

The Pass-Through of Cost Changes to Prices in The Restaurant Industry Before and After COVID-19

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ABSTRACT

In this article, I examine the pass-through of cost changes to price changes in the restaurant industry, both before and after the COVID-19 pandemic. The analysis reveals that prior to the pandemic, the relationship between combined costs and the food away from home price—used as a proxy for restaurant prices—was relatively stable, indicating a rapid pass-through of costs to prices. However, during the pandemic, frequent and significant fluctuations in overall costs led to increased hesitation in pricing decisions by restaurant owners, suggesting a slower pass-through during this period.

Introduction/Literature Review

In early 2020, Covid impacted the entire world. Restaurants were hit especially hard with the new trend of staying safe and at home. Many local and national governments imposed capacity restrictions on restaurants to ensure social distancing, which heavily impacted restaurant sales. This often meant that restaurants could only serve a fraction of their usual number of customers at any given time. For example, establishments were frequently required to reduce seating capacity to 50% or even less. Additionally, at various points during the pandemic, governments mandated the complete closure of dine-in services, allowing restaurants to operate only through takeout and delivery, in addition to new regulations such as a three-day shutdown when an employee was found with COVID. This was particularly common during the initial outbreak and following waves of infections. For these reasons and more, restaurants, especially family-owned ones, struggled to make consistent sales throughout and after the pandemic.

On the other hand, there was a sudden and considerable rise in cost due to several reasons. There were many supply chain disruptions in the food transportation industry. For example, early in the pandemic, panic buying and hoarding behavior, coupled with disruptions in the supply chain due to transportation restrictions and worker shortages, led to significant price spikes in eggs across the United States. As a result, the wholesale price of eggs surged by up to 300% in March 2020, according to the U.S. Bureau of Labor Statistics. Similarly, meat processing companies like Tyson Foods and Smithfield Foods experienced shutdowns due to COVID-19 outbreaks among their workers. These shutdowns led to a significant reduction in meat processing capacity—Tyson Foods (Tyson Foods, 2021) reported a 20% reduction in pork processing capacity and a 10% reduction in beef, contributing to price increases and supermarket shortages. For Fish, many fishing operations were halted or operated at reduced capacity due to social distancing measures and worker shortages, critically slowing down the harvest and supply of fresh seafood. Additionally, transportation restrictions and decreased cargo delivery frequency contributed to difficulties in moving seafood from coastal areas to markets, creating blockages and reducing the overall supply. On the same line, vegetable growers and distributors also experienced disruptions. Labor shortages, particularly for migrant workers who are crucial during the planting and harvesting seasons, led to delays and reduced harvests. The rising fuel prices around the United States also contributed to the rise of ingredient costs because this inevitably led to the increase in transportation cost of these ingredients. In addition, restaurant owners faced new costs to comply with new health and safety regulations, such as purchasing personal protective equipment (PPE) for staff, installing barriers, and enhancing sanitization procedures.

All these events led to a sudden rise in cost with the breakout of the pandemic. As a consequence of these fluctuations in cost, many restaurant owners began to be unsure whether the new cost change was temporary or permanent and when and how much they reflected those cost changes in prices.

In this paper, I look at the pass-through of cost changes to price changes in restaurants before and after the pandemic. The main findings are as follows. Before the pandemic, the relationship between the combined cost and the food away from home price, which is the proxy for prices charged by restaurants, was relatively stable, implying that pass-through was fast. However, during the pandemic, with frequent and sizable fluctuations in overall costs, restaurant owners were hesitant in their decision-making, which, in turn, implies that pass-through was slower.

Amiti, Heise, Karahan, and Şahin (2022) analyze the increased pass-through of wages and import prices to the U.S. Producer Price Index (PPI) in the post-COVID period. Their research reveals that both rising import prices and higher labor costs have significantly contributed to the recent surge in inflation, with a marked increase in the correlation between these costs and domestic prices. The authors highlight that this heightened pass-through effect has played a crucial role in the observed inflationary trends, particularly within the goods and services sectors, since the beginning of the pandemic. During the COVID-19 pandemic, firms faced significant challenges in price-setting due to supply chain disruptions, fluctuating consumer demand, and inflationary pressures. The pandemic induced sharp increases in input costs, such as semiconductors, and caused a shift in consumer spending patterns, resulting in firms adjusting prices more frequently. Montag and Villar's (2023) analysis using BLS data reveals that firms began updating their prices more often, primarily increasing them to keep up with rising costs. This frequent price adjustment highlights price-setting's complex and dynamic nature in response to economic shocks. Using a sectoral data set, Chin and Lin (2023) investigate the pass-through of labor costs to consumer prices in the U.S. during the COVID-19 pandemic. Their analysis reveals that the pass-through of wage increases to prices grew significantly during the recovery of the pandemic, contributing notably to inflation in goods and services. The study suggests that elevated demand in goods sectors and the inability of firms in services sectors to absorb high wage growth were key factors driving this increased pass-through. The findings indicate that reducing wage growth could be essential for bringing inflation back to target levels. Chin and Lin (2023) study the pass-through of labor costs to prices in various industries. They find that pass-through increased during the COVID-19 pandemic recovery, temporarily in goods and persistently in services.

Data

I collected monthly data from January 2016 through December 2023. The total cost of restaurants consists of various components: wages, rent, ingredients, etc. The weights for those cost components were computed based on a survey given to Topeka restaurant owners. They were 30% for ingredients, 10% for rent, 5% for equipment and supplies, 50% for wages, and 5% for utilities. My analysis excluded equipment and supplies, utilities, and rent because I had trouble finding reliable data on them. The weights within the ingredients were computed based on the input price index relative importance table for the 722 industry, Food Services and Drinking Places, from the Bureau of Labor Statistics. Ultimately, the weights for ingredients and wages were 37.5% and 62.5%, respectively, and the weights for meat, vegetables, eggs, and fish within the category of ingredients were 60%, 10%, 5%, and 25%, respectively. All data were normalized (January 2016 = 100) before they were combined. The combined cost, called C_t , was computed for each month based on the normalized data with those weights. I chose the Food Away from Home index from the Bureau of Labor Statistics for the average price restaurants charge. For consistency, it was also normalized (January 2016 = 100). From now on, it will be called P_t . The Consumer Price Index (CPI) was acquired from the BLS.

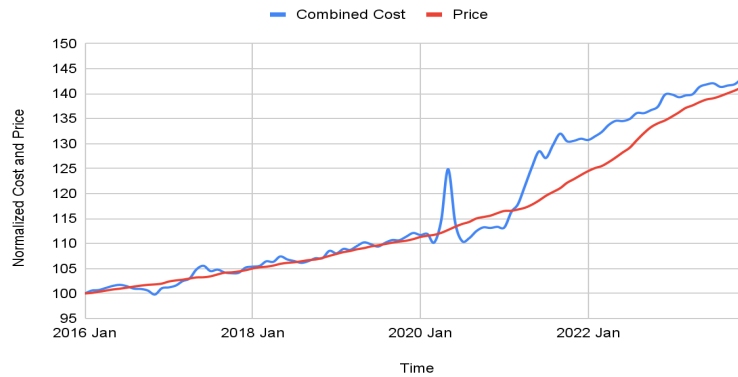


Figure 1. Combined Cost and Price for Restaurants

Figure 1 shows the combined cost and the price from 2016 through 2023. The combined cost and the price exhibited relatively steady behavior from January 2016 through December 2019, just before the pandemic started. It might be an indication that it takes less time for the price to reflect the changes in combined cost. However, from January 2020, the combined cost began to show wild fluctuations, but the price steadily increased. This could imply that the passthrough was slower during that period.

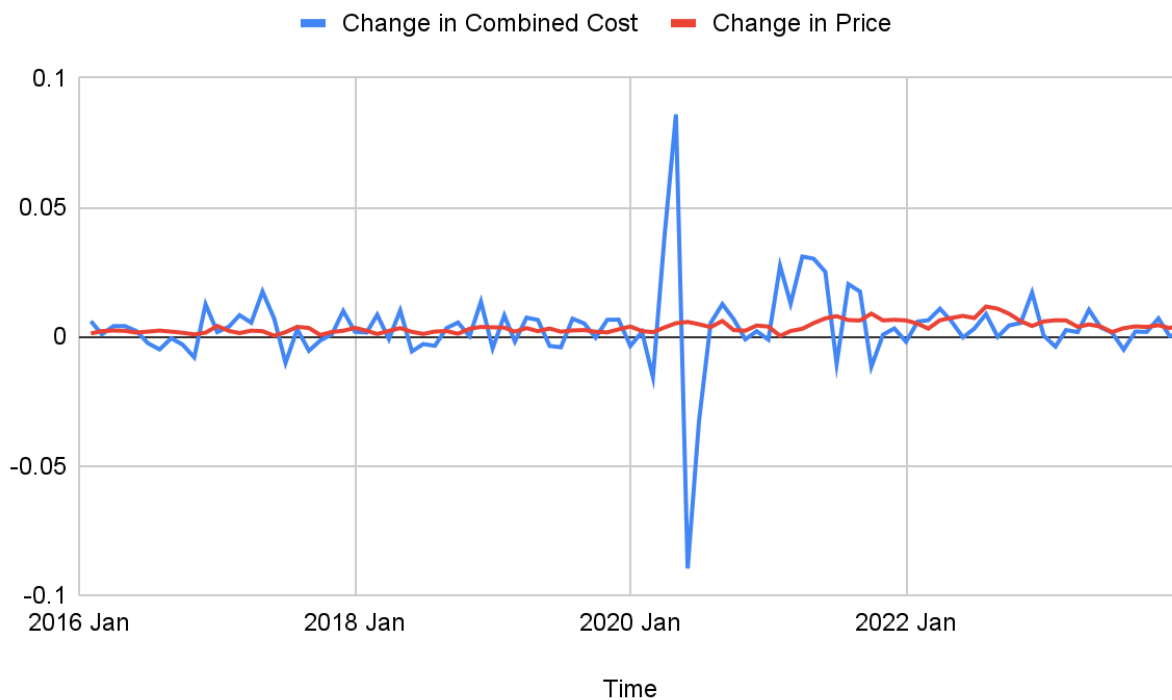


Figure 2. Change in Combined Cost and Price for Restaurants

Figure 2 shows the log change in the combined cost and the price. The period from January 2016 through December 2019 demonstrates a stable relationship between the log changes in the combined cost and the price. The maximum and minimum for the change in the natural logarithm of C_t from 2016 to 2019 were 1.743% and -1.016%, respectively. The corresponding numbers for P_t were 0.411% and 0.034%. Again, from 2020 to 2023, the combined

cost exhibited significantly bigger changes, while the price did not change as much. The maximum and minimum for C_t from 2020 to 2023 were 8.594% and -8.966%, respectively, while the numbers for P_t were 1.162% and 0.030%. It is highly likely that those big changes in the combined cost were not reflected in the price quickly.

Analysis

Correlation Analysis

I first look at the correlation between the combined cost and the price. Restaurants decide on prices based on the level of and changes in combined costs in the present and past. I computed the correlation coefficients between the price and the moving average of the combined cost. For example, the four-month moving average of the combined cost for April 2020 is the average of the combined cost from January through April 2020.

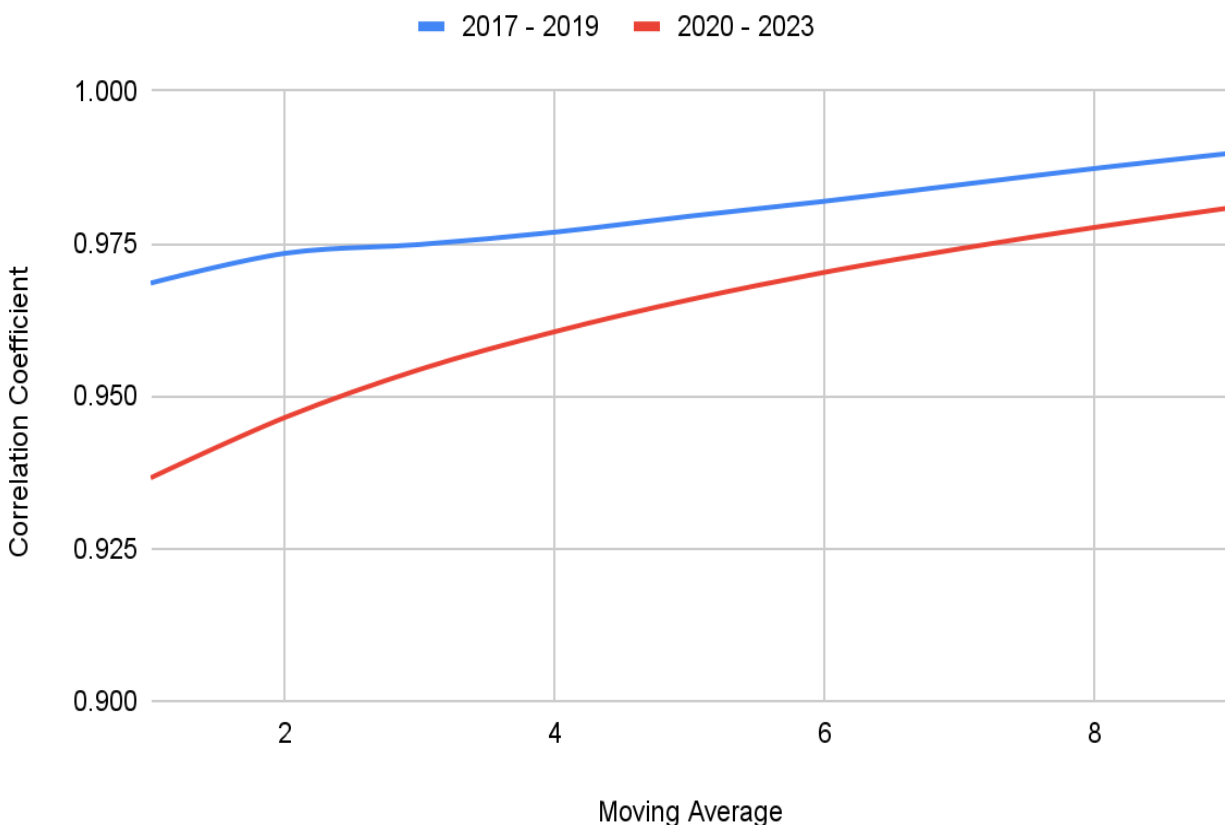


Figure 3. Correlation Coefficient between Moving Average of Combined Cost and Price

Figure 3 portrays the correlation coefficients between the price and the n -month, $n=1, \dots, 9$, moving average of combined cost for two periods, from 2017 - 2019 and 2020 - 2023. The correlation coefficient was higher before the pandemic started but lower after. This is evidence that the pass-through was more substantial before the pandemic. In addition, the correlation coefficient between the price and the moving average of the combined cost for a shorter time horizon with the most recent months was much higher before the pandemic than after the pandemic, implying that cost changes were reflected in the price more quickly before the pandemic.

Regression Analysis

I estimate the passthrough of cost inflation to price inflation based on linear regression. The specification mainly follows Chin and Lin (2023) with some adjustments. Specifically, for each $h = 0, \dots, 8$:

$$\Delta \ln(P_{t+h}) = \alpha + \epsilon_h \Delta \ln(C_t) + \sum_{j=1}^{12} \delta_j \Delta \ln(P_{t-j}) + \sum_{j=1}^{12} \omega_j \Delta \ln(C_{t-j}) + \eta \Delta \ln(CPI_{t+h}) + \epsilon$$

where $\Delta \ln(P_{t+h})$ is the log change in the price during the period $(t+h)$, $\Delta \ln(C_t)$ is the log change in the combined cost, and $\Delta \ln(CPI_{t+h})$ is the log change in the Consumer Price Index, a control variable. The regression coefficient ϵ_h measures the passthrough of a change in the combined cost in month t to a change in the price in month $(t+h)$.

I ran regressions separately for 2016 through 2019 and for 2020 through 2023. The estimated coefficients ϵ_h are reported in Figures 4 and 5.

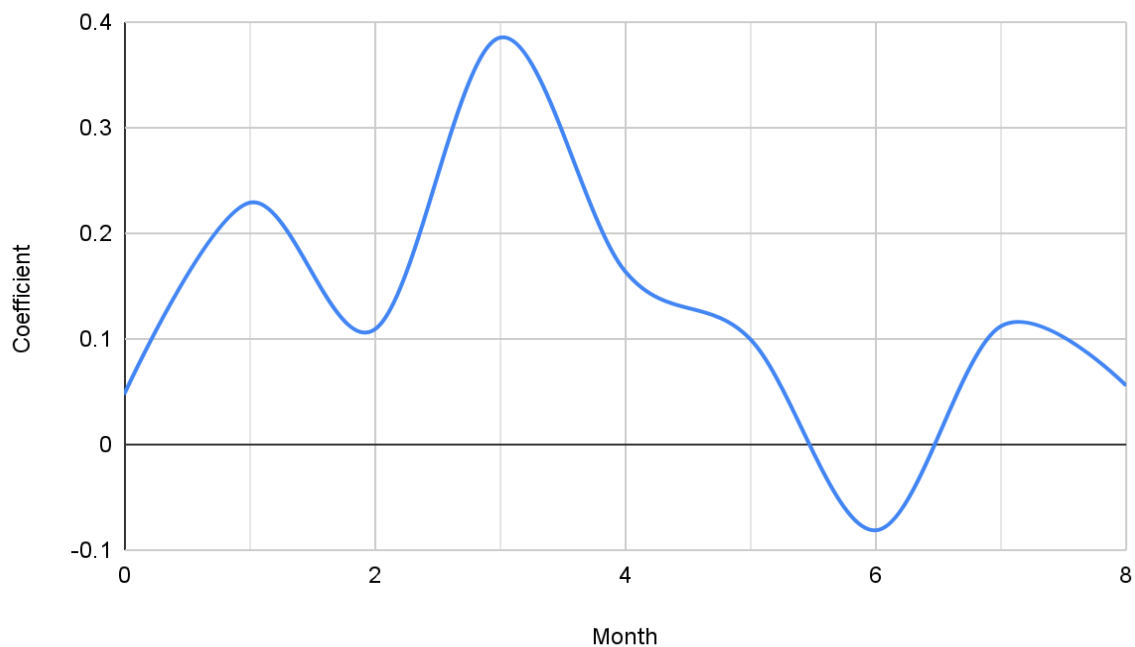


Figure 4. Responses of Food Away from Home Prices to Combined Cost: 2017-2019

Figure 4 summarizes the analysis results for the period from January 2018 to December 2019. It illustrates the effect of a change in combined cost on the price in h months later, $h = 0, \dots, 8$. This period was pre-pandemic, with prices and costs being relatively stable. The price response to the change in combined cost is relatively rapid, with most changes in combined cost reflected in price within five months. This is due to restaurant owners deciding quickly whether to change their prices in response to the change in combined cost.

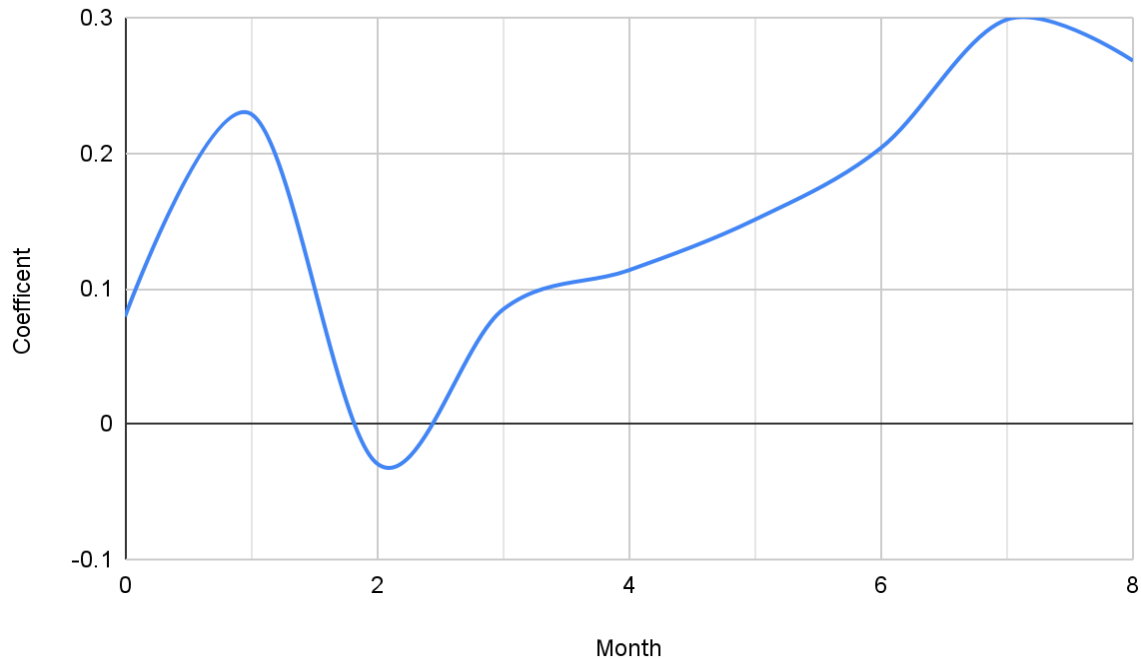


Figure 5. Responses of Food Away from Home Prices to Combined Cost: 2020-2023

Figure 5 outlines the analysis results for the period from January 2020 to December 2023. The price response to the change in combined cost is noticeably slower than in Figure 4; it is seen that there is not a quick adjustment of prices but a slower adjustment. The price adjustment is still continuing even after eight months. This indicates that restaurant owners are more hesitant to make decisions because of the frequent changes in combined costs. One possible explanation for the slow pass-through is that restaurant owners were not sure whether those significant and sudden changes in combined cost were temporary or permanent. Another possible reason is that the pandemic was an entirely new event and caused unusual confusion and uncertainty.

Conclusion

In this paper, I look at the pass-through of cost changes to price changes in restaurants before and after the pandemic. I used the changes in the combined cost and the price before and after the pandemic to conduct regression analysis and correlation analysis to support my findings. The key findings are as follows: Before the pandemic, the relationship between combined costs and the price of food away from home, which serves as a representative for restaurant pricing, was relatively stable, indicating that pass-through occurred quickly. However, during the pandemic, frequent and significant fluctuations in overall costs led to hesitation among restaurant owners in their pricing decisions, suggesting that pass-through became slower. Future studies could explore how lasting changes in consumer behavior, such as the increased demand for takeout and delivery, affect restaurant pricing strategies in the post-pandemic period. Additionally, research on the role of emerging technologies, like AI-driven pricing models, in adapting to fluctuating costs would offer valuable insights into the industry's stability.

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