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The Impact of Global Shipping Cost Surges on US Import Price Inflation

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Global shipping costs have soared to record highs in recent years. Figure 1 illustrates the changes in shipping costs since 2016 for four major shipping routes to the United States. As the figure shows, costs spiked during the COVID-19 pandemic, driven by supply chain disruptions, labor shortages, and port congestion. The size of the cost increase varied across the four routes, with Shanghai-to-New York experiencing the largest increase and Rotterdam-to-New York seeing the smallest.

Costs had eased by mid-2023, but they began rising again later that year and into 2024 due to Houthi violence off the coast of Yemen that restricted access to the Suez Canal and a drought at the Panama Canal that limited vessel traffic and forced rerouting around the Cape of Good Hope. The effects of these factors on costs also varied across routes; costs for Shanghai-to-New York rose the highest, while Rotterdam-to-New York costs increased only slightly.

As global shipping costs have soared, US import prices also have increased. Figure 2 shows the year-over-year change in a composite index of maritime shipping rates over the last decade overlaid with monthly import price data from the US Bureau of Labor Statistics. The correlation between the two series has been

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Key Takeaways



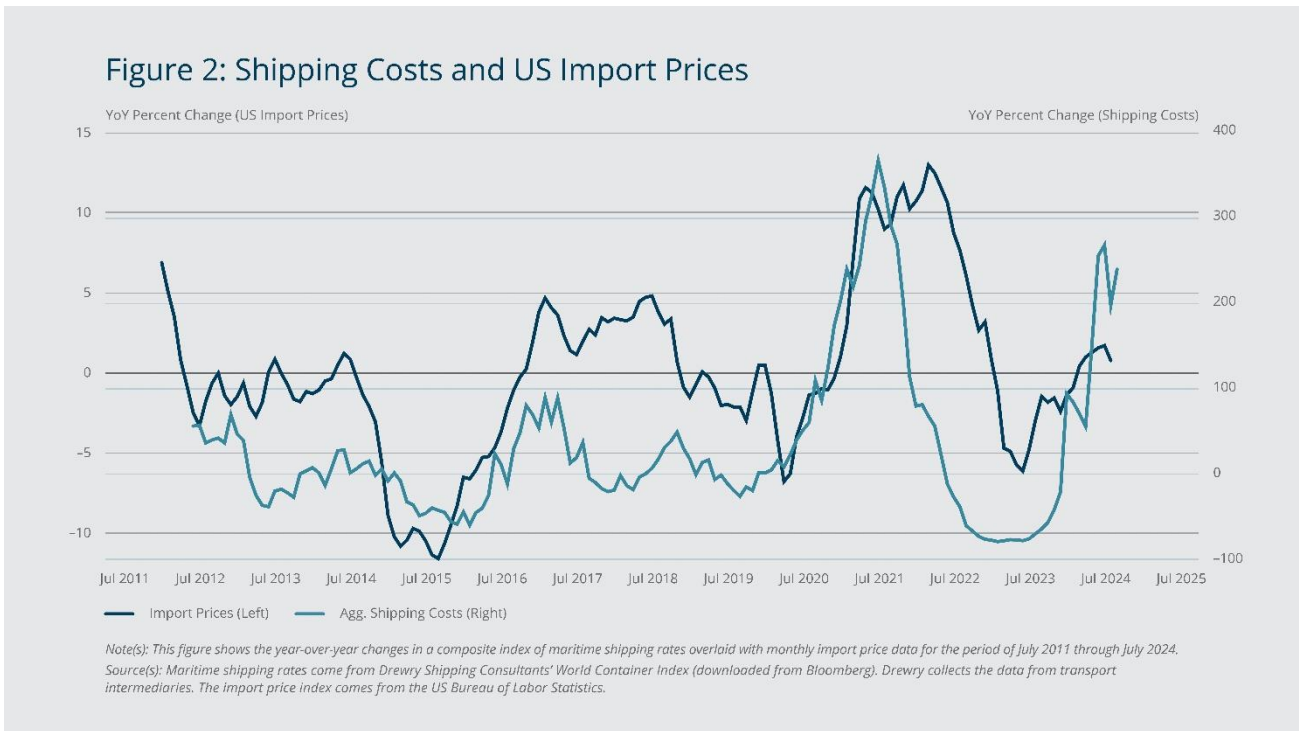
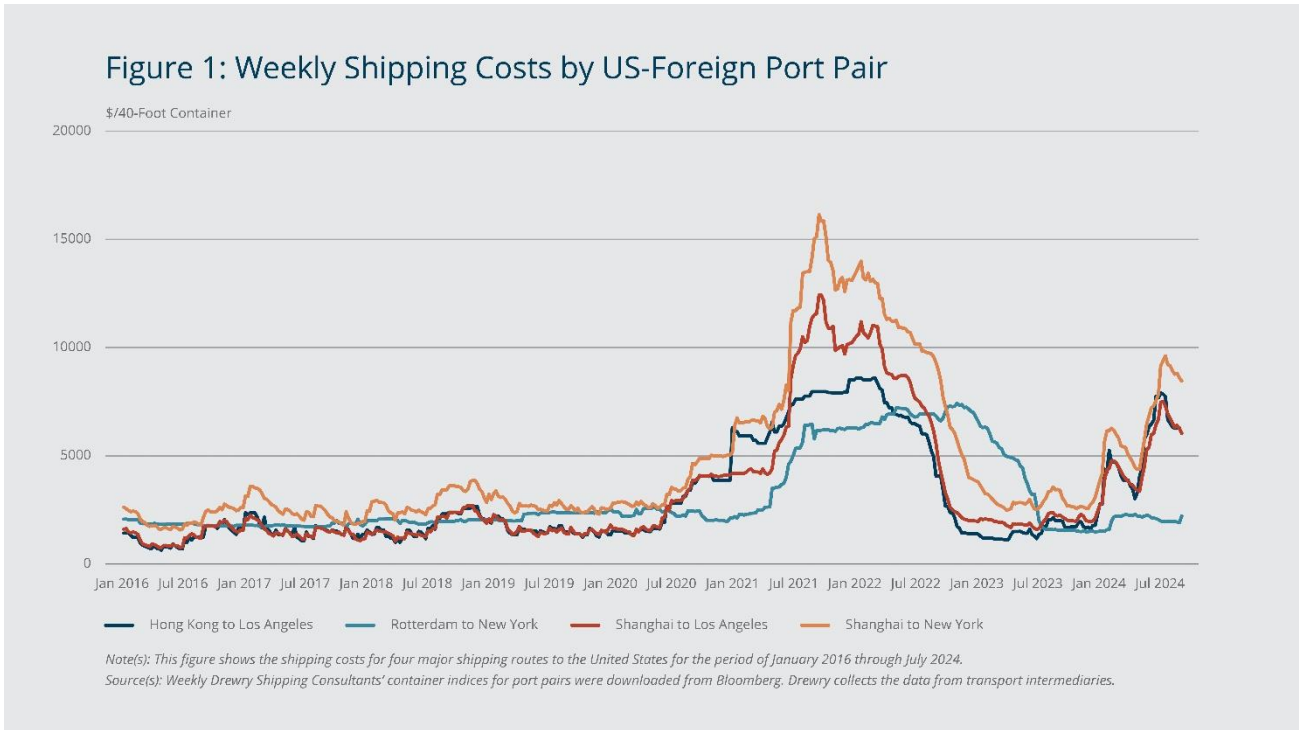
The period of 2020 through mid-2024 saw two large spikes in global shipping costs—during the COVID-19 pandemic and during disruptions at the Suez and Panama canals. Those spikes had a significantly larger pass-through into US import prices compared with price increases during the 2016–2019 period, when shipping costs were more stable.



The two shipping cost spikes contributed an estimated 0.24 and 0.34 percentage point, respectively, to average month-over-month US import price inflation.



The effect of shipping costs on import prices during those shipping cost surges may not have been as strong if a larger choice of routes had been available to US importers.



notably high in recent years. Both spiked in 2020, then plummeted until the second half of 2023, when they began rising sharply again.

The correlation raises this question: To what extent do changes in shipping costs lead to changes in import prices—how much are shipping costs passed through into US import price inflation? We find that the pass-

through increases with the severity of shipping cost surges. In the recent periods of soaring costs, the impact of those costs on US import price inflation increased significantly, according to our analysis of port-level import price data and port-pair shipping cost data.

Transport Cost Surges Drive Higher Import Prices

We analyze the pass-through of shipping costs into US import price inflation by examining the variation in import prices for the same products within a particular time period across shipping routes between different port pairs. In essence, we conduct the following experiment: The same product is shipped monthly from two different international ports to the same US port. If one of those two routes experiences an increase in shipping costs, does the import price of the product on the more expensive route increase relative to the import price of the product shipped along the cheaper route? This granular approach allows us to control for variation in the composition of imported goods.

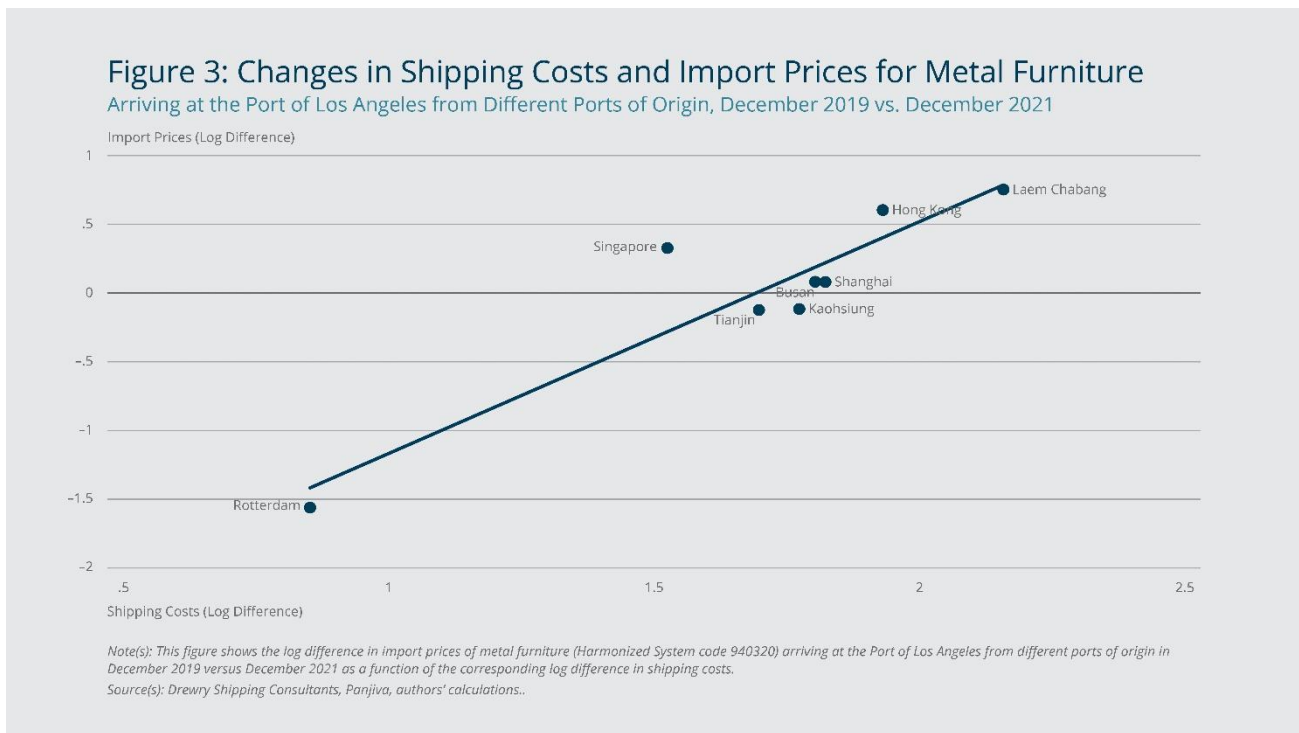


Figure 3 illustrates the variation that underlies our estimations of the pass-through effects. It shows how changes in the import prices of one specific product, metal furniture, arriving at the Port of Los Angeles during the COVID-19 period (from December 2019 through December 2021) correlate with changes in shipping costs from different ports of origin during the same period. The figure reveals significant variation in import price changes for the same good across different routes, with import-price changes growing as shipping-cost changes grow on the corresponding routes.

For our analysis, we build a data set that links shipping costs with import prices at the product-port pair level. Our data come from two sources. For import prices, we use shipment-level bill of lading (BoL) data collected by US Customs and Border Protection and provided by Panjiva, a company that collects data on global trade.¹ The data contain detailed information on each shipment, including its arrival date, ports of lading (loading) and unloading (unloading), and the product identified by a six-digit Harmonized System (HS) code,²

as well as the product’s weight, quantity, and price. We aggregate the data by product, port of loading, port of unloading, and month and compute unit values for each product, which we use as the import prices in our analysis.

For shipping costs, we use data from Drewry Shipping Consultants, which provides monthly or bimonthly time series on shipping costs between major port pairs globally. The firm’s indexes represent current market rates including all maritime charges at the origin and destination ports. The charges cover the base rate, fuel surcharge, and terminal handling charge for a 40-foot equivalent dry container.

We use our data set to run a series of impulse response functions (as in Jordá 2005), a type of regression analysis that estimates a variable’s response to changes, or shocks—in this case, US import prices’ response to shipping cost shocks. Each impulse response estimates the cumulative percentage change in import prices at different time horizons (from zero to six months) following a 1 percent shock to shipping costs.³ Our findings indicate that when shipping costs surge significantly, they can contribute substantially to US import price inflation.

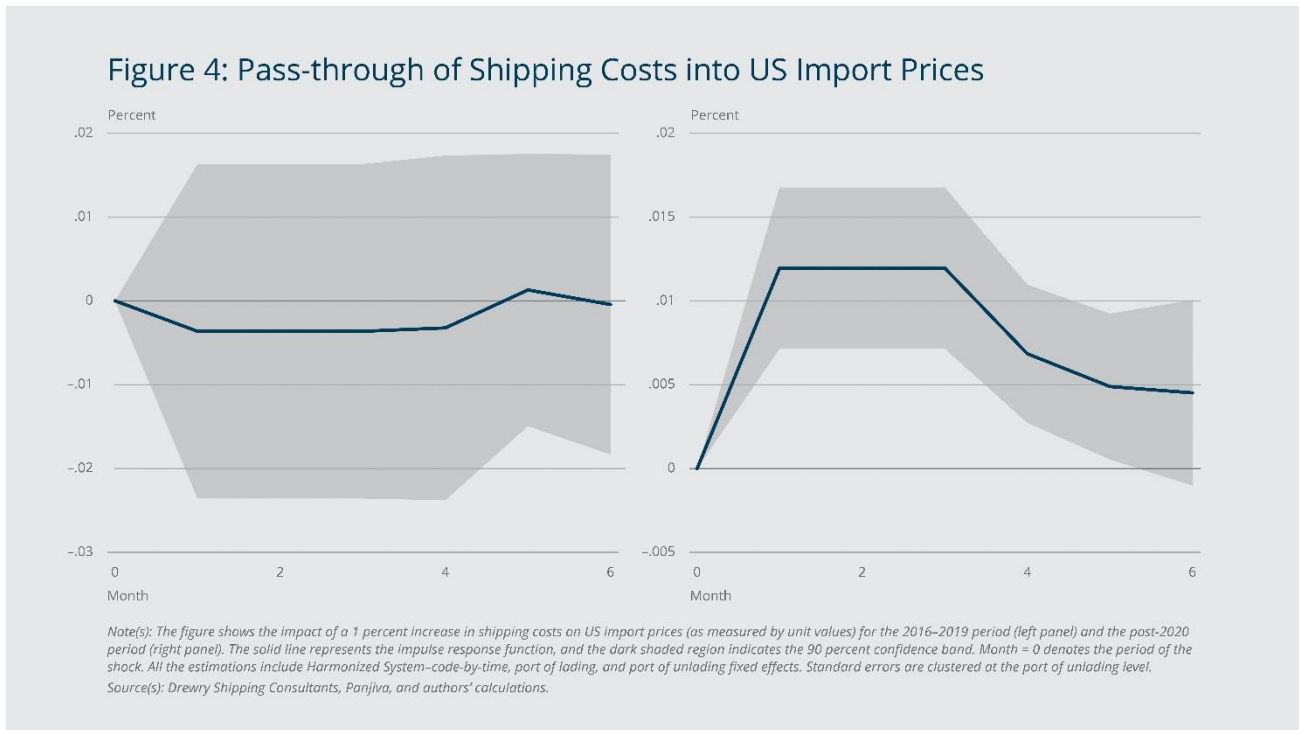
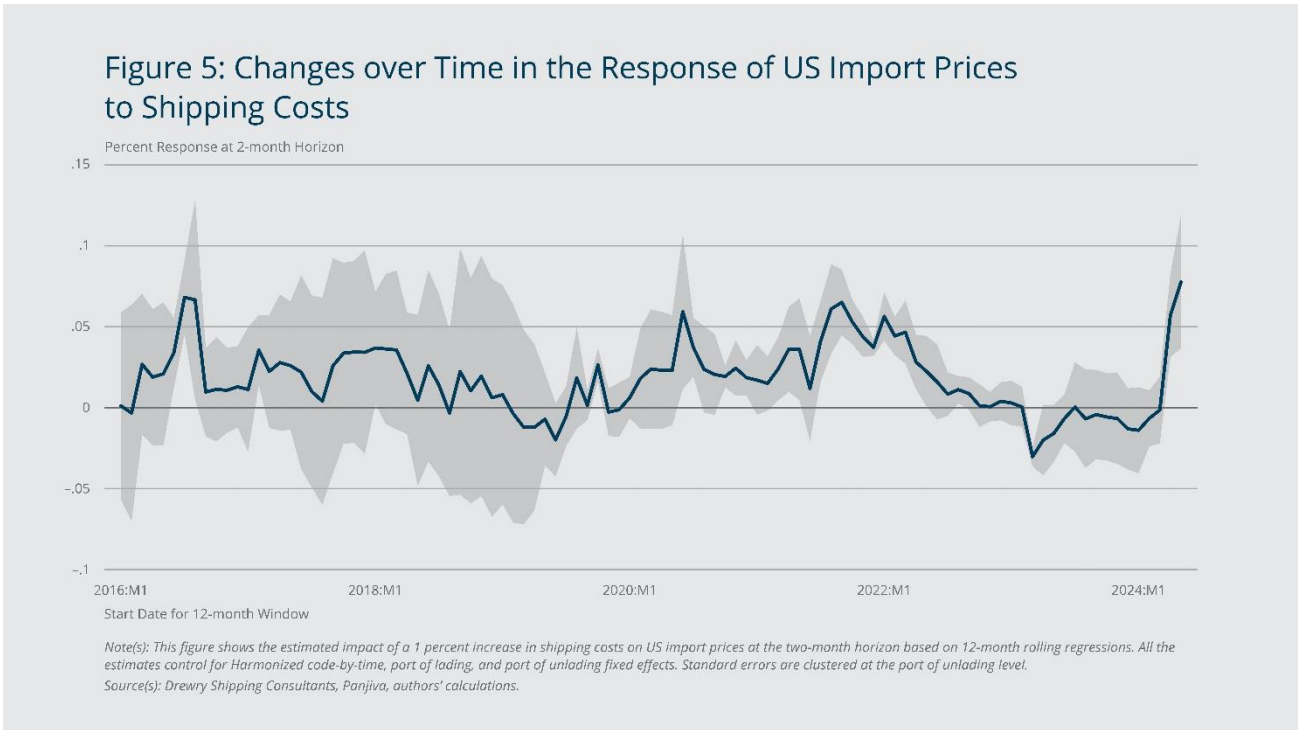


Figure 4 shows the pass-through effect of a 1 percent increase in shipping costs on US import prices (measured by unit values) for two periods: 2016 through 2019, when shipping costs were relatively stable (left panel), and after 2020, when shipping costs surged due to various black swan events including the pandemic and geopolitical and climate disruptions that restricted access to the Suez and Panama canals (right panel). The results show that while the pass-through of shipping costs into US import prices was small and insignificant before the pandemic, it increased significantly after 2020. A 1 percent increase in global shipping costs led to an increase in US import prices, as measured by unit prices, of more than 0.01 percent after one month and through three months. The effect then weakened over the subsequent three months.⁴



Given that shipping costs increased 572 percent over 19 months during the COVID-19 period and 250 percent over the first seven months of 2024, during disruptions to the Suez and Panama canals, our estimates imply an average month-over-month US import price inflation of 0.24 and 0.34 percentage point, respectively, due to rising shipping costs during those episodes.⁵ The observed average month-over-month US import price inflation was 0.43 and 0.35 percentage point, respectively.

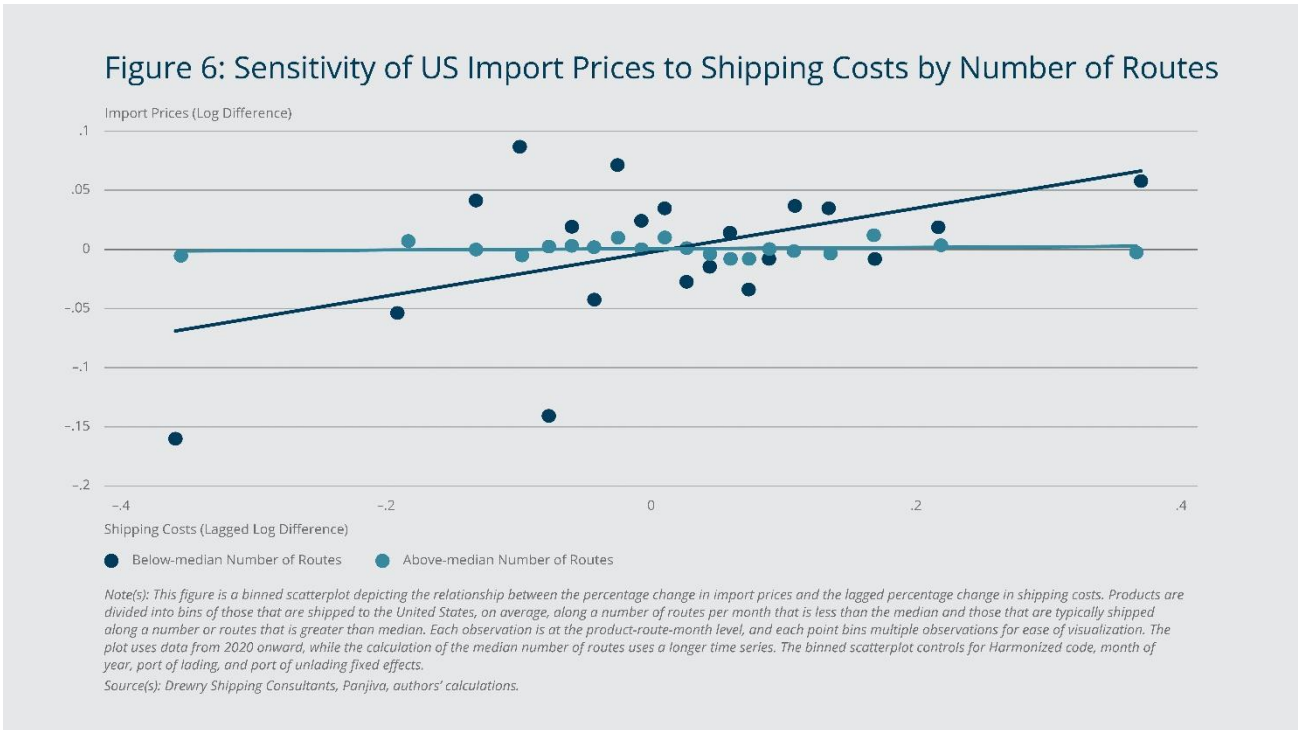
We further examine how the pass-through of shipping costs into US import prices changed over the January 2016–June 2024 sample period by running 12-month rolling regressions.⁶ Figure 5 shows the impact of a 1 percent increase in shipping costs on import prices at the two-month horizon, that is, two months after a cost shock. Consistent with the preceding subperiod analysis, the pass-through significantly increased during the two periods of high shipping costs after 2020.

Mitigating Effect of Alternative Shipping Routes

We also find that the effect of shipping costs on import prices during the shipping-cost surges may not have been as strong if a larger choice of routes had been available to US importers during those periods. Fewer routes give foreign exporters greater pricing power and make it more likely that importers bear the higher transport costs.

We investigate how substitutability among routes might affect the sensitivity of import prices to shipping costs by splitting products into two groups: those that typically arrive in the United States by way of fewer than the median number of routes per month and those that, on average, arrive via more than the median number of routes.

Figure 6 shows the relationship between the percentage change in prices for a given product along a particular route and the percentage change in shipping costs along that route in the preceding month. The relationship is stronger for products that travel along fewer routes to the United States. This finding suggests



that when importers have more options to substitute away from routes experiencing price surges, exporters have less ability to pass on the increased shipping costs to importers and ultimately to US consumers through import price increases.

Potential Pass-through of Shipping Costs into US Inflation

Several recent studies show that the pass-through of US import prices into inflation has increased in recent years. For instance, Amiti, Heise, and Wang (2021) report that a 10 percent increase in import prices led to a 2.6 percent rise in the US Producer Price Index (PPI) following the onset of the pandemic compared with only a 1 percent increase before the pandemic. Similarly, Amiti et al. (2022) find that the pass-through of import prices to the PPI intensified during the pandemic, with large changes in import prices contributing significantly to domestic inflation.

Taken together, our results showing that the pass-through of shipping costs to import prices increases with the severity of shipping-cost surges and the findings from those other studies concerning the pass-through of import prices into inflation suggest that elevated shipping costs in recent years may have played a role in driving up domestic prices in general and contributing to overall inflation.

Endnotes

1. A BoL is a legal document that serves as a record that a shipment has been transported from its origin to its final destination.
2. The World Customs Organization administers the Harmonized System (HS), a standardized numerical method of classifying traded products. Countries around the world use it to uniformly identify and describe products for purposes such as assessing duties and gathering statistics. See <https://www.trade.gov/harmonized-system-hs-codes> for more information.

3. We include Harmonized Shipping—code-by-time, port-of-lading and port-of-unlading fixed effects in the estimation to focus on variations within products across different shipping routes.
4. Because our measure of import prices is unit price, all estimates should be interpreted in the context of unit price changes. We use unit values because they capture the underlying variations in the aggregate import price index, enabling a more detailed analysis of the relationship between shipping costs and import prices at the transaction level. However, we acknowledge that estimates based on unit values may not fully correspond to changes in the aggregate index. We do not aggregate to an import price index due to the methodological challenges and trade-offs involved.
5. Our estimates imply US import price growth of 4.7 percentage points during the COVID-19 episode and 2.4 percentage points during the shipment cost increases of 2024. Because the 2024 episode was considerably shorter than the COVID-19 episode, the 2024 price increases correspond to a higher average month-over-month price growth compared with the pandemic-period price growth.
6. The 12-month rolling regression captures trends over time by calculating the relationship between shipping costs and import prices over a moving 12-month window, updating the results as each new month of data is added.

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