

# Supply Chain Monitor

March 2023





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## Summary

*At Employ America, we have argued that shortages of physical productive capacity played a major role in the inflation seen during and after the recovery from the pandemic recession. In order to analyze the impacts of shortages and their resolution, we have been tracking reported shortages and comparing them to indices of industrial production and prices faced by producers. How the path of investment and production evolves after a period of reported shortages is likely to be highly suggestive for the path of a number of other important economic dynamics, most especially the labor market and increasingly relevant energy transition dynamics.*

In today's report, we see a few key takeaways:

1. The supply chain issues that marred the ramp-up in **US Oil Production** following the onset of the Ukraine war seem to be fading, which aligns with falling oil prices and the need for the **Strategic Petroleum Reserve** to support the market. Producer prices have fallen substantially, and production is above pandemic levels, but is threatening to begin falling.
2. Producer prices for **Construction Materials** are rising alongside industrial production and imports, suggesting demand remains strong and suppliers are beginning to adapt both domestically and abroad while US homebuilders continue working through order backlogs. We see further confirmation of this dynamic in the strength in imports and productions of **Construction Machinery**.
3. Despite this, we see some signs of recessionary dynamics within **Paper and Forest Products**: falling producer prices coupled with falling imports and domestic production. Evidence of this dynamic can also be seen in **Lumber** prices falling to near pre-pandemic levels. This may help offset some of the cost pressure in construction created by the dynamics in construction materials above.

4. Industrial production across the **Capital Goods** sector – most especially various kinds of **Machinery** – has remained strong alongside rising imports and steady producer prices, suggesting tighter monetary policy may have yet to bite into firms' capacity expansion plans. Unlike many other sectors, domestic producer prices have not increased dramatically compared to pre-pandemic levels, suggesting that the Fed increasing firms' cost of capital may be more manageable on the investment front than some expect.
5. Shortages in **Basic Chemical Manufacturing** are still coinciding with depressed industrial production in both basic chemicals and downstream sectors like **Fertilizer** or **Plastics**, both of which have seen increasing imports in response to reported shortages.
6. Producer prices for **Food and Beverage** are continuing to rise as the war in Ukraine continues. As we [explained recently](#), these dynamics can quickly feed into rising inflation in **Food Services**.

## How To Read The Monitors

Hello and welcome to the new and improved Supply Chain Monitor. This month's monitors are better looking, richer in data, and more straightforwardly organized than last months.

Sectors are organized around GICS categories, to better reflect the interlinkages between industries, while the underlying data remains structured around NAICS categories. This introduces some slippage, but for a top-level macroeconomic dashboard, the explanatory benefits justify the slippage. Data is color-coded based on its relation to benchmarks: rather than establish absolute levels that represent improvement or disimprovement in a given sector, we can orient ourselves around relative annualized rates of change. If overall production is falling, but some particular sector is holding steady, it is relatively stronger than the aggregate, which may be meaningful.

The monitors are broken up into two main sections, the current state of the supply chain in the center, and the changes between present and pre-pandemic on the right. The state of the supply chain presents six month, one year and two year annualized changes in the three month moving average of three kinds of data: producer prices, industrial production and import volumes. This is designed to allow users to explore how industrial dynamics play out, to find whether a given shortage is a problem of domestic or foreign capacity, and to get a sense of the momentum of each indicator for each sector.

At the top, we provide a legend for the benchmarks used to color-code the data.

## The Monitors

Heatmap Color Code Benchmarks	Consumer Price Index Green = Lower Red = Higher	Industrial Production Green = Lower Red = Higher	Nominal Imports Green = Lower Red = Higher
6 Month (Annualized)	3.5%	-2.8%	-20.0%
One Year	6.3%	0.8%	-0.9%
Two Year (Annualized)	7.2%	1.9%	10.6%

Energy		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)							
Industry (GICS)	NAICS Name (Code)	Sub-Sectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Energy Equipment & Services (101010)	Drilling Oil and Gas Wells (213111)	--	--	9%	15%	16%	0%	29%	51%	--	--	--	--	--	20%	--	12%
	Mining and Oil and Gas Field Machinery (33313)	--	--	5%	10%	8%	-2%	7%	6%	12%	42%	57%	--	--	17%	30%	-21%
Oil, Gas & Consumable Fuels (101020)	Crude Petroleum Extraction (21112)	--	--	-68%	-9%	25%	2%	7%	5%	-57%	4%	56%	--	--	87%	40%	-4%
	Natural Gas Extraction (21113)	--	--	-34%	-9%	25%	-4%	3%	6%	30%	-12%	47%	--	--	87%	116%	10%
	Petroleum Refineries (32411)	0	0	-25%	7%	34%	-2%	-1%	6%	-64%	16%	45%	1	2	77%	38%	-7%
	Paving, Roofing, and Other Petroleum and Coal Products (32412)	--	--	3%	12%	14%	23%	9%	8%	-91%	10%	8%	--	--	26%	67%	15%

Materials Chemicals		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)			Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years					
Chemicals (151010)	Basic Chemical Manufacturing (3251)	1	2	-12%	5%	18%	-15%	-11%	-2%	-8%	7%	25%	3	2	41%	44%	-8%
	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing (3252)	0	4	-20%	-6%	8%	-10%	-6%	2%	-49%	-18%	16%	1	13	26%	37%	1%
	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	0	0	-12%	6%	27%	-5%	1%	4%	11%	5%	65%	1	1	59%	96%	1%
	Paint, Coating, and Adhesive Manufacturing (3255)	0	2	6%	15%	18%	-1%	14%	17%	-25%	6%	12%	2	4	39%	40%	15%
	Soap, Cleaning Compound, and Toilet Preparation Manufacturing (3256)	1	1	7%	10%	9%	1%	0%	1%	-5%	10%	10%	9	7	16%	36%	-1%
	Plastics Product Manufacturing (3261)	2	1	-1%	6%	16%	-11%	-4%	-1%	-45%	-11%	-2%	9	10	34%	41%	3%
	Rubber Product Manufacturing (3262)	1	4	7%	10%	12%	-5%	2%	1%	-30%	6%	8%	2	8	24%	30%	-3%

Materials Construction Materials + Metals		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)							
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Construction Materials (151020)	Clay Product and Refractory Manufacturing (3271)	1	1	7%	11%	11%	-9%	-2%	1%	-35%	-10%	3%	1	2	23%	27%	2%
	Cement and Concrete Product Manufacturing (3273)	1	2	12%	15%	13%	16%	6%	6%	-35%	13%	16%	1	2	27%	52%	6%
	Lime and Gypsum Product Manufacturing (3274)	--	--	15%	21%	20%	9%	17%	5%	6%	34%	39%	--	--	41%	81%	13%
Metals & Mining (151040)	Architectural and Structural Metals Manufacturing (3323)	0	0	-3%	7%	25%	0%	0%	2%	-18%	12%	27%	1	1	53%	70%	-1%
	Metal Ore Mining (2122)	0	0	6%	0%	6%	-3%	-6%	-4%	-42%	-14%	29%	2	1	34%	19%	-8%
	Nonmetallic Mineral Mining and Quarrying (2123)	0	0	12%	14%	11%	-12%	-9%	-5%	-11%	-3%	11%	1	1	22%	21%	-2%
	Iron and Steel Mills and Ferroalloy Manufacturing (3311)	1	3	-44%	-25%	26%	-12%	-7%	-2%	-50%	-20%	56%	6	13	63%	55%	-1%
	Alumina and Aluminum Production and Processing (3313)	0	0	-11%	-8%	12%	-32%	-15%	-3%	-75%	-12%	33%	2	7	20%	53%	1%
	Nonferrous Metal (except Aluminum) Production and Processing (3314)	0	0	4%	-2%	6%	-4%	5%	-3%	-33%	-22%	-8%	2	1	24%	82%	5%
	Foundries (3315)	0	0	3%	10%	12%	-9%	-2%	6%	-28%	-5%	18%	1	1	28%	43%	-8%

Materials Paper & Forest Products + Containers and Packaging		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)							
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub- sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Containers & Packaging (151040)	Glass and Glass Product Manufacturing (3272)	0	0	12%	6%	9%	4%	-6%	7%	-35%	4%	11%	2	2	19%	33%	-8%
Paper & Forest Products (151050)	Logging (1133)	0	0	-4%	1%	3%	4%	8%	9%	-38%	-12%	4%	1	3	13%	54%	17%
	Sawmills and Wood Preservation (3211)	0	0	-26%	-29%	-9%	--	--	--	-83%	-23%	-13%	3	3	26%	86%	7%
	Veneer, Plywood, and Engineered Wood Product Manufacturing (3212)	0	0	-30%	-20%	1%	-14%	-11%	-3%	-88%	-31%	-5%	2	2	60%	73%	-2%
	Other Wood Product Manufacturing (3219)	1	1	-8%	2%	14%	-15%	-8%	-3%	-63%	-23%	1%	2	4	40%	41%	5%
	Pulp, Paper, and Paperboard Mills (3221)	1	3	7%	13%	16%	-21%	-11%	-4%	4%	25%	29%	2	3	30%	30%	-9%
	Converted Paper Product Manufacturing (3222)	1	1	6%	12%	14%	-13%	-9%	-4%	-31%	-4%	8%	4	7	29%	31%	-5%



Materials Capital Goods		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)							
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Aerospace & Defense (201010)	Aerospace Product and Parts Manufacturing (3364)	0	0	4%	5%	3%	2%	9%	5%	19%	27%	8%	1	1	8%	-20%	10%
Electrical Equipment (201040)	Logging (1133)	--	--	4%	7%	8%	-2%	-7%	4%	-58%	-24%	-7%	--	--	17%	-1%	1%
	Sawmills and Wood Preservation (3211)	3	28	11%	13%	18%	-7%	0%	2%	34%	45%	45%	4	28	34%	92%	5%
Machinery (201060)	Agricultural Implements (33311)	--	--	7%	12%	12%	-3%	5%	9%	4%	23%	22%	--	--	26%	75%	21%
	Construction Machinery (33312)	--	--	11%	12%	11%	1%	5%	17%	26%	34%	44%	--	--	21%	35%	13%
	Industrial Machinery Manufacturing (3332)	4	9	4%	10%	12%	0%	3%	8%	-5%	3%	14%	4	9	29%	20%	23%
	Commercial and Service Industry Machinery Manufacturing (3333)	--	--	4%	8%	9%	1%	2%	5%	-19%	-6%	7%	--	--	19%	15%	-1%
	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing (3334)	1	1	4%	13%	16%	26%	-17%	-6%	-27%	3%	10%	1	1	36%	49%	1%
	Metalworking Machinery Manufacturing (3335)	0	0	7%	9%	8%	-10%	-1%	2%	12%	17%	16%	1	2	14%	5%	1%
	Engine, Turbine, and Power Transmission Equipment Manufacturing (3336)	0	0	6%	8%	6%	-9%	-5%	6%	-29%	8%	8%	1	1	13%	11%	-2%
Heavy Duty Truck Manufacturing (33612)	1	7	1%	3%	2%	-9%	5%	6%	10%	36%	29%	1	7	5%	14%	-4%	

Consumer Discretionary		State of the Supply Chain											Vs. Pre-Pandemic				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)			Trailing 12m, Ratio of Current to March 2020				
Industry (GICS)	NAICS Name (Code)	Sub-sectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Automobiles and Components (2510)	Motor Vehicle Parts Manufacturing (3363)	--	--	3%	4%	5%	4%	10%	1%	-7%	12%	7%	--	--	10%	17%	2%
	Automobile Assemblies (336111)	--	--	5%	5%	4%	-12%	10%	-1%	43%	21%	1%	--	--	9%	-6%	-26%
	Light Truck and Utility Vehicle Assemblies (336112)	--	--	5%	5%	4%	-9%	11%	4%	14%	11%	10%	--	--	9%	15%	4%
Household Durables (252010)	Audio and Video Equipment Manufacturing (3343)	--	--	4%	5%	8%	-13%	3%	1%	-9%	-22%	-4%	--	--	18%	30%	10%
	Household Appliance Manufacturing (3352)	1	2	1%	7%	10%	3%	-5%	-1%	-55%	-25%	-9%	2	5	21%	37%	9%
	Electrical Equipment Manufacturing (3353)	3	5	8%	15%	16%	-5%	3%	-3%	0%	17%	16%	3	5	33%	32%	5%
	Office Furniture (including Fixtures) Manufacturing (3372)	--	--	9%	11%	13%	-9%	-6%	-7%	-39%	-7%	3%	--	--	29%	12%	-8%
	Manufactured Home (Mobile Home) (321991)	--	--	-8%	4%	18%	--	--	--	-80%	-12%	-5%	--	--	54%	163%	28%
Textiles, Apparel & Luxury Goods (252030)	Fiber, Yarn, and Thread Mills (3131)	--	--	-23%	2%	15%	-15%	-11%	-8%	-51%	-15%	-5%	--	--	34%	21%	-2%
	Fabric Mills (3132)	--	--	3%	9%	11%	-15%	-12%	0%	-47%	-12%	-5%	--	--	22%	20%	-15%
	Textile and Fabric Finishing and Fabric Coating Mills (3133)	--	--	-2%	7%	13%	-5%	-3%	5%	-35%	-3%	-1%	--	--	39%	12%	4%
	Textile Furnishings Mills (3141)	--	--	4%	3%	4%	-15%	-14%	-5%	-37%	-25%	-9%	--	--	7%	15%	-8%
	Other Textile Product Mills (3149)	--	--	6%	8%	10%	-1%	-10%	2%	-56%	-24%	-14%	--	--	21%	30%	-4%

Consumer Staples Food, Beverage & Tobacco		State of the Supply Chain											Vs. Pre-Pandemic Trailing 12m, Ratio of Current to March 2020				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)			Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years					
Food, Beverage, and Tobacco (3020)	Grain and Oilseed Milling (3112)	0	0	-3%	11%	18%	-6%	-7%	-2%	-12%	17%	29%	4	2	48%	77%	-2%
	Sugar and Confectionery Product Manufacturing (3113)	0	0	11%	11%	9%	6%	5%	6%	-11%	10%	17%	1	1	16%	38%	15%
	Fruit and Vegetable Preserving and Specialty Food Manufacturing (3114)	0	0	14%	18%	13%	-4%	-3%	-1%	0%	14%	18%	1	1	27%	49%	4%
	Dairy Product Manufacturing (3115)	0	0	-6%	8%	11%	0%	0%	-1%	19%	29%	31%	1	2	23%	64%	5%
	Animal Slaughtering and Processing (3116)	0	0	-2%	8%	12%	2%	1%	0%	-9%	-3%	26%	2	2	26%	59%	2%
	Bakeries and Tortilla Manufacturing (3118)	--	--	11%	15%	12%	2%	-2%	0%	20%	21%	21%	--	--	22%	60%	-1%
	Other Food Manufacturing (3119)	1	1	9%	16%	12%	0%	1%	1%	-11%	7%	16%	1	1	26%	49%	3%
	Beverage Manufacturing (3121)	--	--	12%	11%	8%	-4%	1%	3%	-37%	-2%	4%	--	--	16%	27%	8%
	Tobacco Manufacturing (3122)	--	--	11%	11%	10%	-1%	-7%	-6%	-36%	-3%	-7%	--	--	28%	18%	-8%

Health Care		State of the Supply Chain											Vs. Pre-Pandemic				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)			Trailing 12m, Ratio of Current to March 2020				
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Health Care Equipment & Supplies (3020)	Grain and Oilseed Milling (3112)	2	2	4%	4%	3%	-6%	3%	5%	-9%	-2%	3%	17	14	7%	27%	13%
Pharmaceuticals (3020)	Tobacco Manufacturing (3122)	1	1	3%	4%	3%	10%	7%	8%	16%	8%	8%	3	3	8%	39%	17%

Information Technology		State of the Supply Chain											Vs. Pre-Pandemic				
		Supply Chain Disruption In the Last 6 Months		Producer Prices (Annualized)			Industrial Production (Annualized)			Nominal Import Volumes (Annualized)			Trailing 12m, Ratio of Current to March 2020				
Industry (GICS)	NAICS Name (Code)	Subsectors Reporting Shortages	Longest Shortage (Months)	6m	One Year	Two Years	6m	One Year	Two Years	6m	One Year	Two Years	Most Sub-sectors Reporting Shortages	Longest Reported Shortage (Months)	Producer Prices	Nominal Import Volumes	Industrial Production
Technology, Hardware and Equipment (4520)	Computer and Peripheral Equipment Manufacturing (3341)	1	0	3%	3%	4%	17%	16%	20%	-35%	-15%	-3%	3	6	4%	31%	52%
	Communications Equipment Manufacturing (3342)	--	--	6%	5%	4%	-3%	11%	9%	18%	-14%	4%	--	--	8%	14%	28%
	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345)	0	0	4%	5%	5%	-2%	-4%	2%	3%	8%	12%	1	10	11%	17%	-3%
Semiconductors & Equipment (4530)	Semiconductor and Other Electronic Component Manufacturing (3344)	5	26	2%	2%	3%	-35%	-19%	-6%	-30%	-3%	11%	7	26	4%	37%	10%