

**MASTER IN
INTERNATIONAL ECONOMY AND EUROPEAN
STUDIES**

**MASTER FINAL WORK
DISSERTATION**

BEHAVIOURAL ECONOMICS ON BREXIT POLICY DECISION

ADRIANA CRISTINA PARREÑO GALLARDO

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ORIENTATION:

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DEDICATION

All my gratitude to my father who give me one of the best opportunities in my life which was study abroad. To my mother because of the strength and perseverance that she taught me when I was a child. Thank you, mom, to be such a wonderful inspiration.

AKNOWLEDGEMENTS

There are many people whom I would like to show my gratitude for their support and contribution to this thesis. First, this dissertation wouldn't be possible without the guidance, patience, and recommendations of my thesis advisor, Dra. Margarida Abreu at Lisbon School of Economics and Management. After decided my thesis topic in my second year of the master's degree, Dra. Margarida Abreu accept my thesis dissertation even without having me as directly student, our common ground, the passion for behavioural economics.

To my family and friends, Sebastian Altamirano was a friend from high school and roommate in Lisbon for talking and laughing with me on my endless conversations about my thesis and for always being a welcome distraction. To Andrea Nadelle who give me advises and support me through this stressful process. I cannot thank him enough for his generosity and love. To Ana Patricia the first friend on a foreign country, all my gratitude to her for being a wonderful friend and family on a country which is not home. To Ana Sofia for the willing help, empathy and kindness who represents her, she made sure I could enjoy a good coffee at the end of a tough day. To Anthony Caliz who always give me his support and confidence in each stage of my student and professional life. To my father Julio Parreño for his kind words. To my mother Myriam Gallardo who instilled in me perseverance, determination, and little stubbornness.

Thank you everyone.

ABSTRACT

This study seeks to analyse whether British electors were framed by social media to leave the European Union. Economic experts believed that the result of the referendum would have been to remain in the European Union because of the economics benefits. However, June 23, 2016, marked the United Kingdom's exit from the European Union, and economic theories could not explain this outcome as this violated the assumption that the voting agent seeks the highest economic benefit.

To understand the reasons for the British decision regarding the referendum, this research turned to behavioural economics. Furthermore, this study analysed the usage of social media during the Brexit campaign, in particular the relevance of Twitter, Facebook, and newspapers on the Brexit campaign. The impact of social media usage on the British population was analysed through probit models and interpreted with a literature review of heuristics and biases that may help understand why people behave contrarily to what is expected. Our analysis around 1399 responded reveals that, those who vote leave the EU tend to have few or no academic qualifications, to have lower-income jobs and to be in average 54 year old.

Keywords: Brexit referendum, nudge, social media, Facebook, Twitter, framing, newspaper, behavioural economics, vote, leave, and remain.

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I. Introduction

After the second world war, the reconstruction of Europe was in a vision to create a European family. However, UK until 1976 was a merely observer of the community that have been built. Since his membership the Euroscepticism¹ have been growing in the nation. According with Spiering, M (2004) Britain is the home of the term.

The single European currency (euro) paved the way for an economic union and ensured a deep European integration. However, the British commitment with the EU have been compromised when UK decided not to join the euro. On the other hand, the domestic politics shown a context of fragmentation in British politics (Goodwin & Milazzo, 2015). Since the UK membership in the EU, British government was crippled by division. This can be reflected on the growing support of the UK Independence Party (Eurosceptics) which replace the Liberal Democrats.²

The immigration, the refugee's crisis, and the dissatisfaction with how the democracy was working in the EU played a fundamental role into leave decision. Inside the country an intern fight was being carried out between Eurosceptics and pro-European which exploded out into the Brexit Referendum granting to Britain the exit of the European Union. The political scientist Betts (2016) pointed out on a Ted Talk³ that, according to leaver polls, the two principal reasons for leaving the EU were immigration and sovereignty. He argued that a minority of leave voters were persuaded by fear and

¹ That term refers to those who do not believe in the benefits to be into the EU.

² Toby Helm – British Euroscepticism: a brief history
<https://www.theguardian.com/politics/2016/feb/07/british-euroscepticism-a-brief-history>

³ Alexander Betts – Brexit happened and what to do next Ted Talk
<https://www.youtube.com/watch?v=dcwuBo4PvE0>

mistrust, linked to immigration and refugees once again. Most of the leave campaign took place in journals, magazines, and social media such as Facebook and Twitter. Because of the relevance of the media and the nature of the Brexit, the purpose of this study is to analyse whether the British voters were framed⁴ or nudged⁵ to decide leave EU. In what follows, our focus will be on the role of the internet (network platforms) and traditional communication on the decision to leave EU.

Among the Behavioural Economics objectives is investigating the impact of human behaviour on economic activity Mullainathan & Thaler (2000). According to BE, which highlights the relevance of our environment and mental states, human behaviour does not neatly mirror traditional theories as choices often cannot be reduced to rational decision-making. It also argues that traditional theories have neglected these elements in which the economic agent has been characterised by willpower, selfishness, and unbounded rationality. Unbounded rationality refers to recognising all the alternative choices an economic agent could have and the relevant consequences that may follow. (Tisdell, 1975)

Moreover, to understand the role of heuristics and how decision processes are created, we will look at *two systems of the mind*, which Kahneman (2012) uses to explain how judgments are made and the adoption of heuristics.

⁴ We use the term framed as (Tversky & Kahneman, 1981) which means; an outcome can be controlled by the formulation of the problem and partly by norms, habits and personal characteristics of the decision maker.

⁵ Regarding the term nudged, we refer the term (Thaler & Sustain, 2009) nudge as any aspect of the choice architecture that alters people's behaviour in a predictable way.

II. Literature Review

1. *Two Systems of the Mind*

Prospect theory is a BE value theory based on many experiments seeking to explain why humans decide the way they do (Kahneman & Tversky, 1979).

Because people behave contrary to expected utility theory, this theory cannot explain decision making under risk. To do this, prospect theory presents some principles to explain it. Ackert & Deaves, 2010 identify three important ideas that characterize prospect theory: *i*) people sometimes exhibit risk aversion and sometimes exhibit risk seeking, depending on the nature of the prospect. *ii*) evaluations of prospects depend on gains and losses relative to a reference point. This reference point is usually the status quo, *iii*) people are averse to losses because these looms larger than gains. Furthermore, contrary to the utility theory, prospect theory uses a value function which is concave in the positive domain (gains) and convex in the negative domain (losses). This explains why the value function is not wealth but changes in wealth. In addition, contrary to the utility theory, prospect theory uses decision weight instead of probabilities weights only. Due the nature of the value function, losses loom larger than gains, implying that losses are felt greater than gains. Furthermore, researchers have found that people often overestimate low probabilities events by using decision weights instead event probabilities to value a prospect.

According to Kahneman (2012), the easiest way to understand prospect theory is to think about two choice options. When these options are presented together, we almost immediately know the better option to select through our rational thinking. However,

surprisingly, when these two options are presented separately, the initial better choice is influenced by an intuitive reaction because people do not doubt their own judgment. In this regard, Kahneman identifies how our thinking is based on two *systems*, intuition [Automatic System] and reasoning [Reflective System].

1.1. Automatic System vs Reflective System

There are some situations when reflection is rapid and mostly automatic. Kahneman (2012) calls this *Thinking fast* or *System 1*. In this case, humans show the ability to do some tasks more easily than others. *System 1* generates emotions, and it occurs spontaneously, effortlessly, and quickly. In contrast, solving mathematic problems requires effort and does not occur spontaneously, and task completion requires total concentration. In this state of mind, where full attention⁶ is limited, performance will be slower based on rational thinking. Kahneman calls this *System 2*.

Research has shown that *System 1* makes up a depository of knowledge that we acquire about the world (Kahneman, 2012). It explains how medical diagnoses in some professions are spontaneous and tend to be correct since experience is necessary to make any intuitive judgment. For example, doctors know almost instantaneously when someone has the flu before a clinical diagnosis because the symptoms tend to be repetitive. (Kahneman, 2012)

System 1 and *System 2* are not in conflict but complement each other. When, for example, a situation presents incompatibility or is incongruent with our experience or intuition, *System 1* activates *System 2* to find a reason for the experience.

⁶ Kahneman, 2012 call it *attention resource*

Figure 1 below shows how *System 1* functions and how our knowledge influences our thinking. Looking at the second row as a series of letters, we see letters. However, if we are told that they are numbers, our *System 1* automatically suppresses the ambiguity and generates a coherent solution, making it possible to distinguish the individual numbers. This demonstrates the ability of our mind (*System 1*) to substitute complex questions with easier ones, making an automatic response. Intuition is nothing more than recognition.



Figure 1 - System 1 and ambiguity

Source: *Bulletin of the American Academy of Arts & Sciences*, Winter 2012.

1.2. Heuristics and Biases

Resemblance and stereotypes can lead people to ignore statistical data to confirm their judgments (Kahneman, 2013). Kahneman calls this phenomenon “systematic errors”, otherwise known as biases that can recur predictably in particular circumstances. As mental shortcuts, systematic errors are used as a simplifying heuristic aimed at offering instantaneous responses. Our brain relies on this heuristic to save energy and ease cognitive loads when time constraints are more valuable than accuracy.

However, in uncertain situations, we may look at our beliefs for some aid and do not think about rational probabilities but intuitively biased probability evaluation. These judgments and beliefs are bounded. Our perception about boundaries is a limit of

rationality, where intuition is relevant. According to Tversky & Kahneman (1974), these heuristics sometimes lead to systematic errors since complex tasks are reduced to simple judgmental processes. For example, when we try to predict any distance, our prediction relies on the clarity and sharpness of the object.

To better understand how people deal with complex decision-making processes under uncertainty, biases and heuristics have been applied to people's daily decision-making processes. Moreover, once scholars discovered the implications of some heuristics on political behaviour, biases and heuristics have also been applied to politics. Therefore, to understand the most common biases that influence political behaviour, it is necessary to describe some of them.

(i) Representativeness

Tversky & Kahneman (1974) describe the representativeness heuristic as a response for probabilistic questions. For example, Christine is an excellent swimmer who enjoys swimming three times per week. During her adolescence started a very restrictive diet which allowed her to compete many times and represented her region. Growing up, she goes to college. What is her current profession: *(i)* an Olympic competitor, or *(ii)* a financial consultant? Many people will choose *(i)* in the example because Christine's description matches their stereotype about competitors. Furthermore, this means that *(i)* is more highly representative than *(ii)*. When we do this, we neglect information about the probability of *(ii)* occurring.

This heuristic has three important characteristics: *(i)* This heuristic is closely related to stereotypes, meaning that the judgments are elaborated by being based on resemblance with something, *(ii)* the heuristic is linked to intuitive estimates more than

probabilities, meaning that the choice depends on the similarity between the options and known parameters, and (iii), the heuristic is associated with recurrence, i.e. when a particular behaviour occurs several times, people expect the same behaviour to be sustained and assume it as a global result. This assumption provokes the neglect of the randomness of the process⁷. Tversky & Kahneman (1974) discovered how prior probabilities work on representativeness. In this context, the more information the subject has, the more neglected these prior probabilities are.

(ii) Availability

Availability bias is one of the most common biases. It is also most threatening given the pervasiveness of fake news. This heuristic could have an enormous impact on political affairs. In this heuristic, the decision-maker decides according to the situations a person is most exposed to. In other words, instead of making a rational choice with all available information, the basis of the decision is the most recent information (Abreu, 2014). Kahneman argues that salience is one of the factors of availability biases. The more salient an event is, the more attention it attracts and the easier it will be to retrieve these events from memory. For this, it will be easier to make misjudgements about a situation which could be similar with a remembrance. This bias is highly influenced by emotions, and if a situation happens to a person, the chances of being more influenced by this bias increase significantly. According to Tversky & Kahneman (1974), one may, for example, reduce the risk of heart attack among middle-aged people by recalling such occurrences among their acquaintances. Thus, our expectations are distorted by emotional

⁷ This characteristic was called as misconceptions of chance. Tversky & Kahneman 1987.

prevalence and intensify the message we are exposed to, leading to systematic errors resulting in inaccurate estimations.

(iii) *Adjustment and Anchoring*

This bias explains how people estimate given measures and adjust them until they find a satisfactory estimate. According to Epley & Gilovich, (2006), anchoring explains why judgments tend to be influenced by an initial impression, value, or perspective. In addition, Tversky & Kahneman (1974) discovered that people tend to overestimate the probability of conjunctive events over the probability of disjunctive events.

In connection with heuristics and biases, the relevance of this concept in political affairs has been increasing due to people overvaluing conjunctive events over disjunctive events; for example, the probability that someone with political knowledge will be selected over someone with popularity relevance. In the field of political affairs, social inference has been ignored. According to Colombo et al. (2020), given the low level of information of the average citizen, several features, such as religion, occupation, sociodemographic features, appearance and party preference, provide essential and effortless shortcuts of mind to simplify the decision-making process. People led by these features can easily ignore prior probabilities and choose, neglecting the best option since this aspect has much to do with *representativeness* biases and religion, occupation, and party preference. Expressed differently, people led by their biases can easily ignore prior probabilities and neglect the best option.

(iv) *Status quo*

Sometimes decisions are too complex or simply have too many options. In instances where our interest is as high as the number of available options, our mind needs

some help to select the best option. As seen in the previous section, we have two systems: *system 1*, which works quickly and involves emotions, and *system 2*, rational thinking. (Kahneman, 2013) Academics describe the existence of a bias that aid our *system 1*, namely ‘status quo’, defined as doing nothing when deciding whether to stick to the current decision or change it.

Samuelson & Zeckhauser (1988) confirm that the status quo can influence public policy in the presence of multiple interests. The tendency to stick to the status quo increases to preserve economic efficiency. In addition, among various experiments, Samuelson & Zeckhauser (1998) explain that sticking to the status quo occurs to avoid cognitive dissonance. This can be considered as a mechanism to avoid unpleasant outcomes such as regretting outcomes.

2. Nudging

2.1. Nudge Theory

From the very moment we wake up, we decide on issues such as: what to wear, whether to eat bread or fruit, exercise, or meditate. Sometimes we are not aware of the decisions we take because many of them are *default choices*. The main question for *nudge* is: what if we had better choices? In fact, options are so diversified that they make choices much more complicated. It leaves humans susceptible to their limitations, relying on mental shortcuts to make decisions that are not always the best. In his book, *Nudge*, Richard Thaler describes two types of humans, Econs and Humans: Econs make decisions based on logical assumptions, while their emotions and beliefs profoundly influence humans. These descriptions shed some light on why some decision-makers do not act according to the most rational choice. According to Mullainathan & Thaler, 2000,

Humans act differently than Econs because of some characteristics. These are self-control, bounded rationality, and selfishness.

The paternalism libertarians discover the difficulty of choice when there are so many options. However, at the same time, they found the power of nudging people in some directions to offer them better options. *Nudge* maintains freedom of choice since the goal is simplifying life and improve decision making.

Since we are susceptible to our limitations, Thaler & Sunstein, 2008 hold that people do not choose the best option intentionally, but because of their lack of capacity to store all the information needed to make an optimal choice. Briefly, nudge is considered a way to simplify life, making the choice decision more straightforward and better. Sunstein (2014) describes nudging as *soft paternalism*, where the objective is to lead people in some direction without jeopardizing freedom of choice.

Regarding some characteristics of *nudge*, paternalists defend preserving approaches such as nudging by differentiating such policies from the ones which are considered as mandates or incentives. According to Sunstein (2014), nudges are transparent and effective. This is why he points out the importance of these actions being subject to people's scrutiny. Meanwhile, Kusters & Van der Heijden, 2015, affirm that *nudge* seeks to change behaviour through a wide range of interventions; for example, financial incentives (pay to avoid teenager pregnancy) or blocking an inappropriate choice (the computer will block if it identifies some strong language). All this with a small cost for a larger good.

2.1.1. Types of Nudge

Default rules have been quite useful in consumer behaviour, protecting consumers against economic harm such as spending more money than they possess. If we take our bounded rationality as human beings into consideration, nudges can choose whether a decision is too complicated easier. To illustrate, think about financial aid forms, where simplification can have two effects, additional aid and increase student attendance. In addition, there are some factors which could influence the decision of people. These include factors such as social environment or the weather. Sunstein & Sunstein, 2014, call them “choice architecture” because they are where people often get influenced.

Talking of ways to nudge people, Sunstein & Sunstein, 2014 enunciated *default rules* as one of the essential ways to nudge. Retirement enrolment (automatically enrolment) and increasing savings are some examples of the effectiveness of *default rules*. However, Sustain (2018) lists some other important nudges, such as *simplification* (simplifications of forms and regulations would benefit some nations in affairs like employment, health, and education), *social norms* (emphasizing what the most people do)⁸, *disclosure* (transform more comprehensible information), *warnings, graphics or otherwise* (triggers people attention), *recommitment strategies* (commitment to a specific goal), *reminders* (avoiding the inertia of people), *eliciting implementation intentions* (increasing the engaging since people are actively when someone encourages them), *informing people of the nature and consequences of their own past choices* (by the historical, people can change some habit and increase their savings).

On the other hand, economists, who favour nudging people, are recognised as *libertarian paternalists*. They explore human vulnerabilities in a good sense to avoid

⁸ Libertarian paternalists describe it as a redistributive concept that may benefit some individuals, but harm others.

harm and provide them with more decision alternatives. At first sight, they seek to guide people towards their best interests, steering them into better decisions to preserve their freedom of choice. However, some authors consider nudge as a strategy of concern. In agreement with Goodwin, 2012, exploiting imperfections in human judgments could be considered manipulative. If the nudge is not designed carefully, people who were nudged in one way for the first time can easily be nudged again in the opposite direction. In addition, nudge emphasises individual preference, neglecting that we are selfish and look out for our own welfare. Consequently, nudging alone cannot deal with big problems that society faces and, eventually, can be used in ways that may differ from its principle propose to improve choices.

2.1.2. Nudge and Brexit

On June 23, 2016, the British population voted on remaining in or leaving the European Union (EU). According to a report by The Reuters Institute, during the referendum, the media in favour of remaining used the status quo bias as an argument. In contrast, the leavers used the availability heuristic, with massive information about economy, governance, and migration issues. Thaler, 2016 talked about Brexit and referred to leave voters as “*people who are voting with their guts*” since immigration and other social issues that were used as leave argumenta brought emotional responses from the voters rather than calculation as standard economics would expect. The misunderstanding and lack of information of people who wanted to leave exposed their bounded rationality, misjudgements, and orthodox beliefs. In consequence, they were exposed to unnoticed harm, as Sunstein 2013, said.

Meanwhile, as was expected, this event was subjected to significant media coverage. In fact, political parties made an exhausted follow-up through social campaigns. Apart from local newspapers, social media became the new political weapon. According to (Buchanan, 2019), 67% of the voters used Facebook as an information source, while 30% used Twitter.

People can be influenced by their beliefs and the information they are most exposed to. Moore & Ramsay (2017) show that the main topic discussions favouring leave the EU were the British economy and immigration. Their report, which reviewed 14,779 articles, almost 48% was about the economy, indirectly associated with immigration and 30% of the articles were directly about immigration. In her *Ted Talk* presentation in 2019, the journalist Cadwalladr indicated how newspapers and social media (especially Facebook) influenced people. She witnessed the increasing anger directed at immigrants in her village, where immigration had one of the lowest rates of immigration in the country. This leads us to think about how much people were influenced by their heuristics and biases, especially since most available information was about these arguments. According to (Buchanan, 2019), leave campaigns focussed on immigration, especially Syrian refugees, and the possibility of Turkey joining the EU. The campaign sharpened their advertising with refugee photos at the border of Croatia, increasing the salience of this information letting dubious voters exposed to their bias.

Richard Thaler, interviewed by Marketwatch.com, said that the status quo would prevail in the referendum. However, the results showed the opposite. Scholars wondered why? Buchanan, 2019 suggested that the low skills of people may be the answer. Looking at the referendum data, it is possible to see how Britain was divided along economic,

educational, and social lines. People with a lack of information or were less educated were more vulnerable to the salient effect of the newspaper coverages (M. Goodwin & Heath, 2016). Their report explains how education played a key role since less skilled voters showed 30% support for leaving the EU.

Apart from immigration and the impact on the economy, sovereignty was targeted as a political issue since the leave campaigners suggested that being part of the EU made Britain lose its sovereignty. This perspective generated diverse attitudes and values, enforcing nationalism. In a poll by (Economic and Social Research Council, 2016), British voters were questioned about which issues they thought would be important to help decide which way to vote. Britain's ability to make its own laws was among the three main reasons, having the 15% of the total, while immigrants coming to Britain was the first, with 28%. Laws for immigrants and refugees played a significant role in the voters' minds. Although, it shows how British voters were vulnerable to the *representativeness bias*.

3. Framing

3.1. Framing Argument

Modern theory of decision under risk has some simple principles of rational choice. According to Tversky & Kahneman, 1989, invariance and dominance are the two main principles. On the one hand, *invariance* holds that different representations of the same choice should give the same preference. On the other hand, *dominance* holds that if one option is better than another in one state, the dominant option should be chosen. It says, in the existence of a dominant strategy, a rational decision-maker should always select the dominant strategy over its dominant alternative. (Kourouxous & Bauer, 2019) In any

case, *Framing Theory* violates these principles and exposes their failures. For example, invariance failures have been demonstrated by Tversky & Kahneman (1989) in a study on medical treatments, where the win framing purpose recorded different responses by the attendants compared to the loss framing purpose. That is to say, that the win framing purpose shows two choices where the outcome will always be positive while the loss framing purpose presents the option as losses. For example, José went to a medical visit where the doctor made a bad prognostic and he must decide whether to accept a treatment in which 10% of people have terrible secondary effects or a treatment in which 90% of people do not have secondary effects. Most people select the second option, which expresses the win framing purpose, while the first option indicates a loss framing purpose, making the difference in results easy to see. Furthermore, the dominance failures were illustrated by an experiment in the financial field. When respondents evaluated decisions separately, it was possible to have different outputs (risk-averse and risk-seeking).

Therefore, it is possible to affirm that the framing concept is bounded by how the information is presented. According to Chong & Druckman, 2007, *framing effects* occur when (often small) changes in the presentation of an issue or any event produce (sometimes large) opinion changes. An example by Sunstein, 2013 refers to energy efficiency, where people are presented with the possibility of obtaining a specific amount of money if they decrease their energy consumption. The evidence verifies some (small) changes in energy consumption. However, large behavioural changes will be verified if people are informed that they would lose the same amount of money if they do not improve their usage. Additionally, the major premise of framing theory is that any subject can be presented by different perspectives, provoking different outputs and

considerations. Therefore, framing theory predicts how people develop a particular attitude about any subject according to the way the issue has been presented.

Apart from how the information is presented, framing has much to do with people's emotions and biases. According to Mercer, 2005, emotions are not merely a consequence of a frame but can also be a source of framing when our feelings can reframe our choices. Additionally, Tversky and Kahneman, 1987 presented the value function as a significant property of framing. This function assumes the particular significance that loss may have on people's behaviour, called *loss-aversion*.

3.2. Types of framings

In the past, expected utility theory was used to analyse the way people decide under risk and as a regulative model of rational choice. However, (Kahneman & Tversky, 1979) developed the prospect theory that exposes the ineffectiveness of using the expected utility theory to explain decisions under risk. Equally important, prospect theory exhibits the different outcomes obtained under certain and uncertain events, involving gains and losses.

As mentioned, framing happens when people make a different choice for the same issue when it is presented differently. The framing effect has been widely observed in terms of losses and gains. According to Tversky Kahneman (1987), responses to losses are more extreme than responses to gains. Statistical data suggest that the displeasure of losing exceeds the pleasure of winning, even if the number of gains/losses are equivalent.

According to Mercer (2005), prospect theory supports the idea that loss-averse people usually make riskier choices. It suggests that fear and loss are closely connected at the moment decision. However, Tversky& Kahneman (1979) exemplified that losses are a

major consideration when the reference point of the first option is higher than the second one, even if the loss is identical at the end. This suggests that it is not the final state what matters (loss or win) but a few pervasive effects (the reference point).

Similarly, Levin et al. (1998) show the existence of two more kinds of framing effects. The standard framing effect considers loss aversion on risky choices, while *attribute* and *goal framing* evaluate other contexts. First, attribute framing differentiates the importance of descriptive valence influences. Second, it means any attribute in any context provokes framing manipulation. Third, the goal framing evidences the importance of valence-based framing. In other words, the framing effect here is applied to accomplish a specific goal.

Regarding bias and framing, as well as noticing the impact of framing on people's behaviour, scholars have been studying the framing effects on communication. In particular, on social and political issues. Kahneman, 2003 finds that the accessibility bias is closely connected to the framing effect. It can explain why communication frames cause more impact than other framing approaches. Also, it explains why accessibility is more representative bias in the political field.

In agreement with de Vreese, 2005, the concept of framing focuses on communication processes, describing the process by stages. First, *frame building*, where the interaction is between the journalist and the social movements. Finally, he calls the final stage *framing settings* where the relevant subjects are the media frames and the audience. See figure 2 to understand this process.

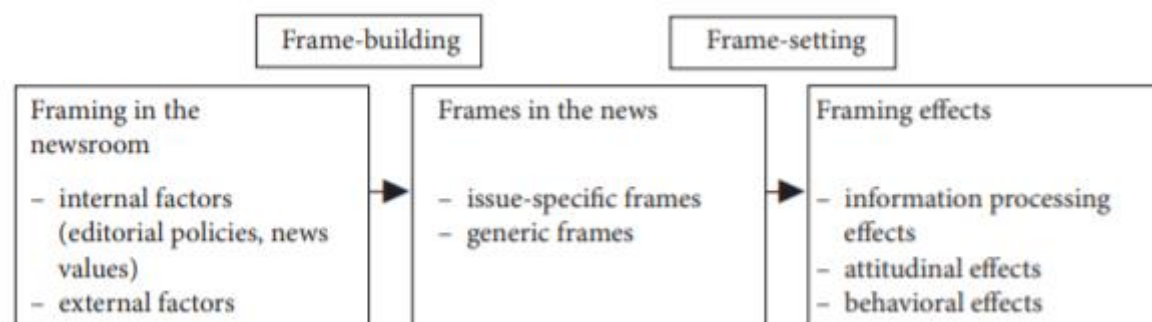


Figure 2 - An integrated process model of framing.
 Source: *News framings: Theory and typology* by Claes H. de Vreese.

Framing can be perceived positively or negatively. In cases such as social movements or political affairs, there is a limit not seen before the Brexit referendum, where the democracy of a country was hurt. Framing communication or news frames play an important role here. The way the news and the information are presented may affect the decision, as seen in the examples.

3.3. Framing and Brexit

Salient approaches were verified during the Brexit campaign; social media or newspapers are some examples. According to a survey of the Department for Culture Media and Sport, 2016, *Taking Part Focus on Social Media*, the main social media apps are Facebook, Twitter and YouTube, with 58%, 22% and 51% of use. On the other hand, the same report shows almost 80% of the home internet and mobile internet use. In addition, local newspapers played an important role in British voter trials and consequent decisions. A study from The Reuters Institute for the Study of Journalism at the University of Oxford and Prime Research found that 41% of the articles focused on pro-leave, while just 27% of the coverage focussed on remaining. Khabaz (2018) mentioned that while newspapers are unable to tell people how to vote, they can influence their attitudes. This

is because humans are deeply influenced by our beliefs, emotions, and social environment.

3.3.1. National newspaper key role

According to (Moore & Ramsay, 2017), coverage of immigration tripled throughout the campaign. The consequences were increasing negative attitudes towards immigrants, blaming them for many of Britain's economic and social issues.

Most of the framing used was the loss aversion framing, linked to the fear. Looking at the numbers presented by More & Ramsay (2017), the framing regarding immigration was present on the referendum campaign from the very beginning. The closer the referendum date, the greater was the number of articles about migration. Just between May to June, the number of articles about migration rose from 13 to 500. The information transmitted by the newspapers connected migration to EU membership. Moore & Ramsey (2017) show that immigration articles were positioned in second place of most articles published during the campaign.

According to (Levy et al., 2016), the tone of the arguments in the press was 46% negative compared to the 12% of the positive ones. The arguments in favour of remaining were assessed the status quo message and focussed only on the Brexit future. Meanwhile, the leave arguments not only dismissed the status quo, but also highlighted the negative message about remaining, referring to *loss aversion*.

In the same context, framing can be exposed in different ways as slogans. In this specific case, slogans played a big role, especially when sovereignty was mentioned. The main slogan for the leave campaign was *Get our country back*. According to (Moore & Ramsay, 2017), most pro-leave articles reveal angry attacks and criticism of attitudes.

3.3.2. *Social media role (Facebook and Twitter)*

Taking Part focus on Social Media found that social media usage in adults in Britain was almost 70% in 2015. Facebook had 52.8% of popularity among social media platforms, and the values increased. The main reasons people used these platforms were: 41% to find local information and 29% to share and view content. Comparing age band usage, the distribution shows 43.7% and 44.5% for Facebook and Twitter, respectively, for the same age range (25 – 44). This compared with The Reuter’s report, which shows that 51% of respondents use social media as news sources.

In the meantime, (Hänksa & Bauchowitz, 2017) studied Twitter and its influence on people. They affirm that the algorithms of a Eurosceptic on Twitter will show news about the subjects such as the harm to British democracy by being part of UE, the amount of money that can be saved by leaving the EU, and how scaremongering the Remainers were. In my opinion, making the users vulnerable to their bounded rationality as human beings trapped them into only accessing what they wanted to know and not all the information available about an issue. In addition, Hänksa & Bauchowitz (2017) discovered the huge importance of newspapers, web pages, and YouTube, since YouTube was the second most prominent domain linked⁹, showing the huge importance people give to the videos to spread information

⁹ In accordance with Statista (Key et al., 2021) Youtube is the second most popular social network worldwide in July 2021. The ranking was by number of users.

III. Methodology and empirical analysis

1. Methodology

The objective of this study is to demonstrate how social media factors impacting on British electors' decision to vote leave the EU. Furthermore, we aim to show how social media networks explored people vulnerabilities and non-rational thinking in the Brexit referendum. Given the binary nature of the referendum, a qualitative model are useful when assessing elector's characteristics, social media preferences and the Brexit decision.

The methodology has three sections. The first section regards the descriptive analysis of the main variables used in this study. This was done through graphs and frequency charts. Next, we studied the association between main sociodemographic, and social media variables. To address this concern, correlation tests between these variables were used. However, the main questions are still unanswered. Were people framed in their vote choice? Moreover, were the age, region, social media usage, education, and income relevant in this framing process? On the third section we provide an analysis of the impact of socioeconomics factors, demographics factors, and social media variables. To this objective we applied a probit model for a binary response (remain, leave) to the referendum.

A *probit model*, estimates the probability of a value falling into one of the two categories of the dependent variable. (Stephanie Glen, 2016). Probit analysis is based on the cumulative normal probability distribution. The binary dependent variable y , takes on the values of zero and one. (Aldrich & Nelson, 1984)

The relationship between a specific variable and the probability outcome is interpreted using the marginal effect, which accounts for the partial change in the

probability. The marginal effect is associated with continuous explanatory variables X_k on the probability $P(Y_i = 1 | X)$, holding the other variables constant. (Greene, 2011)

The probit model intends to estimate the independent variables' impact on the elector's decision, whether leave or remain in the EU. Furthermore, we expect to find statistical evidence to support the presumption that British's voters were framed by social media to vote to leave EU.

2. Data

The empirical study was based on a survey in Britain by the British Election Study (BES) every year. The survey was completed by 2,194 eligible voters from Scotland, Wales, and England and was carried between June 26, 2017, and October 1, 2017. The survey questions were comprised of multiple-choice questions. The relevant content focused on sociodemographic variables such as age, gender, education, newspaper preference, region, gross household income, and social media usage for this study. To handle missing data, we decide to use a deletion method, more specific pairwise deletion. Because of that, our sample reduced to a size of 1399 respondents.

2.1. Definition of Variables

We are interested in the relationships of income, age, gender, Twitter usage, Facebook usage, region, newspaper preference, and vote decision. The leave variable is a binary variable, and we used the vote response in the Brexit referendum.

The region is a categorical variable with eleven geographical locations (East Midlands, Eastern, London, North East, North West, Scotland, South East, South West, Wales, West Midlands, Yorkshire & Humber). However, to do the analysis we desegregate each region

into 11 binary variables, the values fall into (0,1) where, 0=Other, 1=each region. The income was a categorical variable with 18 categories. To have a consist analysis we aggregated this variable into three categories (low income, middle income, high income). The gender was a binary variable (1,2) were 1 was male and 2 was female. The age was defined as a continue variable and their interval of values was 18 to 98 years old. To keep all the relevant information, we distinguish three binary variables for people's qualifications which are no qualification, low qualifications, and high qualifications. The high qualifications contain all the respondents with undergraduate and postgraduate degree, while low qualifications contain all the other categories below undergraduate degree.

Regarding the social media variables, the newspaper was recoded into two binary variables Guardian Observer, and Daily Mail, while social media networks as Facebook, and Twitter was given a dichotomous value (yes, no).

This approach allows use to predict which elector's characteristics and social media preference influenced into the vote decision. The ideal case is that a social media usage and qualifications was leave option impacting.

3. *Sample Characterisation*

A descriptive analysis of the variables studied was carried out (**Table II.**), finding that the average age of the participants who voted in the EU referendum held on June 23, 2016, was 54, with a standard deviation of 18.20. From table 1, 17.6% of the sample said they used Twitter, while 59.8% use Facebook. Among the newspapers, it was obtained that the Daily Mail holds 10.5% and the Guardian Observer 10.2%. On the other hand, the distribution by gender was more representative for women, with 55.3% of the total

sample. Also, looking at the qualification variable, the high qualification variable was 42.2% the most representative between the three variables. The most frequent regions were South East with 12.9% and North West with 13.3%. Finally, looking at the Income-variable, 30.6% of the sample was in the low-income group.

Figure 3 shown that 87% of the respondents were from England, 7% from Scotland and 6% from Wales.

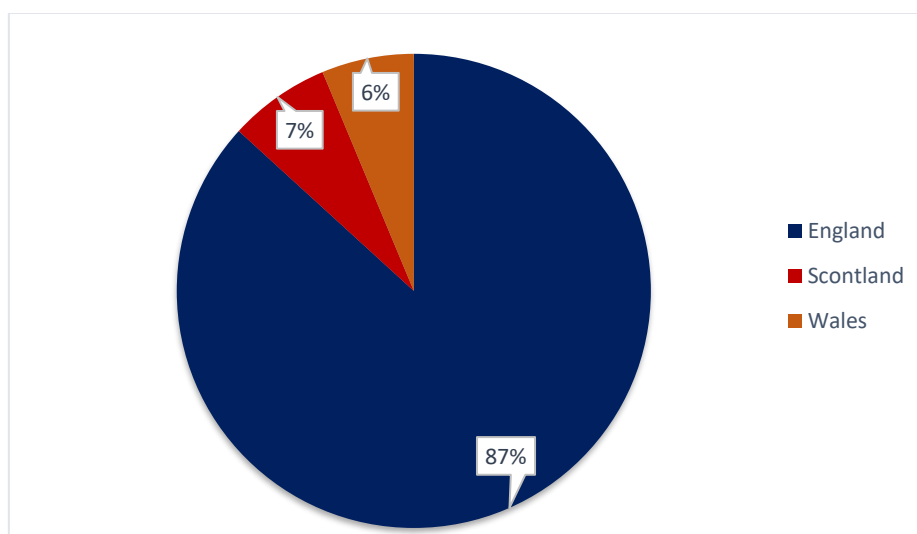


Figure 3 - United Kingdom sample division
 Source: Own Elaboration

Figure 4 shown that from that 87% from England, 8% were from East Midlands, 12% from Eastern, 10% from London, 6% from North East, 15% from South East, 10% from South East 15% from North West, 13% from West Midlands and 12% from Yorkshire & Humber.

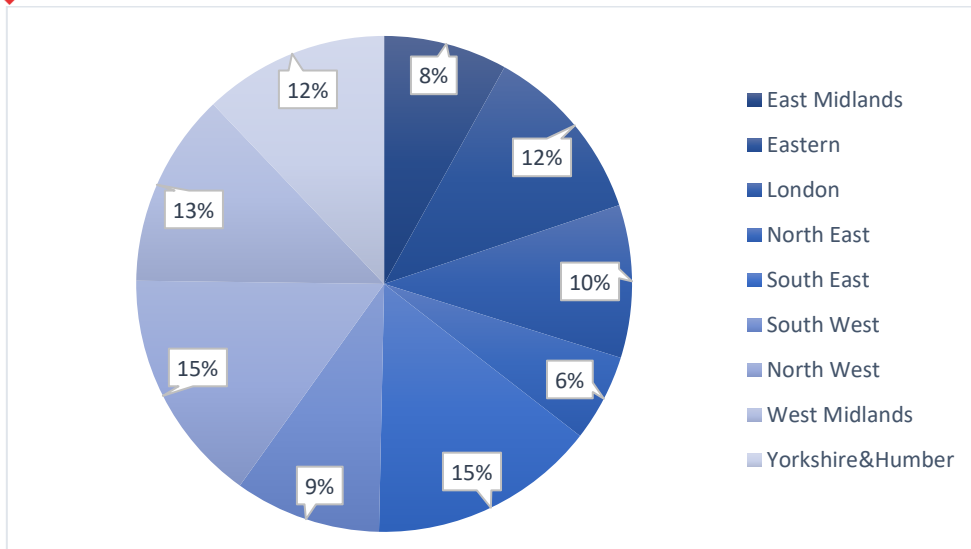


Figure 4 - England sample division
Source: Own Elaboration

Figure 5 shows that according to gender, both showed a greater inclination to leave.

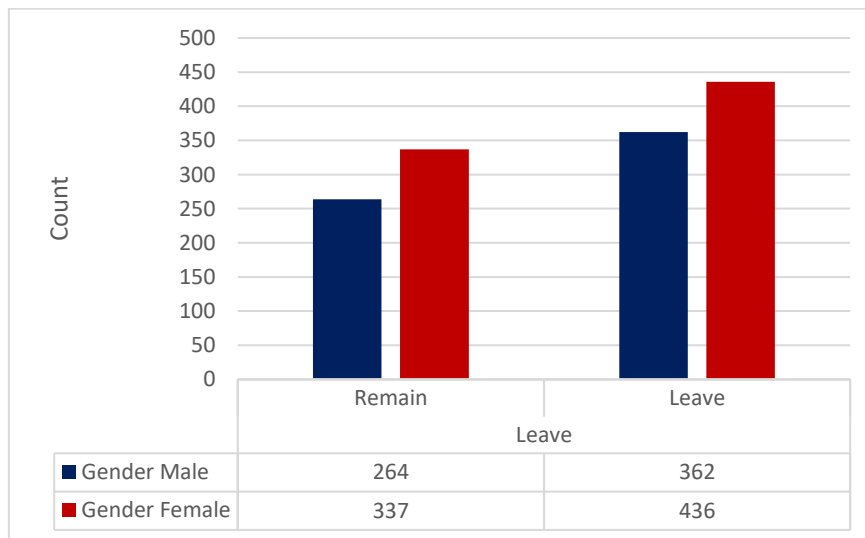


Figure 5 - Distribution of leave and remain according to gender.
Source: Own Elaboration

Figure 6 shows that people who use Twitter were more in favour of remain, while those who did not use this social media were more in favour of leave. Also, those who use Facebook have a greater inclination to leave than those who don't use Facebook.

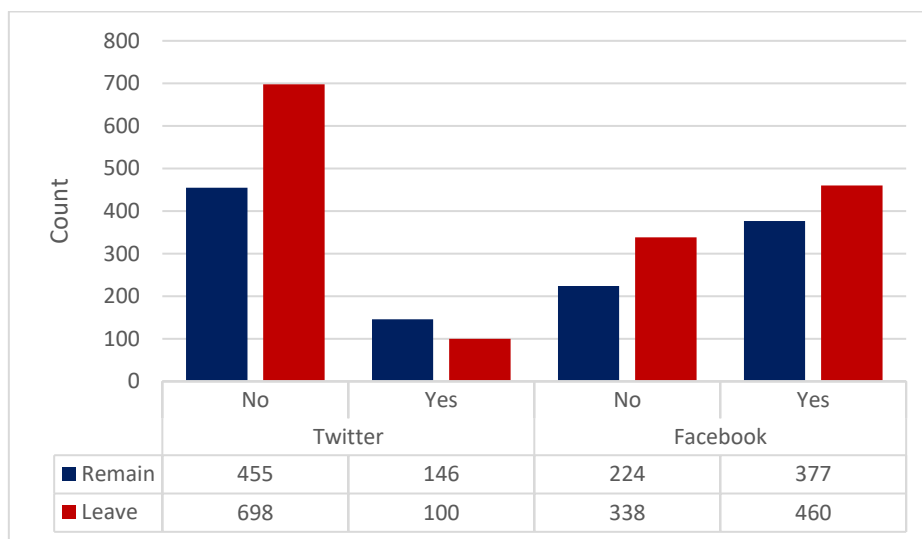


Figure 6 - Distribution of leave and remain according to the use of Facebook and Twitter
Source: Own Elaboration

Figure 7 shows that readers of the Daily Mail voted in favour of leaving, while people who read the Guardian/Observer had more votes in favour of remaining.

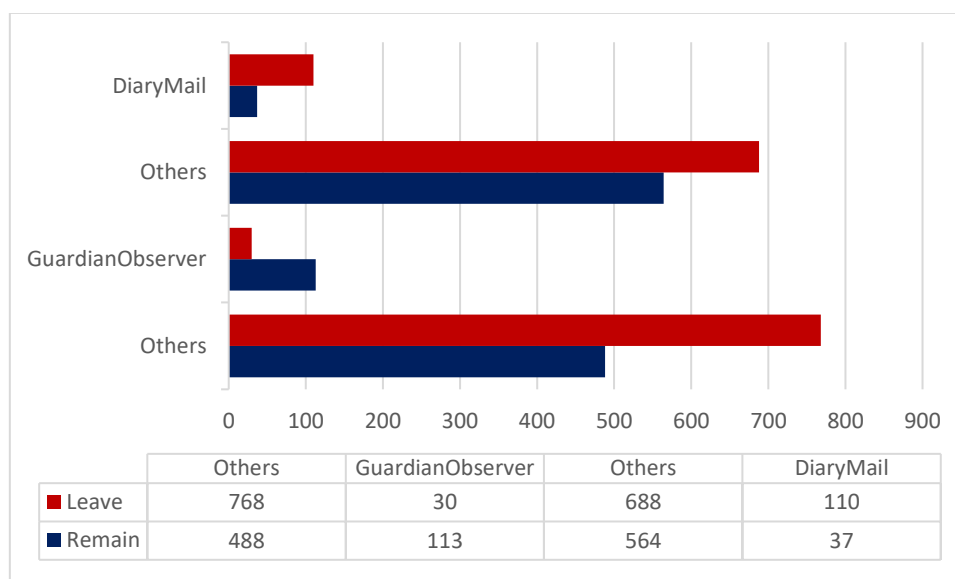


Figure 7 - Distribution of the leave and remain in relation to newspapers read
Source: Own Elaboration

Figure 8 shows that people on the no qualifications and low qualifications groups showed a higher number favouring the leave choice. However, quite the opposite happened with

the people classified in the group high qualifications, where the highest number of votes in favoured remaining.

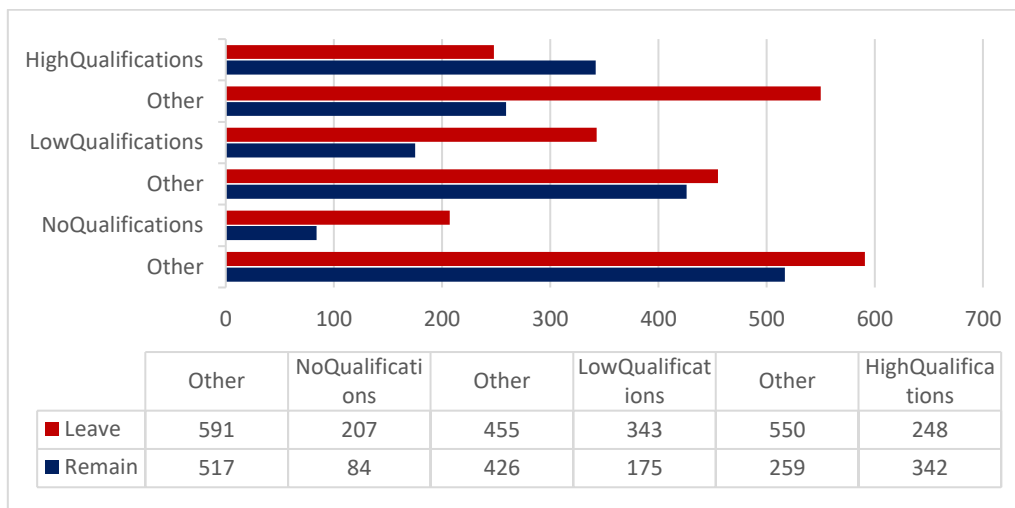


Figure 8 - Distribution of the leavers and Remainers according to qualifications
Source: Own Elaboration

The correlation analysis in Annexes - **Table II.** shows that gender, Facebook, middle income, have no significant correlations with the leave variable. Also, looking to the demographical variables, only London shows a negative correlation in 5%.

On the other hand, Twitter, Observer, Daily Mail, low and high income, all the qualifications variables, and age have significant correlations in 5% with the leave variable.

4. Probit Model Results

In our probit model, leave was assumed as 1 while remain was taken as 0. This study assume that age, income, Twitter, Facebook, qualifications, region, gender, and newspaper influenced the British elector's decision.

This dissertation investigates the following probit model:

$$(1) \gamma = \text{Prob} \left(Y = \frac{1}{X_1, X_2, X_3 \dots} \right) =$$

$$(2) (0.771 - 0.158X_1 - .491X_2 - .497X_3 - .266X_4 - 0.745X_5 + 0.427X_6)$$

$$(3) \gamma = \begin{cases} 1 & \text{if the respondent vote leave} \\ 0 & \text{if the respondent vote remain} \end{cases}$$

$X_1 = \text{Gender}, X_2 = \text{High Qualifications}, X_3 = \text{High Income}, X_4 = \text{Twitter}, X_5$
 $= \text{The Guardian Observer}, X_6 = \text{The Daily Mail}$

0.771 is the value of the dependent variable, which is the leave option.

The X_i coefficients represent the obtained value for each independent variable. Also, this value determines the significance of the independent variable over the outcome.

The **Table I** in the annexes shows the nomination of each independent variable which allowed us to build the model.

The model was estimated using the maximum likelihood method. The estimated coefficients and standard errors reveal the factors which influence voter decisions. The significance of the coefficients suggests that the likelihood of choosing to leave EU will increase/decrease as the response of the explanatory variable increases/decreases. (Borooah, 2002). The MacFadden Pseudo- R^2 can only explain 11.47% of elector decisions whether to leave or remain in the EU.

This study aims to evaluate how social media networks explores people vulnerabilities and non-rational thinking in the Brexit referendum. Due to the polemic about data analysis and Cambridge Analytica, we presumed that people who use social media were the object of studies by enterprises with political interests.

Furthermore, through the construction of an individual profile of these people and studying their judgements and biases, as well as availability, representativeness, and

status quo, could led them to vote to leave the EU. Because of this, the probit analyses had been developed (**Table IV.**). On the first model we tested the chances that vote leave can be associated with the regions, we found statistical significance at 10% in London variable. In model 2 we added the socio-economic variables. We assumed the association between leave and sociodemographic factors such as gender, age, qualifications, and income. However, only some variable show significance. Contrary to our suspicions, age have not any statistical significance. Gender has a statistically significant effect on the leave vote decision in 10% and is related negatively. Also, high income and high qualifications variables were statistically important at a significant level of 1% and related negatively. As these variables decrease, a tendency to vote to leave the EU increases. Notably, as we assume the negative and statistically significant coefficient of high qualifications implies that the electors tended to vote to leave when the education level decreases.

Finally, on our last model was added the social media variables as Facebook, Twitter, Guardian/Observer, and the Daily Mail. We aimed to demonstrate that people with access to social networks have a predictable decision (leave EU) on the referendum held on June 23, 2016. Both newspaper variables were statistically significant at 1%. However, Guardian Observer was related negatively while the Daily Mail was related positively. The positive relation between leave and Daily Mail show that people who increase their reading in Daily Mail were tempted to vote leave the EU.

Finally, our objective was to find statistical evidence that social media framed people to vote for the leave option. Surprisingly, Facebook did not show any statistical significance while Twitter was statistically significant at 1% and related negatively. As

we expected, the probit models suggested a strong influence of some socio-demographic variables as well as newspaper and Twitter variables in the leave decision. Regarding socio-demographic variables the significance was maintaining in the gender, high income, and high qualifications variables.

IV. Conclusions

Based on the outcome from the three probit models, the study reveals that some of the electors' sociodemographic characteristics did have an influence on the vote in the referendum held on June 23, 2016. In fact, women, the most skilled workers, and the highest income people are clearly more associated with the remain vote.

Our findings also support our research questions. In fact, the use of social media influenced the electors' vote in the referendum held on June 23, 2016. Regarding the main variables for this question which are the newspapers Guardian/Observer, and Daily Mail, and the social networks Twitter, and Facebook, only Facebook did not prove to be a significant explanatory variable on our probit models, to explain the leave EU variable.

People who read Guardian Observer have a higher probability to vote remain while people who read Daily Mail are more likely to vote Leave. Which means that these elector's preference about information sources did affect voter ballot. These findings and the presence of representativeness bias, availability, and status quo bias in these information sources are compatible with the idea that people who read the newspaper or use social networks were the subject of framing, especially communication framing. Looking at Figure 2 on the literature review, we can see that people who use more social media and read newspapers go through all the graph mentioned stages (frame-building and frame-setting) until they conclude to vote to leave the EU.

Regarding our second research question, the high negative association between high qualifications and the leave EU variable, and the significance of the coefficients, indirectly support our assumption that less educated people were influenced to vote leave. The literature review can explain this by the availability bias, where less educated people

have less access to information. Furthermore, given that the leave campaign was potentially stronger through social media than the remain campaign, it seems possible that this group could be influenced to vote to leave the EU. In addition, it is possible to see that the leave campaign was studied and constructed with some types of nudges, such as warnings and graphics referring to immigration, reminders about the importance to vote (specially to vote to leave the EU), and informing people of the nature and consequences of their own past choices, implying the discontent generated through the decades for decisions made to be member of the EU.

Briefly, the British people were subject not just to framing but were nudged to vote to leave EU. In a political environment where citizens do not identify themselves with the political parties that represent them, the chances of people turning against them are high. Looking at the literature review, we can see that human beings do not always choose the best option for themselves. This, combined with a lack of information and mistrust in politicians, can lead them to a decision that causes collective harm. Because of the vulnerabilities of people, nudge can be seen as a manipulative strategy which in politics could not only put the democracy of a country in danger but also, the future of a nation and their citizens.

Considering these findings, policies and improving government communication to ensure better understanding of political issues are needed, especially in decisions that can decrease international power, since, in an increasingly globalised world, international relations significantly affect a country's well-being. Also, for future electoral purposes, it is important to be aware of the power that social networks exert on the population. To protect those susceptible to their biases, the government must be the entity which guides

citizens' options to achieve social welfare - that is to say, the institution that can assure social welfare.

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ANNEXUS

Table I.

Independent variable description.

Variable	0	1	Recodification
Age			The age is a continue variable with an interval from 18 to 98.
Low Income	Other	From Under 2,600 annuals To 15,600£ - 20,799£ annual	If the respondent selects 0 will be Other, if he selects 1 it will belong to Low Income.
Middle Income	Other	From 20,800£ - 25,999£ To 40,000£ - 44,999£ annual	If the respondent selects 0 will be Other, instead if he selects 1 it will belong to Middle Income.
High Income	Other	From 45,000£ - 49,999£ To 100,000£ or more annual	If the respondent selects 0 will be Other, instead if he selects 1 it will belong to High Income.
Non-Qualification	Other	Non-Qualifications	If the respondent selects 0 will be Other, instead if he selects 1 it will belong to non-Qualification.
Low Qualifications	Other	People who are: Below GCSE GCSE A-level	If the respondent selects 0 will be Other, instead if he selects 1 it will belong to one of the education levels.
High Qualifications	Other	People who are Undergraduate or Postgrad	If the respondent selects 0 will be Other, instead if he selects 1 it will belong to one of the education levels.

Variable	0	1	Recodification
Gender	Male	Female	If the respondent selects 0 he identifies himself as men, instead if the respondent selects 1 she identifies herself as women.
Twitter	No	Yes	If the respondent selects 0 do not use Twitter, instead if he selects 1 the respondent use Twitter.
Facebook	No	Yes	If the respondent selects 0 do not use Facebook, instead if he selects 1 the respondent use Facebook.
Guardian Observer	Other	Guardian Observer	If the respondent selects 0 do not read Guardian Observer, instead if he selects 1 the respondent read Guardian Observer.
Daily Mail	Other	Daily Mail	If the respondent selects 0 do not read Daily Mail, instead if he selects 1 the respondent read Daily email.
East Midlands	Other	East Midlands	If the respondent selects 0 lives in another area, instead if he selects 1 live in East Midlands.
Easter	Other	Easter	If the respondent selects 0 lives in another area, instead if he selects 1 live in Easter.
London	Other	London	If the respondent selects 0 lives in another area, instead if he selects 1 live in London.

Variable	0	1	Recodification
North East	Other	North East	If the respondent selects 0 lives in another area, instead if he selects 1 live in North East.
South East	Other	South East	If the respondent selects 0 lives in another area, instead if he selects 1 live in South East.
South West	Other	South West	If the respondent selects 0 lives in another area, instead if he selects 1 live in South West.
North West	Other	North West	If the respondent selects 0 lives in another area, instead if he selects 1 live in North West.
Scotland	Other	Scotland	If the respondent selects 0 lives in another area, instead if he selects 1 live in Scotland.
Wales	Other	Wales	If the respondent selects 0 lives in another area, instead if he selects 1 live in Wales.
West Midlands	Other	West Midlands	If the respondent selects 0 lives in another area, instead if he selects 1 live in West Midlands.
Yorkshire Humber	Other	Yorkshire Humber	If the respondent selects 0 lives in another area, instead if he selects 1 live in Yorkshire Humber

Note. Source: Own elaboration. Database BES 2017 – face to face survey.

Table II.

Distribution of absolute and percentage frequencies of the sociodemographic variables of people who voted in the EU referendum according to leave variable.

	N	%
Leave		
Remain	601	43.0
Leave	798	57.0
Gender		
Male	626	44.7
Female	773	55.3
Newspaper		
Others	1256	89.8
Guardian Observer	143	10.2
Others	1252	89.5
Diary Mail	147	10.5
Twitter		
No	1153	82.4
Yes	246	17.6
Facebook		
No	562	40.2
Yes	837	59.8
Income		
Low Income	428	30.6
Middle Income	423	30.2
High Income	368	26.3
Qualifications		
Low Qualifications	518	37.0
High Qualifications	590	42.2
No Qualifications	291	20.8
Regions		
East Midlands	98	7.0
Eastern	143	10.2

	N	%
London	121	8.6
North East	69	4.9
South East	180	12.9
South West	116	8.3
North West	186	13.3
Scotland	97	6.9
Wales	88	6.3
West Midlands	154	11.0
Yorkshire & Humber	147	10.5

Note. Source: Own elaboration, using SPSS program. Database British Election Study 2017 – face to face survey.

Table III.

Correlations matrix between variables.

Spearman's rho		Gender	Age	Leave	Guardian Observer	Daily Mail	Twitter	Facebook	LowIncome	MiddleIncome	HighIncome	LowQualifications	HighQualifications	NoQualifications
Gender	Coef	1.000												
	Sig.													
Age at last birthday	Coef	-0.027	1.000											
	Sig.	0.310												
Leave	Coef	-0.014	.098**	1.000										
	Sig.	0.593	0.000											
GuardianObserver	Coef	-.057*	-.100**	-.246**	1.000									
	Sig.	0.033	0.000	0.000										
DiaryMail	Coef	-0.010	.189**	.123**	-.116**	1.000								
	Sig.	0.697	0.000	0.000	0.000									
Region	Coef	-.059*	-0.005	0.026	0.019	0.017								
	Sig.	0.028	0.856	0.333	0.474	0.522								
Twitter	Coef	0.008	-.362**	-.153**	.179**	-.079**	1.000							
	Sig.	0.770	0.000	0.000	0.000	0.003								
Facebook	Coef	.119**	-.469**	-0.051	.065*	-.114**	.294**	1.000						
	Sig.	0.000	0.000	0.055	0.015	0.000	0.000							
Low Income	Coef	.070**	.168**	.181**	-.111**	0.046	-.164**	-.089**	1.000					
	Sig.	0.009	0.000	0.000	0.000	0.088	0.000	0.001						
Middle Income	Coef	-0.015	-0.031	-0.001	-0.001	-0.007	0.011	0.025	-.437**	1.000				
	Sig.	0.581	0.252	0.974	0.964	0.784	0.689	0.347	0.000					
High Income	Coef	-.115**	-.173**	-.229**	.174**	-0.030	.163**	.099**	-.397**	-.393**	1.000			
	Sig.	0.000	0.000	0.000	0.000	0.262	0.000	0.000	0.000	0.000				
Low Qualifications	Coef	0.023	-.113**	.142**	-.122**	0.017	-0.024	.100**	.127**	0.021	-.152**	1.000		
	Sig.	0.386	0.000	0.000	0.000	0.519	0.377	0.000	0.000	0.442	0.000			
High Qualifications	Coef	-0.047	-.141**	-.259**	.242**	-0.033	.157**	.106**	-.240**	0.040	.295**	-.655**	1.000	
	Sig.	0.082	0.000	0.000	0.000	0.217	0.000	0.000	0.000	0.137	0.000	0.000		
No Qualifications	Coef	0.029	.306**	.146**	-.150**	0.020	-.163**	-.248**	.141**	-.073**	-.178**	-.393**	-.438**	1.000
	Sig.	0.277	0.000	0.000	0.000	0.463	0.000	0.000	0.000	0.006	0.000	0.000	0.000	
East Midlands	Coef	0.010	0.050	-0.011	-0.009	0.034	0.020	0.008	-0.049	0.002	0.001	-.083**	0.026	.066*
	Sig.	0.697	0.063	0.688	0.725	0.206	0.447	0.770	0.070	0.933	0.958	0.002	0.322	0.013
Eastern	Coef	.100**	0.045	0.035	-0.052	0.038	-0.032	0.017	0.001	0.014	0.007	.074**	-.073**	0.001
	Sig.	0.000	0.092	0.185	0.054	0.152	0.233	0.535	0.962	0.596	0.782	0.006	0.006	0.956
London	Coef	0.001	-.081**	-.077**	.106**	-.056**	0.025	0.003	-0.039	-0.036	0.001	0.001	0.051	-.064*
	Sig.	0.978	0.002	0.004	0.000	0.037	0.353	0.906	0.148	0.173	0.970	0.969	0.055	0.017
NorthEast	Coef	0.019	0.011	0.018	-.055*	-0.024	0.016	-0.009	0.035	0.008	-0.031	0.037	-0.047	0.013
	Sig.	0.476	0.694	0.510	0.039	0.365	0.545	0.747	0.190	0.760	0.245	0.164	0.076	0.617
SouthEast	Coef	-0.028	-0.019	-0.003	0.032	-0.041	-0.037	0.036	0.000	-0.021	.095**	0.006	0.022	-0.034
	Sig.	0.300	0.472	0.914	0.225	0.124	0.163	0.176	0.991	0.442	0.000	0.823	0.411	0.205
SouthWest	Coef	-0.016	0.034	0.031	0.001	0.015	0.011	-0.002	0.037	0.017	-0.027	0.038	0.000	-0.046
	Sig.	0.547	0.209	0.254	0.964	0.567	0.683	0.937	0.171	0.537	0.321	0.157	0.988	0.089
NorthWest	Coef	-0.037	-0.030	-0.009	-0.028	-0.024	-0.037	-0.044	-0.009	-0.033	0.029	-.091**	-0.019	.131**
	Sig.	0.165	0.257	0.739	0.297	0.363	0.166	0.099	0.745	0.215	0.278	0.001	0.479	0.000
Scotland	Coef	0.008	0.000	-0.019	-0.018	-0.029	0.000	-0.023	0.002	-0.045	-0.035	-0.046	-0.028	.089**
	Sig.	0.767	0.991	0.479	0.506	0.274	0.988	0.387	0.941	0.093	0.188	0.085	0.296	0.001
Wales	Coef	-0.045	-0.030	0.005	-0.010	.055*	0.050	0.050	0.032	-0.004	-0.021	.057*	-0.001	-.067*
	Sig.	0.091	0.263	0.858	0.718	0.039	0.059	0.061	0.225	0.884	0.431	0.032	0.980	0.012
Wes tMidlands	Coef	-0.010	0.029	0.042	-0.013	.066*	-0.018	-0.019	0.009	0.042	-0.039	0.024	-0.004	-0.023
	Sig.	0.720	0.286	0.114	0.624	0.014	0.490	0.471	0.727	0.117	0.145	0.379	0.870	0.396
Yorkshire Humber	Coef	0.004	0.000	-0.013	0.031	-0.026	0.032	-0.009	-0.010	.054*	-0.014	-0.002	.061*	-.072**
	Sig.	0.892	0.998	0.616	0.253	0.328	0.238	0.729	0.709	0.045	0.598	0.938	0.022	0.007

		EastMidlands	Eastern	London	NorthEast	SouthEast	SouthWest	NorthWest	Scotland	Wales	WestMidlands	YorkshireHumber
Gender	Coef											
	Sig.											
Age at last birthday	Coef											
	Sig.											
Leave	Coef											
	Sig.											
GuardianObserver	Coef											
	Sig.											
DiaryMail	Coef											
	Sig.											
Region	Coef											
	Sig.											
Twitter	Coef											
	Sig.											
Facebook	Coef											
	Sig.											
Low Income	Coef											
	Sig.											
Middle Income	Coef											
	Sig.											
High Income	Coef											
	Sig.											
Low Qualifications	Coef											
	Sig.											
High Qualifications	Coef											
	Sig.											
No Qualifications	Coef											
	Sig.											
East Midlands	Coef	1.000										
	Sig.											
Eastern	Coef	-.093**	1.000									
	Sig.	0.001										
London	Coef	-.084**	-.104**	1.000								
	Sig.	0.002	0.000									
NorthEast	Coef	-.063*	-.077**	-.070**	1.000							
	Sig.	0.019	0.004	0.009								
SouthEast	Coef	-.105**	-.130**	-.118**	-.088**	1.000						
	Sig.	0.000	0.000	0.000	0.001							
SouthWest	Coef	-.083**	-.101**	-.093**	-.068*	-.116**	1.000					
	Sig.	0.002	0.000	0.001	0.010	0.000						
NorthWest	Coef	-.107**	-.132**	-.120**	-.089**	-.150**	-.118**	1.000				
	Sig.	0.000	0.000	0.000	0.001	0.000	0.000					
Scotland	Coef	-.075**	-.092**	-.084**	-.062*	-.105**	-.082**	-.107**	1.000			
	Sig.	0.005	0.001	0.002	0.020	0.000	0.002	0.000				
Wales	Coef	-.071**	-.087**	-.080**	-.059*	-.100**	-.078**	-.101**	-.071**	1.000		
	Sig.	0.008	0.001	0.003	0.027	0.000	0.004	0.000	0.008			
West Midlands	Coef	-.097**	-.119**	-.108**	-.080**	-.135**	-.106**	-.138**	-.096**	-.091**	1.000	
	Sig.	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001		
Yorkshire Humber	Coef	-.094**	-.116**	-.105**	-.078**	-.132**	-.103**	-.134**	-.094**	-.089**	-.121**	1.000
	Sig.	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.000	

Note. *, **, and *** are statistical significance at 10%, 5% and 1% respectively. Listwise N = 1399 Source: Own elaboration using SPSS program. Database BES 2017 – face to face survey.

Table IV.*Probit model with Leave as dependent variable.*

Variables	1	2	3
Regions			
East Midlands			-.087 [.172]
Eastern	.183 [.148]	.1149 [.154]	.032 [.156]
London	-.263* [.154]	-.289* [.161]	-.254 [.165]
North East	.147 [0.185]	.009 [.190]	-.041 [.192]
North West	.021 [.139]	-.051 [.146]	-.112 [.148]
Scotland	-.038 [.164]	-.182 [.170]	-.206 [.173]
South East	.397 [.139]	.062 [.145]	.329 [.149]
South West	.179 [.157]	.123 [.163]	.100 [.166]
Wales	.072 [.169]	-.007 [.175]	-.071 [.171]
West Midlands	.203 [.146]	.140 [.151]	.077 [.154]
Yorkshire & Humber	0	0	0
Age		.001 [.002]	-.001 [0.002]
Gender		-.134 [.071]	-0.158** [0.734]
Qualifications			
No Qualifications		0	0
Low Qualifications		-.0944 [.104]	-.097 [.106]
High Qualifications		-.568*** [.103]	-.491*** [.106]
Income			
Low Income		.110 [.119]	.099 [.120]
Middle Income		-.162 [.119]	-.149 [.120]
High Income		-.547***	-.497***

Variables	1	2	3
		[.125]	[.127]
Twitter			-.266***
			[.103]
Facebook			.083
			[.084]
Newspaper			
GuardianObserver			-0.745***
			[0.131]
DailyMail			0.427***
			[0.124]
Constant	.128	.643	0.771
	[.104]	[.213]	[0.259]
Total Obs.	1399	1399	1399
Pseudo R2	0.0073	0.0823	0.1147
LR chi2(10)	13.96	157.25	219.24
Prob chi2	0.1749	0.0000	0.0000

Note. Own elaboration, using Stata program. All Probit models are estimated by maximum likelihood.

The dependent variable is Leave. *, **, and *** are statistical significance at 10%, 5% y 1% respectively.

The standard deviation is in brackets.