



The impact of the COVID-19 pandemic on the input and output prices of the airline and hotel industries: Insights from new BLS data

By Sarah Eian and Brett Matsumoto

The leisure and hospitality industry and closely related travel industries, such as air travel, were hit especially hard by the spread of the coronavirus disease 2019 (COVID-19). Between February 2020 and April 2020, 49.3 percent of leisure and hospitality jobs were lost, but 54.9 percent of the losses were recovered as of September.¹ In April 2020, the daily number of air passengers on some days declined by over 96 percent from the level in April 2019, and hotel occupancy rates for the month of April fell by almost 64 percentage points from the prior year.²

Businesses in these industries were affected by COVID-19 in a number of ways—from the loss of customers to changes in operating costs. New data from the U.S. Bureau of Labor Statistics (BLS) are able to provide some insight into how these businesses have been affected.³ BLS now publishes net inputs to industry price indexes as a satellite data series which measures price changes of goods and services used by different industries.

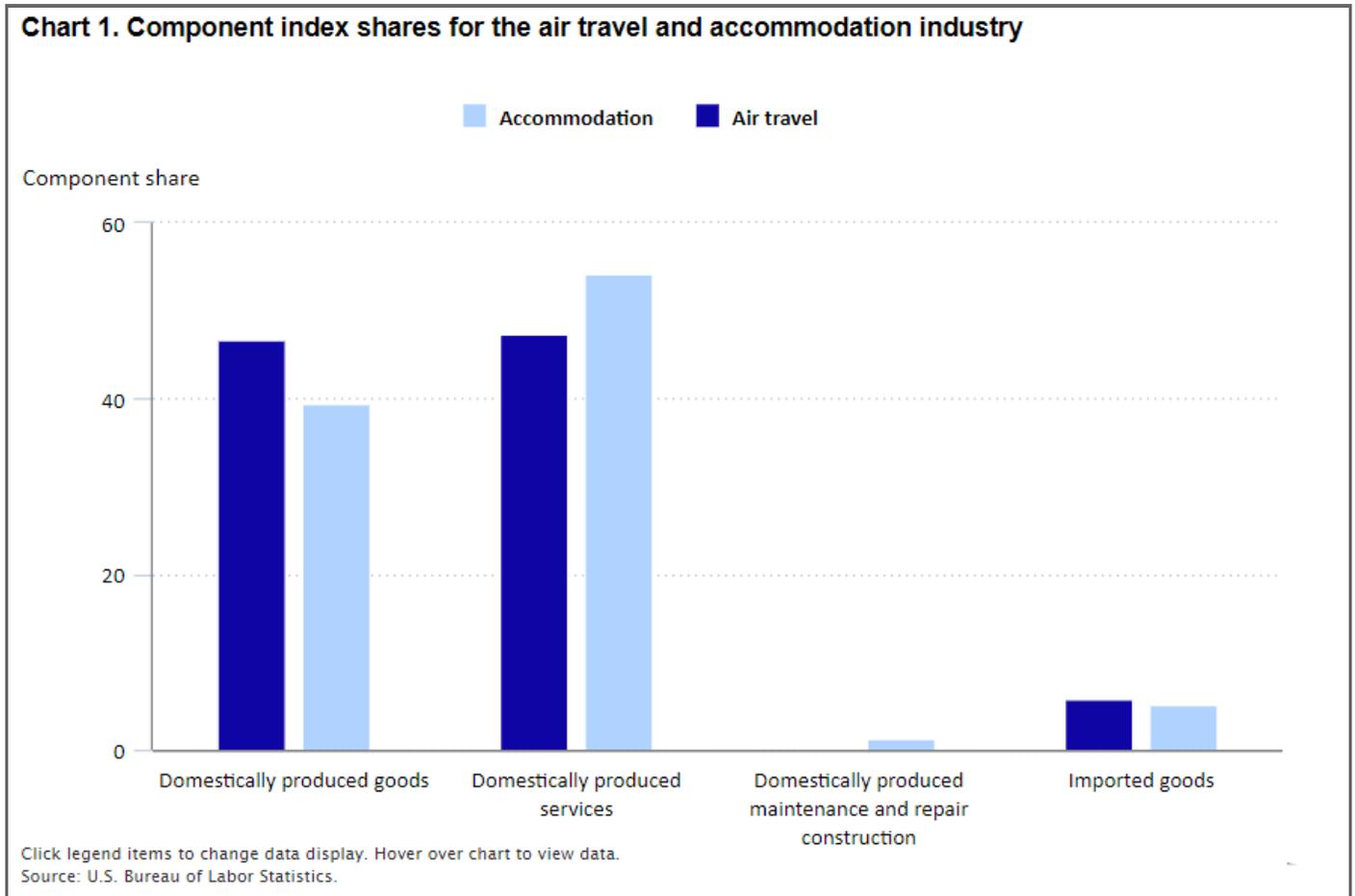
This **Beyond the Numbers** article examines the impact of COVID-19 on firms in the air travel and accommodation (e.g., hotels) industries using the new input to industry indexes as well as the Producer Price Index (PPI) output price indexes for these industries. Inputs are the goods and services that businesses purchase (such as energy, food commodities, or raw materials) in order to produce a final output that is sold to consumers. The inputs to industry price indexes measure the average change in price of the inputs purchased by firms in the industry.⁴ The PPI output indexes measure the average change in price received by firms for the services sold.⁵ Examples of services sold include flights by airlines in the air travel industry and overnight stays at hotels for the accommodation industry.

The initial impact of COVID-19 led to a decline in input prices in both industries through April 2020. In the hotel industry, input prices have since fully recovered and are above January 2020 levels as of September 2020, whereas air travel input prices have only partially recovered and remain well below pre-COVID-19 levels. Output prices for air travel and hotels declined sharply due to COVID-19 and remain well below their pre-COVID-19 levels.

Components of the input price index

To arrive at the overall input price index, we can look a little deeper at its components. We split the input price index into four major components: domestically produced goods, domestically produced services, imported goods, and domestically produced maintenance and repair construction. The input indexes do not include other costs of running a business such as paying for their workers or spending on new building construction and machinery. However, building maintenance is included in domestically produced maintenance and repair construction.

The component indexes are weighted by their share in terms of cost to the business of all inputs into the production process. This means that a price change in a component index that covers a small share of overall input costs will have a smaller impact on the overall index than a similar price change for a more important input in terms of overall input costs. Examining the shares of these component indexes in the overall input price index can give us insight on the prices that businesses face to operate as component indexes that reflect a larger share of input costs will have a greater effect on the overall input index for the industry. The weights used to construct the input indexes are fixed over time, which is a limitation of the input indexes as they will not capture the changes in inputs used in response to operational changes due to COVID-19.⁶ For example, an industry may use more cleaning products due to COVID-19, but this will not immediately be reflected in a larger weight for the commodity index that includes cleaning supplies. Chart 1 shows the weights of these component indexes for the air travel and accommodation industry.

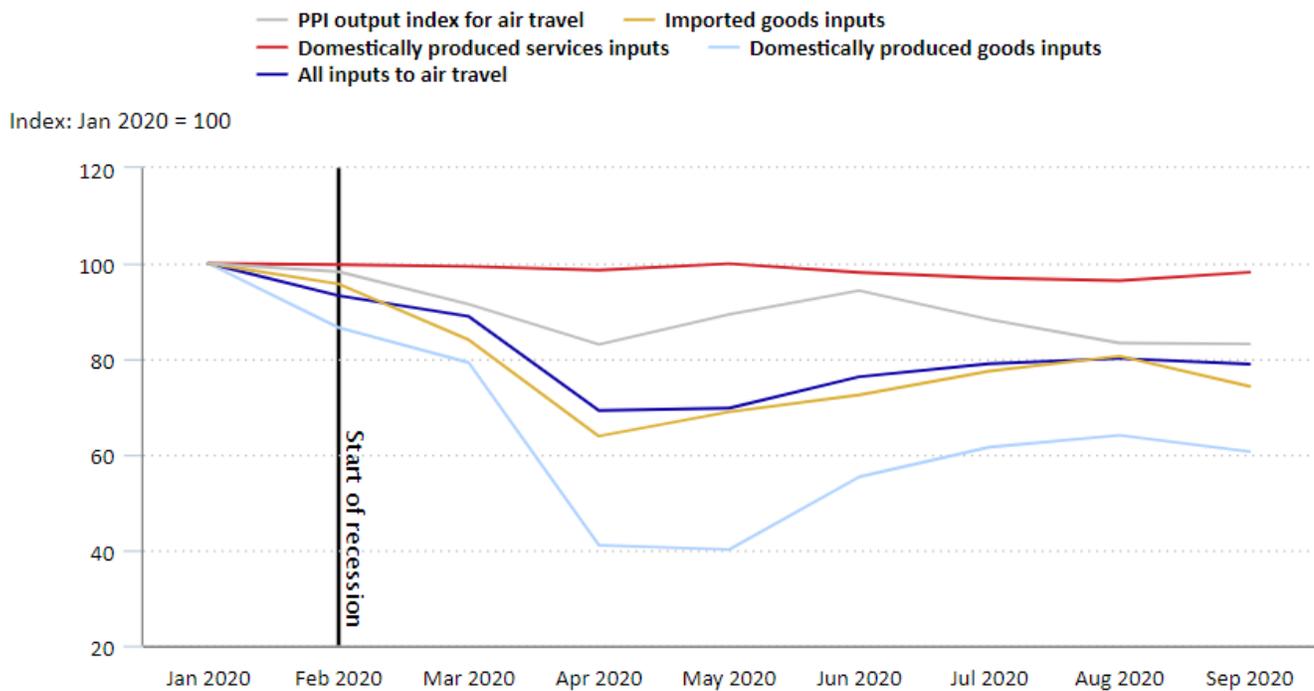


Over 94 percent of total inputs used by each industry are domestically produced. This means that changes in the price of imported goods will have little effect on the overall input price index for either industry. A larger share of the air travel industry inputs are domestically produced goods, compared with the accommodation industry, which tends to use a larger share of domestically produced services. Domestically produced maintenance and repair construction inputs are a relatively small share of overall inputs in the accommodation industry and are not a significant share of inputs in the airline industry.

Changes in input and output price indexes

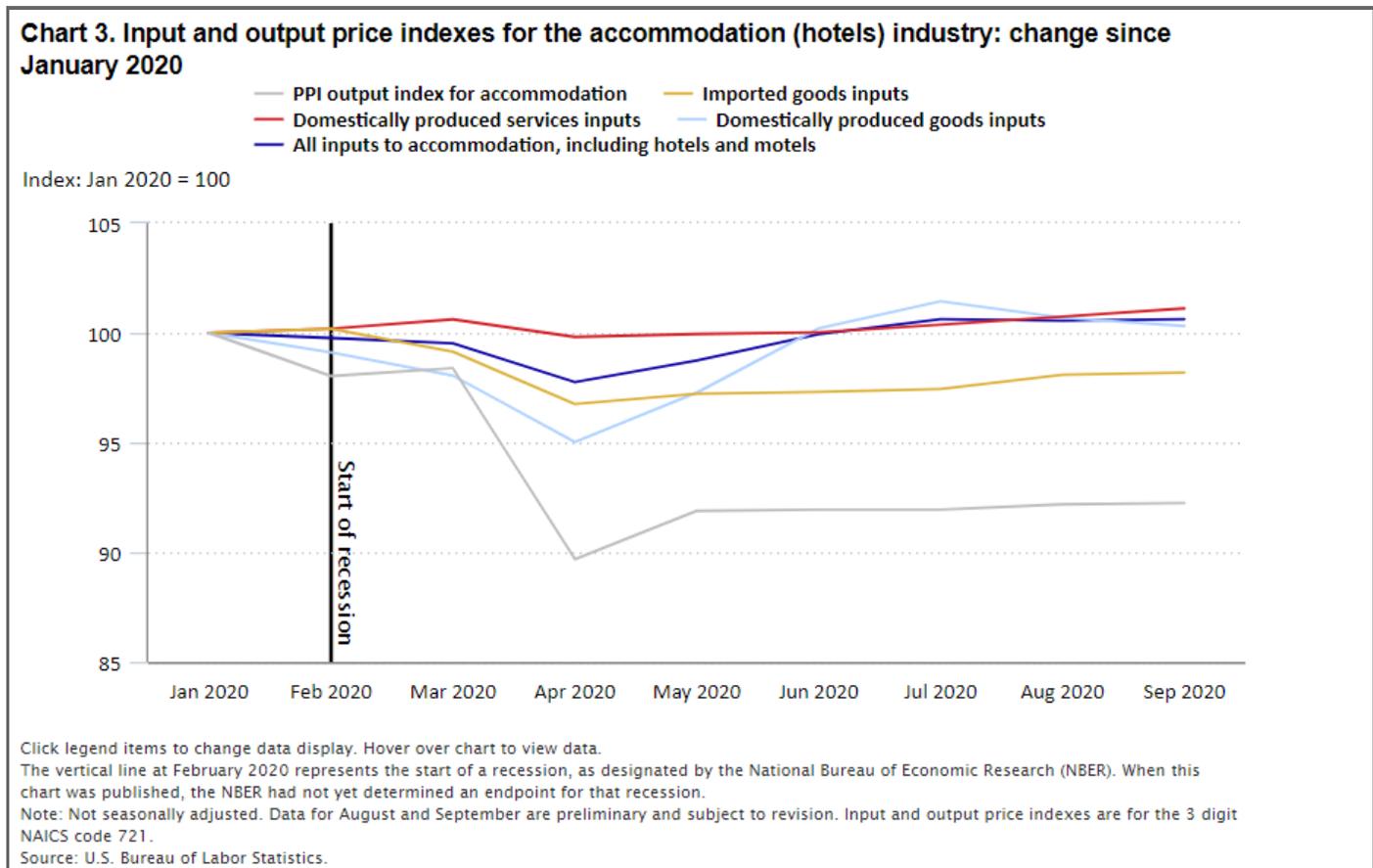
Chart 2 shows the input price indexes and PPI output index for the air travel industry. From January to April 2020, overall input prices declined by about 31 percent. This decline is largely due to an almost 60-percent decline in the price of domestically produced goods that are used by the air travel industry. The largest component of the domestic goods input index is jet fuel, and the price of jet fuel fell by almost two-thirds from January to April 2020.⁷ There was also a large decline in the price of imported inputs due to the decline in energy prices as petroleum refining makes up the vast majority of the imported inputs index. The output price index for airlines declined almost 17 percent over the same period. Since April 2020, input prices have recovered significantly but remain 21 percent below January levels as of September 2020, as the price of jet fuel was still almost 45 percent below January levels. PPI output prices for the air travel industry recovered slightly in May and June but have since fallen back to April levels.

Chart 2. Input and output price indexes for the air travel industry: change since January 2020



Click legend items to change data display. Hover over chart to view data.
 The vertical line at February 2020 represents the start of a recession, as designated by the National Bureau of Economic Research (NBER). When this chart was published, the NBER had not yet determined an endpoint for that recession.
 Not seasonally adjusted. Data for August and September are preliminary and subject to revision. Input and output price indexes are for the 3 digit NAICS code 481.
 Source: U.S. Bureau of Labor Statistics.

Chart 3 shows the input and output price indexes in the accommodation industry. The onset of COVID-19 caused a decrease in input prices, although the decline was much less than those in the airline industry. From January to April 2020, overall input prices declined by about 2 percent. This decline was driven by the decrease in the input prices of goods as the prices of services were essentially unchanged. Input prices for domestically produced goods declined by about 5 percent, and input prices for imported good declined by about 3 percent. The declining prices of gasoline and diesel fuel and certain food commodities contributed to the decline in the input prices of domestically produced goods.⁸ Similarly, the decline in imported prices was driven by a decline in imported energy and certain imported food categories. Output prices for the accommodation industry declined by about 10 percent from January to April 2020. After April, input prices had fully recovered from the initial effects of COVID-19, reaching slightly above January levels, as fuel and food prices had either partially or fully recovered, as of September 2020. A relatively large increase in the price of commercial electric power, the largest component of domestic goods inputs, also contributed to the higher input prices.⁹ However, output prices had only partially recovered and remained 8 percent below January 2020 levels.



In both the air travel and accommodation industries, the prices of inputs and outputs decreased due to the onset of the COVID-19 pandemic in March and April 2020. However, other than the output prices for the air travel industry, prices have at least partially recovered as of September 2020. In both industries, the movements in the overall input price indexes are driven primarily by changes in the domestic goods input indexes. The input and output price data show that firms in the airlines industry are receiving much lower prices for providing air travel but are also experiencing a relatively large reduction in input prices. However, firms in the hotel industry are potentially facing a greater challenge as input prices are now back above pre-COVID-19 levels while the prices received for providing accommodation remain well below pre-COVID-19 levels. The main challenge for both industries is that they continue to suffer from a sharp decline in the volume of sales. Hotel occupancy rates in September 2020 were still over 28 percentage points lower than the rates in September 2019.¹⁰ On October 18, 2020, the Transportation Security Administration (TSA) screened over 1 million air travelers for the first time since the pandemic hit, but that was only 40 percent of prior-year levels.¹¹

Conclusion

The new BLS input price indexes provide insight into the operational challenges faced by firms in the current environment. Input and output prices in the air travel and accommodation industries fell during the onset of the pandemic. Output prices in both industries remain well below their pre-pandemic levels as of September 2020, though there has been some recovery in the output prices in the accommodation industry. Overall input prices in the air travel industry remain well below their pre-pandemic levels while input prices in the accommodation industry have returned to pre-pandemic levels as of September 2020. One limitation of the input price indexes is that the

mix of goods and services that make up the input price indexes is fixed over this period. Changes in business operations due to the COVID-19 pandemic could cause airlines and hotels to use a different mix of inputs (such as using more cleaning products).¹² However, this change in the mix of inputs would not be reflected in the input price indexes.

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NOTES

¹ For employment, hours, and earnings data from the BLS Current Employment Statistics program, see <https://beta.bls.gov/dataViewer/view/timeseries/CES7000000001>.

² Air passenger traffic based on the number of security screenings at Transportation Security Administration (TSA) checkpoints: <https://www.tsa.gov/coronavirus/passenger-throughput?page=0>; hotel occupancy rates based on data from STR: <https://str.com/press-release/str-us-hotel-performance-april-2020>.

³ A *Monthly Labor Review* article explains the methodology used to construct the input price indexes. See Jayson Pollock and Jonathan C. Weinhausen, “A new BLS satellite series of net inputs to industry price indexes: methodology and uses,” *Monthly Labor Review*, September 2020, <https://www.bls.gov/opub/mlr/2020/article/a-new-bls-satellite-series-of-net-inputs-to-industry-price-indexes.htm>.

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⁵ For more information on the PPI industry output indexes, see the PPI website: <https://www.bls.gov/ppi/home.htm>.

⁶ The weights will be updated periodically as more data becomes available. Since real-time data on business input use is not available, changes in the mix of inputs used by the industry will only be reflected in the inputs to industry price indexes with a lag.

⁷ COVID-19 led to a large decrease in the demand for oil products which caused a surplus of crude oil and a large decrease in oil prices. See “U.S. oil prices turn negative as demand dries up,” *BBC News*, <https://www.bbc.com/news/business-52350082>.

⁸ An article in the *Monthly Labor Review* examines the impact of COVID-19 on the food price indexes. They show that there was a large decline in the PPI commodity indexes for milk and dairy products during these months. See Dave Mead, Karen Ransom, Stephen B. Reed, and Scott Sager, “The impact of the COVID-19 pandemic on food price indexes and data collection,” *Monthly Labor Review*, August 2020, <https://www.bls.gov/opub/mlr/2020/article/the-impact-of-the-COVID-19-pandemic-on-food-price-indexes-and-data-collection.htm>.

⁹ Note that the input price indexes are not seasonally adjusted and much of the increase in commercial electricity prices in June is due to normal seasonal variation. Seasonally adjusted commercial power prices increased in June, but by much less than non-seasonally adjusted prices.

¹⁰ Hotels occupancy data for September 2020 can be found at <https://str.com/press-release/str-us-hotel-performance-september-2020>.

¹¹ For TSA press release, please see <https://www.tsa.gov/news/press/releases/2020/10/19/tsa-screens-over-1m-passengers-single-day-first-time-march>.

¹² Changes to hotel and airline operations due to COVID-19 can be found at <https://www.hotelbusiness.com/hotels-step-up-housekeeping-in-the-age-of-COVID/>; <https://www.cnbc.com/2020/10/14/how-airplanes-are-cleaned-during-pandemic-shepard-smith-documentary.html>.

SUGGESTED CITATION

Sarah Eian and Brett Matsumoto, “The impact of the COVID-19 pandemic on the input and output prices of the airline and hotel industries: Insights from new BLS data,” *Beyond the Numbers: Prices and Spending*, vol. 10, no. 3 (U.S. Bureau of Labor Statistics, February 2021), <https://www.bls.gov/opub/btn/volume-10/impact-of-covid-19-pandemic-on-input-and-output.htm>