Consumer Searching Behavior Under High Inflation

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Project Summary

1 Research Question

Do consumers search more for cheaper goods under high inflation? This project explores the relationship between inflation and searching behaviors. Inflation can affect individuals' searching behaviors through two potential channels: 1) the real wage channel, and 2) the price dispersion channel. Regarding the real wage channel, when real wage decreases due to higher inflation, it can affect searching in either direction. Consumers might search more due to lower purchasing power, or lower opportunity cost of searching (real wage). On the other hand, consumers may search less if they are working more to compensate reduced purchasing power or income. So the direction of real wage channel remains mixed. As for the dispersion channel, inflation can affect searching because the dispersion represents the return to search. Depending on how price dispersion changes with higher inflation, individuals might search more or less.

In this project, I focus on the dispersion channel as it is presumed to be significant channel. Even though consumers may be inclined to search more due to lower real wages, if the return to search is small, they would instead prefer leisure or working more over searching. I expect the dispersion channel leads consumers to search less under high inflation, based on Figure 1. The grocery shopping time trends are stable over time, and there even seems to be a negative correlation between inflation and search. Considering that the real wage channel is likely to increase searching, the figure suggests the dispersion channel could be dominant. So the goal of this project is to document the dispersion channel's operation and its relevance to the aggregate economy's searching behaviors.

2 Importance & Contribution

This project is worth pursuing because it provides insights into the relationship between inflation and markup. If consumers search less under high inflation, it implies that firms can set higher

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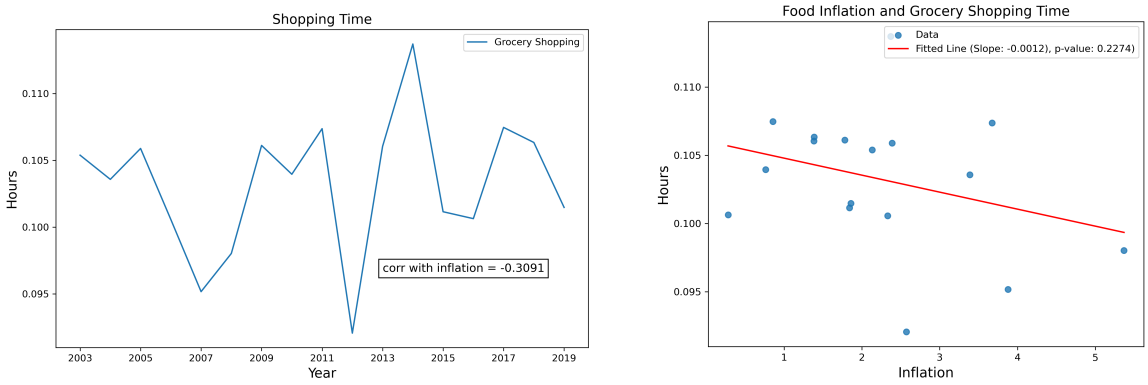


(a) Grocery Shopping Time Trends

(b) Grocery Inflation and Searching

Figure 1: Aggregate Facts

prices. This is because less searching implies less demand elasticity. If so, an increase in inflation will lead to an amplification channel: high inflation results in higher individual prices/markups. Regarding this potential amplification channel, there could be also policy implications. If the problem is less searching, the government could search instead of consumers. The government may want to compare prices and give information to consumers to prevent the vicious cycle.

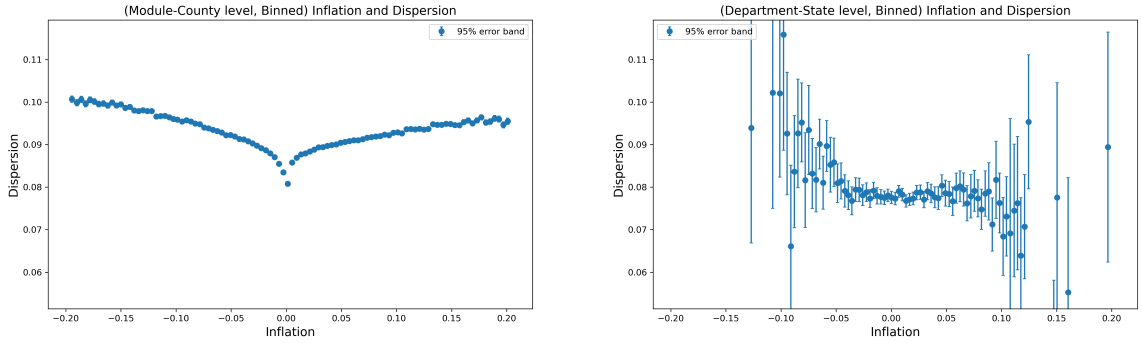
This project contributes to the literature by answering the unanswered question. There are two main papers related with the research question: Sara-Zaror (2021) and Nakamura et al. (2018). Sara-Zaror (2021) finds an upsilon shape cross-sectional relationship between inflation and dispersion across product categories, and explains it by adding endogenous searching components in the model. The model predicts that under higher aggregate inflation, we should expect more searching from consumers. However, the paper can be improved due to the following reasons: 1) all empirical works in the paper are cross-sectional evidence, so it does not really answer the question, and 2) the model is unreliable because the mapping from data to model is implausible. The upsilon shape cross-sectional empirical evidence is replicated in the model as an aggregate relationship, but that is not observed in aggregate data. Furthermore, the model prediction about the relationship between aggregate inflation and searching is supported again by cross-sectional evidence. Since the model is matching and being supported by different moments, the model itself and prediction from it are unreliable.

Nakamura et al. (2018) could be informative to the research question because it studies the aggregate relationship between inflation and price dispersion. However, it does not directly answer the relationship between inflation and search because return to search (dispersion) and actual search can be different at aggregate level. Consider an extreme case: the dispersion is extremely high in certain categories (so is aggregate dispersion), but consumers do not really consume those categories. If this is the case, actual search is not necessarily high even under high aggregate dispersion. To solve this possibility, I go down to micro-level and revisit cross-sectional inflation-dispersion relationship across product categories.

3 Progress & Issues

To explore the dispersion channel, I look into the cross-sectional inflation-dispersion using Nielsen scanner dataset. I focus on the cross-section variation rather than at aggregate because of the following reasons: 1) to solve the potential problem from Nakamura et al. (2018), and 2) the cross-sectional evidence will be more powerful discipline facts for different models because it is natural to analyze searching behaviors at narrow product category level. Consumers search within very narrow category (e.g., chocolate milk), not across all the products in the economy. I mostly follow Sara-Zaror (2021)'s empirical approaches.

The left panel of Figure 2 replicates Sara-Zaror (2021)'s results: when a narrow category ('Module') is going through higher absolute inflation compared to another category, the dispersion of it increases. This result implies higher inflation could lead to higher searching, which might seem incompatible with the aggregate facts above. However, the right panel of Figure 2 shows that the relationship washes out at the higher product/geography grouping level. This could imply the positive relationship washes out as samples are being aggregated up, and it is because how the aggregate dynamics work.



(a) Module-County Samples

(b) Department-State Samples

Figure 2: Cross-sectional Facts

Issues: It is unclear yet that how the patterns in Figure 2 is observed, and how it is informative to searching behaviors. The followings are issues and answers (or plans to answer):

1. To answer the aggregate question, what cross-sectional evidence should be used?
   : Both. While the module-level facts are natural since consumers search within modules, it is incompatible with the aggregate pattern. Explaining why that pattern goes away at upper level could be informative to aggregates.

2. Why/How explaining different patterns across grouping levels will be informative?
   : Not clear yet, it could be just a mechanical result (regression toward the mean) as samples are being averaged up. I will do Monte Carlo simulation with module-level samples to check

whether it is mechanical or there is an economic meaning in why the pattern goes away. After knowing that, I can answer why/how it is going to be informative.

3. If consumers search within the narrow 'module' level, how should we think about department or aggregate level dispersion?
   : The department or aggregate dispersion is calculated by taking a weighted average of module sample values. However, It is unclear if that averaged dispersion means return to search or actual search at those levels. This is hard to be answered with data, so I will think about a very simple model to answer how consumers think about the averaged (upper level) dispersion related to their welfare or searching behaviors.

References

Nakamura, Emi, Jón Steinsson, Patrick Sun, and Daniel Villar, "The Elusive Costs of Inflation: Price Dispersion during the U.S. Great Inflation," *The Quarterly Journal of Economics*, 2018, *133* (4), 1933–1980.

Sara-Zaror, Francisca, "Expected Inflation and Welfare: The Role of Consumer Search," *Working Paper*, 2021.