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POLICY BRIEF

22-12 Soaring Demand Is Driving Double-Digit Import Price Inflation in the United States

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October 2022

INTRODUCTION

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At a time of soaring price increases in the United States, inflation in the US import sector has been soaring the most. Import price inflation in the first half of 2022 was in the double digits, above US consumer price index (CPI) and personal consumption expenditures (PCE) inflation. Excess demand for certain imported goods is playing a big role, but so are supply shortages caused by temporary business closures overseas and shipping delays associated with the COVID-19 pandemic. Correctly identifying the culprit for misaligned demand and supply, and hence rising prices, is central to understanding the type and extent of policy intervention needed.

This Policy Brief employs an approach similar to that applied in a June 2022 Federal Reserve Bank of San Francisco note, which used data on 100 goods and services categories to conclude that supply factors in the US domestic economy account for about half the rise in inflation, compared with about one-third for demand factors. A different conclusion is reached, however, if a similar methodology is applied only to the import sector. An examination of price and quantity movements of over 15,000 imported goods to determine the cause of import price inflation finds that demand factors have been at least as important in explaining import price inflation as supply constraints and that they are farther from historical norms.

Judging the importance of supply and demand factors matters because policy prescriptions are different for each. When supply is constrained, even a small increase in demand can lead to higher prices. As Federal Reserve chairman Jerome Powell pointed out in a June 15, 2022, press conference, some product markets have "a vertical supply curve or close to it." Higher demand thus only drives prices up without expanding supply, explaining why the Fed's policy of raising interest rates to depress demand could achieve lower prices without huge changes in output.

The import sector ought to respond to similar dynamics. Suppressing demand should slow import price inflation. And if import supply is constrained, lower demand may not lead to huge changes in imports. In addition, the rejuvenation of logistics networks will be an important part of the solution to boost supplies.

The efficacy of tariff reduction to lower current rates of inflation will also depend on which factors are driving import price inflation. In general, lowering tariffs increases competition and helps constrain future price inflation. But during periods of severe shortages, tariff reductions would be less likely to be passed on to consumers because there would be no supply response. Over time, supply will become more elastic as production returns to normal and logistics improve, but the immediate effects of tariff reduction on inflation are likely to be muted in a supply-constrained environment.

METHODOLOGY

One way to identify which effect is dominating is to examine concurrent movements in prices and quantities. When demand surges, quantities and prices typically go up together. In Econ 101, this is a shift out of the demand curve and a movement along the upward-sloping supply curve (figure 1a). For example, increased consumption of electronics during the COVID-19 pandemic caused a surge in demand for semiconductors, and, as explained in this Policy Brief, data show both import prices and import quantities rising.

In contrast, when supply is unusually curtailed, as could happen because of factory closures or input shortages, any demand shift out will result in rising prices, with little or no supply response (figure 1b). If conditions are severe enough, supply could even contract, exacerbating price increases (figure 1c).

Consider motor vehicles. Companies around the world suspended production for health reasons. Later, when demand increased, they had trouble accessing sufficient parts because they had incorrectly anticipated weak demand. As a result, auto import prices have risen while the number of imported cars has declined.

This Policy Brief focuses on imports, measured at a very detailed level to examine shifts in supply and demand—and the importance of global supply disruptions in price pressures.

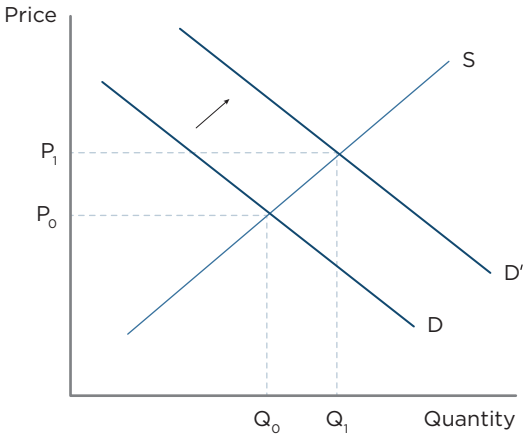
Measuring import prices

Monthly data on more than 15,000 Harmonized System (HS) 10-digit products imported into the United States are used to estimate import price inflation. Individual product prices are calculated as unit values, defined as the value of imports of a specific product divided by the import quantity (e.g., number or weight). Given the extraordinary detail of the import data, movements in unit values are effectively price changes. In contrast, for more aggregate import categories, quantities may not be comparable for different goods within the category. For example, at the six-digit level (the alternative detailed level), all men's and boys' coats are lumped together so a movement in the import unit value could result from a shift between products (from windbreakers to more expensive winter jackets) or from different units of measurement across products

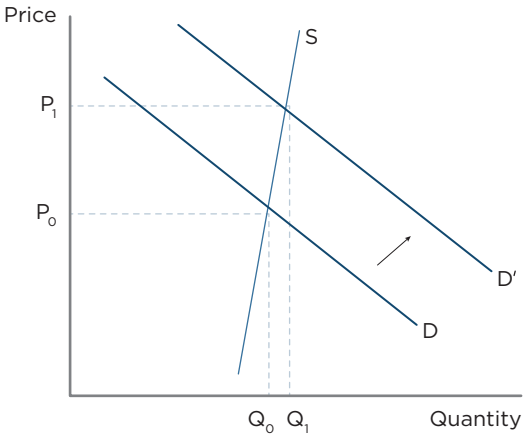
in the group (some by weight and some by number of units). The measure of inflation used in this Policy Brief avoids such inconsistencies by calculating from the universe of imports in very specific product categories, such as "men's raincoats made of manmade materials" or "fresh turnips."[1]

Figure 1
Demand and supply shocks

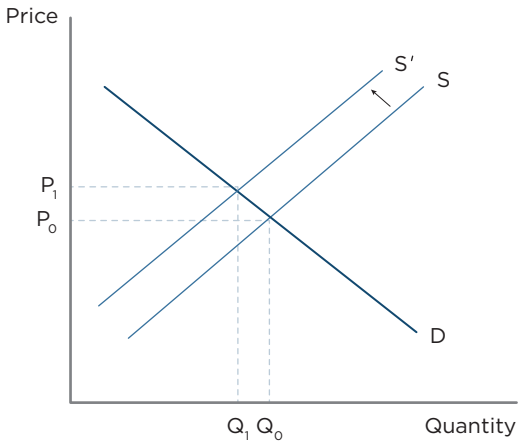
a. Demand increases, standard supply response



b. Demand increases, limited supply response



c. Supply decreases



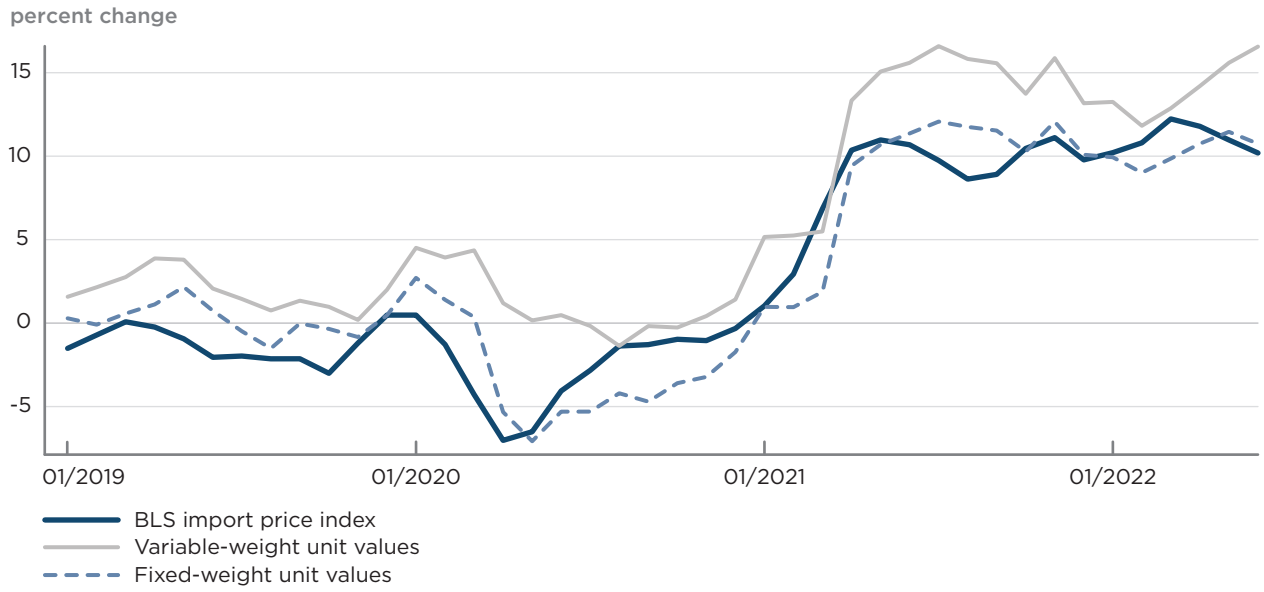
Note: D is the demand curve and S is the supply curve. S′ and D′ are the new demand and supply curves after the shock. P_0 is the initial price and Q_0 is the initial quantity. P_1 is the postshock price and Q_1 is the postshock quantity.

1 One caveat with using 10-digit data is that new codes are added and old codes disappear and some goods are not traded every month. Since 2017 the codes that have positive import values during each month for the whole period have accounted for 81 percent of total trade.

IMPORT PRICE INFLATION IS HIGH

Unit values show rising inflation and trends similar to the Bureau of Labor Statistics (BLS) import price index (IPI). Figure 2 shows the inflation rate using the import price index as measured by the BLS, where price data are primarily drawn from a survey of exporting enterprises. It also shows inflation rates using two indexes of inflation calculated from unit values of 15,000 10-digit products, using fixed and variable weights.[2]

Figure 2
Import price inflation, January 2019–June 2022



Note: Import price index from the Bureau of Labor Statistics (BLS). Unit values (value/quantity or product prices) calculated from the Census data. Fixed weights are defined as the sum of total imports in a given product over total imports for the period since January 2018. Variable weights are defined as imports of a product relative to total imports in the month.

Sources: Bureau of Labor Statistics, US Census Bureau, and author's calculations.

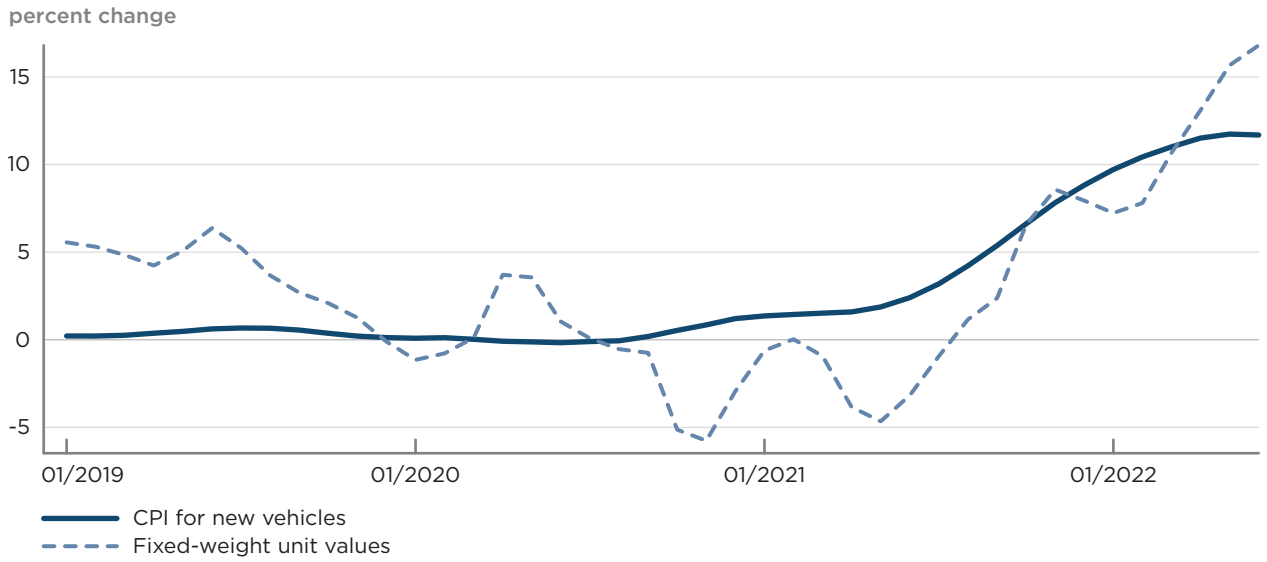
All three series show average import price inflation running at or above 10 percent, well above pre-COVID times. The fixed weight of unit price inflation, which puts fixed period weights on each product, is very similar to the BLS price index.

The slight differences between the series are a result of methodology. Inflation using monthly import values as weights on unit values (the gray line) is running above BLS inflation and fixed-weight inflation, as more weight is given to goods where prices and quantities are rising rapidly.

2 Inflation is measured as the 12-month difference in natural logarithms.

To illustrate how import prices and CPIs are moving together, figure 3 shows 6-month moving averages of the annual inflation rate of the CPI for new vehicles—the price that US consumers face—and the corresponding inflation rate from imports based on the unit values of imported vehicles.[3] Both show strong increases since 2020, with new car prices up more than 10 percent in 2022.

Figure 3
New vehicle consumer price index (CPI) and unit values, annual inflation rates, 6-month moving averages, January 2019–June 2022



Sources: Bureau of Labor Statistics, US Census Bureau, and author's calculations.

IMPORT QUANTITIES ARE ALSO SOARING

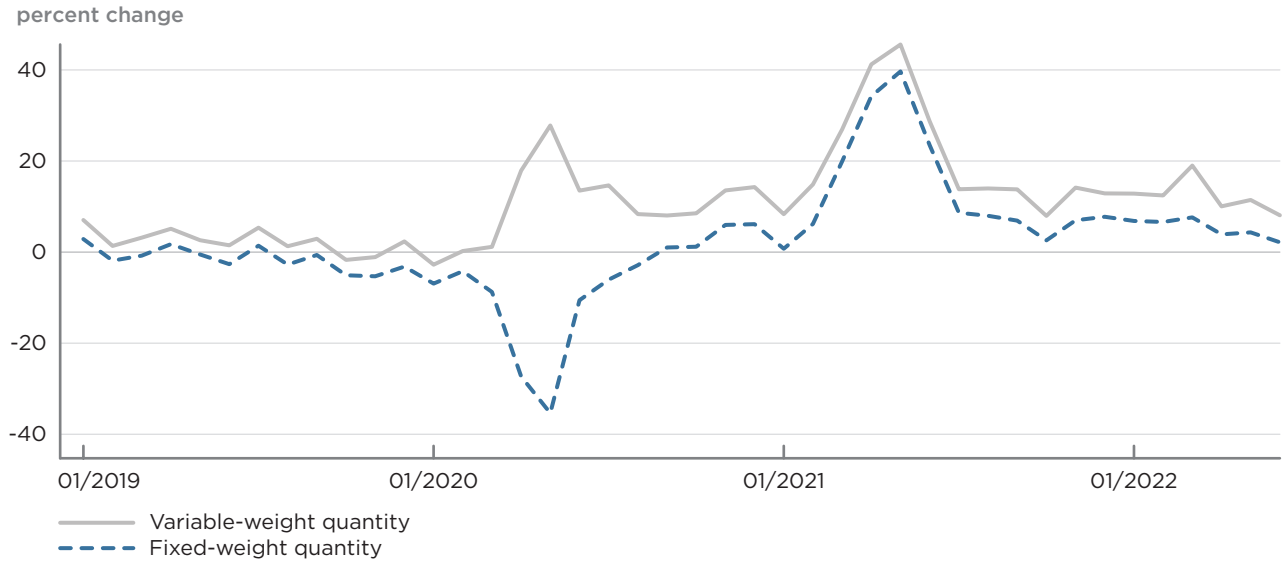
If rising prices are primarily a result of global constraints, import quantities should be flat or falling. That is not the case. Quantities have been especially volatile since the onset of COVID-19 and growth is up markedly even after stabilizing from their early-2021 peak.

Figure 4 shows import quantity growth with fixed and monthly weights. Two points stand out. First, the average growth in import quantities since 2021 is well above pre-COVID levels. Second, when COVID-19 hit in 2020 there was a divergence between fixed- and variable-weight average growth. This divergence reflects the extraordinary demand for specific goods, while other goods experienced plummeting demand. The drop in aggregate imports (shrinking denominator), combined with strong imports of particular goods, meant that these goods experienced both high shares and skyrocketing growth, pushing up quantity growth when measured using time-varying shares. Examples of goods with surging demand are tracksuits, cotton blouses, video projectors, and several chemical compounds. In contrast, goods with declining demand in mid-2020 are

3 Moving averages are used because at the monthly level auto import prices are highly volatile because shipments come in bulk—so in one month there may be a large shipment of Toyotas and in another a large shipment of BMWs. Moving averages reported in figures 3, 5, 6, and 7 are calculated using current and previous months for the date shown.

dresses, dress suits, cameras, petroleum, and industrial diamonds. By March 2021, the two series converged and skyrocketed; demand remains higher than pre-COVID levels for most goods.

Figure 4
Import quantity growth, January 2019–June 2022



Sources: US Census Bureau and author's calculations.

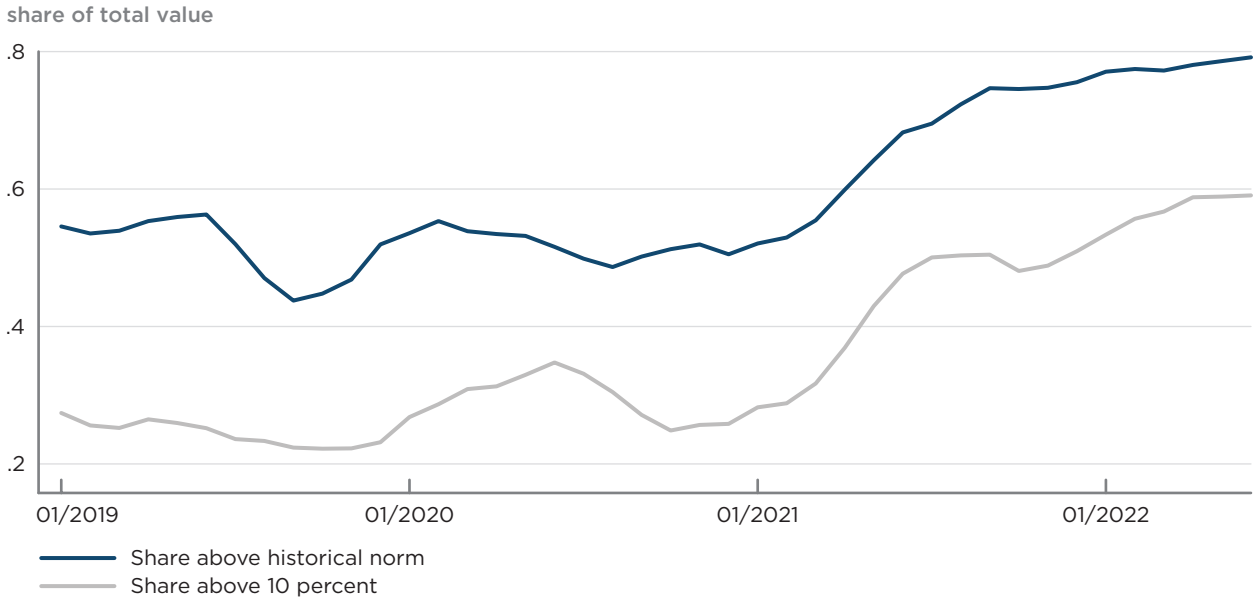
The movements in prices and quantities, with both up sharply since early 2021, imply that strong demand for goods is a big part of the explanation for high import price inflation. The next section explores the share of goods with increasing prices and quantities compared with the share with rising prices and stagnant quantities.

MOST GOODS ARE EXPERIENCING HIGH INFLATION

This section focuses on goods with inflation above 10 percent and with inflation above pre-COVID norms.[4] The over-10-percent group accounted for 58 percent of US goods imports on average in 2022, up from 45 percent in 2021 and 30 percent in 2020 (figure 5). The above-historical-inflation group accounted for 78 percent of US goods imports in 2022, up from 68 percent in 2021 and 52 percent in 2020 (figure 5). The rise in the share of imports with inflation over 10 percent is notable: Most imported goods—almost twice as many as in 2020 by value—are experiencing high inflation since January 2021.

4 Pre-COVID norm is the average product price inflation rate in the month during the period January 2012–June 2020. The inflation data used start in 2012 (based on unit values from 2011–12) to drop potential outliers resulting from the aftermath of the 2008 financial crisis shock.

Figure 5
Share of imports with high inflation, 3-month moving averages, January 2019–June 2022



Note: Historical norm is the average product price inflation rate for the given month in the period January 2012–February 2020.

Sources: US Census Bureau and author's calculations.

WHAT IS CAUSING THE RISE IN IMPORT PRICES?

To examine the cause of inflation, this section splits goods depending on supply response: goods whose prices and quantities are rising compared with those whose prices are rising but quantities are not.

Figure 6a disaggregates these goods into two categories. The dotted blue line shows the fraction of the high-inflation (10 percent or more) goods for which quantities failed to expand relative to the same month in the previous year. These goods are subject to stringent supply constraints as prices rise sharply while quantities are stagnant or falling. These supply-constrained goods accounted for less than 30 percent of the value of imports in the first half of 2022.

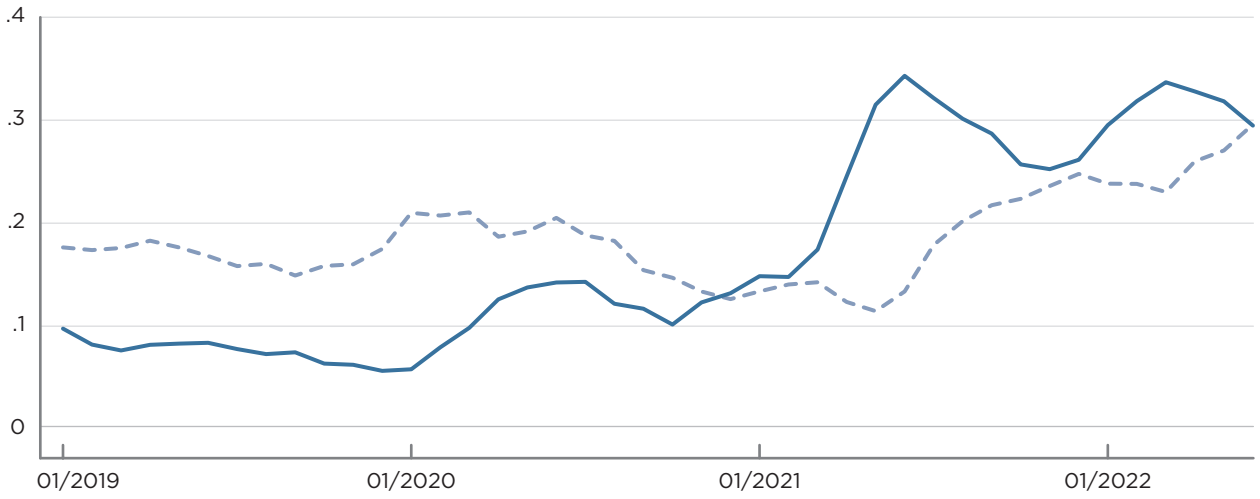
The solid blue line shows the share of import value where prices increased by 10 percent or more and quantities were increasing. These are goods where demand increase was accommodated to some extent by a supply expansion: prices are going up and higher quantities are being imported. These excess demand goods accounted for over 30 percent of imports through June 2022.

While both factors are clearly important, the big change from historical trends is this greater share of imports experiencing both rising prices and quantities. Prior to COVID-19, less than 13 percent of goods on average experienced rising prices and quantities.

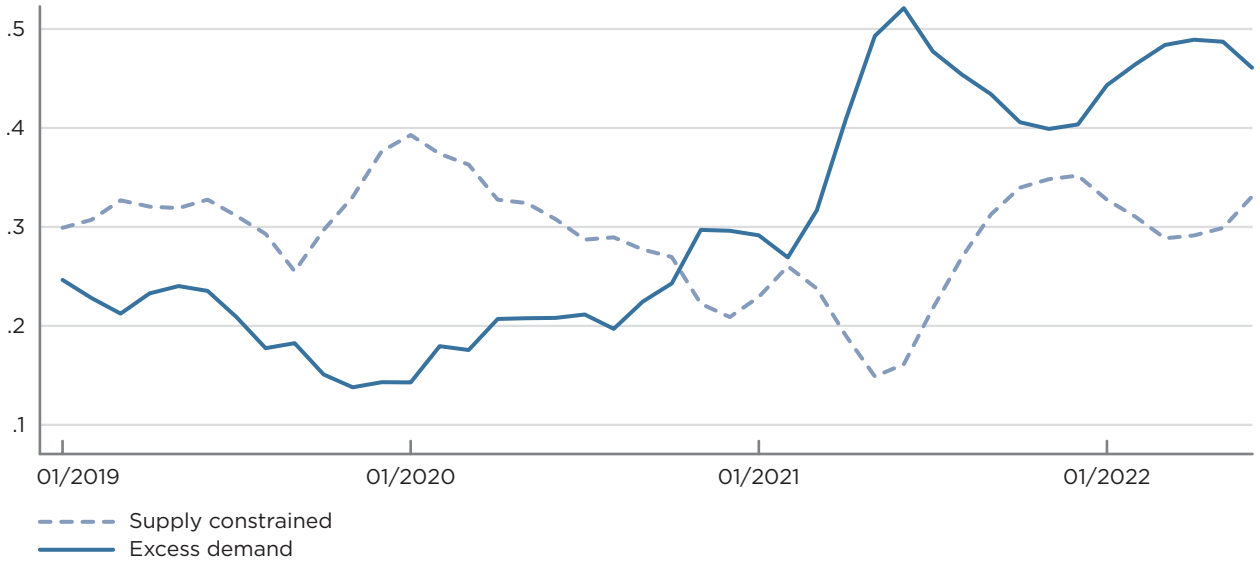
One potential caveat is that zero growth in supply is a strong condition. A more liberal take on supply constraints is to limit to growth below the expected rate (like the methodology in the Fed note), as opposed to zero growth.

Figure 6
Impact of supply constraints and excess demand on inflationary pressures, 3-month moving averages, January 2019–June 2022

a. Conservative measure: No supply response



b. Liberal measure: Supply response above expected



Note: The panels show the share of goods in products with high price growth. In panel a, "supply constrained" is defined as the share of imports with inflation of 10 percent or more and constant or falling import quantities; "excess demand" is the share of imports with inflation of 10 percent or more and rising import quantities. In panel b, "supply constrained" is defined as the share of imports with inflation above historical average and import growth below historical average; "excess demand" is the share of goods with inflation and quantities increasing above historical averages.

Sources: Quarterly HS 10-digit data from US Census, quantity of imports and unit values, and author's calculations.

In figure 6b, supply constraints are assumed to exist when quantities expand less than expected for the product and prices increase more than expected. In contrast, demand factors dominate when prices and quantities rise more than

expected. Expected growth in prices and quantities for a product is calculated as the average growth for the product in the eight years before COVID-19, in the given month (to account for seasonal variation in demand).[5]

While the share of goods experiencing abnormal inflation is higher under this definition (reaching 80 percent by July 2022, as shown in figure 5), excess demand is even more important than supply constraints, accounting for nearly 50 percent of total imported value and 60 percent of the value of goods with high inflation.

Focusing on the share of imported goods experiencing abnormal (above historical average) inflation, the goods in the excess demand and supply constraints groups vary over time. Early in the pandemic goods such as disposable gloves, tequila, and bullets were in high demand; by the end antivirals and semiconductors were experiencing excess demand (table 1). In contrast, various types of medicines and some electronics were constrained early on, while in the first half of 2022 capital goods and vehicles have been more constrained.

Table 1
Top individual products contributing to excess demand or constrained supply, 2020–22

	Excess demand	Constrained supply
2020	Disposable gloves, tequila, cartridges for rifles or pistols, cocoa paste	Medicines, vehicles, processors, petroleum
2021	Disposable gloves, natural gas, video game consoles, metals, tequila	Medicines, laptops, chemicals
2022	Antivirals, petroleum, gas, semiconductors	Vehicles, machines for manufacturing semiconductors, oil drilling equipment

Note: These goods fall in either excess demand or constrained supply in 10 or more months of a given year or 5 or more months in the first half of 2022. They are ranked among the top 10 in terms of contribution to inflation for the category.

Sources: US Census Bureau and author's calculations.

CONTRIBUTION OF SUPPLY CONSTRAINTS AND DEMAND FACTORS TO IMPORT PRICE INFLATION

The contribution to inflation depends on not only the share of goods experiencing demand-driven or supply-constrained inflation but also the increase in prices of those goods. In general, supply-constrained goods have experienced higher inflation rates. For example, the median import price inflation for supply-constrained goods under the conservative definition was 45 percent, compared with 28 percent for goods in the excess demand category, and −13 percent for other goods in 2021.

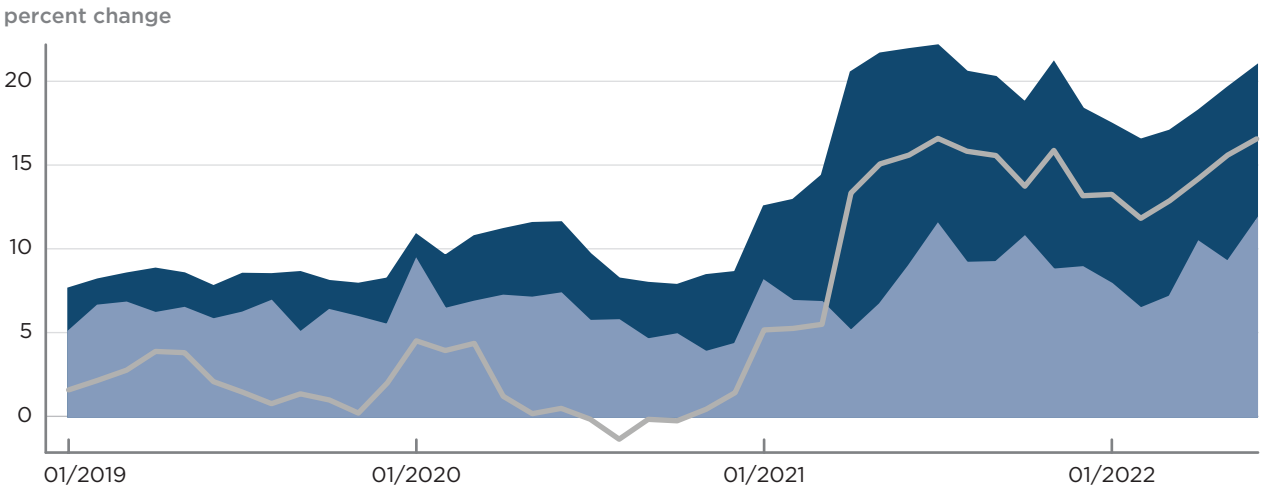
Figure 7 shows the contribution to inflation of demand factors and supply constraints on import price inflation. Inflation in supply-constrained and strong-

5 Expected growth is calculated at the 6-digit level because of numerous code changes at the 10-digit level over the period from January 2011 to February 2022.

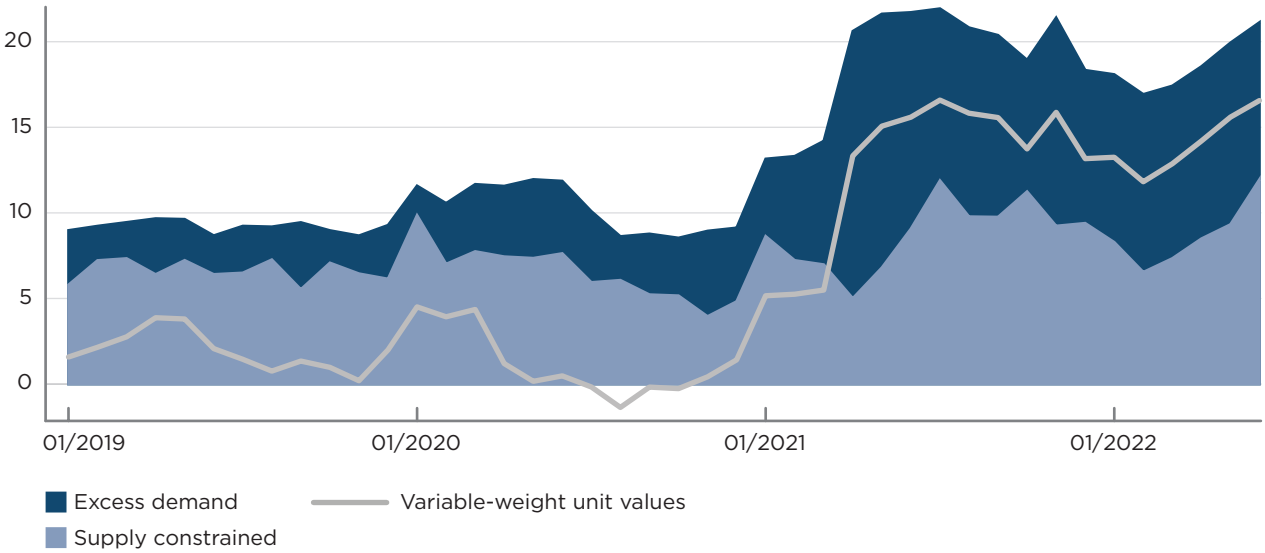
demand goods more than explain the overall increase in unit values. The big change in contribution since 2021 has been a sharp increase in the contribution of high demand to inflation, though in the second quarter of 2022 supply constraints have become more pronounced. As of June 2022, demand and supply have been about equally important in driving inflation.

Figure 7
Contribution of supply constraints and excess demand to import price inflation, 3-month moving averages, January 2019–June 2022

a. Conservative measure



b. Liberal measure



Sources: Quarterly HS-10 digit data from US Census Bureau and author's calculations. Variable-weight unit values refer to the estimated import price inflation from the unit values, using monthly weights.

It is worth noting that the relative importance of import supply constraints also matters for the effectiveness of tariff reduction as a tool to lower inflation. With near-vertical supply, tariff liberalization alone would do little to reduce

short-run consumer inflation since strong demand would offset it—allowing exporters, importers, or intermediaries to absorb the decline in tariff revenue as higher profits. The short-run effect of tariff liberalization on inflation for these goods may be limited. Reducing tariffs on some consumer goods with elastic supply would likely have more effect on short-run inflation than on supply-constrained products. Over time, of course, trade liberalization will boost competitiveness and depress prices.

CONCLUSION

A contributing factor to inflation has been global supply chain disruptions. Booming demand for certain goods (relative to services) during COVID-19 led to rising import prices, while plant and port closures led to shortages of some goods. US manufacturers were affected because they could not get critical parts and components.

The media frequently highlighted the hundreds of ships stranded outside the Los Angeles and Long Beach ports as evidence of such disruptions. But US container traffic in those two congested ports was up 16 percent between January and October in 2021 from the previous record in 2018 over the same period. While import price inflation surged since early 2021, import quantities have as well, as illustrated by the surge in activity in the Los Angeles and Long Beach ports. From this perspective, goods demand clearly increased sharply.

By various measures, import price inflation has been high over the last year. Using movements in prices and quantities of specific goods, the analysis presented here shows that the increase in import price inflation has been driven to the same or a greater extent by demand as compared with supply constraints.

The results have important implications for policies to help reduce the supply and demand imbalance and thus tame inflation. Given that high inflation is apparent in a significant and growing share of imported goods with a strong supply response, constrained global supply is not the primary force driving rising US import price inflation.

The results are also relevant for the effect of tariff reduction on short-run inflation. For tariff reduction to be effective in reducing consumer prices, import quantities need room to expand. The fact that supply constraints are present in a large share of imports (and have become more pronounced in the second quarter of 2021) means that care must be taken in using liberalization to tackle immediate price pressures. Over time, openness to trade will be critical to boosting competition and reducing inflationary pressures, but immediate relief may be more limited.

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