The Effect of the Online Experience on Household Consumption Expenditure in the European Union

Mr. Mark Gallo mg98716n@pace.edu
Economics Department
Pforzheimer Honors College
Pace University, NYC

Prepared for the Eastern Economic Association Conference, New York City
March 3rd, 2019

Abstract: This study aims to explore the elements of the online user experience that have helped firms like Apple, Alphabet, Microsoft, Amazon, and Facebook become world giants in terms of market capitalization. We use data from Eurostat to investigate the impact of mobile device usage, social media participation, usage of online communal learning sites, customer product reviews, and the national presence of Amazon Prime on final consumption expenditures of households in the European Union. We employ Expected Utility Theory as a theoretical framework to explain consumer behavior associated with online purchases and online sources for product information. We seek to answer the following questions: How does the presence of the resources allotted by the world's wealthiest retailer influence purchasing? Does the use of online social media reflect consumers' buying habits? And finally, what are some potential benefits and challenges associated with an online consumption experience? We use the Ordinary Least Square method to estimate a linear model, in which median net income and gross domestic product are held as control variables. We expect mobile device usage, social media participation, usage of online communal learning sites, and the presence of Amazon Prime to have a positive effect on the consumption expenditures.

Keywords: online purchases, consumer behavior, household consumption expenditure, expected utility theory, European Union

Introduction

- In the European Union, as of 2016, 85% of households had access to the internet and 55% of those households had used this access to purchase goods or services online (Statista, 2018).
- Online consumption has grown overtime, with 2017 online spending growing to 534 billion euros, a 73.94% increase from 2013 (Ecommerce News Europe, 2017).
- The initial product search market contains two leading players, Amazon and Google. In 2016, 55% of product searches began on Amazon, those who did not use Amazon were most likely to use Google. These firms control more than 80% of the initial product search market (Galloway, 2018).

Key Research Question

What is the relationship between the online experience and consumption in the European Union? We hypothesize that the online experience will positively impact the rate of consumption in Europe.

Theoretical Framework & Literature Review

- **Expected utility theory** assumes rational actors understand how much risk is associated with every economic decision. According to Avinash Dixit, Susan Skeath, and David Reiley's *Games of Strategy*, **rational behavior takes place when one is: "perfectly calculating a pursuit of a complete and internally consistent objective (payoff) function"** (2015, p.707).

- George Lowenstein (1987), of the Royal Economic Society, observed that when given the opportunity to obtain an optimal outcome multiple times, people chose to maximize their utility with a minimal time delay
- According to Philleppe Mongin, expected utility theory states that the decision maker chooses between risky or uncertain prospects by comparing his expected utility values (1997).
- **Expected utility theory** can be used to explain how consumers choose between Amazon or Google when searching for product knowledge because information obtained online is not always trustworthy.
- Given the poor economic conditions of 2009, lower online prices could explain a shift to online spending, as lower prices and greater transparency of transactions have the potential to inspire a shift to online spending. However, a market study conducted by Alberto Cavallo of Harvard University proved otherwise. Cavallo (2017) conducted research of 56 large multi-channel retailers in 10 countries and concluded that price levels are identical 72% of the time. In the United Kingdom the figure increased to 90%.
- Once uncertainty is accounted for, consumers will make decisions that net the best expected gain in marginal utility (Mongin, 1997, Cavallo, 2017). The selling of identical products at different price points, only because they were bought through different platforms could spur customer backlash and cause the retailer to assume a negative reputation.
- According to the laws of game theory, a rational consumer's pursuit of maximum utility will not be deterred by the rationality, or lack of rationality, of a seller (Dixit, 2015). A rational buyer would be incentivized to choose whichever good provides the greatest

marginal utility. In the given scenario the discount provided online would be the necessary choice. Because it is assumed that the seller has been presented identical products at different price points, the buyer's incentive to maximize utility is derived from the realization of the lesser price. This is because the goods are otherwise identical. The usage of such a pricing strategy places the seller in a risk trap because he is now at the mercy of the buyers' rationality.

- Sellers who understand expected utility theory infer that the risk associated with buying an identical product at a higher cost would be too substantial for a buyer to ignore. Thus, buyers would be incentivized to utilize the platform that provides the lowest prices, while sellers would be incentivized to match prices across all platforms in order to cater to market demand (Cavallo, 2017).
- Cavallo's study infers that price differentiation between physical stores and stores online is not persistent and is unlikely to play a substantial role in determining consumer behavior. Thus, it is important to analyze factors that explain the uncertainty and risk associated with obtaining information online.
- The onset of the online experience was associated with various forms of risk particularly privacy and reliability (Ling, 2010). Developing trust online is critical for retailers and some have an easier time developing trust than others. According to a study conducted by Koufaris and Hampton-Sosa (2004), consumers are more likely to trust large companies when distributing financial information.
- Trust for smaller firms can be developed, but it may take time. Ling (2010) concludes that customers will develop trust for retailers online as they shop. Thus, firms that provide a consistent and positive shopping experience are better off when building trust.

This theory is substantiated by research conducted by Seckler (2000), who determined that as people gain online shopping experience they begin to shop online at an increasing rate.

Data and Methodology

- Cross-sectional data on 30 countries (28 EU members and Macedonia and Turkey)
- Sources of Data: Eurostat, 2016.
- An OLS regression
- The dependent variable: The natural log of final consumption expenditure.
- The key independent variables:
  - Percentage of population that uses only one type of social media
  - Percentage of population that uses two or more types of social media
  - Percentage of population that uses customer reviews before making a purchase
  - Dummy Variable: Access to Amazon Prime

$$Ln(Consumption) = \alpha 0 + \alpha 1PRWIKIi + \alpha 2PRSOCIALi + \alpha 3PRSOCIAL.1i + \alpha 4PRSOCIAL.2i - \alpha 5CUSTOMERRVi + \alpha 6INCOMEi + \alpha 7AMAZONi + \alpha 8MOBILEPHONEi + \alpha 9MOBILEPCi + \alpha 10GDPi + \mathcal{E}i, \quad (Eq1)$$

$$Ln(Consumption) = \alpha 0 + \alpha 1PRWIKIi + \alpha 3PRSOCIAL.1i + \alpha 4PRSOCIAL.2i - \alpha 5CUSTOMERRVi + \alpha 6INCOMEi + \alpha 7AMAZONi + \alpha 8MOBILEPHONEi + \alpha 10GDPi + \mathcal{E}i$$

where *Ln(Consumption)* is natural log of final consumption expenditure, *PRWIKI* is the percentage of the population that uses wiki based knowledge sharing tools, *PRSOCIAL* is the percentage of the population that uses social media in any form, *PRSOCIAL.1* is the percentage of the population that uses one social media platform, *PRSOCIAL.2* is the percentage of the population that uses social media on two or more platforms, *CUSTOMERRV* is the percentage of the population that uses customer reviews before making a purchase, *INCOME* is median equivalised net income, *Amazon* is the presence of Amazon Prime (has a value of 1 if Amazon Prime is available in the country, 0 otherwise), *MOBILEPHONE* is the percentage of individuals who use mobile phones to access the internet, *MOBILEPC* is the percentage of individuals who use non-phone smart devices to access the internet, and *GDP* is gross domestic product.

Empirical Results

Table 3: Results

	Dependent variable:	
	log(Consumption)	
	(Initial)	(Final)
PrWiki	0.017*	0.018*
	(0.010)	(0.009)
PrSocial	0.020	
	(0.023)	
PrSocial.1	−0.125***	−0.102***
	(0.039)	(0.028)
PrSocial.2	0.006	0.007
	(0.008)	(0.007)
CustomerRv	−0.062***	−0.056***
	(0.021)	(0.019)
Income	0.715**	0.786***
	(0.288)	(0.218)
Amazon	0.235	0.159
	(1.080)	(1.000)
MobilePhone	0.005	0.006
	(0.031)	(0.023)
MobilePC	0.005	
	(0.034)	
GDP	1.251**	1.291**
	(0.521)	(0.493)
Constant	12.425***	12.530***
	(0.926)	(0.865)
Observations	30	30
R^2	0.837	0.830
Adjusted R^2	0.752	0.766
Residual Std. Error	0.802 (df = 19)	0.779 (df = 21)
F Statistic	9.772*** (df = 10; 19)	12.839*** (df = 8; 21)
Note:		*p<0.1; **p<0.05; ***p<0.01

- Breusch-Pagan test: a p-value for Breusch-Pagan test is 0.3981, so we could not reject the test's null hypothesis that homoscedasticity, or constant residual variance, was present. Plotting the residuals and fitted values supported the results provided through the Breusch-Pagan test, as the test's fitted line plot remained flat.
- Multicollinearity: Correlation matrix showed that the predictor variables were not likely to be to impacted by one another.
- A 1% increase in a European country's population that uses communal learning sites produced a 0.018% increase in the rate of household consumption expenditures, holding social media usage, customer reviews, net equivalised income, and GDP constant.
- At the 99% level of significance, a 1% increase in the percentage of the population that uses only one social media platform resulted in a 0.106% decrease in consumption.
- While a 1% increase in the percentage of the population that uses social media in at least two forms resulted in a 0.007% increase in the rate of consumption.
- A 1% increase in those who always use customer reviews before making a purchase online resulted in a 0.057% decrease in consumption.
- An increase in net equivalized income by 10,000 euros leads to an increase in consumption of 79.3%.
- An increase in a nation's GDP by one million euros increased a countries consumption by 31.5%, holding the model's remaining variables constant.

Conclusions

- Our research observed variables that allowed users to provide commentary on products. We believe that these tools help develop trust. If a customer discovers that his sources for product reviews are often credible he would be inclined to assign a higher expected utility

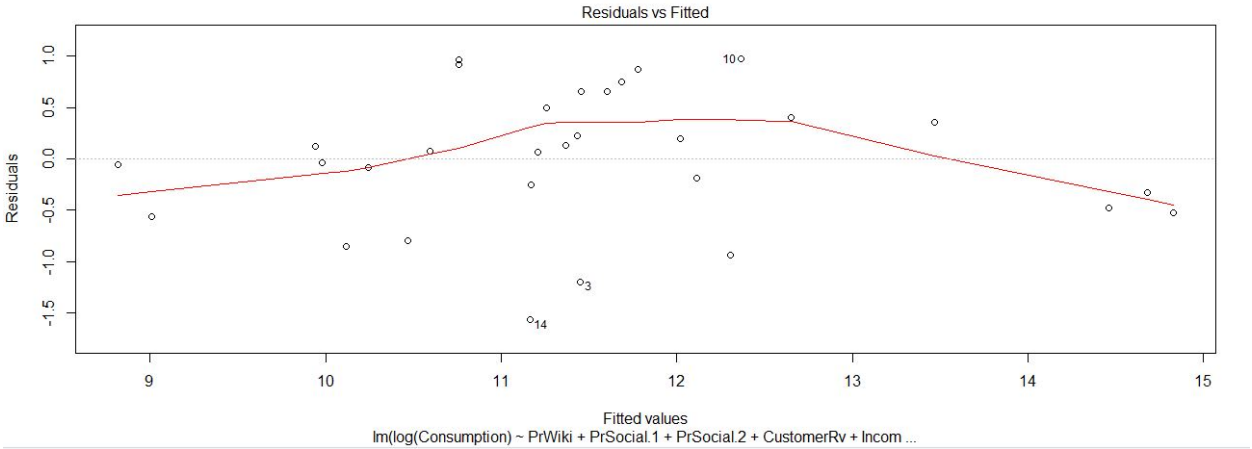
value to them. As a result, he would be more incentivized to trust such reviews when making future purchases. This may explain why firms that take advantage of customer reviews, like Amazon, have flourished in the digital age.

- The growing population of people using social media to review products may explain why our observations of digital literacy returned mixed results.
- Continued development of this research is necessary, as the online experience shapes how people across Europe consume goods.

Appendix:

Correlation Matrix

	Consumption	PrSocial	PrSocial.1	MobilePC	CustomerRv	PrWiki	Income	Amazon	GDP	MobilePhone	PrSocial.2
Consumption	1	-0.010	-0.140	0.030	0.190	0.100	0.100	0.610	1	-0.080	-0.070
PrSocial	-0.010	1	0.790	0.620	0.230	0.390	0.680	-0.060	-0.010	0.340	-0.200
PrSocial.1	-0.140	0.790	1	0.540	-0.080	0.230	0.590	-0.250	-0.130	0.410	-0.220
MobilePC	0.030	0.620	0.540	1	0.380	0.420	0.780	-0.020	0.030	0.620	-0.190
CustomerRv	0.190	0.230	-0.080	0.380	1	0.340	0.360	0.350	0.19	-0.010	-0.200
PrWiki	0.100	0.390	0.230	0.420	0.340	1	0.280	0.030	0.110	0.300	-0.230
Income	0.100	0.680	0.590	0.780	0.360	0.280	1	0.170	0.100	0.340	-0.190
Amazon	0.610	-0.060	-0.250	-0.020	0.350	0.030	0.170	1	0.600	-0.150	-0.120
GDP	1	-0.010	-0.130	0.030	0.190	0.110	0.100	0.600	1	-0.080	-0.070
MobilePhone	-0.080	0.340	0.410	0.620	-0.010	0.300	0.340	-0.150	-0.080	1	-0.080
PrSocial.2	-0.070	-0.200	-0.220	-0.190	-0.200	-0.230	-0.190	-0.120	-0.070	-0.080	1



Works Cited

"2M Monthly Advertisers on Instagram." Instagram for Business. Accessed December 04, 2018. https://business.instagram.com/blog/welcoming-two-million-advertisers/.

"Amazon Launches Amazon Prime Now in Italy." Ecommerce News. October 19, 2018. Accessed December 04, 2018. https://ecommercenews.eu/amazon-launches-amazon-prime-now-in-italy/.

"Amazon Now Has Nearly 50% of US Ecommerce Market." EMarketer Retail. Accessed December 04, 2018. https://retail.emarketer.com/article/amazon-now-has-nearly-50-of-us-ecommerce-market/5b48c542ebd4000b24140992.

"Big, Bad Amazon." The Economist. October 20, 2014. Accessed December 04, 2018. https://www.economist.com/free-exchange/2014/10/20/big-bad-amazon.

Briggs, R. A. "Normative Theories of Rational Choice: Expected Utility." Stanford Encyclopedia of Philosophy. August 08, 2014. Accessed December 04, 2018. https://plato.stanford.edu/entries/rationality-normative-utility/.

Burguillo, Juan Carlos. "Trust-based Modelling of Multi-Criteria Crowdsourced Data" *Data Science and Engineering, Springer Link.* Vol. 2. No. 3 (2017): 199-209

Cavallo, Alberto. "Are Online and Offline Prices Similar? Evidence from Large Multi-Channel Retailers." American Economic Review, no. 107(1) (2017): 283 – 302.

Chaturvedi, Sumit, Gupta, Sachin, and Hada, Singh. "Perceived Risk, Trust and Information Seeking Behavior as Antecedents of Online Apparel Buying Behavior in India: An Exploratory Study in Context of Rajasthan" *International Review of Management and Marketing,* 6(4). (2016): 935-943.

Chen, Yu-Hui and Barnes, S. 'Initial trust and online buyer behavior', Industrial Management & Data Systems, 107(1), (2007): 21-36

Ciddi, Sinan. "For Turkey and the EU, Partnership May Be Better Than Membership." Stratfor. April 04, 2018. Accessed December 15, 2018. https://worldview.stratfor.com/article/turkey-and-eu-partnership-may-be-better-membership.

"COUNTRY COMPARISON:: GDP (PURCHASING POWER PARITY)." Central Intelligence Agency. Accessed December 04, 2018. https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html#ch.

Dabholkar, P. 'Incorporating choice into an attitudinal framework: analyzing models of mental comparison processes', Journal of Consumer Research, 21(1), (1994): 100-118

de Bruijn, Mark. Ecommerce Europe. EuroCommerce. European Ecommerce Report 2018 Edition.

Diacon, Paula-Elena, and Liviu-George Maha. "The Relationship between Income, Consumption and GDP: A Time Series, Cross-Country Analysis." October 30, 2014. https://ac.els-cdn.com/S2212567115003743/1-s2.0-S2212567115003743-main.pdf?_tid=f3cc7c3d-1d46-41b0-aa89-8e129b5e2b7a&acdnat=1543889148_4e5a00c69f2f8cc88c6e7dc73f9acb7e.

Dixit A., Skeath S., and Reiley D. *Games of Strategy Forth Edition.* New York: W.W. Norton & Company, 2015

Dutchen, Stephanie "Trust Me, I'm Your Smartphone." Paying for Health Care with Time | Harvard Medical School. Accessed December 04, 2018. https://hms.harvard.edu/magazine/connections/trust-me-im-your-smartphone

Editors, EMarketer. "Mobile Ad Spending to Surpass All Traditional Media Combined by 2020 - EMarketer Trends, Forecasts & Statistics." EMarketer. October 16, 2018. Accessed December 04, 2018. https://www.emarketer.com/content/mobile-ad-spending-to-surpass-all-traditional-media-combined-by-2020.

Elliot, S. and Fowell, S. 'Expectations versus reality: A snapshot of consumer experiences with internet retailing', International Journal of Information Management, 20(5), (2000): 323-336.

Eurosystem, European Central Bank. "Key ECB Interest Rates" European Central Bank. Accessed October 10, 2018.https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html

Europe, Ecommerce News. "Ecommerce in Europe was Worth €534 billion in 2017." *Ecommerce News Europe*. July 2, 2018. Accessed October 6, 2018. https://ecommercenews.eu/ecommerce-in-europe-was-worth-e534-billion-in-2017/

Eurostat**,** V1 E-sales and turnover from e-sales, 2008 to 2016, EU28 (% enterprises, % total turnover), Accessed October 6, 2018. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:V1_E-sales_and_turnover_from_e-sales,_2008_to_2016,_EU28_(%25_enterprises,_%25_total_turnover).png#filelinks

Hamilton, D. and Sherman. S. "Perceiving individuals and groups: Expectancies, dispositional inferences, and causal attributions" *Journal of Personality and Social Psychology* (1999): 181-190.

Hankin, Lisa. "The Effects of User Reviews on Online Purchasing Behavior across Multiple Product Categories." May 2007. https://www.ischool.berkeley.edu/sites/default/files/lhankin_report.pdf.

Hoorens, Stijn. "The Future Contribution of the European Internet Industry Under the Three Scenarios" In *Towards A Competitive European Internet Industry. A Socio-Economic Analysis of the European Internet Industry and the Future Internet Public-Private Partnership,* ed. RAND Corporation, 57 – 72. Santa Monica: RAND Corporation, 2012.

"Household Internet Access in the European Union (EU28) 2007-2017 | Statistic." Statista. Accessed December 04, 2018. https://www.statista.com/statistics/377585/household-internet-access-in-eu28/.

Investopedia, "Cost-Benefit Analysis" Investopedia. Accessed October 14, 2018. https://www.investopedia.com/terms/c/cost-benefitanalysis.asp

Investopedia, "Law of Demand*" Investopedia*. Accessed October 13, 2018. https://www.investopedia.com/terms/l/lawofdemand.asp

Jappelli, Tullio, and Luigi Pistaferri. "The Consumption Response to Income Changes." 2010. https://web.stanford.edu/~pista/ann_rev.pdf.

Koufaris, M. and Hampton-Sosa, W. 'The development of initial trust in an online company by new customers', Information & Management, 41(3), (2004): 377-397.

Kowalczyk, Piotr. "How Much Does Amazon Prime Membership Cost in Your Country? (comparison)." Ebook Friendly. January 21, 2018. Accessed December 04, 2018. https://ebookfriendly.com/amazon-prime-membership-price-comparison/.

Laroche, M., Kim, C. and Zhou, L. 'Brand familiarity and confidence as determinants of purchase intention: an empirical test in a multiple brand context', Journal of Business Research, 37(2), (1996): 115-120.

Lecher, Colin. "Amazon Is Facing an EU Antitrust Probe into Its Collection of Sales Data." The Verge. September 19, 2018. Accessed December 04, 2018. https://www.theverge.com/2018/9/19/17879480/amazon-eu-data-collection-probe.

Lieber, Ethan. "Online vs. Offline Competition" *Oxford Handbook of the Digital Economy*. (2011): 1-29.

Ling, Kwek Choon. "The Effects of Shopping Orientations, Online Trust and Prior Online Purchase Experience toward Customers' Online Purchase Intention" *International Business Research* Vol.3, No. 3 (2010): 63-76.

Mongin, Philippe. "Expected Utility Theory" *Handbook of Economic Methodology,* (1997): 2-11.

"Number of Social Media Users Worldwide 2010-2021." Statista. Accessed December 04, 2018. https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/.

Nachira, Francesco. "Digital Business Ecosystem." 2006. Accessed December 2, 2018. http://www.digital-ecosystems.org/events/2006.06-sardegna/nachira-sardegna-ict.pdf.

Pace University Library Remote Database Authentication. Accessed December 04, 2018. https://www-statista-com.rlib.pace.edu/statistics/203722/smartphone-penetration-per-capita-in-western-europe-since-2000/.

Page, Vanessa. "Digital Native." Investopedia. May 24, 2018. Accessed December 04, 2018. https://www.investopedia.com/terms/d/digital-native.asp.

Seckler, V. (2000). 'Survey says Web apparel buys doubled', Women Wear Daily, 12, July, pp.2.

Sharma, Rakesh. "Perfect Competition." Investopedia. November 13, 2018. Accessed December 04, 2018. https://www.investopedia.com/terms/p/perfectcompetition.asp.

Statista, "Smartphone user penetration as percentage of total population in Western Europe from 2011 to 2018*". Statista The Statistics Portal. Accessed October 5, 2018. https://www.statista.com/statistics/203722/smartphone-penetration-per-capita-in-western-europe-since-2000/

"Star Ratings." Driver Requirements | How To Drive With Uber | Uber. Accessed December 04, 2018. https://www.uber.com/drive/resources/how-ratings-work/.

"trust." *Merriam-Webster.* 2018. https://www.merriam-webster.com (14 October 2018)

"Trust Me, I'm Your Smartphone." Paying for Health Care with Time | Harvard Medical School. Accessed December 04, 2018. https://hms.harvard.edu/magazine/connections/trust-me-im-your-smartphone.

Vincent, James. "Amazon Will Change Its Ebook Contracts with Publishers as EU Ends Antitrust Probe." The Verge. May 04, 2017. Accessed December 04, 2018. https://www.theverge.com/2017/5/4/15541810/eu-amazon-ebooks-antitrust-investigation-ended.

Weber, K. and Roehl, W. 'Profiling people searching for and purchasing travel products on the World Wide Web', Journal of Travel Research, 37(3), (1999): 291-298

Weissman, Cale Guthrie. "How Has Technology Changed The Way We Trust?" Fast Company. February 14, 2017. Accessed December 04, 2018. https://www.fastcompany.com/3068057/how-has-technology-changed-the-way-we-trust.

"Why Is Competition Policy Important for Consumers?" Together Against Trafficking in Human Beings. Accessed December 04, 2018. http://ec.europa.eu/competition/consumers/why_en.html.

Wiltshire, Emma. "The Current State of Social Media Algorithms [Infographic]." Social Media Today. April 26, 2018. Accessed December 04, 2018. https://www.socialmediatoday.com/news/the-current-state-of-social-media-algorithms/522260/.

"Your Key to European Statistics." Together Against Trafficking in Human Beings. Accessed December 04, 2018. https://ec.europa.eu/eurostat/data/database.