Grocery Greedflation

# Price gouging and ‘Covid-Collusion’ in the food industry

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# Motivation and Data

In the wake of the COVID-19 pandemic, the world witnessed an unprecedented upheaval in various sectors, and many previously accepted theories of economics began to unravel. Supply chains collapsed, money was pumped into the economy, and inflation soared. These factors all helped to contribute to rising prices across the board. The effects were felt by all consumers, but nowhere was it more obvious than in the grocery store. In the last four years, grocery prices are up a staggering 30% from pre-pandemic levels, outpacing both the growth of real wages and the increase in input costs for food manufactures. These heightened prices had an immediate effect on the public, with food insecurity [rising 12%](https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/key-statistics-graphics/) in the last year alone, and food prices being cited as consumers [number one economic concern.](https://www.fooddive.com/news/consumers-food-prices-top-concern-morning-consult-economy-inflation-recession/702613/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202023-12-15%20Food%20Dive%20Newsletter%20%5Bissue:57444%5D&utm_term=Food%20Dive)

As household budgets become more and more strained, the relationship between the rising cost of groceries and the [soaring profits](https://time.com/6269366/food-company-profits-make-groceries-expensive/) of grocery corporations becomes a focal point of concern. As consumers grapple with the reality of shrinking purchasing power, questions have arisen regarding the ethical implications of profit-maximizing strategies employed by corporations, especially in times of crisis. Moreover, the widening gap between corporate gains and consumer hardships underscores broader systemic issues of income inequality and corporate responsibility.

The theory of seller's inflation encapsulates the dynamic where firms increase prices at a rate faster than their costs are rising, leading to a net increase in profits. In essence, it represents a scenario where sellers hold significant pricing power in the market, allowing them to capitalize on increased demand or reduced competition to bolster their bottom line. The food industry is a highly concentrated market, and thus has a high potential for tactics such as seller’s inflation and price gouging, especially in the wake of an event like a pandemic.

The variables in this analysis are the Consumer Price Index (CPI) [for food](https://fred.stlouisfed.org/series/CPIUFDNS), and the Producer Price Index (PPI) [for food manufacturers](https://fred.stlouisfed.org/series/PCU311311) in the United States. The CPI for food measures the average change over time in the prices paid by consumers for a market basket of food and other necessities that may be purchased at a grocery store. The PPI for food manufacturers, on the other hand, measures the average change over time in the selling prices received by domestic producers for their output of food products. I pulled data directly from the FRED website for my analysis. The data sample is from November 1997 through March of 2024, with a base year of with 1984.

The relationship between these variables is intuitive, as higher costs facing producers will no doubt drive prices up for consumers. Since the pandemic, however, different trends have been emerging in this relationship that suggest manufactures may have altered their typical strategies. As input prices have leveled out, the CPI continues to rise, suggesting manufactures are passing higher prices onto consumers simply because they can. Increasing prices faster than costs are rising is the essence of sellers’ inflation, and this practice can be harmful to the American consumer and disproportionately affect lower income populations.

# Dataset

# A graph of a price Description automatically generated

# ARDL Model

I chose to examine the effect of prices facing manufacturers on the prices consumers receive in the grocery store, thus the PPI is my *xT* and the CPI is my *yt*. I also include a single lag on each variable, and a constant and error term. My model is as follows:

*yt*= β0 + β1*yt*-1 + β2*x*t + β3*x*t-1 + εt

For this analysis, I estimated three ARDL models. One across the entire period, from March 1997 to March 2024. I then split the data into two sets, one before the COVID-19 pandemic, and one after the impact of the pandemic in 2020. These are referred to as the Pre-COVID and Post-COVID models. The attempt was to see how the pandemic may have impacted the relationship between these variables. It has been shown in [previous studies](https://www.scirp.org/journal/paperinformation?paperid=91757#:~:text=2)%20There%20is%20a%20cointegration,index%20and%20producer%20price%20index.) that CPI and PCI are cointegrated, thus there is no worry about the stationarity of these processes while estimating ARDL models.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Full Series** | **estimate** | **standard error** | **t-value** | **p-value** |
| **Intercept** | -1.606E-05 | 0.005175 | -0.003 | 0.998 |
| **lag(CPI)** | 9.89E-02 | 0.004651 | 212.661 | <2e-16\*\*\* |
| **PPI** | 7.99E-02 | 0.0157 | 5.09 | 6.19E-07\*\*\* |
| **lag(PPI)** | -6.81E-04 | 0.0159 | -4.283 | 2.46e-05\*\*\* |

r-squared value : 0.9998

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pre-Covid** | **estimate** | **standard error** | **t value** | **p-value** |
| **intercept** | 0.018075 | 0.006504 | 2.779 | 0.00584\*\* |
| **lag(CPI)** | 0.987367 | 0.004936 | 200.054 | <2e-16\*\*\* |
| **PPI** | 0.088245 | 0.018903 | 4.668 | 4.83e-06\*\*\* |
| **lag(PPI)** | -0.078222 | 0.019225 | -4.069 | 6.24e-05\*\*\* |

r-squared value : 0.9998

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Post-Covid** | **estimate** | **standard error** | **t-value** | **p-value** |
| **Intercept** | 0.11728 | 0.03243 | 3.617 | 0.000764\*\*\* |
| **lag(CPI)** | 0.89379 | 0.01534 | 58.279 | <2E-16\*\*\* |
| **PPI** | 0.04909 | 0.02462 | 1.994 | 0.052394 |
| **lag(PPI)** | 0.04096 | 0.0269 | 1.523 | 0.134993 |

r-squared value : 0.9987

The pre-COVID ARDL model shows that both the current and lagged values of producer price level have a highly significant impact on the consumer price level (CPI). However, in the post-COVID ARDL model, the impact of the producer price level (PCI) becomes marginally significant, with the lagged producer price level showing no significant impact. This difference in significance suggests a potential change in the relationship between producer and consumer prices after the COVID period. This change in trends can be seen clearly when examining a graph of PPI and CPI over the last 15 years.

A graph of a graph showing the growth of a number of years

Description automatically generated

As can be seen in this graph, the two variables follow similar trends that would be typical of cointegrated systems. Though the consumer price index is less responsive to shocks, both variables display similar trends and rates of change throughout the sample. However, in the past few years, CPI has been increasing at a much higher rate than PPI, which appears to have plateaued around the level of 250. This is an interesting observation, and one that is backed up by the results of the previously stated ARDL models. Now, it is important to put these changes in context, and try to understand what may be driving these variables apart.

The key factor at play is undoubtedly [corporate profits](https://time.com/6269366/food-company-profits-make-groceries-expensive/), which have increased massively in the food industry over the past few years. These profit increases have largely been driven by price increases imposed on consumers, with one PepsiCo executive even stating [“I still think we’re capable of taking whatever pricing we need.”](https://investors.pepsico.com/docs/default-source/investors/q3-2022/q3-2022-pep_transcript_r9ltxf2sicuqx5kn.pdf) Though profit increases have been lauded by executives and shareholders alike, the burden is falling on the American consumer, with low-income families feeling the greatest impact. This is also amidst rising levels of [shrinkflation](https://www.casey.senate.gov/imo/media/doc/shrinkflation_report.pdf), which is the practice of reducing the size of a product while maintaining its price, often used by companies as a subtle form of price increase. In short, Americans are spending more on groceries, receiving less food, all while corporate profits continue to climb.

# Forecasting *xT*

Using the ‘auto.arima’ function in R, I was able to compute a point forecast over the next 12 months for the producer price index. This function found the optimal predictive model for *xT* included two lagged forecast error terms and an integration order of one. This forecast includes a 95% confidence interval, which can be seen as the shaded area of the graph.

A graph of a graph

Description automatically generated with medium confidence

PPI

Time (Months)

This graph shows that the producer price index is expected to increase slightly over the next year, following a similar trend to the long-term growth rate of the PPI. It should be noted that the confidence interval widens as time goes on, as more and more variance is taken on in predicting later periods. Personally, I expect PPI to continue undulating around the 250 mark, with some slight variation that can attributed to supply shocks. I believe the suppliers of food manufactures are satisfied with the prices they took during the COVID-19 pandemic, and will not be looking to greatly increase prices on manufactures unless prompted by some externality or supply shock.

# Forecasting *yt*

Using a causal regression model and my forecasted values of *xt*, I was able to compute point and interval forecasts of *yt*twelve periods beyond the end of the sample.

A graph showing the price of a product

Description automatically generated

This graph shows prices for consumers are predicted to rise slightly over the next year, increasing at a similar rate as that of the PPI. The model predicts the two systems will return to their cointegrated ways, following similar trends and being highly correlated. This may very well be the case, as manufactures are receiving more and more pushback for their unjustifiably higher prices. I hope, for the sake of the American consumer, that these predictions hold, and we see some manufacturers ease up on their practices of seller’s inflation.

# Conclusion

In the face of the COVID-19 pandemic and its aftermath, the food manufacturing industry has undergone profound shifts, reflecting broader economic upheavals. The sharp rise in grocery prices, outpacing both wage growth and increase in input costs, has contributed greatly to the overall trend of [“greedflation”](https://finance.yahoo.com/news/greedflation-caused-more-half-last-100000899.html) in the economy.

Through my analysis, I was able to gain insight on the intricate dynamics between producer and consumer prices. Before the pandemic, both current and lagged producer prices significantly influenced consumer prices, indicating a tight relationship. However, in the post-COVID period, this relationship has shown signs of alteration, with the impact of the producer price index becoming marginally significant.

The observed trends align with broader narratives of corporate greed, exemplified by soaring profits amidst consumer hardships. Justifying price hikes due to pandemic related shocks was accepted for some time, but as profits continue to rise, it is clear the food industry engaged in large scale price-gouging during and following the pandemic. This is what I have dubbed ‘Covid Collusion’, and though there may be no tangible proof of such collaboration, the incentives certainly aligned during the pandemic for food manufacturers to increase prices across the board. Though some price hikes were certainly justified on the basis of rising costs, unprecedented profit growth shows that corporations undoubtedly overstated the need for such increases. The Department of Justice issued [a statement in 2022](https://www.justice.gov/opa/pr/department-justice-announces-initiative-protect-americans-collusive-schemes-amid-supply-chain) that their antitrust division would be “looking out” for companies using supply chain disruptions to engage in anticompetitive conduct. Anyone with information on price fixing, bid rigging, market-allocation agreements was advised to call the DOJ complaint center. In my opinion though, when incentives align as they did in 2020, and companies see it in their best interest to rapidly increase prices, there’s almost an understood agreement. Especially within in industry as concentrated as food manufacturing.

Executives' unabashed statements about the ability to dictate prices further highlight the power a highly concentrated market like the food industry has over its consumers. Moreover, the simultaneous practice of shrinkflation exacerbates the strain on consumers, reflecting a subtle yet damaging form of price escalation. These issues pose a serious and tangible threat to the American consumer, as food insecurity continues to rise and more families become reliant on social welfare programs like [SNAP](https://www.pewresearch.org/short-reads/2023/07/19/what-the-data-says-about-food-stamps-in-the-u-s/).

Looking ahead, my forecasting models project modest increases in both producer and consumer prices, with a tentative return to cointegration. However, the hope for a [“soft landing”](https://www.reuters.com/markets/us/persistent-us-services-inflation-threatens-soft-landing-kemp-2024-02-14/) hinges on manufacturers' willingness to temper their profit-driven pricing strategies. As consumers push back against unjustifiable price hikes, the industry stands at a crossroads, where ethical considerations must be weighed against the value of profit-maximization. A large onus lies on the distributers of the products, namely grocery stores, to use their negotiation power to advocate for the interests of consumers. This has been occurring more so in Europe, where many grocery store chains have been pushing back against higher prices demanded by manufacturers. French retail company Carrefour's recently removed PepsiCo products off its shelves for three months on the basis on unreasonably high prices, and [similar spats](https://www.reuters.com/business/retail-consumer/carrefour-pepsico-dispute-sheds-light-key-role-retailers-ad-business-2024-04-04/) have been cropping up all across the continent. I believe this is an important issue that affects all consumers, and needs to be addressed further by the DOJ. This really becomes a moral quandary, and one that pulls at the threads of our understanding and trust in the capitalist system. As an issue that has an outsized impact on lower income consumers, it is especially important to examine how we personally believe corporate profits should be weighed against consumer welfare.

One potential limitation for this analysis is the presence of omitted variables in the models. For instance, changes in government policies, market regulations, or external shocks could confound the observed relationship, leading to biased estimates of the coefficients. Moreover, the possibility of reverse causality poses a significant concern for such an analysis. In a dynamic system like the food industry, consumer demand may have an influence on producer prices, creating a feedback loop that complicates causal interpretation. Similarly, simultaneous interactions between producer and consumer prices could skew the estimated effects, as changes in one variable may prompt reactions in the other, leading to endogeneity issues. While these issues do pose a threat to the robustness of observed results, I still think my findings show a concerning trend that can be understood when looking at the full context of what has been going recently in the food industry.

There are a lot of moving parts that come into play with an industry as complex as food manufacturing and distributing, and taking them all into account is nearly impossible. This is a simple analysis, and by no means does it come close to painting a full picture of the relationship between the Consumer Price Index for food, and the Producer Price Index for food manufacturers in the United States. However, I do think this analysis provides an important insight into a system that everyone in America is a part of. Everyone shops for groceries, everyone has to feed their family, and everyone has to eat. At the very least, I believe people deserve to be informed of how and why their lives are being shaped by decisions that are out of their hands.