gas, and electricity.



The conflict will be exported globally mostly through higher energy prices. Current forecasts call for losses in Russian oil production and exports of 1-3 million barrels per day through 2023. Brent crude, which peaked at $132 per barrel on March 8th, closed the quarter at $107 per barrel. Natural gas prices are expected to be substantially higher throughout Europe and moderately higher in Asia.

Global consumer price inflation is projected to pick up from 3.9% in 2021 to 6.4% in 2022, the highest rate since 1995. The 2022 forecast has been revised upward and expectations are that all regions will experience a significant uptick, sharpest in Europe. The EU imports 90% of its natural gas, with Russia accounting for 45% of that total. Russia also accounts for 25% of the EU's oil imports and 45% of its coal imports.

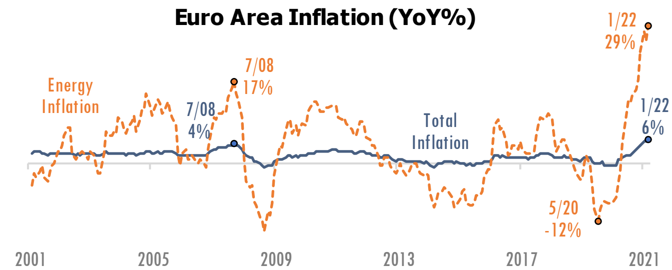
Sanctions have disrupted Russia's ability to receive payments for exports, pay for imports, engage in cross-border financial transactions, and support the ruble. While the totality of the impact won't be known for some time, economists expect Russia's GDP to contract 9-15% this year. The scale of sanctions has cratered equity prices, closed factories, spiked a jump in interest rates, and weakened the ruble.



Source: US Energy Information Administration

Business surveys showed Europe's economic recovery slowed in the first weeks of March after the invasion. The war disrupted already strained supply chains, weakened confidence, and sent raw material and energy prices soaring. A slight cushion was provided by the lifting of pandemic restrictions on Europe's services sector; however, economists expect any positive effects to fade and for the war to impact growth more heavily. Consumer confidence has been impacted by inflation, weighing on spending power even as governments provide subsidies. In Spain, one of the bloc's larger economies, inflation accelerated to 9.8% in March from 7.6% in February, the fastest pace since May 1985. German price growth also surprised, rising to 7.6%, a level not seen since the early 1980s.

The ECB lowered its forecast for eurozone growth to 3.7% from 4.2%, assuming that energy disruptions and confidence prove temporary and global supply chains aren't significantly affected. The bank said that inflation could be even larger with cuts in Russian supplies of natural gas, slowing growth to 2.3%. In early March, the bank said it would reduce bond purchases beginning in Q2 and possibly end them by September in an effort to restrain inflation, reported at 5.9% in February. Given the uncertainty of war, policy makers have vowed to be flexible.



Asia

China's economy expanded just 4% from the same period a year earlier, the slowest pace since 3Q 2020. To support a slowing economy, the People's Bank of China cut its loan rates. However, measures have not yet been passed to the real economy and data shows the economy is on uncertain footing. Manufacturing and non-manufacturing PMIs declined, and unemployment has been increasing over the past two quarters. While the export sector has served as a reliable pillar of growth, the boom has begun to moderate. February exports were up 16% YoY, slowing from January's 24% pace.

Chinese consumers had been cautious till the end of last year. Retail sales, a gauge of household spending, grew by just 1.7% last December from a year before, the slowest growth since August 2020 and a substantial decline from the 8% increase in December 2019. Household savings rose by $855 billion in January, nearly four times the amount it increased in the same month a year earlier. However, from January to February, retail sales increased by 6.7% from a year before.

There is one upside to weaker spending in China. The country doesn't have a major problem with inflation right now in part because consumer demand hasn't outstripped the supply of available goods. The Producer Price Index increased to 8.8% from a year ago in February, declining from December's 10.3% increase. The Consumer Price Index followed the same trend as it rose 0.9% from a year ago in February, decelerating from December's 1.5% increase.

The lockdown in Shanghai, a city of more than 25 million people, which accounts for about 4% of China's total economic output and is the country's largest port, may further impact growth. Given the outbreaks, the recent call for growth of 5.5% for the year may prove to be a high target and may signal further government interventions. In the meantime, equity markets responded negatively to the lockdown and continued decline. The CSI 300 index realized a return of -14.5% for the quarter and -16.3% for the year.

Japan's Prime Minister Fumio Kishida requested that the finance minister craft an economic package as a result of rising food and energy prices caused by the war in Ukraine. To help offset rising costs, a large stimulus package of $900 billion was passed. The government proposed providing cash payouts to low-income pensioners while easing the pain of surging fuel prices through subsidies and tax incentives.

Americas

After coming out of recession in Q4, the Brazilian government cut its GDP growth forecast for 2022 to 1.5% from 2.1%. Industrial production contracted sharply in January. Consumer and business sentiment remained pessimistic through February. Yet, the forecast for 2023 remains unchanged at 2.5%. Soaring prices of raw materials such as soy may help the agriculture sector while also strengthening the real. Brazil's GDP growth surged during the last commodity super-cycle over a decade ago. However, the recent commodities rally is also contributing to inflation. Consumer prices have risen 10%. In response, the central bank has lifted the benchmark SELIC rate 875 basis points, to 10.75%, since last March.

Canada's service sectors were hurt by the Omicron variant at the start of the year as lockdowns and capacity restrictions went into effect. Statistics Canada reported that GDP expanded by just 0.2% in January despite solid growth in goods-producing industries and construction. Activity rebounded in February due to strength in manufacturing, mining, quarrying, oil and gas extraction, accommodation and food services, and construction.

Economic growth of 3.4% is forecast for Mexico this year, a significant undershoot from President Obrador's 5% projection last year. The economy continues to dig out of losses sustained during the pandemic. The finance ministry's budget expects growth to expand 3.5% in 2023. Budget comments highlight the need to adjust growth expectations due to the impact of the pandemic on supply and demand imbalances and due to military escalation between Russia and Ukraine.

Focus On: Supply Chain Evolution

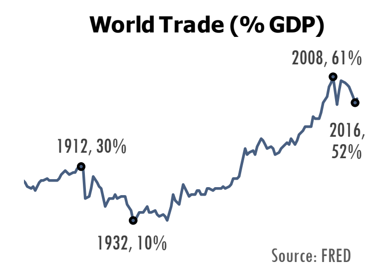
Prior to the COVID pandemic, protectionist measures under Modi, Trump, and Xi (among others) threatened global trade. The health crisis, and shortages of kit to combat it, prompted travel and trade restrictions, insourcing initiatives, and stockpiling. Supply chains were stressed, fractured, and repurposed as companies and governments responded to seismic structural shifts in demand. Sometimes these challenges were met with impressive adaptability: the manufacture and distribution of billions of vaccine doses in a short time. In other cases, people just had to accept that they might not enjoy a bike ride, sitting on a recliner, or eating cream cheese for the next 18-to-34 weeks plus free two-day shipping.

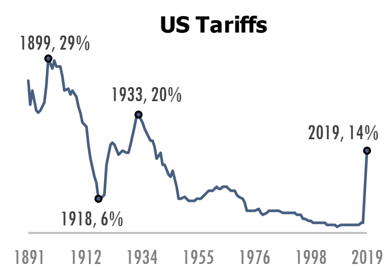
Supply chain disruptions aren't just making breakfast less appetizing, they have hurt equity and debt prices in sensitive industries. Like inflation, disruptions were waved off as transitory; but, only before Russia's invasion of Ukraine invalidated that optimistic narrative. Diversifying suppliers seems like good sense when you consider 180 global trade products are near-monopolies [McKinsey]. Localization of essentials can help, but too much insourcing leads back to concentration.

Neither supply chain disruptions nor inflation will be solved overnight, but both are likely to be solved. Supply chains have been growing into more sophisticated and technologically advanced networks. They are diversifying against concentrated points of risk. For example, geopolitical risk is being moderated by insourcing, near-sourcing, and friend-sourcing. Once-linear chains have evolved into complex webs. Supply chains may soon flexibly resize and restructure themselves according to anticipated supply and demand. This future has yet to arrive, but recent innovations have shown this is not some aspirational "Jetsonian" fantasy.

Forging Global Supply Chains

The industrial revolution delivered massive productivity gains powered by technology and specialization. No longer was global trade merely for exchanging luxury goods and commodities only found in one corner of the world. Globalization ramped up through the 19th and 20th centuries as world trade expanded at a consistent pace, averaging 3% per year up to World War I. Reactionary tariffs enacted in a subsequent nationalist wave are, in part, to blame for the onset of the Great Depression. In contrast, several landmark trade policies, including the North American Free Trade Agreement (NAFTA), were borne out of World War II. This marked the start of a 60-year expansion.





The advent of standard cargo shipping containers in 1956 accelerated the trend of globalization by slashing the cost to load a ship from $5.86 per ton to just $0.16. By 1980, global trade reached record levels [Marine Insight]. Ship sizes swelled to skyscraper proportions, carrying as much as a 44-mile-long freight train. This enables companies to sell products at low prices by sourcing from the cheapest supplier. A short-term focus on revenue and profit worked well when shipping and raw materials could be secured cheaply and reliably. No longer so. Shipping container transport from Shanghai to Rotterdam that used to cost around $2,000 recently exceeded $10,000.

Economies prospered under globalization empowered by technology and open trade policies. More broadly, global value chains, which factor in design, marketing, and other pre/post-production contributions, were estimated to generate a 30% foreign value-add to exports, on average in 2011 [OECD]. Globalization has lifted wages in poorer regions and increased economic mobility; it has improved the diversity, availability, and affordability of consumer goods. However, globalization also fueled the spread of COVID-19 and has meant that disruptions in one country often impact the world.

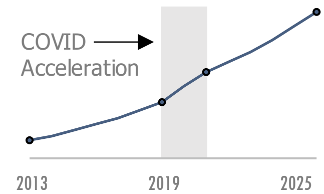
As the Russia-Ukraine war unfolds, sanctions are impeding global trade. In 2021, Russia was the top exporter of natural gas, second in crude oil, and third in coal. For Europe, Russia is the main source of these resources. Accumulating supply chain disruptions are poised to wreak havoc. Russia supplies 40% of the world's palladium and Ukraine about half of all neon, both key inputs in semiconductor production. Russia and Ukraine are also key exporters of agricultural goods.

Weak Link Disruptions

The pandemic subjected supply chains to startling pressure as demand for consumer goods surged. Caught in a confluence of adversities, businesses cut inventory and production as virus breakouts erupted while stimulus and social distancing pushed the shut-in public to max out home deliveries. Consumer spending was 40% higher in October 2021 than in October 2019 [Morgan Stanley].

Not all recent supply chain issues were pandemic driven. A true bottleneck occurred in 2020 when the 400-meter-long Ever Given ran aground in the Suez Canal completely blocking the trade artery. More than 360 ships were stuck in the ensuing traffic jam. Its sister vessel, the Ever Forward similarly ran aground in the Chesapeake Bay on March 13, 2022. So far, efforts to free this ship have been unsuccessful. Issues can occur anywhere along the supply chain, up to last-mile deliveries. When all goes well, it takes 20 to 30 days for a ship to journey through the Pacific Ocean. However, everything from inclement weather to pirates might delay travel. Recently, congestion has been a major problem, but pirates have been less so.

Parcel Shipping Volumes (bn)
(2013-20 act. & 2021-26 est.)



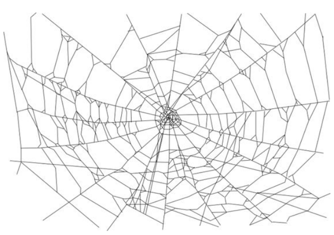
Parcel Volumes (2020)

Country	# (bn)	ΔYoY
China	83.4	+31%
US	20.2	+37%
Japan	9.1	+1%
UK	5.0	+33%
Germany	4.1	+12%
India	2.4	-16%
Canada	1.6	+29%
France	1.6	+18%

Source: Statista, Pitney Bowes

Potential stresses to the supply chain don't evaporate once ships are in port. Workers are needed to load and unload. Longtime readers of our Market Recap may recall the 2015 impact on GDP by a slowdown during an acrimonious contract negotiation between the International Longshoreman & Warehouse Union and the Pacific Maritime Association, its industry counterpart. Worse yet was the 10-day west coast-wide lockout that resulted from a breakdown in negotiations between these two parties in 2002. Today, US ports continue to experience record-setting queues driving the processing time for a container unit from 3-5 days to 2 weeks. Opening ports 24-7 does not resolve the issue. Truck drivers must be available to pick up containers and distribution centers must be open to receive them.

Spinning Supply Webs



In 2011, a devastating earthquake and tsunami struck Japan. Toyota, the largest car company in the world, took two months to resume local operations. Consequently, production in the US fell 30%, held up by shortages of parts from Japan. Toyota's stock price fell 20% over the next six months. In contrast, when major earthquakes struck in 2016 and 2019, domestic production was able to resume within two weeks. Toyota accomplished this feat through standardizing parts, building up analytics, increasing regionalization, and mitigating single-source supplier risk through diversification and/or increased inventory [McKinsey].

Post-pandemic, auto manufacturers are facing universal supply chain disruptions coupled with high demand. In 2018 and 2019, US-China and Japan-Korea trade wars were already stoking long lead times and high prices on semiconductor chips and their raw inputs. Manufacturing shut down for half of 2020 due to the pandemic. A series of factory fires and natural disasters followed. Meanwhile, consumers were buying more vehicles to avoid public transit. Russian sanctions add more disruption while car companies compete with other industries to source semiconductors (e.g., the shift from office to home and drop in leisure and vacation spending has meant more demand for computers and consumer electronics).

More capacity is clearly needed in semiconductor and other high-tech manufacturing. Plans to phase out sales of new gas-powered vehicles have been announced for 2035 through 2040 in many countries. Electric vehicle (EV) battery demand is expected to grow more than 30% per year this decade. The global industry is adapting similarly to how Toyota has. In 1990, nearly all semiconductors were produced in the US, Japan, or Europe. By 2030, they will account for less than one-third of global production. In 2021, 79% of EV batteries came from China. The US, Hungary, and Poland constituted another 12% of capacity. By 2030, China's market share of EV batteries is forecast to decline to 65% as Volkswagen boosts local production by adding six factories in Germany and many countries add modestly to their output. Geographic diversification is just one way supply webs are shaping world economies [Visual Capitalist].

Planning for Tomorrow

In today's vast and interconnected supply networks, a single company may rely on thousands of suppliers; though, it would be more accurate to say they all rely on each other. Intelligent sharing of information upstream and downstream defines the new era of supply chain management. As consumers migrate onto e-commerce platforms, companies are leveraging machine learning and big data to operate dynamic predictive supply chains. The boom of e-commerce changed the way businesses design logistics models, as it requires faster shipping, lower costs, and competitiveness.

Incredible gains in productivity under the just-in-time inventory model were made possible by Enterprise Resource Planning (ERP) systems. ERP integrates inventory management, materials planning, and transactions management to meet these needs. ERP stores all the data in one centralized database, allowing different business functions to access, such as production, procurement, and R&D. Accurate information enables business functions to make the best use of resources. Though implementing such a system is expensive, long-term labor and operating cost savings can be enormous.

The mechanical automation that drove productivity gains in manufacturing is now driving similar changes in shipping and distribution. As these parts of the supply chain become more centralized, automated, and flexible, productivity may spur greater economic growth. Robots are already staffing distribution centers. Drones are already delivering packages. Advances in artificial intelligence promise to fully automate these innovations and enable self-driving vehicles. A truck hauling freight 8 hours per day now might see an instant doubling in productivity. At the same time, the gig economy model makes it possible for a company like Amazon.com to add hundreds to its workforce days after a decision is made to advertise job openings. Successful automation often requires an adaptive workforce.

Supply Chain Vulnerabilities

- **Concentration:** one or few suppliers without viable substitutes
- **Interconnectivity:** contagion risk among suppliers when disruptions occur
- **Limited Visibility:** limited information on suppliers of suppliers, possibly many tiers
- **Dependence:** supplier has concentrated client risk

Source: McKinsey

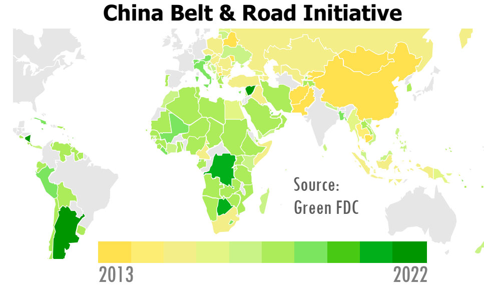
Silk Road of the Future

A truly robust supply chain requires flexibility and diversification from sourcing to transportation to manufacturing to storage. To accomplish this, China announced a global infrastructure development strategy spanning 70 countries dubbed the Silk Road Economic Belt in 2013. Later renamed the Belt and Road Initiative, this huge undertaking should grow China's economic and political influence while securing a global trade network via railways, roads, and ports.

- Initially focused on investments in education, construction materials, railways and highways, automotive manufacturing, iron, and steel production, real estate development, and power grid modernization
- As of February 2022, 147 countries and 32 international organizations have signed onto the initiative; seven of the countries counted have not confirmed their participation, including Austria and Russia [GFDC]
- Targets completion in 2049, but is estimated to boost global GDP by more than $7 trillion by 2040

The Belt and Road Initiative has been criticized as a potential predatory debt trap, citing the 99-year lease of Hambantota Port. Sri Lanka agreed to the lease due to failure to service Chinese loans which funded the port's construction. While the term of the lease implies predatory behavior, Chinese lenders have been amenable to fairly restructuring loans in other instances [Foreign Policy]. The initiative has attracted many high-income countries as well, including developed market nations Italy, Portugal, Singapore, and New Zealand.

China Belt & Road Initiative



This trade bloc division that has emerged with the US and China on opposing sides echoes the Cold War era. However, instead of competing to amass doomsday weapons, these blocs will be competing to outbuild, outproduce, and outperform each other economically – an improvement, for certain. In addition, the formation of this global trade network does not preclude collaboration with the US. The prosperous economic growth achieved from the 1990s through the early 21st century was built on "Western industrial know-how and Asian manufacturing muscle [fueling] the hyper-globalization of supply chains" [The Economist].

Adapt or Die

Tariffs, rising transportation costs, and other impediments to global trade threaten to slow economic growth. The optimistic view, and perhaps most likely outcome, is a healthy balance will be found in supply chains between cost-efficiency and flexibility and in global trade between competition and collaboration. This looks to be achievable with technological innovation on the horizon accelerated through the changes ushered in by the pandemic and hopefully not derailed by Russia's invasion of Ukraine. The Belt and Road trade bloc may help with the latter, as sanctions are being imposed mainly by those outside of the initiative. China is already ramping up its imports from Russia as other countries seek to limit theirs.

The return-on-equity focus popularized by DuPont Analysis led investors and companies to focus on short-term financials and lean business operations. The past two years have taught that a high ROA may be more risk than reward and adaptability has been undervalued. Companies and governments ultimately "have no choice but to operate in a world shaped by globalization and the information revolution. There are two options, adapt or die." - *Andy Grove, Co-Founder of Intel*

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