NET Institute Summer Grant 2020 Application

Andre Veiga

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1 Executive Summary

This proposal is for a joint project with Tommaso Valletti, who is also faculty at Imperial College London.

The COVID-19 outbreak has led to a large share of the population spending more time at home. One of the consequences is rising media consumption in households. As of April 2020, UK digital newspapers have logged the record number of 44 million unique users (ABCe, Audit Bureau of Circulations Electronic). Yet, this unprecedented increase was not reflected in additional revenues for newspapers. On the contrary, in the same relatively short period, due to the crisis so far, digital advertising is reported to have decreased by £50m.[1] The economic effects of the pandemic are expected to extend to newspapers, and be large in magnitude. Professor Rasmus Kleis Nielsen, the director of the Reuters Institute at the University of Oxford, predicted that over 10% of all frontline journalistic jobs could be lost as a result of the pandemic.[2] The consequences for our democratic life could be profound.

The project will investigate if there are ways to arrest this decline during the crisis. In particular, several industry sources suggest that a large problem is related to advertisers using "ad blockers" that effectively prevent their advertisements from be shown next to COVID-related stories.[3] These ad blockers refer to technologies that allow firms to prevent ads for their products or brand from appearing next to hard-hitting content. Google has also been criticized by some UK news publishers which say that the tech group has failed to explain its approach to blocking and filtering adverts alongside COVID-related content online.[4] The Interactive Advertising Bureau, the leading digital advertising trade body, has had to issue guidance on the indiscriminate use of these technologies (for instance, they issued the hashtag "#BackNotBlock British journalism").[5] The use of blocks and filters historically had the goal of helping readers and advertising firms deal with difficult topics (eg, violence and pornography) sensitively. However, recently this technology seems to have added further pressure on the news industry. Some newspapers (especially, local newspapers) have already started closing,[6] and this has been attributed to declined advertising revenues due to ad blockers.[7] The project intends to shed light on this phenomenon.

We will team up with Lumen Research (https://www.lumen-research.com/), an eye tracking marketing and advertising research company whose managing director, Mike Follett, is an MBA alumnus of our institution (Imperial College London). Lumen employs a technology that measures visual engagement of digital viewers using eye tracking software. They can measure which ads get noticed, how much time is spent viewing them, and their subsequent recall. We will design and run an experiment measuring the engagements of ads when shown next to COVID-related stories, as opposed to a control group where the same ads are shown to a comparable group of articles that are not COVID-related. The tool for conducting experiments on attention

[1] https://www.theguardian.com/media/2020/jan/20/uk-publishers-losing-digital-ad-revenue-due-to-content-blacklists

[2] https://reutersinstitute.politics.ox.ac.uk/risj-review/what-will-coronavirus-pandemic-mean-business-news

[3] https://digiday.com/media/coronavirus-climbs-keyword-block-lists-squeezing-news-publishers-programmatic-revenues/

[4] See "Google criticised by news publishers over coronavirus ad blocking", Financial Times, 22nd April 2020, https://www.ft.com/content/672911e1-de6a-444b-a5f0-09df9cc06460

[5] https://www.iabuk.com/news-article/covid-19-x-keyword-blocking-9-tips-advertisers

[6] https://www.washingtonpost.com/lifestyle/media/the-coronavirus-crisis-is-devastating-the-news-industry-many-newspapers-wont-survive-it/2020/04/08/df6f54a8-7818-11ea-9bee-c5bf9d2e3288_story.html

[7] https://www.dailymail.co.uk/news/article-8219717/Australian-newspapers-stop-printing-coronavirus-pandemic-hits-advertising.html

to ads is already available at Lumen Research, and has been thoroughly tested by the firm in the past.

Initial conversations with Lumen Research suggest that, in fact, corona-related stories in print newspapers drive a significant amount of attention from the viewers,[8] without bringing a negative connotation to the ads shown next to such news.[9] If that is indeed true, then current ad blockers represent a market failure. The sub-optimal decisions of firms are unnecessarily harming firms themselves, but have an additional externality: draining resources away from the media, which can have long last effects on the already struggling industry. But to be sure, one would need to conduct a proper test of this hypothesis. That is what we propose to do in this project.

The experimental design will involve a sample of 1000 individuals. The sample would be stratified so that respondents match the UK online population in terms of age, gender, income, and location. They will be recruited via reputable recruiters such as Panelbase or Norstat. Respondents will be asked to conduct a test, on their home laptops or mobile phones, while having their eyes tracked via Lumen's webcam eye tracking technology.

Each respondent would be asked to read approximately 10 pages of cached content from IPSO-regulated newsbrands and non-newsbrands, with ads inserted into the pages as they would be normally. The news brands used for the study would include both national papers and regional/local papers. Notice that this effectively amounts to several experiments per individual, which should increase our power to identify small effects. Half the content would relate to the coronavirus epidemic, and half would not.

Respondents' visual engagement with the content and the ads would be recorded by Lumen's eye tracking software. Respondents would then be asked to complete a post-test questionnaire to assess their recall of stories and ads, and their response to the brands. This will enable us to assess any potential negative impact of advertising next to coronavirus-related content. The procedure above would allow us to measure brand recall and purchase intent.

However, one way in which this study would innovate relative to the existing literature would be on measuring willingness to pay (WTP) directly. We would request that participants make a number of real choices, which would have consequences for the participant's expected payoff for the experiment. These decisions would then allow us to estimate WTP. For instance, we will ask whether subjects prefer their cash payment for the experiment or a voucher (of higher value) in one of the brands used in the experiment. We are currently considering posing several such questions per individual, with their realized outcome being randomly chosen from amongst their choices.

Lumen would provide its technology and tool for conducting the experiments for free. A letter from the Managing Director of Lumen Research is attached to this proposal.

2 Project Objectives

The project's findings would constitute experimental causal evidence regarding whether ads shown next to COVID-related articles harm the advertisers.

These findings will help us understand the impact (or lack thereof) of coronavirus on attention to advertising in newsbrands. This may have a dramatic effect on the revenues of one of the communities most immediately affected by the coronavirus epidemic – the free press, especially in local areas. A letter from the Commercial Director of the Guardian newspaper, as well as one

[8] https://www.lumen-research.com/blog/attention-to-advertising-even-higher-during-coronavirus-outbreak
[9] https://www.lumen-research.com/blog/corona-related-ads-get-9-more-attention

from the Director of Newswork (marketing body for UK newspapers), both describing the importance of this research and their strong support for the project, are attached to the proposal.

3 Expected Output

The expected outcome would be a more evidence-based view on ad blockers employed during this crisis and how they impact the media, including its advertising revenues and broader sustainability.

We would share our results with government, the news publishers, with the advertisers, and with the big tech intermediaries, such as Google and the ad blockers providers (a market dominated by three players worldwide). In case it is confirmed that Covid-related content helps to drive attention and does not create negative brand connotations, ad blockers and big tech firms would then want to take immediate actions to change their current settings during the crisis.

We are also expecting an academic paper publishable in a top outlet such as *AER:Insights*, *Management Science* or *Marketing Science*.

4 Techniques Used

We have used standard techniques to determine the necessary sample size for the experiment (see, for instance, List et al. [2011]). Using the standard values of 5% significance level and 80% power, our experimental design with 1000 individuals would allow us to identify an effect of under one-tenth ($\approx 8\%$) of a standard deviation.[10] In practice, we expect to run 3-5 experiments per individual, so we are likely to detect even smaller effects. We believe that this will be sufficient to detect the effects we are studying.

Our within-subject design (ie, multiple experiments per individual) will allow us to significantly reduce the variance of the unobserved component of the outcome thereby increasing the precision of the estimated average treatment effect.

To control for the effects of interactions between the multiple treatments that each individual is exposed to (eg, learning, sensitization, etc), we will randomize the order in which articles and ads are shown to each individual. We will check for differences in the effects of articles and ads shown earlier vs. later in the experimental sequence.

One concern is that we might measure differences in the outcomes that are due simply to differences in the quality of COVID articles vs non-COVID articles. For instance, COVID articles might simply be more clearly written, more engaging, etc. The use of multiple articles from multiple sources helps mitigate this concern. Moreover, we will use Lumen's eye-tracking technology to further address this concern, by including engagement as a control variable in our estimation equation. That is, we will determine the effect of an advertisement being shown next to a COVID-related article, conditional on viewer engagement with the article. This measure of engagement is something that is not available to most existing studies of the effects of advertising (eg, Goldfarb and Tucker [2011a])

We will build an econometric model for an "ad effectiveness" function, similar in spirit to the one in Goldfarb and Tucker [2011a] (but different in several details, given our within-subject design). Our experimental design allows us to include fixed effects for each brand and each individual. We cannot include article fixed effects, but we control for article quality by including

[10] This assumes that outcome variance is the same under treatment and control conditions.

engagement with the article, as measure using Lumen's eye tracking software. We will also control for other article-level covariates based on the existing literature.

The model we intend to use is

$$y_{ias} = \mu_i + \gamma_a + X_s\beta + \theta Covid_s + \epsilon_{ias}.$$

In the equation above, y_{ias} is the outcome variable for individual i, advertisement a and story (ie, article) s. We currently intent to consider three outcome measures y_{ias}: attention paid to ad (as measured through the eye-tracking tool), brand recall and WTP. X_s is a vector of story-level controls. Our coefficient of interest is θ, where $Covid_s$ is an indicator for story s being COVID-related. We will cluster standard errors at the individual level.

We are currently discussion with Lumen the best way of measuring WTP. Ideally, we would use the classical Becker–DeGroot–Marschak method (Becker et al. [1964]). However, another option in this setting is to measure Short-term advertising strengths (STAS, see for instance Hansen et al. [2006], Hansen and Olsen [2002]). A final option is to elicit simple choices (between a small number of options) from participants. In this case, we would measure WTP by presenting individuals with choices between products whose ads were shown during the experiment, and an outside option equivalent to cash.

Using these choices, we will build a simple structural model of demand that explicitly considers ad context in individual choices. This model would be straightforward to estimate using just discrete choices made by participants. Of course, direct elicitation of WTP would provide a non-parametric measure of the distribution of WTP with no need for a parametric model of demand.

5 Necessary steps and Timeline

This project is particularly time sensitive and we will attempt to complete shortly after obtaining the necessary funds.

Once we secure the necessary funding, we will register the experiment with the American Economic Association (https://www.socialscienceregistry.org/).

We estimate that it will take 3 days to identify, cache and set up the webpages we want to use set up the test, and a further 3 days to source all the ads that we will use in the test and insert them into the webpages we will have identified.

Following this, we will run a pilot experiment for a day. We will revise the experiment on the basis of the pilot's results within 2 days.

We will then do a full rollout of the experiment. Since recruitment is done online, we are confident that we will be able to finalize data collection within a week.

Finally, we will analyze the data. Since the data was generated experimentally, we are confident that we are able to obtain preliminary results within 3 weeks of data collection.

6 Budget

- Set up of study and sourcing of ads: £3,000. Lumen charges a standard fee of £500 per day for these tasks (hence 6 days x £500/day = £3,000), as this will cover the time for the technical team to make this happen. Note that Lumen also charges £1000 a day for the consultancy team who will help with designing the survey questionnaire and helping the RA analyze the data from the experiments, but these charges have been waived.

- Recruitment costs for 1000 respondents (at £7 per respondent): £7,000. These is the expected cost for recruiting a representative sample via reputable recruiters (we expect to use Panelbase or Norstat). The recruitment costs include both the fees to the recruiter, and the incentives for respondents.
- Casual research assistance to oversee study design, analyze and report results: £2,000
- Software license for Lumen's technology: Free
- Help and support from the Lumen analytics team: Free

TOTAL: £12,000 = $14,628 (in US dollars)

7 Ethics requirement

Since this project will entail human participation, it will be submitted for approval to the science and technology research ethics committee (SETREC) under the terms of Imperial's research ethics policy.

We do not believe that there are ethical complications arising from this research. Respondents will be required to opt in twice to take part in the study (firstly, to agree to take part in the study at all, and then as part of the calibration process), and will be given full information on the purposes of the study and the uses to which their responses will be put.

Lumen's remote eye tracking approach means that respondents will not have to attend a central testing location to conduct the research. Lumen's software is written in javascript, and will not require any changes to be made to user's machines. All eye tracking data will be processed locally on users machines. No personal identifiable information will be captured or retained as part of this project. The software required for the study is removed from user machines immediately after the study.

8 Literature Review & Contribution

The literature on advertisement effectiveness predominantly focused on the properties of the ad itself. Relative to this literature, we are considering the effect of the context surrounding the ad, on its effectiveness.

Several papers study how the properties of the context surrounding an add affects the add effectiveness. Prominent examples are Goldfarb and Tucker [2011a] and Goldfarb and Tucker [2011b]. The issue has also been tackled outside of the economics and marketing literature, for instance by Simola et al. [2013], Myers et al. [2019], Chang [2005], Jeong and King [2010]. These articles typically consider noisy measuring of willingness to pay like "purchase intent." By contrast, the goal of this study is to considered these measures, but crucially to measure also WTP through incentivized choices, which would allow us to build a structural model of demand that quantifies the effect of advertising and its context.

We would also be the first article, to our knowledge, to build a simple structural model of advertisement effectiveness of the basis of experimental choice data.

Moreover, our study will shed light specifically on the effect of COVID-related news articles, which can have a large and immediate implication for the news industry, especially local newspapers.

References

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John A List, Sally Sadoff, and Mathis Wagner. So you want to run an experiment, now what? some simple rules of thumb for optimal experimental design. *Experimental Economics*, 14(4): 439, 2011.

Susan D Myers, George D Deitz, Bruce A Huhmann, Subhash Jha, and Jennifer H Tatara. An eye-tracking study of attention to brand-identifying content and recall of taboo advertising. *Journal of Business Research*, 2019.

Jaana Simola, Markus Kivikangas, Jarmo Kuisma, and Christina M Krause. Attention and memory for newspaper advertisements: effects of ad–editorial congruency and location. *Applied Cognitive Psychology*, 27(4):429–442, 2013.

ANDRÉ VEIGA

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EMPLOYMENT

Assistant Professor of Economics, Imperial College Business School 2017-present
Career Development Fellow, Somerville College, University of Oxford 2016-2017
Postdoctoral Research Fellow, Nuffield College, University of Oxford 2013-2016

EDUCATION

PhD in Economics, Toulouse School of Economics 2013
BA, Woodrow Wilson School, Princeton University 2007
IB, Mahindra United World College of India 2003

AFFILIATIONS

Research Associate, CESifo 2016-present

RESEARCH INTERESTS

Industrial Organisation, Digital Markets, Two-sided Markets, Healthcare, Insurance, Credit, Adverse Selection, Structural Estimation

PUBLICATIONS

Equilibrium Profits in Perfectly Competitive Screening Markets, with John Levy **Games & Economic Behaviour**, Conditionally Accepted

Social Media, News Media and the Stock Market, with Peiran Jiao and Ansgar Walther, **Journal of Economic Behaviour & Organization**, Forthcoming

A Note on How to Sell a Network Good, **International Journal of Industrial Organization**, 2018

Multidimensional Platform Design, with Alexander White and E. Glen Weyl, **American Economic Review: Papers and Proceedings**, 2017

Pricing Institutions and the Welfare Cost of Adverse Selection, with E. Glen Weyl, **American Economic Journal: Microeconomics**, 2017

Product Design in Selection Markets, with E. Glen Weyl, **Quarterly Journal of Economics**, 2016

Competition Policy in Selection Markets, with Neale Mahoney and E. Glen Weyl, **CPI Antitrust Chronicle**, 2014

WORKING PAPERS

Competitive Equilibrium in Screening Markets with Unbounded Types, with John Levy
Shortlisted for SCOR/EGRIE Young Economist Best Paper Award 2018
Journal of Economic Theory, R&R

Community Rating in Markets for Lemons

Migration Between Platforms, with Gary Biglaiser and Jacques Cremer

WORK IN PROGRESS

Quality Information and Competitive Selection in Health Care, with Zach Brown, Ashvin Gandhi and Christopher Hansmann

Frictions and Equilibria in Insurance Markets, with John Levy

Fifth Degree Price Discrimination, with Daniel Quigley

HONOURS & AWARDS

British Academy Leverhulme Small Research Grant	2020
Imperial College Teaching Excellence Award for Innovation in Teaching	2018
Net Institute Summer Research Grant	2013
CRESSE Young Researcher Scholarship	2012
ANACOM Award for research on ICTs	2018
Price Theory Scholar, University of Chicago, Becker Center for Price Theory	2011
Net Institute Summer Research Grant	2011
Fundacao para a Ciencia e a Tecnologia (FCT), PhD scholarship	2010-2013
Fondation Jean Jacques Laffont, M2 Masters scholarship	2008-2009

TEACHING

Digital Economics and Digital Strategy (Masters, Imperial)
Business Economics (undergraduate, Imperial)
Core Microeconomics (undergraduate, Oxford)
Quantitative Economics (undergraduate, Oxford)
Economics of Industry (undergraduate, Oxford)
Topics in Selection Markets (PhD, Oxford)
Topics in Network Markets (PhD, Oxford)
Microeconomic Theory (PhD, Oxford)
Game Theory (Masters, TSE)

ADVISING

Alessio Piccolo (Oxford M.Phil)	2014-2015

REFEREEING

American Economic Review, Econometrica, Journal of Political Economy, Quarterly Journal of Economics, RAND Journal of Economics, International Economic Review, Journal of Industrial Economics, Journal of Economics and Management Strategy, International Journal of Industrial Organization, Journal of Public Economics

PERSONAL

Born: 6 June 1983
Citizenship: Portuguese

From: Mike Follett
To: Valletti, Tommaso
Subject: Fwd: Imperial College - Brand safety project
Date: 28 April 2020 16:52:45
Attachments: image001.png

---------- Forwarded message ---------

From: **Nick Hewat** <nick.hewat@theguardian.com>

Date: Tue, 28 Apr 2020 at 16:05

Subject: Imperial College - Brand safety project

To: Mike Follett <mike.follett@lumen-research.com>

To whom it may concern:

My name is Nick Hewat, Commercial Director of the Guardian.

Newsbrands have struggled with the issue of keyword blocking for years now, which directs advertiser investment away from 'hard news' – the sorts of stories that the Guardian reports on a daily basis. The COVID-19 crisis has exacerbated this problem, at a time when overall advertising investment levels are in decline.

As a result, at a time when more people than ever are reading the Guardian's reporting, COVID-19 keyword blocking is having a negative effect on our business.

We therefore support this research project, and look forward to hearing the results,

Yours sincerely,

Nick Hewat

Commercial Director

Guardian News & Media

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Interim EA: Siobhan Finn
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From: Mike Follett
To: Valletti, Tommaso
Subject: Letter of support
Date: 28 April 2020 13:59:30
Attachments: image001.png

To whom it may concern,

My name is Mike Follett and I am managing director of Lumen Research. We are an independent research agency, specialising in eye tracking.

Over the past few years we have worked with a large number of advertisers and publisher to help them understand the reality of attention to advertising. Almost invariably, we find that the greater the attention and engagement with editorial content, the greater the attention and engagement with accompanying ads. This has led us to believe that there should be a virtuous circle to the placement and pricing of advertising: the publishers who produce the most engaging content should also be able to charge the most for their advertising inventory.

Unfortunately, this does not seem to be the case in the market. For many years now, cautious advertisers have used ad blocking technology to make sure that their ads do not appear next to 'negative' content, meaning that there has been a secular trend away from advertising against 'hard news' - even though ads that accompany there articles tend to get more attention, achieve better recall, and have greater sales impact.

This trend has been accelerated by the recent coronavirus crisis, with many advertisers blocking their ads from appearing next to any articles that mention coronavirus. This is having an extremely deleterious effect on newspapers and journalists, just as the country needs them most - and just as readership of their product has increased dramatically.

We are therefore very keen to involve ourselves in this project, and, as it is such an important issue for the country and our clients, happy to work for free in partnership with Professor Valletti.

Yours sincerely,

Mike Follett

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Mike Follett

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FAO: Imperial College Funding board

28th April 2020

Dear Sirs/Madams,

I am on the leadership team at Newsworks, the trade marketing organisation for news brands in the UK.

I am writing in support of Tommaso Valleti, with particular regard to his research proposal into 'attention markets' and ad-blockers. Of specific interest to us at this time is his focus on what happens when advertising appears next to coronoavirus content.

The publisher news brand industry which we represent is vital in keeping the British public and all its diverse communities up to date with the news. And a lot of that is funded by advertising revenues.

There is an incredible appetite for an interest in news, as people seek to find out what is happening, and turn to trusted sources of information and opinion. And our publishers take their responsibility in this area very seriously indeed. A free press is vital both in terms of providing that information and holding government to account.

Some of the latest figures from Comscore for digital news brands show that there has been a 30% yoy increase in visits to publishers' websites as people seek out the news.

Yet the industry is facing significant challenges when it comes to supporting that free press and the vital service it provides. While all news brands have seen a surge in demand from readers for quality, accurate reporting, advertising industry 'blocklists' are preventing adverts from appearing alongside online stories about coronavirus. Keyword blocking has been an increasing issue over the last few years but is very problematic at the moment. The majority of news content is about corona virus and a lot of that is being blocked to advertisers because of blunt tools.

The impact of that is a significant negative effect on revenues at a very challenging time. Newspapers are one of the most heavily and negatively impacted industries by the coronavirus, at a time when the British public needs them the most. Indeed, the paradox of increasing consumption of news, yet falling revenue due to keyword blocking needs to be addressed urgently.

We know from more general research a couple of years ago that advertising next to 'hard news' content (which coronavirus would be a part of) actually gets more attention rather than less. We wholeheartedly support this project and would very much like to prove that advertising next to coronavirus content is incredibly important in funding a free press.

With best wishes

Denise Turner
Insight Director

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