Supply Side Dislocations
Navigating Disruption, Delays & the Downgrade to Global Growth

NOV 2021
Global Corporate & Investment Banking
Capital Markets Strategy Team

Tom Joyce
Managing Director
Capital Markets Strategist
New York, NY
Tom.Joyce@mufgsecurities.com
(212) 405-7472

Hailey Orr
Director
Capital Markets Strategist
New York, NY
Hailey.Orr@mufgsecurities.com
(212) 405-7429

Stephanie Kendal
Associate
Capital Markets Strategist
New York, NY
Stephanie.Kendal@mufgsecurities.com
(212) 405-7443
Contents

1 Introduction
2 Global Demand Shock
3 Supply Chain Dislocations
4 Microchip Backlog
5 Labor Market Shortages
6 Inflationary Pressures
7 Desynchronized Global Growth

APPENDIX
Top 100 Ports in CPPI 2020 Global Ranking
1 Introduction
Supply Chain Disruptions Top of Mind

Mentions of “supply chains” in investor and earnings calls reached a record high in 2021

News stories mentioning supply chain

Mentions of “supply chain” on earnings / investor calls

Source: (1) Bloomberg. Data as of November 15, 2021. Count based on topics and includes every article that Bloomberg index algorithm counts as about supply chain, even if it mentions those words or not. Bloomberg “Supply Chain Mentions on Earnings Calls Hit a Record High” (October 13, 2021). (2) Bloomberg, “Inflation Builds with Biggest Gain in Consumer Prices Since 1990” (November 10, 2021).
Supply Chain Disruptions a Top Business Concern

According to a McKinsey Global Survey in October, the top risks to company growth globally are supply-chain disruptions and labor shortages.

### Potential risks to growth for respondents’ companies in the next 12 months, % of total respondents

<table>
<thead>
<tr>
<th>Region</th>
<th>Supply Chain Disruptions</th>
<th>Labor Shortages</th>
<th>Policy / regulatory changes</th>
<th>Changing customer needs</th>
<th>Weak customer demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>38%</td>
<td>45%</td>
<td>25%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Developing Markets</td>
<td>34%</td>
<td>7%</td>
<td>27%</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>Asia - Pacific</td>
<td>30%</td>
<td>19%</td>
<td>19%</td>
<td>33%</td>
<td>29%</td>
</tr>
<tr>
<td>Europe</td>
<td>29%</td>
<td>23%</td>
<td>25%</td>
<td>18%</td>
<td>20%</td>
</tr>
<tr>
<td>Greater China</td>
<td>25%</td>
<td>13%</td>
<td>17%</td>
<td>24%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: (1) McKinsey “The Coronavirus Effect on Global Economic Sentiment” (October 29, 2021). Out of 16 risks that were presented as answer choices. North America, n=170; developing markets, n=166; Asia-Pacific, n=98; Europe, n=265; and Greater China, n=100. Developing markets includes India, Latin America, Middle East, North Africa, South Asia and sub-Saharan Africa. Greater China includes Hong Kong and Taiwan.
Significant Improvement Expected in 2H 2022

Global supply chain disruptions are likely to persist well into 1H 2022, as evidenced by a recent business survey from Oxford economics. However, a desynchronized deceleration in global growth, ramping production capacity, and more normalized consumer spending may ease disruptions in the back half of the year.

When do you expect supply-chain disruption to end for your business?

% of respondents affected by disruption

Source: Oxford Economics, September Oxford Economics Global Risk Survey, September 2021 flash survey. The survey was completed by 129 businesses from September 1 to 9.

Supply Side Dislocations / NOV 2021 / page 7
Supply Side Drags US GDP Lower in Q3

Delta infections and supply chain dislocations drove US Q3 GDP sharply lower to 2% as rising inflation and declining demand adversely impacted growth. While growth is expected to recover in Q4, continued supply side disruptions remain a risk.

Moderate Recovery Expected in Q4

Since the start of October, economic data in the US, China and the Eurozone has surprised to the upside, a strong indicator that global growth is likely to recover in Q4 before moderating in 2022.

Citi economic surprise index

Source: (1-2) Bloomberg. Data as of November 19, 2021.
2 Global Demand Shock
Supply side dislocations

- Production shortfalls
- Transportation delays
- Labor market shortages
- Higher input costs & wages

Largest global demand shock since WWII

GDP growth rates at 2-3x long term averages

Delta virus restrictions
- East Asia “zero Covid tolerance” policy
- Factory disruptions
- Port closure & capacity reductions

Vaccine
- 7 billion administered globally

Extraordinary policy easing
- $32 trillion of global monetary & fiscal stimulus in 18 months ($13 trillion in US)

Excess consumer savings
- >$5 trillion globally

Changing consumer behavior patterns
- Pent-up demand
- Goods over services
- Increased online purchases

Vaccine
- 7 billion administered globally

Extraordinary policy easing
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- Increased online purchases

Delta virus restrictions
- East Asia “zero Covid tolerance” policy
- Factory disruptions
- Port closure & capacity reductions
Rapid Global Vaccine Rollout

In less than one year, over 7.6 billion COVID vaccines have been administered globally across 184 countries, including 445 million doses in the United States.

Source: (1-2) Bloomberg. Data as of November 19, 2021.
Over $30 Trillion of Global Monetary & Fiscal Stimulus

Global monetary and fiscal stimulus has risen by a remarkable $32 trillion over the last 18 months, $13 trillion in the US alone ($5.5 monetary, $7.4 fiscal)

Global fiscal stimulus in response to COVID-19 (% of GDP)

- **Less than 2.5%**
- **2.5% - 5%**
- **5% - 7.5%**
- **7.5% - 10%**
- **More than 10%**

Over $5 Trillion of Global “Excess Savings”

Over the course of the COVID-crisis, global consumers accumulated over $5 trillion in excess savings. In advanced economies alone, households accumulated roughly $3.7 trillion in excess savings, equivalent to 14% of advanced economy consumer spending and 8.4% of GDP.

Excess savings as % of GDP, by country

Source: (1) Oxford Economics. (2) FRED. Deposits for all commercial banks, weekly Wednesday level as of November 3, 2021.

Supply Side Dislocations / NOV 2021 / page 14
Robust Consumer Demand for “Goods”

The COVID related lockdowns dramatically shifted consumer spending to “goods” over “services”. The boom in goods demand and intermittent COVID production shutdowns have created a significant supply / demand imbalance.

Source: (1) Bloomberg. Data as of November 19, 2021.

US Real PCE on goods & industrial output, Feb 2020 = 100
3 Supply Chain Dislocations
Countries Most Vulnerable

Countries with higher trade in intermediate goods and production complexity are relatively more exposed to global supply chain disruption. In addition, the United States has been more highly impacted than many other advanced economies due to the strength of its economic demand shock.

Economic Complexity Index

- Japan
- Switzerland
- Germany
- South Korea
- USA
- UK
- France
- Italy
- Mexico
- China
- Canada
- Saudi Arabia
- India
- Brazil
- Indonesia
- Australia

Source: Oxford Economics, "Global Scenarios: Delta Surge" (September 2021). The Observatory of Economic Complexity
East Asia COVID Waves Exacerbate Bottlenecks

With a “zero Covid tolerance” policy across much of the region, Delta related disruptions in East Asia, which accounts for 40% of global exports, have episodically rippled through the global supply chain (closures and reduced hours for factories and ports).

Daily new COVID cases

(1-10) Bloomberg. Data as of November 19, 2021.

Supply Side Dislocations / NOV 2021 / page 18
Industries Most Vulnerable

Those industries most dependent on international supply chains – in particular, textiles, electronics and autos – have been the most highly impacted by the COVID-19 global demand and supply shocks, and related dislocations.

Source: (1) Apollo (Torsten Slok). OECD. Trade in value added, latest data available is 2015.
Longer Port Wait Times

The precipitous reduction in transportation capacity has slowed the pace of unloading container ships and pushed wait times in US ports to record lengths. In November, the wait times to enter the ports of Los Angeles and Long Beach more than doubled from two months prior to reach a record high.

Time of turnaround, by port

<table>
<thead>
<tr>
<th>Port</th>
<th>2021 time of turnaround</th>
<th>2017-2019 avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Kelang, Malaysia</td>
<td>1.7 days</td>
<td>1.3 days</td>
</tr>
<tr>
<td>Qingdao, China</td>
<td>2.1 days</td>
<td>1.8 days</td>
</tr>
<tr>
<td>Kaosiung, Taiwan</td>
<td>2.1 days</td>
<td>2 days</td>
</tr>
<tr>
<td>New York, New Jersey, US</td>
<td>2.5 days</td>
<td>2.3 days</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.1 days</td>
<td>3.5 days</td>
</tr>
<tr>
<td>Rotterdam, Netherlands</td>
<td>3.9 days</td>
<td>3.6 days</td>
</tr>
<tr>
<td>Shanghai, China</td>
<td>4.5 days</td>
<td>4.9 days</td>
</tr>
<tr>
<td>Los Angeles / Long Beach, US</td>
<td>6.4 days</td>
<td>3.6 days</td>
</tr>
</tbody>
</table>

Record Number of Container Ships Waiting

As of mid-November, a record 83 ships were waiting in the San Pedro Bay to be unloaded in the ports of Long Beach and Los Angeles.

Average container ship wait time at anchor to enter port of LA / Long Beach:

- 16.9 days

Number of vessels waiting in San Pedro Bay:

- 83


Supply Side Dislocations / NOV 2021 / page 21
Transportation Costs Elevated

While likely past peak, transportation costs may take two years to return to normalized levels, based on analysis of past market cycles by Sea-Intelligence, a Copenhagen-based maritime data and advisory company.

The average spot-market price for transport via truck hit $2.85, the highest recorded and 19% above the same level last year.

(2) Bloomberg. Data as of November 19, 2021. Drewry World Container Index.
(3) WSJ “Freight Operators’ Profits are Surging in Strained Supply-Chain Markets” (November 3, 2021). DAT Solutions LLC. Monthly average per-mile price includes fuel surcharges.
Transport Capacity Declining

Transportation capacity has contracted for 17 consecutive months with scores below 40 in 13 of the past 15 readings. In the US, the outsized proportion of imports coming through ports in Southern California has caused a mismatch in trucking capacity moving west vs. east (outbound demand from California is 43% higher than inbound demand). Further, shortages in semiconductors make it difficult to build new trucks to alleviate the constraint.

Source: (1) Logistical Managers’ Index “October 2021 Logistics Manager’s Index report.”
Longer Delivery Times & Elevated Backlogs

ISM delivery times

Kansas City Fed delivery times

Empire State delivery times

ISM order backlog

Kansas City Fed order backlog

Richmond Fed order backlog

Source: (1-6) Bloomberg. Data as of November 19, 2021. ISM orders backlog is manufacturing report.

Supply Side Dislocations / NOV 2021 / page 24
Prices Paid Rising

The persistent labor shortages, shipping delays, production bottlenecks and higher commodity prices have created pricing pressures that appear to have peaked in aggregate, but which remain elevated at multi-decade highs.

Source: (1-6) Bloomberg. Data as of November 19, 2021.
Retail inventories have lagged well behind broader business inventories and hit their lowest level in records going back to 1992. Despite business inventories increasing 0.7% in September, the business inventory-to-sales ratio remained unchanged at 1.26x as business sales rose 0.9% in the month.

Source: (1-3) Oxford Economics, Bloomberg, FRED. Data as of November 19, 2021.
Signs of Relief in Some Industries

Z-scores appear to have troughed for most industries, indicating that inventories are being rebuilt. However, the number of scores below zero show inventories are still low relative to historical norms.

Record Long US Factory Lead Time

In September, the lead time for maintenance and repair supplies reached 45 days (record high), for production materials it reached 92 days (record high) and for capital expenditures it reached 154 days (highest since 1989)

Source: (1) Bloomberg Government “Lead Times for US Factories Lengthen to a Record: Supply Lines” (October 5, 2021). ISM.
4 Microchip Backlog
Complex Global Semiconductor Value Chain

Semiconductor production requires the specialized capabilities of several different geographic regions. In 2019, the US, South Korea, Japan, mainland China, Taiwan and Europe each contributed 8% or more to the total value added by the semiconductor industry.

Illustrative example of semiconductor design, manufacturing, and use process

1. European firm licenses IP
2. US firm provides software for chip design
3. US firm designs chip
4. US company selects chip for new device
5. US, Japan and Europe produce highly advanced manufacturing equipment for specific chip
6. Silicon dioxide mined in US to create metallurgical grade silicon
7. Silicon processed in Japan to create ingot
8. South Korea slices ingot into several wafers
9. Taiwan imprints wafers with integrated circuits to create “patterned” wafers which are stacked and interconnected
10. Individual chips are separated and packaged in Malaysia
11. Chip shipped to device assembly partner in China
12. Completed device sold to US consumer

Semiconductor Supply Chain Vulnerabilities

Semiconductor demand exceeded global supply even before the onset of the pandemic. COVID exacerbated the existing supply-demand imbalance in three major ways: i) demand dislocation as consumer purchases shifted to home appliances and “work from home” equipment, requiring factories to alter output; ii) supply side dislocations from factory shutdowns; and iii) unexpected shipping bottlenecks as ports closed. While the global nature of the semiconductor value chain has allowed for rapid and cost efficient technological advancement, the regional specification creates numerous supply chain vulnerabilities.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%</td>
<td>Share of global semiconductor capacity located in East Asia</td>
</tr>
<tr>
<td>100%</td>
<td>Share of most advanced semiconductor manufacturing (nodes below 10 nanometers) located in Taiwan &amp; South Korea</td>
</tr>
<tr>
<td>70%</td>
<td>Share of manufacturing market controlled by just two companies (Taiwan’s TSMC &amp; South Korea’s Samsung Electronics)</td>
</tr>
<tr>
<td>12%</td>
<td>Share of semiconductors made in American factories, down from 37% in 1990</td>
</tr>
<tr>
<td>$1 trillion</td>
<td>Estimated incremental upfront investment that would have been required to have a fully self-sufficient local supply chain in each region</td>
</tr>
</tbody>
</table>

Regional Specialization

Each region specializes in a different part of the semiconductor production supply chain. In general, the US leads in R&D intensive activities while regions in Asia focus more on raw materials and manufacturing (which are more capital intensive).

Semiconductor industry value added by activity and region, 2019 (%)

China is mainland china only. BCG analysis with data from SIA WSTS, Gartner, IDC.

Supply Side Dislocations / NOV 2021 / page 32
Over the past 30 years, the US & Europe’s share of chip manufacturing has declined from 81% to 21%. Furthermore, over the next decade, global manufacturing capacity is expected to increase by roughly 50%, 40% of which will be in China and only 6% expected to come from the US. According to a study by BCG, between $20 and $50 billion in US federal grants and tax incentives would be needed to reverse the declining market share trend of the last 30 years.

Regional semiconductor demand can be measured in three different ways: i) by the headquarter location of the electronic device maker (design devices and purchase chips); ii) by the manufacturing or assembly location; or, iii) by the location of the end user of the finished electronic device.

Source: (1) BCG, Semiconductors Industry Association “Strengthening the Global Semiconductor Supply Chain in an Uncertain Era”. April 2021. China is mainland China only. BCG analysis with data from SIA WSTS, Gartner, IDC.

Supply Side Dislocations / NOV 2021 / page 34
Semiconductor Demand Well Above Trend

In an effort to avoid future supply chain bottlenecks, automakers globally have started “over-ordering” chips necessary for production. In Q3 2021, chip orders by automotive customers were 42% above the number of cars actually being produced.

Source: (1) FT. “EU Should Put the Brakes on its Chips Strategy” (November 4, 2021). Bernstein.
Semiconductors Essential to Auto Manufacturing

As vehicles become more technologically advanced, semiconductors have become a more critical piece of the manufacturing process. A modern vehicle uses roughly 1,400 chips, on average, to control everything from the airbags to AV displays and navigation.

Source: Bloomberg “Silicon Valley Answer to the EV Question Calls for Less Silicon” (King, Coppola, September 29, 2021).
Growing Chip Backlog

In September, the wait time between ordering a new semiconductor and delivery hit a record high 21.7 weeks, nearly double the pre-COVID average wait time. While the Biden administration and US Congress are pursuing ways to alleviate bottlenecks, the regionally specialized global value chain and surging global demand means disruption is likely to persist.

## The Staggering Cost of Semiconductor Self-Sufficiency

While semiconductors are strategically important for both economic growth and national security, developing “self-sufficiency” in every major region would require roughly $1 trillion of upfront investment and up to $125 billion of incremental annual cost.

### Incremental cost to cover 2019 demand with fully “self-sufficient” localized semiconductor supply chains

<table>
<thead>
<tr>
<th></th>
<th>Est cost range ($ bn)</th>
<th></th>
<th></th>
<th>Est cost range ($ bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upfront investment</strong></td>
<td></td>
<td></td>
<td><strong>Incremental annual cost</strong></td>
<td></td>
</tr>
<tr>
<td>EDA &amp; Core IP</td>
<td>10 - 30</td>
<td></td>
<td>Manufacturing</td>
<td>3 - 10</td>
</tr>
<tr>
<td>Design</td>
<td>30 - 95</td>
<td></td>
<td>Materials</td>
<td>10 - 35</td>
</tr>
<tr>
<td>Equipment</td>
<td>90 - 275</td>
<td></td>
<td>Equipment</td>
<td>20 - 60</td>
</tr>
<tr>
<td>Materials</td>
<td>15 - 40</td>
<td></td>
<td>Design</td>
<td>5 - 10</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>755 - 785</td>
<td></td>
<td>EDA &amp; Core IP</td>
<td>7 - 10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$900 bn - $1.2 tn</td>
<td></td>
<td><strong>Total</strong></td>
<td>$45 - $125 billion</td>
</tr>
</tbody>
</table>

Source: (1-2) BCG, Semiconductors Industry Association “Strengthening the Global Semiconductor Supply Chain in an Uncertain Era”. April 2021. Manufacturing includes both wafer fabrication and assembly, packaging and testing. Range defined by number of local companies assumed to be required to meet the local needs in each activity of the value chain.
5 Labor Market Shortages
The Great Resignation

More than 24 million US workers have quit their jobs since April 2021. In September alone, 4.4 million US employees quit, a record high level since data started being recorded in 2000.

Source: (1) Bloomberg. Data as of November 19, 2021.
The Great Resignation

Source: (1-3) Bloomberg. Data as of November 19, 2021. Quits level is NSA.

Supply Side Dislocations / NOV 2021 / page 41
Resignations Likely to Remain Elevated

According to a study by McKinsey, a majority of companies are experiencing higher voluntary turnover in 2021 than in prior years, and over 60% expect the trend to continue or worsen going forward. In a departure from prior labor cycles, more employees have or are willing to resign without another offer in hand, a strong indicator that the “Great Resignation” trend is likely to accelerate.

Source: (1-2) McKinsey “Great Attrition or Great Attraction? The Choice is Yours” (September 8, 2021). Employee survey included 5,774 people of working age; the employer survey included 250 managers specializing in talent. Managers were evenly split between large and midsize organizations across Australia, Canada, Singapore, the UK and the US and across multiple industries.
At the start of the pandemic, the US labor force participation rate had its largest decline since WWII. While the rate has recovered since April 2020, it remains near the 1970s lows and nearly two points below its February 2020 level. The participation rate decline represents 4.3 million fewer workers employed today relative to pre-pandemic levels.

Source: (1) Bloomberg. Data as of November 19, 2021.
Over 10 Million Job Openings

Data from the US department of labor shows employers are trying to fill more than 10 million job openings at the same time that layoffs are relatively low, resignations are rising rapidly and unemployment is steadily declining from pandemic levels. In October, jobless claims, a good proxy for layoffs, fell below 300k for the first time since the pandemic started.

Number of job openings and number of unemployed, millions

Source: (1) Bloomberg. Data as of November 19, 2021.
Structural Changes to the Workforce

Female labor force participation in the US had been slowly declining since its peak in 1999. However, in the wake of the COVID recession, with working women taking on more hours of unpaid child care compared to working men, women have left the workforce at a much more rapid pace. At the same time, there is a growing divide between the participation rates of workers with a bachelor’s degree (or higher) vs. those without. As companies invest further in automation and business processing equipment, the number of lower skilled labor jobs available may be permanently reduced.

Source: (1-2) WSJ. “4.3 Million Workers Are Missing. Where Did They Go? (October 14, 2021). Labor Department. Seasonally adjusted data includes people 16 and older. Without a degree is high school graduate and no college. Bloomberg. Data as of November 19, 2021.
Key Drivers of Labor Market Shortages

- Expansive unemployment benefits (expired Sep 6)
- COVID related fears
- COVID related visa / travel restrictions
- Child & elderly care challenges
- Elevated consumer savings rate ($3.7 trillion “excess savings” in US in 18 months)
- High workforce exit rates (baby boomers, women)
- “Mismatches” between job needs and skillsets
- Impact of supply chain disruptions
- Decade-long disruption from technology disintermediation
Wage Pressures Rising

With plentiful job openings and quit rates at record levels, wages have experienced upward pressure as employers attempt to fill positions. Near term, pressure is likely to remain elevated with Oxford Economics forecasting private hourly earnings to rise to 5% y/y in Q4 before easing toward 4% y/y in the first half of 2022.

Source: (1) Bloomberg. Data as of November 19, 2021. (2) Oxford Economics, “No Wage-Price Spiral, But There are Three Ps to Monitor”. JOLTS is private quits rate, 1-quarter lead. Wage growth is Employment Cost Index, wages and salaries, private workers y/y.
Wage Growth Pressures by Industry

A few industries have disproportionately contributed to recent wage growth. Over the past three months, education and healthcare, leisure and hospitality, and professional and business services industries have accounted for about 60% of the month-on-month wage growth. So far, the rise in wages is still below that of inflation and productivity growth.

Source: (1-2) Oxford Economics “No Wage-Price Spiral, But There are Three Ps to Monitor” (October 27, 2021).

Contributions to the m/m % change in average hourly earnings, September 2021

US average hourly earnings, y/y

Low wage: +7.9%
Middle wage: +5.2%
High wage: +4.2%

Source: (1-2) Oxford Economics “No Wage-Price Spiral, But There are Three Ps to Monitor” (October 27, 2021).
Labor Challenges Weigh on Small Business

Labor market challenges and elevated prices paid are weighing on small business optimism, which has steadily declined from its recent peak in June of this year. In a sign of continued wage pressure, a record number of small companies are planning to raise compensation in the months ahead.

Source: (1-4) Bloomberg. Data as of November 19, 2021. All indices are from the NFIB Small Business Optimism Survey.
6 Inflationary Pressures
Record Number of Companies Citing "Inflation" in Earnings Calls

In Q3, 285 S&P 500 companies cited the term “inflation” in their earnings calls (the highest number since data recording began in 2010), well above the prior record of 222 in Q2 2021 and the 5 year average of 137.

Source: (1) FactSet Earnings Insight (November 12, 2021). Based on approximately 460 companies reporting earnings.
Highest US Inflation Since 1990

In October, headline US inflation surprised markets with a 6.2% year-on-year increase, the fastest annual increase since 1990 and well above consensus expectations of 5.9%. Inflation has now exceeded 5% for five consecutive months.

US Headline CPI & Core PCE (y/y)

Headline CPI increased from 5.4% to 6.2%
Core CPI increased from 4.0% to 4.6%
Core PCE stayed flat at 3.6%

Source: (1) Bloomberg. Data as of November 19, 2021. FRED.
Supply Side Dislocations / NOV 2021 / page 52
Near Term Inflation Expectations Rising More Rapidly

University of Michigan short-term inflation expectations increased to a 13-year high of 4.9% in October while five-to-ten-year inflation expectations dropped slightly to 2.9%, though still significantly higher than pre-pandemic levels.

Expected change in US consumer prices

Source: (1) Bloomberg. Data as of November 19, 2021.
Inflation Pressures Broadening

While increases in food and fuel did contribute to October's surprisingly high inflation print, growth in "core" factors were an even larger driver. Within the "core" component, numerous sectors are facing rising inflationary pressures, not just those directly impacted by the re-opening.

Source: (1) Bloomberg. Data as of November 12, 2021.

**CPI inflation, y/y**

- **Headline CPI:** 6.2%
- **Core:** 3.6%
- **Food:** 0.7%
- **Fuel:** 2.2%

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Source: (1) Bloomberg. Data as of November 12, 2021.
Inflation Rising Across Multiple Sectors

US CPI m/m in 2021


Supply Side Dislocations / NOV 2021 / page 55
In 2021, the Bureau of Labor Statistics started publishing a version of core inflation that excluded food, shelter, energy and used cars and trucks, sectors that were severely impacted by rising commodity prices and the pandemic related shutdown and re-opening. In October, this measure of inflation moved above 4%, its highest level since 1991, indicating inflationary pressures are broadening across the economy.

Source: (1) Bloomberg. Data as of November 19, 2021. IUS CPI all items less food, shelter, energy & used cars & trucks is NSA.
Demand and Prices for Services Also Soaring

As consumer spending normalizes post-pandemic, and shifts back to services from goods, the services sector will face many of the same supply side dislocations as manufactures. In October, the ISM services PMI rose to 66.7, its highest level on record with data going back to 1997.

Source: (1-2) Bloomberg. Data as of November 19, 2021.
Fed’s “Sticky” Inflation at 30 Year High

The Atlanta Fed produces a “sticky” inflation index that tracks prices of products that typically take several months to adjust and, by definition, are more difficult to manage. In October, the Atlanta Fed “sticky” inflation index reached it’s highest level since 1991 on an annualized basis.

Source: (1) Bloomberg. Data as of November 19, 2021. IUS CPI all items less food, shelter, energy & used cars & trucks is NSA.
Producer Prices at Decade High

The US producer price index rose 8.6% y/y, the same as September and the highest on record since late 2010. While rising producer prices don’t always translate into higher consumer prices as businesses absorb some of the additional costs, they do indicate the role of supply side dislocations in rising inflationary pressure.

Source: (1) Bloomberg. Data as of November 19, 2021.

US producer price index, y/y

Source: (1) Bloomberg. Data as of November 19, 2021.
Global Inflation Also Rising

Global inflation has been rising since the end of 2020. G7 headline inflation is up from less than 1% y/y to 3.6%, and core from 1% to 2.5%. US headline inflation, at 6.2%, is at its highest level in 30 years.

Selected inflation indicators

- G7 headline: 3.6%
- G7 core: 2.5%
- US core: 4.6%

CPI, y/y

- US: 6.2%
- EM - ex Asia: 4.9%
- Eurozone: 3.4%
- EM - Asia: 1.8%
- China: 1.5%

Source: (1) Oxford Economics, “Rising Inflation is a Demand as well as Supply Issue” (October 26, 2021). (2) BIS. Bloomberg. Data as of November 19, 2021.
Global Inflation Expectations Rising

10 year breakeven rate

UK: 4.1%
US: 2.7%
Australia: 2.2%
Canada: 2.1%
Sweden: 2.0%
Germany: 1.7%
Spain: 1.7%
Italy: 1.7%
Japan: 0.5%

Source: (1) Bloomberg. Data as of November 19, 2021.
Supply Side Dislocations / NOV 2021 / page 61
Inflation Moderation in 2H 2022?

In a non-COVID world, supply side gaps can be closed relatively quickly, which raises questions about whether the current rising inflation environment represents a fundamental “regime change” or a short term phenomenon vulnerable to “normalization”. Looking ahead, numerous factors could converge to drive a moderation in inflation pressures as soon as the 2H of 2022.

More favorable base effects (Y/Y comparisons)

Continued deceleration in global growth

Massive global production and supply increases underway

Global monetary and fiscal stimulus tightening

Energy prices approaching cyclical highs / demand destruction at higher prices

Rebalancing of consumer behavior from goods to services (if global pandemic eases)

Gradual easing of supply chain disruptions

Pre-COVID disinflationary forces remain intact (aging populations, rising debt, declining productivity)

Source: (1) MUFG Macro Strategy, “November 2021 FOMC Recap” (George Goncalves).
7 Desynchronized Global Growth
Growth & Inflation Expectations Diverging

Persistent supply side dislocations have driven inflation expectations higher and growth forecasts lower.

Source: (1-2) Bloomberg. Data as of November 19, 2021.
Desynchronized Global Economic Recovery

Real GDP in 2021 relative to 2019 level

Source: (1) Oxford Economics. Data as of November 19, 2021.
Headwinds for Global Growth

Following the largest positive global demand shock since WW2, numerous supply side bottlenecks have begun to create formidable headwinds for global growth.

- Virus-related restrictions
- Supply chain dislocations / labor shortages
- Inflationary pressures
- Rising energy prices
- China slowdown (property and energy sectors)
- Fed and central bank policy tightening
- Washington risk (debt ceiling concerns, tax code change)
China’s Economy Slowing Down

Evergrande’s crisis is both a driver and symptom of China’s slowing growth. President Xi’s pivot to lower but “higher quality” growth may have positive implications in the long term, but in the near term, a more activist regulatory stance toward many industries, a focus on deleveraging, and a cooling property sector will adversely impact China’s economic growth outlook. China’s economy is expected to grow at just 5-5.5% in 2022, roughly half the rate of growth a decade ago.

China GDP growth, y/y

- 2000 - 2010 average: 10.4%
- 2011 - 2021 average: 6.9%
- 2022: 5.4%

Headwinds for China’s economy

- Recent fiscal & monetary tightening
- Recent regulatory activism in private sector
- Cooling property market
- Virus related restrictions
- Power & electricity shortages
- Production cuts related to climate policy
- Supply side / chain pressures

Source: (1) Oxford Economics. Data as of November 19, 2021.
Global Monetary Growth Normalizing

Global broad money supply growth soared in 2020 but has started to normalize over recent months. In advanced economies, broad money growth is down from a peak of 25.6% y/y to 8.1% y/y - still higher than the average of the past decade. In EM, broad money growth has returned pre-crisis norms.

Broad money growth, 6 month annualized change

Source: (1) Oxford Economics “Normalizing Money Growth is Reducing Inflation Risks” (November 9, 2021). Advanced economies include US, Eurozone, UK, Canada, Australia & Japan. EM includes China, India, Brazil, Russia, South Africa, Nigeria, Indonesia, Turkey & Mexico. Excess money growth is 6m annualized broad money growth minus a target rate consisting of the inflation target, trend GDP growth and trend velocity growth.
Global Growth Reassessment

While the initial early-cycle stages of the COVID recovery were highly synchronized on a strong and simultaneous global policy response, we expect the economic recovery in this mid-cycle stage to decelerate in terms of rate of growth, and to also become more de-synchronized and uneven.

### 2021 GDP growth forecasts, y/y

<table>
<thead>
<tr>
<th>Country</th>
<th>Peak forecast (May - June)</th>
<th>Current (November)</th>
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<tbody>
<tr>
<td>China</td>
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<td>11.8%</td>
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<td>UK</td>
<td>6.9%</td>
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<td>Japan</td>
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Desynchronized Global Growth in 2022

2022 GDP growth forecasts


Supply Side Dislocations / NOV 2021 / page 70
Appendix: Top 100 Ports in CPPI 2020 Global Ranking
Top 100 Ports in CPPI 2020 Global Ranking

<table>
<thead>
<tr>
<th>Rank</th>
<th>Port Name</th>
<th>Country</th>
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Supply Side Dislocations / NOV 2021 / page 72
## Top 100 Ports in CPPI 2020 Global Ranking

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Supply Side Dislocations / NOV 2021 / page 73
# Top 100 Ports in CPPI 2020 Global Ranking

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Supply Side Dislocations / NOV 2021 / page 74
### Top 100 Ports in CPPI 2020 Global Ranking

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About the Authors

Tom Joyce
Managing Director
Capital Markets Strategist
New York, NY

Tom.Joyce@mufgsecurities.com
(212) 405-7472

Tom Joyce is a Managing Director and Capital Markets Strategist within MUFG’s global capital markets and investment banking business. Based in New York, Tom heads a team that creates customized analytical content for multi-national S&P 500 companies. His team provides in depth analysis on the impact of economic, political, public policy and regulatory dynamics on the US credit, foreign exchange, rates and commodities markets.

Tom has over 25 years of Investment Banking experience in New York, London, Hong Kong, and San Francisco. Over the last 15 years, Tom created and built the Capital Markets Strategy role, advising corporate C-Suite executives (Boards, CEOs, CFOs, and Treasurers) on the pervasive macro forces driving markets. Tom also presents at dozens of corporate events each year including Board meetings, CEO ExCo sessions, CFO and Treasury off-sites, corporate leadership events and conferences.

Tom’s educational background includes a year of study at Oxford University from 1991 - 1992, a Bachelor of Arts in Political Science from Holy Cross College in 1993, and a MBA from Kellogg Business School, Northwestern University in 2000.

Tom resides in New Canaan, CT with his wife and four sons, where he coaches youth basketball and serves on the Board of Trustees of the New Canaan Library, the Board of the New Canaan Football (Soccer) Club and the Holy Cross College President’s Council.
About the Authors

**Hailey Orr**

Director  
Capital Markets Strategist  
New York, NY  
Hailey.Orr@mufgsecurities.com  
(212) 405-7429

Hailey Orr is a Director in MUFG’s Capital Markets Strategy group within the global capital markets and investment banking business. The team provides market based content for corporate clients to assist in strategic decision making. Focus areas include the impact of economic, political, public policy and regulatory dynamics on the US credit, foreign exchange, rates and commodities markets.

Hailey has a decade of Wall Street experience, including three years as a Consumer Sector Specialist in Equity Sales and seven years as a Capital Markets Strategist. Hailey is also a member of MUFG’s Inclusion & Diversity Council and has devoted years to participating in and developing Wall Street recruiting programs.

Hailey graduated with honors from the University of Michigan’s Ross School of Business with a BBA and a minor in International Studies.

In March 2020, Crain’s New York Business Magazine named Hailey one of the “Rising Stars in Banking and Finance”.

**Stephanie Kendal**

Associate  
Capital Markets Strategist  
New York, NY  
Stephanie.Kendal@mufgsecurities.com  
(212) 405-7443

Stephanie Kendal is an associate in MUFG’s Capital Markets Strategy group within the global capital markets and investment banking business. The team provides market based content for corporate clients to assist in strategic decision making. Focus areas include the impact of economic, political, public policy and regulatory dynamics on the US credit, foreign exchange, rates and commodities markets.

Stephanie has spent over three years as a Capital Markets Strategist. At her prior firm, Stephanie was a part of the Americas Women’s Network Junior Council and was an active member of the University of Michigan recruiting team.

Stephanie graduated with honors from the University of Michigan’s Ross School of Business with a BBA.
MUFG’s Capital Markets Strategy Team

The MUFG Capital Markets Strategy team provides monthly publications and weekly policy notes, presenting to Boards and C-Suite executives, on a broad range of transformative themes driving the FX, rates and credit markets including: the COVID-19 recovery, ESG’s acceleration, tax code policy changes, US-China decoupling, corporate strategy, geopolitical risk and central bank monetary policy.
MUFG’s Capital Markets Strategy Team
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