

Research Report

Measuring Consumption Reactions to Political Conflict with Smartphone Location Data

FIRMS, RESEARCHERS, AND POLICY MAKERS OFTEN WANT TO MEASURE CONSUMPTION AND ESPECIALLY HOW EVENTS, PROMOTIONS, OR POLICIES AFFECT IT. MEASURING CONSUMPTION REACTIONS IS OFTEN HARD. FIRMS LACK ACCESS TO COMPETITORS' SALES DATA AND REGULARLY DO NOT SHARE THEIR OWN WITH OUTSIDERS. LARGE SAMPLES OF SMARTPHONE LOCATION DATA COULD SOLVE THIS PROBLEM. THIS ARTICLE DESCRIBES A RESEARCH PROJECT USING SMARTPHONE LOCATION DATA TO ESTIMATE CONSUMPTION REACTIONS TO POLITICAL CONFLICT DURING THE TRUMP PRESIDENCY.

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Introduction

Political conflict is a fixture of modern democracies. Such conflict shapes societal and political outcomes. But does political conflict with a foreign country also influence domestic consumers' daily consumption choices? In our study, we investigate whether consumers boycott goods associated with the opposing country in a setting where the conflict does not directly influence the characteristics of these focal goods.

More concretely, we use the US-China trade conflict to analyze whether consumers reduce their visits to Chinese restaurants in the

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US when political relations deteriorate. We measure the intensity of political conflict through the negativity in media reports and rely on smartphone location data of more than eleven million devices to proxy daily visits to over 194,500 restaurants in the US.

We find that worsening US-China relations induce a statistically and economically significant decline in visits to Chinese restaurants relative to the average restaurant in the US. At the same time, visits to other foreign cuisines also decrease substantially, while visits to traditional American restaurants increase. We interpret these results as

evidence for international conflicts triggering ethnocentric consumer behavior – defined as consumers' tendency to discriminate against foreign products (e.g., Shimp and Sharma, 1987; Sharma et al., 1994).

Smartphone Location Data as a Proxy for Consumption

We proxy consumption of conflict-associated goods using daily visits to dine-in restaurants in the US in 2018 and 2019, distinguishing among restaurants serving different types of ethnic food. The underlying data stems from Safegraph, a company that gathers smartphones' global positioning system (GPS) location data and attributes visits of these devices to specific location polygons corresponding to individual buildings. Safegraph attributes a visit to a restaurant once a device resides at the dine-in restaurant for over four minutes.

After obtaining metadata on US dine-in restaurants and information on their daily visits, we use Safegraph's sampling rate by small geographic areas to remove sampling bias and estimate the actual number of visits. We scale the raw data by monthly sampling rates for each area, which we calculate by dividing the number of smartphones tracked therein by the number of residents. We exclude all restaurants with an average daily visitor number smaller than ten since Safegraph intentionally randomizes low numbers of visits to preserve visitors' privacy.

Approach

To investigate how political conflicts influence daily consumption behavior, we exploit the context of the US-China trade conflict and measure the intensity of this conflict based on US media reports about China. More precisely, we use textual analysis methods to measure the negativity in media reporting over the past week and compute a daily metric for the intensity of political conflict with China. To measure consumption choices, we use daily data on restaurant visits in the US. Finally, we use a two-way fixed effects estimation to assess how aggravations in the political conflict with China causally affect visits to Chinese restaurants compared to the average non-Chinese restaurant.

Our baseline analysis relies on estimating the following model:

$$Visits_{it} = \gamma_i + \tau_t + \beta \times Chinese_i \times Negativity_t + \epsilon_{it}$$

Thereby, $Visits_{it}$ denotes the number of visits to restaurant i on day t . γ_i is a restaurant-fixed effect that accounts for time-constant differences in the number of visits to individual restaurants (e.g., due to varying restaurant sizes, business models, or locations). τ_t are day-fixed effects, which capture day-level variation in visits common to all restaurants across the US. The day-fixed effects thus account for, e.g., seasonal effects or national holidays that affect the number of visits across all restaurant types. $Chinese_i$ is a dummy variable that takes

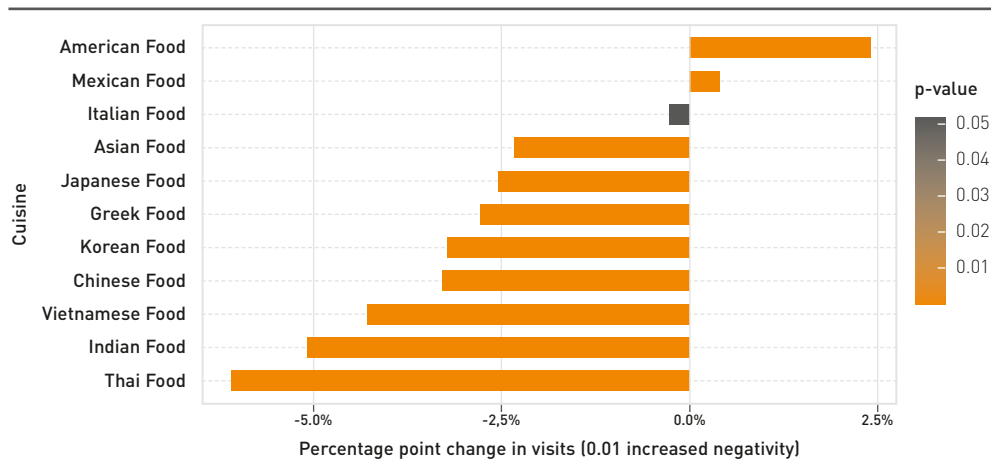


Figure 1: Relative Effect on Other Ethnic Cuisine Visits of a 0.01-Negativity Increase in US Newspaper Reporting on China

the value of one if restaurant i offers Chinese food. β is the coefficient of interest and indicates how the political conflict, measured by *Negativity_{*t*}*, in media reporting about China on day t , affects the number of visits to Chinese restaurants on day t relative to the average non-Chinese restaurant in the US.

Effect on Chinese Restaurants

Overall, our findings suggest that increases in political conflict with China have a statistically and economically meaningful impact on visits to Chinese restaurants in the US. Across all our specifications, the estimated effect β is statistically significant and negative, indicating that more political conflict with China is associated with a decline in visits to Chinese restaurants relative to the average non-Chinese restaurant

in the US. Assuming an increase in the week's average reporting negativity of 0.01 (corresponding to one additional negative word in each 100-word long paragraph), visits to Chinese restaurants decrease by 3.6% in our preferred specification. Our results are robust to including the control variables and estimating an array of alternative time series models. Further, the results are externally valid: applying our approach to the US-Mexico conflict during the Trump presidency yields qualitatively similar reductions in visits to Mexican restaurants after more political conflict with Mexico.

Effect on Other Ethnic Restaurants

The existence of ethnocentric tendencies suggests that consumers might decrease their

visits to foreign restaurants in general, even when the political conflict is only with one specific foreign country. Figure 1 shows that our data support this theory. We illustrate the estimated effects of a 0.01 increase in our measure of political conflict with China on other ethnic restaurants' visits. All estimated effects are highly significant, except for the small positive effect on Italian restaurants. Most strikingly, Figure 1 shows that our model estimates an almost 2.5% increase in visits to restaurants serving American food. The estimated effects for Mexican and Italian restaurants are comparatively small, with less than a 0.5% change in the number of visits. At the same time, our estimates for all other East-Asian restaurants are large and negative. This result suggests that US consumers might not always distinguish between Asian ethnic cuisines. Finally, Greek and Indian Food restaurants also exhibit sizable negative coefficients, although we consider these restaurant types as easily distinguishable from Chinese restaurants.

Conclusion

This study illustrates how smartphone location data can enable firms and researchers to answer empirical questions that have previously been hard to evaluate. These data provide information on daily visits to most locations – including commercial shops and restaurants – thus enabling researchers to estimate consumption reactions at scale and locations where the researcher would not have had data access under ordinary circumstances.

While real-world anecdotes and survey-based research suggest that political conflicts can have large effects on the consumption of foreign products, it is often difficult to quantify these effects separately from accompanying confounders such as, e.g., changes in prices and availability of products. We overcome this challenge based on novel data sources and demonstrate that an increased political conflict between the US and China substantially reduces visits to Chinese and other foreign restaurants. This finding suggests that consumers behave ethnocentric, which holds implications for policy makers and firms. Policy makers should communicate with that finding in mind during political conflicts. Additionally, firms should consider ethnocentrism as a relevant risk factor for product branding: products associated with a political conflict could suffer, even if they are not the subject of the conflict and are merely perceived as foreign.

References

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