Identity, Media and Consumer Behavior

Mattia Nardotto* Sandra Sequeira†

March 1, 2020 ‡

Abstract

This paper examines how political events that sharpen identity affect consumer behaviour. We study the impact of the Brexit Referendum on consumer choices in the UK between British and EU grocery products. Using a unique panel dataset from a major retailer in the UK with over half a billion shopping trips for 12 million shoppers before and after the referendum, we find that consumers respond to the referendum results by increasing consumption of UK products and reducing consumption of EU products. Following the Brexit Referendum, the market share of European products falls by a factor of 1.6 when compared to UK products that have either a UK flag or a UK name. We confirm that these changes in consumption are driven by British identity being top of mind by exploiting the impact of media storms: following the referendum, the increase in consumption of UK products is 4% higher in days in which there is intense social media discussion on Brexit. The effect of social media is stronger when users discuss the politics of Brexit as opposed to economic or social issues such as immigration. These findings underscore the importance of identity in shaping everyday economic decisions and the mediating role that the media can play in the process.

*mattia.nardotto@kuleuven.be, KU Leuven

†s.sequeira@lse.ac.uk, London School of Economics and Political Science, corresponding author

‡We thank Georgij Alekseev and Jack Fisher for outstanding research assistance. We are also grateful to Gonzalo Nunez-Chaim for his excellent support with the data collection. We thank Hunt Alcott, David Atkin, Pedro Bordalo, David Yang and Noam Yuchtman for very helpful comments.

1 Introduction

A growing literature in economics focusses on the importance of identity in shaping a variety of economic behaviors and outcomes (Akerlof and Kranton 2000; Grossman and Helpman 2018; Atkin et al 2019; Gennaioli and Tabellini 2019). This literature has followed closely from earlier developments in Social Identity Theory (Tajfel 1981; Tajfel 1982; Tajfel and Turner 1986), on how individual identity can be partially derived from group affiliations via categorization (Nosofsky 1992; Tajfel and Turner 1986) (e.g. British people are culturally distinct from Europeans). Social Identity Theory further predicts a need for positive self-esteem, which is partially built on comparisons with out-groups. In particular, periods in which the group experiences some external threat may strengthen individual identification with the group (Branscombe, Ellemers, Spears, and Doosje, 1999; Davies, Steele, and Markus, 2008). Threats increase the salience of group membership, increasing the utility from identifying with the group. This then increases the likelihood that individuals adopt prototypical group behaviors, namely that they would prefer to consume products consistent with their most salient political and economic identities (Khan, Misra, and Singh, 2013; Bertrand and Kamenica 2018; Pandya et al 2019).

In this paper, we show that a plausibly unexpected political outcome - the Brexit Referendum outcome revealing the collective decision for the United Kingdom (UK) to exit the European Union (EU) - made British identity salient across the UK, inducing consumers to change every day economic behaviour by shifting towards consumption bundles that were congruent with "being British".

To study consumer behavior we use scanner data from a major UK retailer, with over 600 stores across the UK and a set of 12 million customers who shop regularly with a loyalty card (out of a universe of 15 million customers shopping at this chain during our period of interest). This loyalty card allows us to construct a panel of customers and their shopping transactions. Our data span the entire period from three months prior to the ascent of prime-minister David Cameron to power in 2015, to his calling of the referendum in February 2016, and up to 9 months following the June 2016 referendum. This allows us to observe and control for any pre-trends or anticipatory movements in consumption bundles that might have been driven by expectations around the timing of

the referendum and its outcome. While we always account for prices in our analysis, we also exploit the fact that during our window of analysis, supplier contracts were fixed in pounds and the share of UK and EU products available on shelf was stable.

Our empirical analysis proceeds in three steps. First, we conduct an event study with shopper, store-week and product category fixed effects to estimate changes in the share of UK vs EU products purchased before and after the Brexit referendum. We find that increasing the salience of British identity was associated with an across the board 0.3% increase in purchases of UK products that persisted for up to 9 months following the Brexit Referendum. While substitution occurs in product categories with an above average market share of EU products, it is less frequent in product categories in which EU products were less dominant. Switching is also more frequent in product categories with higher average prices, driven mostly by decreased price sensitivity to UK products and increased price sensitivity to EU products.

Second, we test the robustness of our findings by implementing a difference-in-differences model in which we exploit differences across products for which place of origin is more salient, before and after the referendum took place. The increase in UK product market share is particularly pronounced for products that are saliently labelled as being British, by having the union jack flag on the package or by directly mentioning the place of origin in the product name (eg British ribs), which is consistent with the fact that it is product origin that is driving observed changes in consumption patterns. The flag leads to a 3% increase in sales relative to UK products without a flag in the 9 months after the referendum and it decreases EU product consumption by a factor of 1.6 following the referendum.

Third, we examine the role of the media as a shifter of the salience of identity to better understand the impact of political events on consumption behaviour. The media can potentially play a critical role as a coordination mechanism that can both validate group identity and increase its salience. We rely on a panel of locality-level twitter data to proxy for changes in exposure to discussions about Brexit and to the salience of UK vs EU identities. We obtain data on the universe of tweets published on Twitter in the UK during the period between March 2015 and March 2017 that related to Brexit or British identity, and combine text analysis with machine learning to measure the level and direction of sentiment towards Brexit at the locality level. The social media panel data

are then matched to the consumption data to elicit the impact of media activity on the direction and strength of consumption changes following the Brexit referendum. To advance on causation, we identify twitter storms, i.e. peaks in twitter activity at the national level. We then focus on the top 2% of episodes of intense twitter activity and we compare sales of UK vs EU products in the same store, the day before and after each twitter storm took place. This empirical strategy rests on the assumption that the timing of tweets at the national level is exogenous to the timing of grocery shopping at the local level. We find that days in which there is a high share of overall tweets about Brexit there is also an increase in consumption of British products and a reduction in consumption of EU products: a 10% increase in the number of tweets is associated with a 4% increase in the share of UK products purchased. Moreover, the effect of twitter activity is particularly strong when tweets are about the politics of Brexit (eg. regaining sovereignty) relative to economic or social concerns such as immigration. Note that we interpret these results as suggestive of the role of the broader media in making identity salient to a larger segment of the population, not just twitter users. Days with twitter storms are likely to occur when there is more discussion about Brexit in the traditional media as well. While there are no data available on readership of traditional media in the UK at the required level of granularity, we find a strong positive correlation between twitter and facebook usage at the locality level.[1]

Finally, we examine the role of standard economic, social and political mechanisms that could drive changes in identity around the Brexit referendum. We find no evidence that shoppers in areas categorized by low income, a higher share of blue collar workers, higher rural population and higher unemployment, are more likely to move consumption towards UK products. We also find no evidence that shoppers are more likely to buy products that contribute to local employment suggesting that this is not a primary concern of those purchasing more British products following the referendum.However, we do find that the market share of UK products increases more in areas that voted to Leave the European Union. This is consistent with our interpretation of the referendum and the campaign that preceded it as making identity salient, without being systematically driven

[1]Our findings are robust to different ways of identifying twitter storms such as looking at intense twitter activity started by the top 5 and 10% of influencers on Twitter. This corresponds to twitter users who have the highest twitter activity and the largest number of friends and followers on twitter. For this analysis, these attributes are aggregated into a score with equal weights for each dimension.

by strong economic fundamentals.

Consumption choices are an ideal outcome to measure the economic consequences of changes in political identity given the frequency of shopping transactions and existing evidence of the importance of political and religious identity in shaping consumption decisions in a variety of settings (Escalas and Bettman 2005; Pandya et al 2018; Bertrand and Kamenica 2018; Atkin et al 2019). Since supermarket shopping is a frequent and near universal activity, we can observe real-time temporal shifts in behaviour that are triggered by well-defined political events. Relative to opinion surveys, purchases are less subject to social desirability bias (Newman, B. J. and Bartels, B. L. 2011). Moreover, everyday grocery shopping is likely to have less social signalling value than purchases of durables such as cars, which are the focus of most of the literature to date (Hong et al 2011; Fouka and Voht 2018). Agents in our setting are therefore less likely to be constrained by social signalling concerns when making purchasing decisions, which brings us closer to isolating individual preferences for identity.

The unexpected outcome of the Brexit referendum renders it an ideal event study. Prior to the referendum there was scant public discussion on Brexit. Post-referendum, interest in Brexit soared and a potentially latent form of British identity was revived in the media and in the public discourse. Discussions around Brexit have dominated the political debate up to three years following the referendum, resulting in the resignation of two prime ministers and in a renewed threat of the disintegration of the United Kingdom.[2] At the same time, while the referendum and its aftermath have triggered extensive debate on the categorization of a "British vs EU political and social identity", there is no evidence that it was associated with explicit boycotts of EU products or an appeal to buy British.[3] Any change in consumption behaviour is therefore likely to be driven by a shock to the salience of identity.

Our findings contribute to several literatures. First, we contribute to a new but growing literature examining the impact of identity on every day economic activity, as theorized by Akerlof

[2]The referendum also pre-dated the rise of nationalist and autarkic rhetoric in some western democracies such as the US, with the ascent of Donald Trump to power happening five months after the referendum.

[3]The Brexit referendum did not produce explicit calls for consumers to change their consumption patterns, and it did not systematically change product characteristics or availability. As discussed above, product availability remained constant throughout the period of our analysis. Moreover, when we examine our twitter data, we find that less than 0.02% of all tweets in our dataset refer to an explicit boycott of EU products. Additionally, google trends report no data on searches about boycotting EU products.

and Kranton's (2000) seminal paper (Pandya et al 2018; Bertrand and Kamenica 2018, Fouka, V. and Voth, H. J. 2013; Atkin et al 2019). While our evidence supports some key findings in the literature namely the importance of political identity in shaping consumption behaviour, we provide novel and more nuanced evidence on how preferences are not fully stable and consistent across consumption domains, and we provide suggestive evidence that shoppers are likely to incur in higher total expenditure to accommodate their identity preferences. We further depart from this literature to examine the mediating role of the media as creating focal points for the salience and validation of group identities.

Our findings also speak to an emerging behavioural literature on the psychological foundations of consumer behaviour (Bordalo et al 2020). We provide novel evidence on the instability of preferences and how identity can change consumers' price sensitivity. As a result, our findings can help augment and improve the predictive power of existing models, by showing that consumers may systematically deviate from workhorse rational models of consumer behavior.

Finally, we contribute methodologically to the study of identity. The existing literature relies mostly on lab experiments, surveys and ethnographic studies to measure shifts in identity. In line with recent papers (Bertrand and Kamenica 2018; Atkin et al 2019), we rely on a revealed preference approach to elicit meaningful shifts in political identity through consumption data. We advance on this literature by suggesting the use of social media as a shifter of the salience of group identity that can significantly affect consumer behavior.

The rest of the paper is organized as follows: section 2 describes our retail setting and the timeline for the Brexit referendum. Section 3 describes the data used in our analysis including the transaction-level store data, the twitter data and the census and voting data. Section 4 discusses our identification strategy and presents the main results. Section 5 discusses key robustness checks and section 6 concludes.

2 Identity, Media and Consumer Behavior

A growing literature has focussed on how identity can affect a variety of important economic outcomes such as team production (Hjort 2014), conflict (Depetris-Chauvinand and Durante 2017)

and trade policy (Grossman and Helpman 2018). A parallel literature has developed in political science to establish similar links between political identities and consumption (Cuadras-Morat, X, and Raya, J. M. 2016). While identity is often studied in lab experiments, real-time collective shocks to identity are hard to reproduce in the lab, and they may lack external validity (Aronczyk 2013; Brewer 1984). Alternatively, studies can measure identity based on self-reported surveys but these are often constrained by social desirability bias and demand effects (Barbara, Jost, Nagler, Tucker and Bonneau 2015).

Recent literature has adopted a revealed preference approach by focussing on consumption choices as high frequency, nearly universal economic decisions that can reveal preferences for identities that are clearly identified with specific consumption bundles (Bertrand and Kamenica 2018; Pandya et al 2019; Atkin et al 2019). This literature provides proof of concept evidence of the importance of identity and its malleability in response to salient political, social or religious shocks.

We build on this work to examine several outstanding questions. First, we investigate the mechanisms through which identities can become salient and change actual economic behavior. In particular, we examine the role of the media in increasing the salience of group identities, thus paving the way for individuals to adopt consumption bundles that bring them closer to the prototypical behaviour of the group they now feel they belong to (Akerlof and Kranton 2000).

Second, we examine whether preferences for identity are stable across consumption choices and across time by exploring heterogeneity in treatment effects across product categories, before and after the Brexit referendum. The key sources of heterogeneity that we focus on are prices, the salience of each product's association with a given political identity, and the availability of substitute products in each product category choice set. In particular, we test whether identity preferences change not only levels of consumption but also price sensitivity towards goods associated with a certain identity.

Third, we test whether preferences for identity are driven by economic fundamentals affecting individuals in the localities in which they live in. It is possible that areas that face economic hardship experience heightened awareness and support for identities that demand changes to economic circumstances. This is a common narrative associated with the recent rise in nationalistic rhetoric in several countries, including across the EU and in the US. Alternatively, the rise of a nationalist

political identity can be mostly driven by political ideology instead of economic preferences.

Fourth, we study the distinctive case of how public consultations such as referenda can directly shape political identities. Early work in social identity theory established that individuals attribute positive utility to the well-being of members of their own group, and negative utility to that of members of other groups (see e.g., Tajfel et al. 1971). Alesina and La Ferrara (2000) show that when the population is heterogeneous, individual utility from joining a group depends positively on the share of group members of one's own type and negatively on the share of different types. A possibility that is less studied in the literature is that individuals misperceive actual membership in different identity groups. In this case, the campaign and the referendum results can provide an important signal of latent membership and support for distinctive political groups, thus emboldening individuals to more explicitly adhere to the majority's political identity.

Finally, we begin to unpack the notion of identity preferences. While challenging, we make progress on this issue by observing how consumption behavior responds to discussions about political, economic and social underpinnings of identity.

3 Setting and Data

3.1 The Brexit Referendum Timeline

The UK joined the European Union in 1973. Survey evidence suggests that by 2015, the majority of the population (over 60%) believed that participation in the block brought economic benefits to the UK and thus, supported continued membership in the EU (What UK Thinks: EU 2015; British Social Attitudes Survey 2015). In an unexpected turn of events, in May of 2015, David Cameron became prime minister of the UK as the leader of the Conservative party. In fulfilment of his electoral platform he enacted the EU Referendum Act in December 2015. The referendum was announced in February 2016 and it was held on June 23, 2016. Actual public discourse on Brexit was, however, extremely limited before the referendum took place. This is evident from figures 1 and 2, showing the frequency of google searches of the term "Brexit" and tweets mentioning Brexit

across the UK during this period.[4]

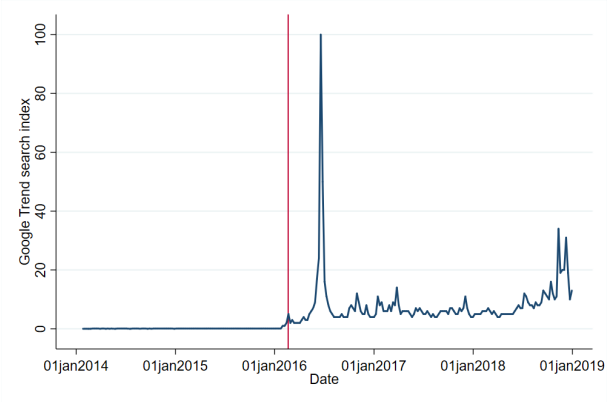


Figure 1: Google Trend Search Index of the Term "Brexit".

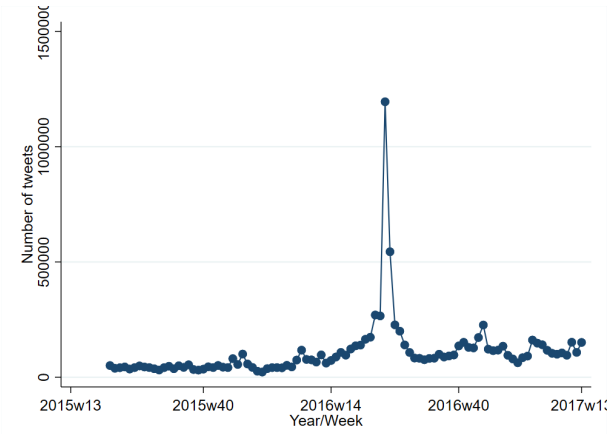


Figure 2: Tweets that include the term "Brexit".

On June 23, 2016, all UK citizens were asked to participate in a national referendum and express their view as to whether the UK should remain part of the EU or leave the EU. During this week, the public discourse around Brexit intensified as shown in figures 1 and 2. The race was tight, and the option to leave the European Union prevailed by only 4 percentage points (51.9% vs 48.1%).

The referendum, and the campaign that preceded it, may have represented an important co-

[4]Note that the figures represent search interest relative to the highest point on the chart for the given region and time. A value of 100 corresponds to the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term.

ordination device from which consumers could extract a clear signal of the degree of support for a "British identity", particularly when juxtaposed against the external threat of the "European identity". This signal may have reduced the social cost of associating with the British identity and of adopting behaviours that were believed to be more stereotypical and supportive of this identity (Bursztyn, Egorov and Fiorin, 2019). Our study exploits this shock to the salience of identity to understand how identity affects consumption behavior.

3.2 Consumption Data

To measure consumer responses to changes in the salience of identity we analyse weekly sales data for products labelled as originating in the UK or in the EU, in a major retail chain across the UK, before and after the Brexit Referendum took place. Our retail partner has over 600 stores across Wales, England and Scotland, serving a mainstream segment of the grocery market.

Our data span a time period between March 2015 and March 2017. This covers the three months before David Cameron's Conservative government came to power (May 2015), the announcement of the Referendum Act (December 2015), the announcement of the referendum (February 2016); the Brexit referendum (June 2016) and up to nine months after the referendum, as shown by figure 3.

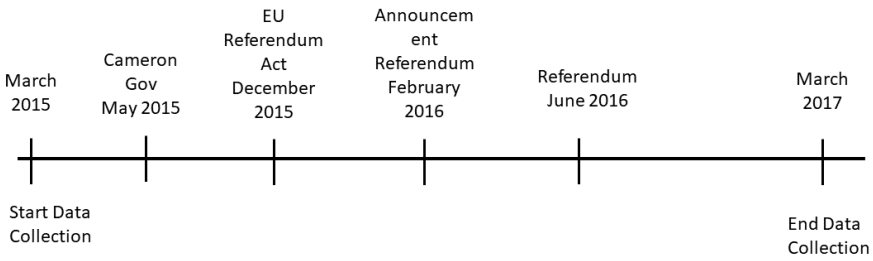


Figure 3: The timeline of the Brexit Referendum and the Scanner Data

The universe of transactions during this period lists approximately 15 million customers, out of which, 12 million have a loyalty card that they frequently use. To construct a panel of frequent shoppers, we restrict our analysis to the subset of consumers with a loyalty card to be able to

observe within consumer variation across time.[5] This sample of 12 million customers engages in a total of half a billion transactions during our period of interest. For tractability, we extract and analyse a random sample of one million shoppers, engaging in over 55 million transactions.[6]

Table 1 shows the descriptive statistics for our sample. To identify the share of UK products in a shopper's consumption basket we ascribe an "identity" to any given product based on a label displayed on the product package specifying its country of origin (eg: made in). When a product lists more than one origin country, we apply a simple weight to identify the share of the product that is British or European. As a result, the definition of UK product or EU product represents a score from 0 to 1.[7] We use a similar strategy to identify products that are European.

We use machine learning to assign products to product categories based on product descriptions. These consist of distinctive categories such as wine; biscuits and crackers; and breakfast cereals, among others, for a total of 20 product categories.[8] The scanner data provides a shopper unique identifier, a product unique identifier (Stock Keeping Unit –SKU– number), information on the price and quantity bought, the store location, and a discount indicator for whether the product was sold on a discount. The loyalty card data includes demographic information for approximately 12 million shoppers, including age, gender, number of people in the household and a 7-digit postcode (with an average radius of 50 meters).

To examine the areas where shoppers live, we match our store-level data to census tracts. Administrative units in the UK vary between output areas (OA) -which were built from clusters of adjacent unit postcodes, and designed to have similar population sizes and be as socially homogenous as possible based on tenure of household and dwelling types[9] - and Lower Layer Super Output Areas (LSOA) built from groups of contiguous OAs. LSOAs have been automatically generated to be as consistent in population size as possible and typically contain from four to six output areas. The minimum population is 1000 and the mean is 1500.

[5] We find that transaction activity of consumers with and without a loyalty card is qualitatively similar (see online appendix Table 1).

[6] The ensuing results remain unchanged when we draw different random samples of a similar size.

[7] Our results are not sensitive to this classification method. For example, using a lexicographic binary classification capturing whether the product has any link to the UK leaves the results unchanged.

[8] Note that the results are robust to using the retailer's definition of product categories, consisting of 385 categories.

[9] OAs preferably consisted of entirely urban or entirely rural postcodes, not a mix. The minimum OA size is 40 resident households and 100 resident people, but the average size is rather larger at 125 households.

Table 1: Descriptive Statistics

	Mean	Std Dev	Min	Max
Panel A: Shopping trips (N=56,947,974 T=108)				
Number shopping weeks	56.9	28.2	8.0	108.0
Weekly expenditure	50.9	33.9	1.1	1995.9
Weekly expenditure UK products	33.7	22.5	0.0	1294.2
Weekly expenditure EU products	10.6	8.3	0.0	566.7
Share UK products	67.9	8.5	0.0	100.0
Share EU products	19.9	6.8	0.0	100.0
Panel B: Household and Locality characteristics (N=999,995)				
Sex (female=1)	67.6	46.8	0.0	100.0
Age	55.3	16.2	18.0	89.0
Unemployment in LSOA	5.2	3.8	0.0	65.9
Share white in LSOA	88.1	16.4	0.0	100.0
Share blue collar in LSOA	23.1	7.7	0.0	100.0
Rural index in LSOA	18.2	38.6	0.0	100.0

3.3 Social Media Data

Our second main source of data are 19.8 million tweets and re-tweets extracted from Twitter's Historic database covering the period between March 2015 and March 2017. We rely on a machine learning algorithm to implement sentiment analysis based on hashtags and the content of each tweet. We identify key hashtags and content words related to Brexit based on Amador et al (2017) and calculate the TF-IDF (Term Frequency - Inverse Document) frequency for each tweet, which corresponds to a measure of how often each stem word occurred within the tweet, adjusted for frequency over all tweets. This created a vector with all the TF-IDFs per tweet. We then trained support vector machine (SVM) models on the training set obtained from Amador et al (2017) and used the TF-IDF vector as an input. Intuitively, SVM models try to identify a border between two subgroups that separates them as best as possible in a multidimensional space. As a robustness check, we train SVM models with linear, polynomial and RBF kernels and specify the optimal model parameters by cross validation (a machine learning technique that samples the training set into further subsets and compares the model performance within those). We identified the RBF

kernel as our preferred specification and trained the SVM model again on the complete identified tweet dataset. We repeat these procedures to identify positive/negative sentiment towards Brexit and to identify political, economic or social (immigration) arguments. This categorization further allows us to better understand the mechanisms through which social media content can shape identity and consumer behaviour. Table 2 describes the sample of twitter data used in the analysis.

Table 2: Descriptive Statistics: Twitter Data

County/week, N=7,547				
	Mean	Std Dev	Min	Max
Total tweets per week per county	1495.7	8924.2	1.0	375025.0
Share pro-brexit	44.4	49.7	0.0	100.0
Share against-brexit	55.6	49.7	0.0	100.0
Share political	35.9	48.0	0.0	100.0
Share economic	22.8	41.9	0.0	100.0
Share migration	10.4	30.6	0.0	100.0

3.4 Census Data

To measure the impact of economic fundamentals in shaping identity and consequently consumer behavior we obtain measures of locality level characteristics from the 2011 UK census that we then match to our store data. These include the share of blue collar workers, unemployment, the share of each product's contribution to local employment and whether the locality is rural or urban. A growing literature has documented that support for leaving the EU was stronger in geographical areas of the UK characterized by recent poor economic performance. The Leave vote share was higher in regions with higher unemployment rates and lower real wage growth, as well as larger increases in inequality and poverty, and sharper declines in manufacturing employment (Becker et al. 2016; Bell and Machin 2016; Clarke and Whittaker 2016; Darvas 2016; Langella and Manning 2016; Colantone and Stanig 2019; Darvas 2016).[10]

[10]Langella and Manning (2016) find that a declining share of employment in agriculture, manufacturing, mining and construction in the past three decades was associated with higher regional leave shares and a similar correlation is found with declining employment in services over the same period. Bella and Machin (2016) find that support for leaving the EU was higher in areas of Britain witnessing poorer performance in terms of real wage growth in the last two decades.

4 Empirical Analysis

We begin by examining unconditional aggregate changes in market shares of both EU and UK labelled products using the raw data for the universe of transactions in our sample (approximately 55 million transactions).

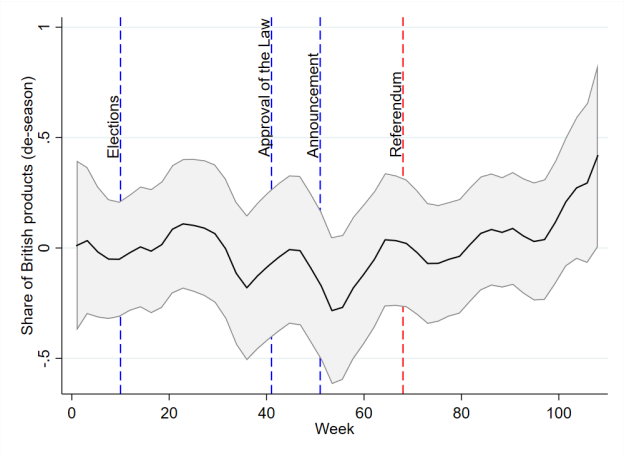


Figure 4: Share of UK products (de-seasoned with monthly dummies)

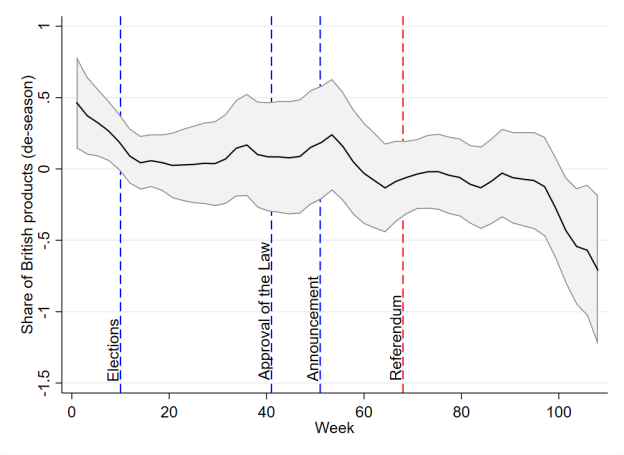


Figure 5: Share of EU products (de-seasoned with monthly dummies)

Figures 4 and 5 show the share of expenditures on UK and EU products between March 2015 and March 2017 (de-seasoned with monthly dummies). In the months prior to the referendum, the shares of each product were fairly stable and following a parallel trend. At the time of the

referendum, the market share of UK products increased at the expense of the market share of EU products. These changes persisted, and became stronger, up to 9 months after the referendum took place.

This comparison does not however account for baseline heterogeneity in shopper preferences, store characteristics, heterogeneity in product availability, or prices. The next sections describe how we advanced on identification.

4.1 Event Study: Changes in the Shares of UK vs EU products

We conduct an event study to examine the impact of the Brexit referendum on consumer behaviour. For each store-week in our sample between March 2016 and March 2017, we model the change in the weekly market share of UK and EU products, compared to the same store-week in 2015, which precedes any anticipation of the Brexit referendum. By analysing differences, we hold constant time-invariant store characteristics including the ex-ante demand for UK and EU products, customer demographics, and seasonal fluctuations. Note also that the timing of a store's exposure to the Brexit Referendum is orthogonal to consumers' shopping decisions.

We compute the market share of UK products and EU products as the number of UK product units sold as a percentage of all units in the product category sold in that store-week. For example, if a product (e.g., rice) had a 50% market share in a given store in a given week, the product accounted for half of all units of rice sold in that store in that week. Measuring market share, as opposed to the total number of units sold, allows us to scale each store's sales of a certain product relative to the overall demand for that product category in that store-week. Changes in market share also capture shifts in demand for products distinct from changes in demand for a particular product category.

We further control for seasonal effects by including week and flexible monthly dummies and we control for shopper level heterogeneity in preferences through shopper fixed effects. This allows us to control for omitted variables that generate persistent deviations in consumption patterns across shoppers or across time. Approximately 95% of all products in our sample were available in each store during the period of our analysis. This means that the overall share of UK and EU products in consumers' choice set was stable as well. We also hold constant seasonal fluctuations by comparing

2015 and 2017 shares in the same week.

Our baseline specification corresponds to:

$$Share_{ist}^{k} = \beta^{UK} ln(price_{st}^{UK}) + \beta^{EU} ln(price_{st}^{EU}) + \gamma Post\ Brexit_t + \beta Expend_{ist} + Week_t + \eta_i + \varepsilon_{ist} \quad (1)$$

where $Share_{ist}^{k}$ corresponds to the share of $k = UK, EU$ products in the household budget for shopper i in store s and week t. $Price_{st}$ corresponds to the average price in store s and week t. The $Post\ Brexit_t$ indicator equals 1 starting from the week after the referendum. We control for total $Expenditure_{ist}$ to isolate compositional changes in shopping patterns, and we include week of the year dummy variables and a trend (flexible month dummy) together with shopper fixed effects. The fixed effects ensure that we are exploiting within shopper variation, shopping in the same store and in the same time period. Standard errors are clustered at the shopper level.

4.1.1 Main Findings

Table 3 reveals that UK labelled products gained a market share of 0.2 percentage points, representing a 0.3% overall increase in the share of UK products purchased. Following the referendum, EU products lost a market share of 0.4 percentage points, corresponding to an overall 3% decrease relative to the mean. In the aggregate, this led to a substantial shift in revenue from the different bundles of products across all stores of the retail chain. Aggregating across 12 million consumers (the sample that we observe with loyalty card data), these changes suggest a yearly increase of 63 million GBP in revenue from sales of British products since the Brexit Referendum.[11]

[11] Note that this is likely to be the lower bound since the company had approximately 15 million shoppers. Assuming that the non-loyalty cards responded similarly to the Brexit referendum, these figures would increase to 79 m GBP per annum.

Table 3: Event Study: Changes in the Share of UK vs EU products

	Share UK (1)	**Share EU** (2)
Post Brexit	0.222***	-0.373***
	(0.007)	(0.007)
Constant	72.816***	14.920***
	(0.086)	(0.074)
Individual FEs	YES	YES
Week FEs	YES	YES
Total Expenditure	YES	YES
Average Prices (UK, EU)	YES	YES
Adj R^2	0.158	0.140
Observations	56,947,944	56,947,944
Num. of groups	1,000,000	1,000,000

One concern is that shifts in market share are driven by shifts in prices that coincided with the Brexit referendum. In our analysis we take advantage of short-term price stickiness as the retailer we worked with used a 6 month lag between pricing decisions and actual price movements, and adopting a similar strategy for promotions.[12] In fact, the Brexit uncertainty does not appear to have moved average prices for UK or EU products during the period of analysis as is clear from figure 6.[13]

[12]Retailers' contracts with suppliers also constrained short-run changes to products' shelf space allocation.

[13]The slight price movement that is picked up in a thicker confidence interval around weeks 47 and 99 represent the period in the run-up for Christmas in 2015 and 2016.

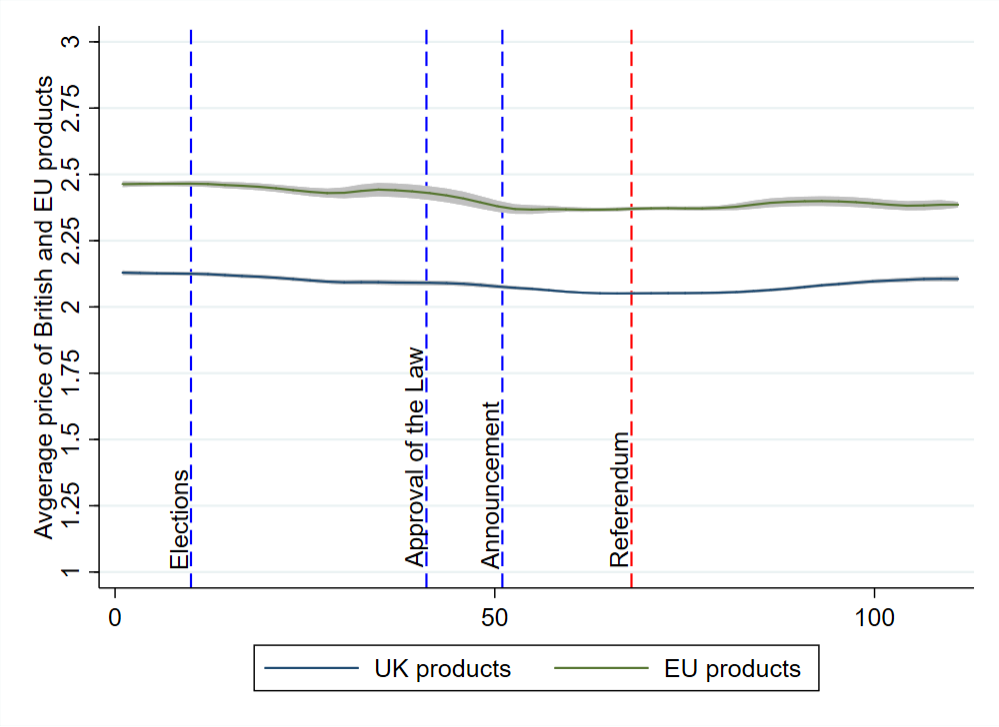


Figure 6: Average Prices of UK and EU products between March 2015 and March 2017

The observed price stability also mitigates concerns about anticipatory supply responses, i.e. stores shifting supply of EU vs UK products in expectation of increased future costs. The uncertainty around the Brexit negotiations that ensued the referendum does not appear to have immediately induced the retailer to change its supply chains. In fact, 90% of all products that are on shelf in March 2015 were consistently on shelf until the end of our window of analysis in March 2017. This figure grows to 95% if we consider products that were not on shelf for just 2 weeks during this entire period. The new products that were introduced between March 2015 and March 2017 were replacing discontinued products, but keeping the overall share of UK and EU products available constant throughout.

We then include product category fixed effects to absorb heterogeneity in product-level characteristics that could be correlated with changes in consumption patterns. This will allow us to identify how shoppers may trade off UK vs EU close substitutes within each product category (eg. within types of milk; types of biscuits, types of wine, etc.)[14]

[14]We group product categories into 20 categories based on their product description using machine learning. The

We rely on the same specification as in equation 1 but we now include product category fixed effects. Table 4 reveals that both the increase in market share of UK products and the decline in EU products are sizable and significant.

Table 4: Event Study with Product Fixed Effects

Dependent variable:	**Share UK**	**Share EU**
	(1)	(2)
Post Brexit	0.287***	-0.295***
	(0.007)	(0.006)
Avg. price UK products	-4.822***	4.775***
	(0.056)	(0.046)
Avg. price EU products	3.992***	-3.786***
	(0.037)	(0.030)
Household FEs	YES	YES
Week FEs	YES	YES
Product category FEs	YES	YES
R^2	0.116	0.178
Number of households	1,000,000	1,000,000
Observations	194,098,792	194,098,792

While we control for average product prices in all specifications, it is still possible that the observed compositional changes are occurring because shoppers are moving from expensive EU products to cheaper UK alternatives. In figure 7 we zoom into the product categories with the top 20% of treatment effects, and find that for these product categories prices of EU and UK products are fairly similar and stable across time.[15]

results are unchanged when we use a much finer categorization used by the retailer that includes up to 380 categories.

[15]This is conditional on having at least 1 UK product and 1 EU product in the product category.

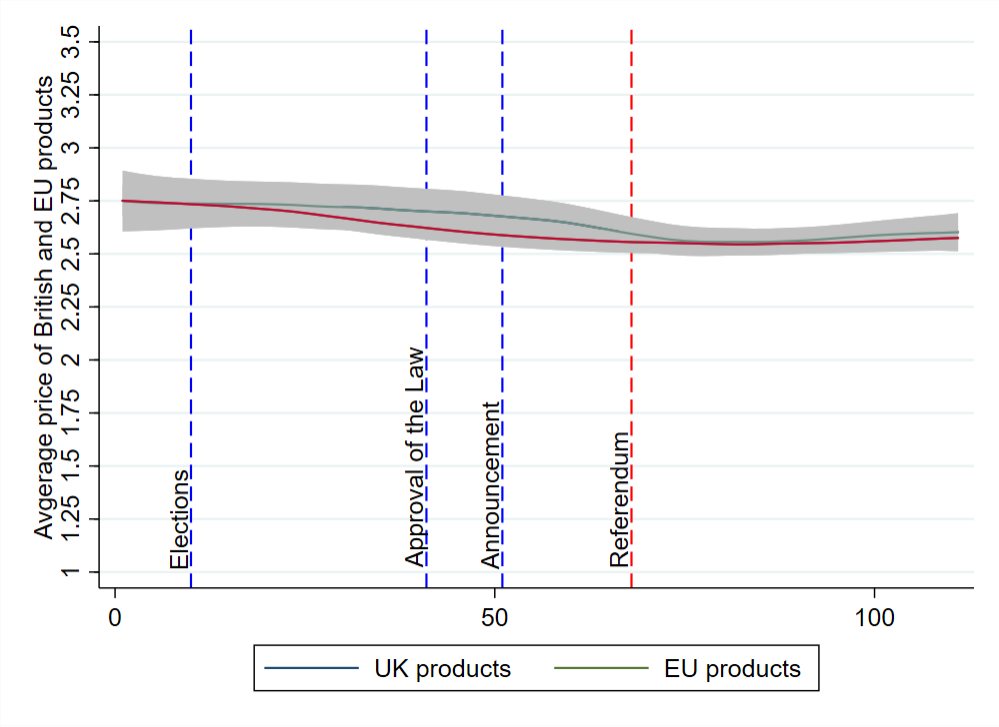


Figure 7: Prices for product categories in the top 20% of treatment effects

Figure 8 examines the relationship between average category price and treatment effects. The evidence suggests that substitution occurs for more expensive products.

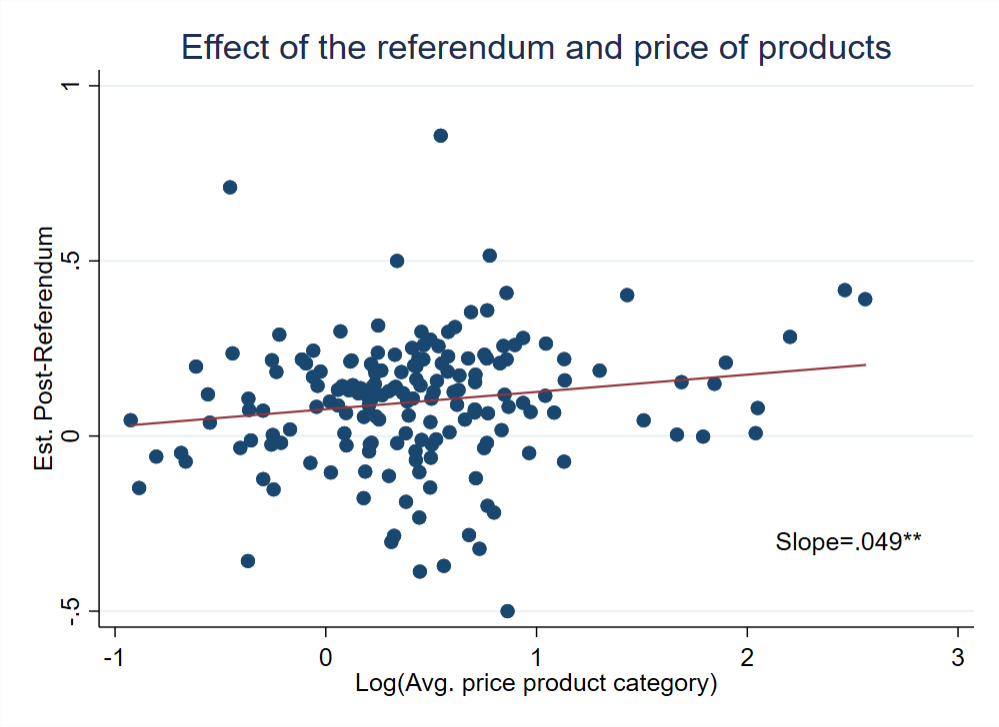


Figure 8: Average Prices and Treatment Effects

Finally, we examine whether demand for "identity" is driven by changes in price sensitivity across time. Table 5 shows that the observed shift towards UK products is driven mostly by a decrease in price sensitivity towards UK products and an increased price sensitivity towards European products, which is consistent with the previous results: shoppers are moving towards more expensive goods both within and across product categories in response to the salience of product identity.

Table 5: Changes in Price Sensitivity

Dependent variable:	**Share UK**	**Share EU**
	(1)	(2)
Post Brexit	0.187***	-0.290***
	(0.026)	(0.024)
Avg. price UK products	-5.338***	4.959***
	(0.058)	(0.048)
Avg. price UK products * Post Brexit	0.972***	-0.353***
	(0.018)	(0.015)
Avg. price EU products	4.261***	-3.889***
	(0.037)	(0.030)
Avg. price EU products * Post Brexit	-0.890***	0.338***
	(0.013)	(0.011)
Household FEs	YES	YES
Week FEs	YES	YES
Product category FEs	YES	YES
R^2	0.117	0.178
Observations	194098792	194098792

We then examine how the availability of products of each type (UK vs EU) in the choice set affects substitution patterns.

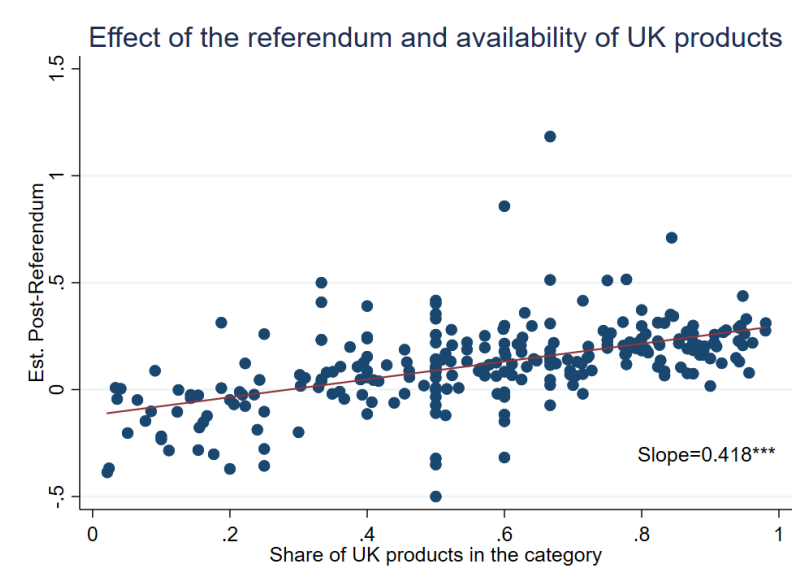


Figure 9: Changes in UK products' market share given availability of UK products in product category

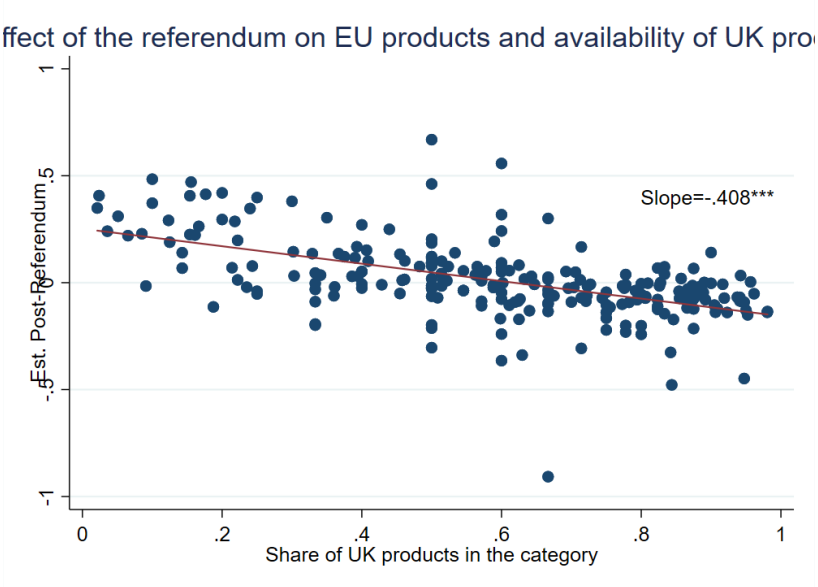


Figure 10: Changes in EU products' market share given availability of EU products in product category

Figures 9 and 10 show that as the share of UK products in a given product category increases, shoppers are more likely to move towards the consumption of UK products. The higher the share of EU products in the category, the less likely shoppers are to substitute away from them.

One important question is whether consumers incur in higher costs to accommodate their identity preferences. In figure 11 we provide some preliminary evidence on the cost of "identity". The x-axis corresponds to changes in pounds in total expenditure from before and after the referendum. There are two striking features of this figure. First, most consumers increased total weekly expenditure in the 9 months after the referendum despite the fact that prices did not change. Second, there is significant heterogeneity across shoppers with some increasing their weekly expenditure by up to 6%.

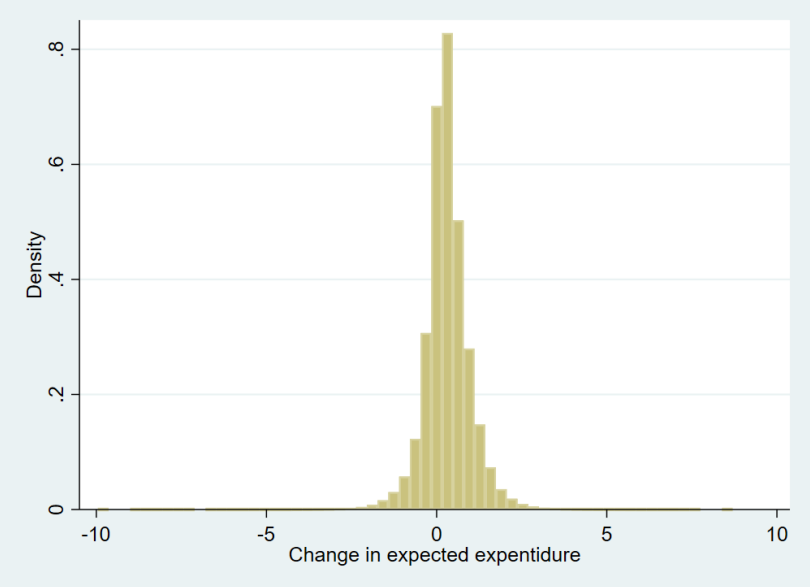


Figure 11: Change in Total Expenditure Before and After the Brexit Referendum

4.2 Difference-in-Differences

While all products in our dataset have a label specifying the country of origin, a subset of products include an image of the union jack displayed on the front of the package while others include a clear identifier in the name such as "British ribs" or "Scottish Oatcakes". If changes in consumption patterns are driven by a preference for identity, then we should observe that the largest increases in market share are for products with country of origin more saliently displayed in the package. Products with either a flag or the British name represent approximately 20.52% of all products on the shelf. Products with a flag or a clear identifier in the name are represented in almost all product categories in our sample and packaging did not change for any product during the two years in which we worked with the retailer. On average, flagged products tend to be more seasonal and more expensive so we focus on a subset of product categories that contain either the flag or the country identifier in the name but that are not affected by seasonality, while still representing an important share of the market (21%). This allows us to rely on a difference-in-differences estimator to identify moves toward products with a salient UK identity, before and after the Brexit referendum.

Figure 12 shows the trend in purchases of products with the union jack flag or a British identifier in the product name before and after the Brexit Referendum. The raw data suggests that

market shares for these products were stable until they experienced a significant increase after the Referendum took place.

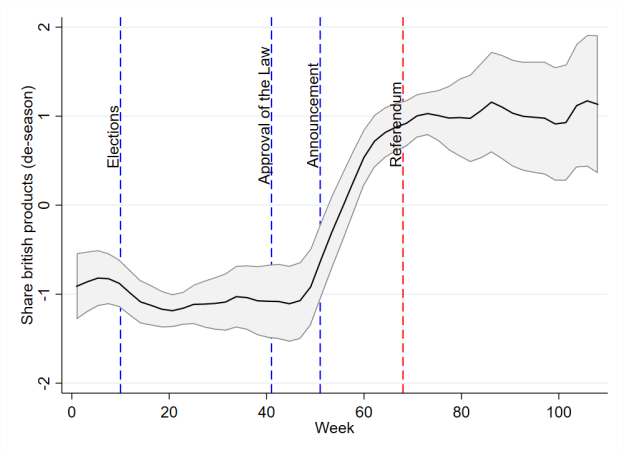


Figure 12: Share of Expenditure on Products with Flag or British Name

Our difference-in-differences specification is:

$$Diff\,Share\,Flag-UK_{ist} = \beta_1^A vg\,Price\,Flag + \beta_2^A vg\,Price\,UK + \gamma Post\,Brexit_t + Week_t + \eta_i + \varepsilon_{ist} \quad (2)$$

Where $Diff\,Share\,Flag\,UK_{ist}$ corresponds to the difference in the market share of products with the UK flag or name saliently displayed relative to the Share of UK products sold in stores that do not have the flag. As before, $Post\,Brexit$ is an indicator that equals 1 for the period following the Brexit referendum (our difference-in-differences estimator). We further include a control for total shopper weekly expenditure; week and monthly dummies and individual shopper fixed effects. We then replace as the dependent variable $Diff\,Share\,Flag\,EU_{ist}$ and replace the price control for $\beta_2^A vg\,Price\,EU$ to examine the impact of the referendum on shifts in market share between European products and those that are saliently British.

Table 6 shows that the union jack flag significantly increases the impact of identity on shopping behavior. The presence of the flag increases sales of UK products (relative to UK products that do not have a flag) by 0.981 percentage points, representing a 3% increase. Products that are clearly identified as being British increase their market-share relative to EU products by a factor of 1.6.

These findings are consistent with our interpretation that identity became more salient in the post referendum period, particularly for products clearly identified as being British, and that this had a significant impact on patterns of grocery shopping.

Table 6: Difference-in-Differences Estimates: Products with UK Flag or Name

Dependent variable:	**Share Flag - UK**	**Share Flag - EU**
	(1)	(2)
Post Brexit	0.981***	2.415***
	(0.028)	(0.029)
Avg. price Flag/Name products	-0.600***	-0.939***
	(0.041)	(0.044)
Avg. price UK products	6.151***	
	(0.233)	
Avg. price EU products		12.072***
		(0.214)
Household FEs	YES	YES
Week FEs	YES	YES
Product category FEs	YES	YES
R^2	0.178	0.196
Observations	33,185,350	33,183,019

4.3 Social Media Activity

We now turn to the role of the media in shaping identity and, consequently, consumer behavior. We obtain the universe of tweets published by twitter in the UK during the period March 2015 and March 2017, totalling 19.8 million tweets. We are able to geo-locate 11.3 million tweets either because the user has identified a location in the user profile or because the tweet itself was geo-tagged.[16] We then conduct slant/sentiment analysis to identify tweets that are pro or against Brexit using a supervised vector machine classification method. We use the radial basis function kernel (RBF kernel) as a learning algorithm applied to a training sample comprising of 43,221 tweets about Brexit identified in Amador et al (2017). To do this we combine metric multidimensional scaling of co-occurrence and manual tweet inspection.[17] Using the same method, we further classify tweets as being predominantly about politics, about economics or about social issues such

[16]Only about 2% of tweets are geo-tagged overall.

[17]Note that the resulting matched dataset is very similar when we use a linear classification as opposed to an RBF kernel.

as migration, the three key issues that dominated the Brexit debate (Amador et al 2017). Figures 13 and 14 show examples of the hastags and words used in the classification process.

To establish a causal link between exposure to media, identity and consumer behavior, we exploit the timing of the breakout of intense discussions about Brexit in the form of twitter "storms". We select the top 2% of twitter storms occurring at the national level and compare the share of UK vs EU products purchased at the store level, in the day before (control) and after (treatment) each twitter storm took place.[18] Using this method, we identify 12 twitter storms during our period of interest between March 2015 and March 2017. The underlying assumption is that the timing of news about Brexit is not driven by consumer choices at the local level.

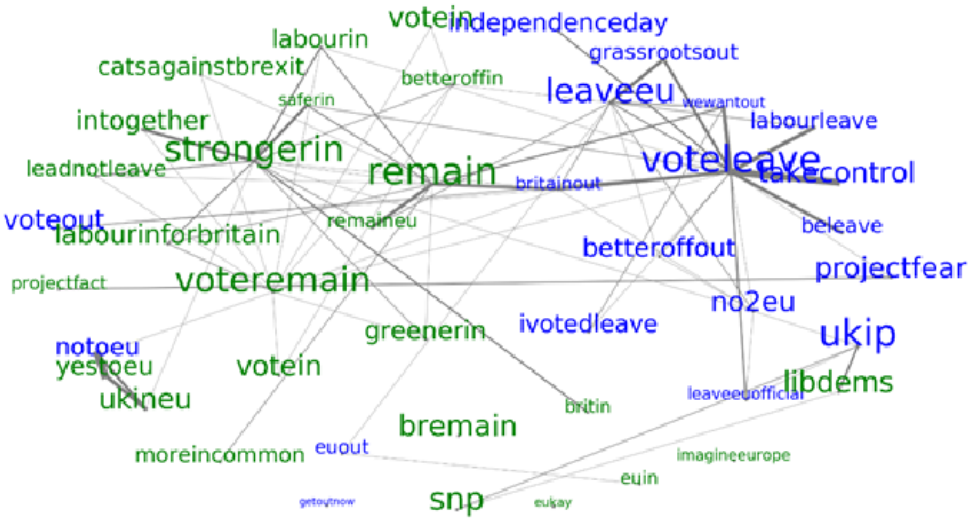


Figure 13: Classification of tweets into pro and against Brexit

[18] Note that our results are not sensitive to the choice of this threshold. In the online appendix we show that results remain unchanged when we use a different intensity cut-off such as 10 or 5%.

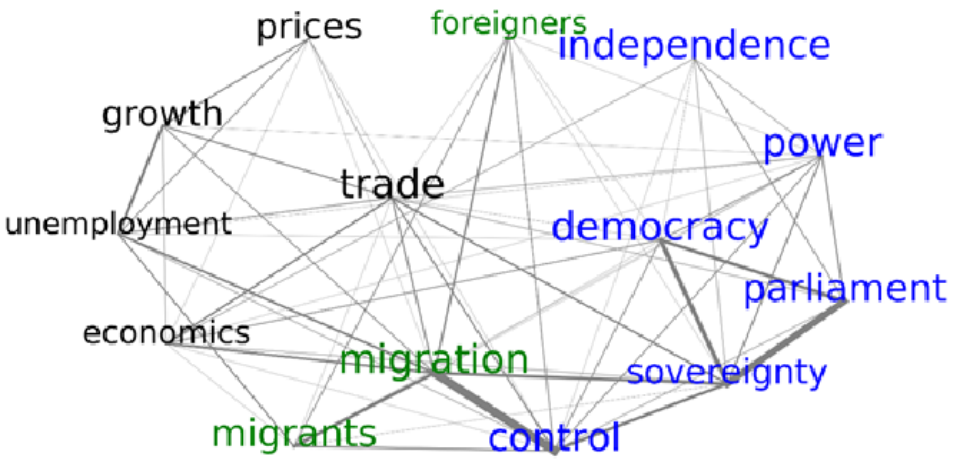


Figure 14: Classification of tweets into economic, political or social (migration) issues.

We then estimate the following model:

$$Share^{k}_{isct} = \delta Treated_{ct} + \beta X_{it} + \eta_s \times Event_t + \varepsilon_{isct} \tag{3}$$

where $Share_{isct}$ corresponds to the share of $k = UK, EU$ products sold in store s,to individual i, in county c and in event t relative to the preceding day. The $Treated_{ct}$ indicator equals 1 for each day following a twitter storm (event) and we include store-event fixed effects to account for variation across stores and across time. Note that in this analysis, we are no longer relying on the panel of consumers we used in section 3. In this analysis we use the universe of shoppers in each store.

To exploit the intensity of tweets we replace the $Treated$ variable with the number of tweets in each event - adding all tweets nationally with the exception of those from the county associated with each store - in logarithmic form. We go further and examine the relative impact of tweets that are pro vs against Brexit based on our classification.

$$Share^{k}_{isct} = \gamma Log(Tweets_{ct}) + \beta X_{it} + \eta_s \times Event_t + \varepsilon_{isct} \tag{4}$$

Table 7: Twitter Storms and Consumer Behavior

Dep. var.	**Share UK** (1)	**Share EU** (2)	**Share UK** (3)	**Share EU** (4)	**Share UK** (5)	**Share EU** (6)	**Share UK** (7)	**Share EU** (8)
Treated	0.001***	-0.000***						
	(0.000)	(0.000)						
Log(Tweets)			0.261***	-0.168***				
			(0.028)	(0.024)				
Log(Tweets pro)					0.237***	-0.147***		
					(0.026)	(0.022)		
Log(Tweets against)							0.270***	-0.176***
							(0.029)	(0.025)
Store × Event FEs	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Observations	6874833	6874833	6874833	6874833	6874833	6874833	6874833	6874833

Table 7 shows that an increase in the number of tweets about Brexit (pro or against) at the national level (excluding the corresponding locality of each store) is associated with a significant increase in the share of UK products and a significant decrease in the share of EU products purchased. A 10% increase in the number of tweets is associated with a 3% increase in the share of UK products purchased. We do not find a significant difference between tweets that are classified as pro or against Brexit. This is consistent with the fact that it is the discussion around Brexit that makes identity more salient.

Table 8: Twitter Storms and Consumer Behavior

Dep. var.	**Share UK** (1)	**Share EU** (2)	**Share UK** (3)	**Share EU** (4)	**Share UK** (5)	**Share EU** (6)
Log(Tweets immigration)	0.194***	-0.123***				
	(0.027)	(0.023)				
Log(Tweets politics)			0.360***	-0.218***		
			(0.023)	(0.019)		
Log(Tweets economy)					0.230***	-0.182***
					(0.028)	(0.024)
Store × Event FEs	YES	YES	YES	YES	YES	YES
R^2	0.008	0.008	0.008	0.008	0.008	0.008
Observations	6874833	6874833	6874833	6874833	6874833	6874833

In table 8 we find that while discussion around all themes: economic, political and social are associated with an increase in the purchase of UK products and a decrease in the purchase of EU

products, the coefficient for political tweets is relatively larger in magnitude. This lends further support to the importance of identity, and particularly political identity, as driving the observed changes in economic decisions.[19]

Note that we interpret twitter activity and in particular twitter storms as a proxy for more intense general media discussions around Brexit, given that twitter users will often tweet about news in the traditional media. One concern is that twitter users represent a non-random sample of individuals at the locality level and may be an unrepresentative group of individuals. While we cannot fully dismiss this possibility, we find strong evidence that increased twitter activity at the locality level is strongly correlated with increased usage of other, perhaps more representative social media platforms such as facebook. As shown in figure 15, there is a strong correlation between twitter and facebook activity at the locality level.[20]

[19]To verify the robustness of our results, we implement a second identification strategy to examine the causal link between exposure to the media and consumer behavior. We now identify top "influencers" on twitter by creating an index that equally weights the number of tweets, the weekly frequency of tweets, the number of friends and the number of followers to generate a measure of twitter usage and influence. We then identify twitter storms based on the timing of the top 10% influencers' tweets, and again compare shopping activity the day before and after these episodes occur. Our results remain unchanged.

[20]Facebook usage is retrieved by using Google search API to identify users that list a given locality in their user profile.

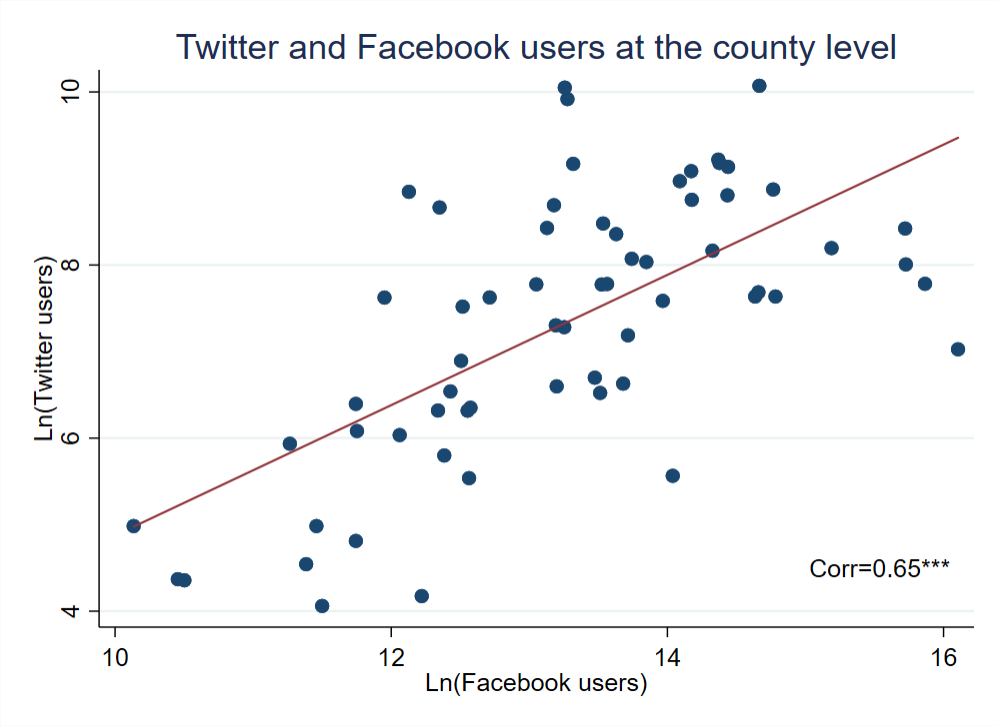


Figure 15: Correlation between Twitter and Facebook usage at the locality level.

5 Robustness Checks

5.1 Locality Characteristics

One possible explanation for our findings is that changes in consumption are driven by locality level characteristics. By matching our store data to census localities, we measure treatment effects across areas with different levels of unemployment, different shares of blue collar workers, rural vs urban populations and areas with varying shares of immigrant populations. An extant literature has shown that constituencies with higher unemployment and higher inequality were more likely to vote against EU membership in the Referendum. It is possible that these populations used the Brexit referendum as a protest vote against the UK Government, protesting against poor economic conditions in their communities (Ansolabehere et al 2014). Alternatively, it is possible that voters attribute the root causes of unemployment to membership in the EU and competition by EU products. Consuming local products instead of products originating in the EU would then be a dominant strategy to pursue if voters were primarily concerned with employment and local

economic opportunities. To test this hypothesis, we identity the share of local employment in each product category.

Table 9 shows that economic fundamentals cannot explain the observed patterns of changes in consumption of UK and EU products following the Brexit Referendum. The exception is that localities with high average income are slightly more likely to continue to consume EU products but this effect is small in magnitude.[21]

Table 9: Consumption Patterns and Locality Characteristics

Dependent variable:	**Share UK**	**Share EU**
	(1)	(2)
Post Brexit	0.300***	-0.293***
	(0.027)	(0.023)
Post Brexit × I(high income)	-0.022	0.035***
	(0.014)	(0.012)
Post Brexit × Blue collar	-0.001	-0.001
	(0.001)	(0.001)
Post Brexit × Unemployment	0.002	-0.000
	(0.002)	(0.002)
Avg. price UK products	-4.822***	4.774***
	(0.056)	(0.046)
Avg. price EU products	3.992***	-3.786***
	(0.037)	(0.030)
Household FEs	YES	YES
Week FEs	YES	YES
Product category FEs	YES	YES
R^2	0.116	0.178
Observations	194098792	194098792

In table 3 in the online appendix, we show that the share of each product category's contribution to neither local nor national employment predicts the observed substitution toward UK products following the referendum.

To validate the political identity mechanism, we then examine whether changes in consumption

[21]Similarly, we find no evidence that individual characteristics such as age or gender explain the observed consumption patterns.

behaviour are stronger in areas in which voters revealed a stronger preference for leaving the European Union. Table 10 shows that a 10% increase in the share of voters voting to leave the European Union is associated with a 1% increase in products with a UK flag relative to products that do not have the place of origin prominently displayed on the package and a 2% decline in the share of EU products. This evidence is consistent, though suggestive, of how the referendum may have represented an important coordination mechanism to signal different communities' level of support for a British identity.

Table 10: Consumption Patterns in Areas that Voted Leave and Areas that Voted Remain

Dependent variable:	**Share of British products**		**Share of EU products**	
	Remain	Leave	Remain	Leave
	(1)	(2)	(3)	(4)
Post Brexit	0.273***	0.283***	-0.270***	-0.303***
	(0.012)	(0.009)	(0.011)	(0.008)
Avg. price UK products	-5.348***	-4.972***	5.011***	4.955***
	(0.093)	(0.070)	(0.078)	(0.058)
Avg. price EU products	4.111***	3.953***	-3.893***	-3.797***
	(0.063)	(0.046)	(0.050)	(0.036)
Household FEs	YES	YES	YES	YES
Week FEs	YES	YES	YES	YES
Product category FEs	YES	YES	YES	YES
R^2	0.117	0.116	0.180	0.177
Observations	71463412	122635380	71463412	122635380

5.2 Rational expectations and the anticipation of worsening economic conditions

One alternative interpretation of our findings could be that shoppers anticipate the worsening of economic conditions following Brexit and/or negative supply shocks for European products. Rationally, consumers would then begin to phase out consumption of EU products in anticipation of these changes. Our evidence is, however, inconsistent with this hypothesis. First, concerns about supply shocks due to a no deal Brexit appeared much later in the public discourse, outside our window of analysis. In Figure 16 we show the frequency of google searches on the term "no deal Brexit".

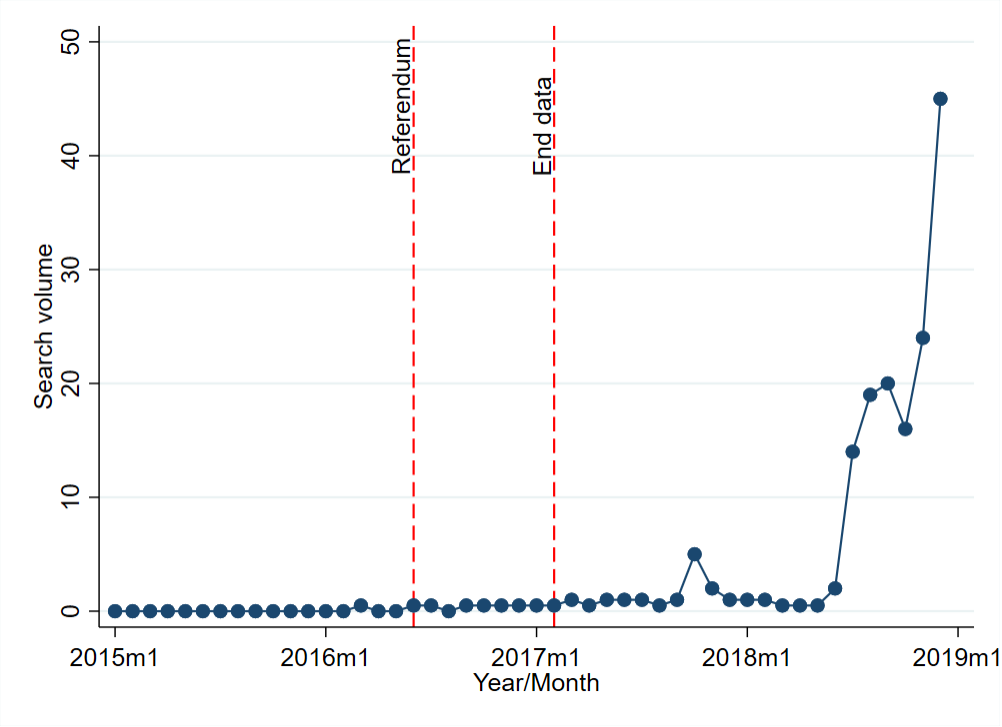


Figure 16: Google Search Index for the Term "No Deal Brexit".

This evidence confirms that disruption to trade flows and supply shocks only became a concern significantly later, by the end of 2017. Second, as discussed in section 3, over 90% of products in our sample were continuously traded and on shelf throughout our period of analysis, which is consistent with the fact that there was no short-run disruption to supply chains (and therefore no likely anticipation of such) during our period of analysis.[22] Finally, in all specifications, we control for total household weekly expenditure which is likely to be a good proxy of expectations about future economic conditions. Despite no changes in prices, we observe that total expenditure increased slightly for the majority of shoppers as shown in figure 11.

5.3 Placebo and Parallel Trends Tests

We first test more formally the parallel trends assumption for our main event study, which measures the impact of the Brexit referendum on the share of UK products purchased. Table 5 in the online

[22]Note that the figures represent search interest relative to the highest point on the chart for the given region and time. A value of 100 corresponds to the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term.

appendix shows that the slopes of the *Post Brexit* variable that represent changes in UK products and changes in EU products are not statistically different from each other. This lends support to the parallel trend hypothesis and suggests that the two types of products - UK and EU - were on similar, parallel trends before the referendum took place.

We then conduct a series of placebo tests in which we select a random day in October 2015 and in February 2016 to test whether they are also associated with any changes in the share of UK vs EU products in each shoppers' budget. We find that this is not the case as the coefficient of interest is very small (0.005; p-value: 25.92).

Finally, we conduct a placebo test with our twitter analysis. We identify consecutive days in the two lowest deciles of twitter activity. We then replicate the analysis assigning the treatment to the second day of each dyad.[23] The coefficient for treatment is now precisely estimated at zero.[24] This is consistent with our interpretation of the evidence that it is indeed the higher intensity of media discussion about Brexit that is causing the change in consumption patterns.

5.4 Sampling Bias

A potential confounding factor in our analysis is that the observed change in consumption patterns could be driven by compositional changes either in the products being sold in stores before and after Brexit or in the type of shoppers that appear in our dataset. If fewer EU products are sold after Brexit or if Brexit changes the type of shoppers shopping at our retailer, we would not be able to attribute changes in consumption to changes in identity preferences alone.

As discussed in section 2, over 90% of products in our sample are sold in all weeks between March 2015 and March 2017. 95% of products are sold in at least 106 weeks out of the total 108 weeks in our sample. When we relax this constraint and include the total unbalanced set of products in the analysis, the results remain unchanged (see Table 7 in the Online Appendix). Note also that products from the rest of the world account for less than 4% of all products sold in stores.

Our baseline analysis is based on an unbalanced set of shoppers, as they enter and exit the

[23] Note that this method results in a larger number of "events" given that our main analysis requires that we exploit a twitter storm day that is preceded by a non-twitter day storm, thus restricting the set. This means that we use more than 16 million observations in this analysis.

[24] Table 6 is in the Online Appendix.

sample during the period under analysis. However, we find no evidence that entry or exit of shoppers is correlated with Brexit. Average exit and entry rates are similar in the 3 months prior to, and following, the Brexit referendum. We define exit as a shopper appearing regularly in our dataset and then not shopping again until the end of the analysis. When we use an alternative definition of exit one in which a shopper exits when there is a below median persistent drop in shopping frequency following Brexit -, results remain unchanged. Similarly, shoppers who enter our dataset in the three months after the Brexit referendum do so at the same rate as shoppers who entered the dataset in the three months prior to the referendum. Moreover, these new entrants are similar in average expenditure relative to those in the main sample of shoppers from before the referendum.

A third potential source of sampling bias relates to the sample of tweets used in the twitter analysis. We are able to geo-locate 11.3 million tweets out of a universe of 19.8 million tweets. We then match these tweets to 71 counties for which we also have individual consumer data. We find that the share of tweets that are pro and against Brexit is similar in counties with and without stores, as are the shares of tweets about politics, economics and migration. This is reassuring since it suggests that there is limited sampling bias in our analysis of the role of the media on consumption behaviour.

6 Conclusions

This paper provides novel data on the impact of political events in shaping collective identities, and on how identity affects frequent and near-universal economic decisions such as grocery shopping. We examine the Brexit referendum, an impactful yet unexpected political outcome as a shock to the salience of British identity. We then observe how this shift in the salience of British identity affects consumption of UK vs EU products. We find that in the aftermath of the referendum, i) shoppers were more likely to consume UK products and to decrease consumption of EU products; ii) sales increased even more for products that prominently displayed their origin in the front package (by including a flag), iii) identity impacts not only the levels of consumption but also the price sensitivity associated with each good and iv) the media is an important shifter of identity

preferences as days in which discussion about Brexit was most intense experienced a higher jump in sales of UK products, particular when the discussion was more directly centred on issues of political identity. We find no evidence that these effects are driven by changes in product availability or in prices. We find evidence however, that consumers switch selectively across product categories, depending on the availability of UK alternatives to EU products. Finally, we find no evidence that shifts in consumption are driven by economic fundamentals, but that instead, they seem to respond to respond to political identities.

7 References

Atkin, D., E. Colson-Sihra and M. Shayo (2019)"How Do We Choose Our Identity? A Revealed Preference Approach Using Food Consumption", manuscript

Bertrand, M and E. Kamenica 2018 Coming Apart: Cultural Distances in the United States over time, manuscript

Bordalo, P. M. Nardotto and S. Sequeira (2020)."Price Norms and Consumer Behavior", manuscript

British Social Attitudes Survey, 2015

Bursztyn, L. and D. Cantoni (2016). "A tear in the iron curtain: the impact of western television on consumption behavior", The Review of Economics and Statistics, March 2016, 98(1): 2541

Colantone, I. and P Stanig, Global competition and Brexit, manuscript 2019

Cuadras-Morat, X., and Raya, J. M. (2016)."Boycott or buycott?: Internal politics and consumer choices. The BE Journal of Economic Analysis and Policy, 16(1), 185-218.

Escalas, J. and J. Bettman (2005). "Self-Construal, Reference Groups, and Brand Meaning", *Journal of Consumer Research*, Vol. 32, pp.378-389

Fouka, V., and Voth, H. J. (2013). *"Reprisals remembered: German-Greek conflict and car sales during the Euro crisis"*. Working Paper.

Grossman, G. and E. Helpman (2018). *"Identity Politics and Trade Policies"*. Working Paper.

Hong, C., Hu, W. M., Prieger, J. E., and Zhu, D. (2011). French automobiles and the Chinese boycotts of 2008: Politics really does affect commerce. *The BE Journal of Economic Analysis and Policy*

Hogg, M. and S. Reid (2006). "Social Identity, SelfCategorization, and the Communication of Group Norms", *Communication Theory*, Volume 16, Issue 1, pp.7-30

Newman, B. J., and Bartels, B. L. (2011). Politics at the checkout line: Explaining political consumerism in the United States. Political Research Quarterly, 64(4), 803-817.

Nosofsky, R. (1986) "Attention, Similarity, and the Identification-Categorization Relationship" *Journal of Experimental Psychology*, Vol.115, n.1, pp 39-57

Pandya, S., L. Cian and R. Venkatesan, 2018, Grocery Shopping for America: External vs Internal Threats to National Identity, The Review of Economics and Statistics

Shah, D. V., McLeod, D. M., Kim, E., Lee, S. Y., Gotlieb, M. R., Ho, S. S., and Breivik, H. (2007). Political consumerism: How communication and consumption orientations drive lifestyle politics. The ANNALS of the American Academy of Political and Social Science, 611(1), 217-235.

Tajfel, H. (1981) *Human groups and social categories: Studies in social psychology.* Cambrigde University Press

Tajfel, H. (1982) Instrumentality, identity and social comparisons. In H. Tajfel (Ed.) Social Identity and intergroup relations (pp. 483-507). Cambridge, England: Cambridge University Press

Tajfel, H. and Turner, .C (1985). "The social identity theory of intergroup behaviour. In S. Worchel and W.G. Austin (Eds.), *Psychology of intergroup relations* (2nd ed., pp 7-24). Chicago: Nelson-Hall