4 Automated text analysis of Eurosceptic publications
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4.1 Introduction

The study aims to gain insights into the stance of Greek media towards the European Union by analyzing large volumes of data from various websites. It seeks to identify and examine publications that express a negative attitude towards the EU. It's first goal is to measure the polarity of Greek media towards the EU, classify them as either Eurosceptic or not Eurosceptic. To achieve this goal, the study will utilize automated text analysis methods, which provide the capability to extract and analyze large amounts of data efficiently. The text analysis will include word frequency counting, sentiment analysis, and topic modeling analysis. These methods will enable the study to determine the topics that Greek media refer to when discussing the EU and to assess their overall tone and sentiment towards the EU. The second and main goal of the study is to create a new small lexicon, that is going to be used with automated methods for easier detection of possible Eurosceptic publications. Additionally, the study will highlight any gaps or needs for future research on the position of Greek media towards the EU. By providing a comprehensive analysis of the stance of Greek media towards the EU, the study aims to contribute to the existing literature on media and its role in shaping public opinion.

4.2 Understanding Euroscepticism

The term "Eurosceptic" dates back to the mid-1980s in the United Kingdom and, in its simplest form, refers to someone who is opposed to the powers of the European Union (EU) (Brack & Startin, 2015). After the Maastricht Treaty of 1992, EU evolved by establishing European citizenship, allowing citizens to reside in and move freely between Member States and introducing a common foreign and security policy. Euroscepticism evolved as well, because the discussions over the Treaty focused public debate "on the extent to which member states were in the process of transferring what had formerly been considered sovereign national powers to the supernational level" (Gower, 2013, p. 74). More recently, with the advent of the Eurozone crisis, Euroscepticism has become increasingly "integrated" into European nation-

states, putting Europe's elites under increasing pressure on the future direction of the EU (Boomgaarden et al., 2011). This can be clearly seen at various levels: the development of European public opinion that has become more hostile to the EU, support for the parties opposed to further European integration, an increase in Eurosceptic rhetoric among traditionally pro-European parties; an increase in the number of Eurosceptic civil society groups and changing (and more provocative) debates in the media (Brack & Startin, 2015). The literature defines Euroscepticism as "the possible objection, as well as the complete and unreserved objection to the process of European integration" (Taggart, 1998).

Szczerbiak and Taggart (2004) argue that Euroscepticism involves two different forms of opposition to European integration: 'hard' and 'soft' Euroscepticism. Hard eurosceptics reject the idea of EU membership, meaning they do not want to be part of such a Union. On the other hand, soft eurosceptics are generally in favor of European integration, but oppose a specific policy in the context of the integration process or oppose it with the incentive to maintain the national interest in a particular area. Kopecky and Mudde (2002) propose an alternative classification for Eurosceptic trends in Europe. In this context, they differentiate between soft and hard Eurosceptics, promoting two dimensions that divide citizens into four new categories: Europhilics and Europhobics (depending on the level of support for European integration) and optimists/pessimists about the European Union (depending on their attitude towards current and future EU orientations as a state).

As examples, Kopecky and Mudde bring Jean Monnet and Margaret Thatcher. They state that Jean Monnet's thoughts on the process of European integration, written in the 1960s, represent a clear European position. For them, Jean Monnet believed in European integration for political and economic reasons, with the former perhaps being the most important factor in his thinking. However, according to Kopecky and Mudde, the former British Prime Minister Margaret Thatcher also had a Euro-friendly position. Thatcher believed that the main advantage of the European Union was mainly on economics and trading, because it was aiming for the creation of an economic zone without restrictions on trade and other commercial activities. On the other hand, even though Thatcher believed in the main principles of the

European Union, she considered that the minimal and voluntary cooperation between states is the best way of European integration, rather than immediate great changes that would cause great shifting of power from the states to the European Union. (Kopecký & Mudde, 2002, p. 301).

Europhobics do not support (and often oppose) the general ideas of European integration that govern the EU; they take this position because they may be nationalists or socialists, in favor of isolating their state from the rest of the world, or simply because they believe that the idea of European integration is absurd in the face of the diversity (and thus incompatibility) that exists between European states. At first sight, this position can only express the minority, especially in modern Europe. Even nationalists will often express some support for the idea of cooperation between European countries, but what is important in this respect is that they do not support one or more of the ideas on which European integration is based (Kopecký & Mudde, 2002).

It should be noted that the sub-categories of Euroscepticism have been made mainly to categorize the stances of EU member- states towards European issues. Researchers interested in Euroscepticism, in the countries applying to become members of the European Union, have failed to develop new models and frameworks, and have often tried to replicate the same categories (Taggart & Szczerbiak, 2004). However, there are serious limitations in this methodology; for example, Szczerbiak and Taggart (2008) in their definition of the characteristics of the category of "hard eurosceptics" refer specifically to "parties that believe their countries should withdraw from European Union membership". However, as the candidate countries are not yet members of the European Union, it is not possible to think that the political parties would ask their countries to leave the European Union's membership. Instead, they will ask to withdraw their candidacy. Kopecky and Mudde typology to the candidate countries is even more problematic. For example, the definition of Eurosceptics as Europhilic and pessimistic of the European Union makes no sense if it is a candidate country, as if a country is pessimistic about current or future EU forecasts, why should it seek to join the European Union in the first place?

4.3   Euroscepticism in Greece

Greece joined the European Economic Community (EEC) as its 10th member in January 1981, after a long-standing relationship with the organization. It started back in 1959 when the Greek government submitted its application to become a member of the EEC. This led to the signing of the Athens Association Agreement in 1961, which came into effect in 1962. The agreement aimed to create a customs union between Greece and the EEC, and also involved the alignment of specific economic policies, particularly those related to agriculture. However, due to the 1967 military coup, the process of Greek membership was put on hold. It wasn't until the fall of the dictatorship in 1974 that the process was reactivated and Greece finally became a member of the EEC in 1981 (Vasilopoulou, 2018).

On June 12, 1975, Greek Prime Minister Konstantinos Karamanlis, who led the New Democracy party, submitted the country's EEC membership application. New Democracy tied the membership to modernization, protection from communism and Turkey, stability, and democratization. The Center Union supported this policy, but Karamanlis' decision faced opposition from within. The Communist Party of Greece called for withdrawal from the Association Agreement. PASOK, which was established in 1974 and gained power in the following decade, held a more critical stance on EEC membership, seeing it as serving capitalist and imperialist interests that threatened national sovereignty. (Vasilopoulou, 2018, p. 313).

Since the start of the 2008 economic crisis, Greece has been at the forefront of multiple crises in Europe. The country was one of the protagonists of the eurozone crisis and was often described in international media as the "sick man of Europe". The economic crisis in Greece not only raised the future of this currency, but also the country's accession to the monetary union (Pagoulatos & Triantopoulos, 2009). The country was also one of the front-line states during the refugee crisis, due to its proximity to mission areas such as the Middle East and North Africa. Greece was criticized for failing to provide adequate reception facilities, despite receiving European Union (EU) funding for them (Vasilopoulou, 2018).

Greece, as one of the countries that during the crisis had to readjust its budget program three times with three different memoranda, was marked by the rise of euroscepticism. Greece entered a period of terrible political instability with successive cooperation governments and experienced an "electoral earthquake" with successive elections in May and June 2012, with the dominant division now becoming the "Memorandum - Anti-memorandum", with the parties of the Memorandum bloc identifying themselves as pro-European, while the parties of the anti-memorandum bloc were divided into anti-European and euro-skeptical.

The study by Andreadis, Poletti, Teperoglou and Vezzoni (2014) shows how citizens assess their country's participation in the European Union and how they perceive its benefits. The presentation concerns Greece (1981-2013) and Italy (1973-2013) and has drawn its quantitative data from the Eurobarometer. In this survey, it seems that more than 50% of Greek citizens in November 2011 thought that Greece had not benefited from its membership in the European Union, while 30% of those surveyed thought the European Union was bad for the country.
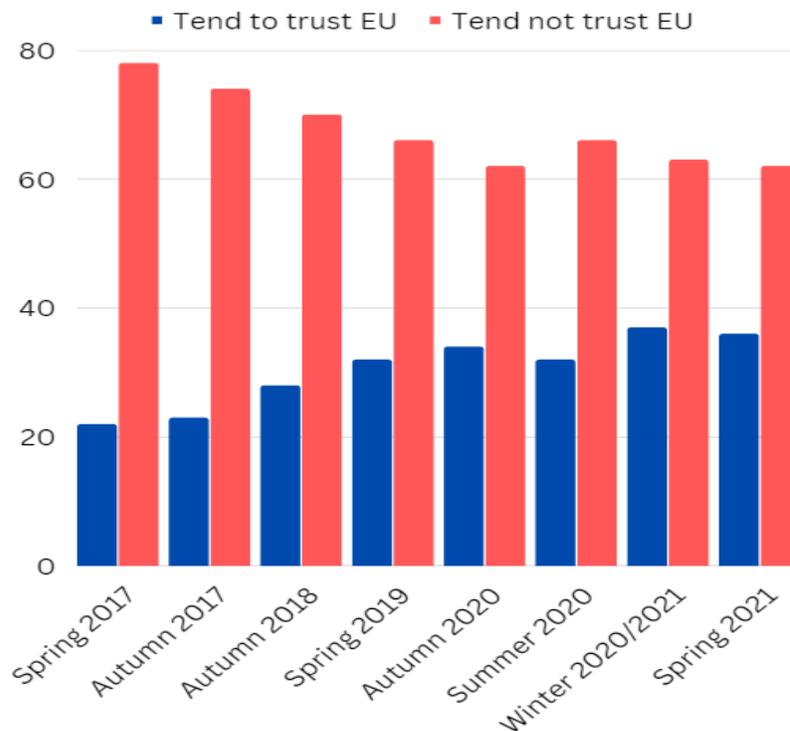

Figure 4-1 Tend to trust EU

The latest available data on citizens' trust in the European Union, presented by the Eurobarometer, shows a rising trend of Greek citizens' trust in the EU, although most Greek citizens still don't trust the EU. The data listed relates to the period from spring 2017 to spring 2021 (Figure 4-1).

4.4 Methodology

As stated above, the objective of the study is to understand the views of Greek media towards the European Union by analyzing a large amount of data from various sources. The focus is on finding and analyzing articles that show a negative perspective. The first objective is to determine the orientation of the Greek media towards the EU by classifying them as Eurosceptic or non-Eurosceptic. The study will use automated text analysis techniques, which are capable of quickly processing large amounts of data. These techniques include word frequency, sentiment analysis, and topic modeling analysis. The study will use these methods to understand the topics discussed by Greek media regarding the EU and to evaluate their overall tone and sentiment towards the EU.

The survey included 20 Greek websites. All websites host content of political news and articles have a Pan-Hellenic character (so they are not local media in the province or specific areas on the urban web of the country), they consistently achieve over 50,000 views monthly (so they have relative readership). Additional criteria for the selection of these websites are their association with or non-association with a political space, with the aim of representing all political and party spaces expressed through these websites. The type of websites hosted are two: The first type consists of purely news websites, which have very little editorial content, but which provide a huge amount of political news data in Greece and Europe. The second type of websites includes purely columnist websites, which are free portals for political scientists and ordinary citizens, which have a respectable number of political articles, whether they are analysis articles or opinion articles.

Web scraping is a solution for those who want to access structured web data in an automated way. The process of gathering structured web data in an automated way is called

Web scraping or web data extraction. In general, data extraction from websites is used by businesses and individuals who want to make use of publicly available web data to improve decision-making. Web scraping uses intelligent automation to retrieve numerous data points from the Web. There are various web scraping techniques currently available, ranging from simple ones that require human effort, to fully automated systems (Vargiu & Urru, 2012).

In politics, Web Scraping is a primary data analyst tool for collecting and understanding data on voter beliefs, demographics, general information of constituencies and analysis of election results. By analyzing data, it is possible to understand how to reach out to the political public and attract voters, which is extremely important for political campaigns. Vargiu & Urru report that usually, data sets containing such information are bought by political parties and politicians, or even by companies interested in promoting specific values to create their brand on the market.

Text mining is defined as the compilation of data in text format (Grimmer & Stewart, 2013). The processing and analysis of this data is called text analysis. Unarranged data sets can be described as "confused" since their data has not been "cleaned and sorted" to allow processing. Tidy data sets provide a standardized way to link the structure of a data set (its physical layout) to its semantics. Most statistical data sets are dataframes consisting of rows and columns, while a single data set can be structured in many ways (Robinson & Silge, 2017).

The tidy text format is defined by Julia Silge and David Robinson (2017) as a matrix with one token per series. A token is a substantial unit of text, such as a word, that we are interested in using for analysis, and tokenization is the process of dividing the text into tokens. This structure of a token per series contrasts with the ways that text is often stored in current resolutions, perhaps as strings or in a document matrix. In the case of tidy text mining, the token stored in each series is usually a word, but can also be a n-gram, sentence, or paragraph.

Nowadays, many of the research studies in the social sciences (and hence in politics) use a large amount of information, which is displayed in the form of text. The enormous

amounts of information coming from either the parties, the media, or the electorate, that is, the daily users of the Internet, offer opportunities for research and comparative study of current political issues. The researcher now, through automated text analysis and the development of automated methods, more easily analyzes. Automated analysis of the texts is a method that helps to study huge documents concerning politics, which used to take several hours of work to be studied. Therefore, there is an excellent contribution of big data ("big data") and text analysis ("text analysis") in the field of social sciences (Grimmer & Stewart, 2013).

In a more general context, sentiment analysis and opinion mining are the field of study that analyzes people's views, feelings, assessments, attitudes, and emotions from the written language; it is one of the most active areas of research in natural language processing and is also widely studied at data mining, web scraping, and text mining. In fact, this research has spread outside computer science to management sciences and social sciences because of its importance to business and to society as a whole. The growing importance of analyzing emotion coincides with the development of social media such as reviews, discussions in forums, blogs, micro-blogs, Twitter, and social networks. For the first time in human history, massive volumes of opinion data are available, recorded in digital format for analysis. Systems of emotion analysis are applied in almost every business and social field because viewpoints are present in almost all human activities and are key factors affecting our behavior. Our beliefs and perceptions about reality, and our choices, depend very much on how others view and evaluate the world. For this reason, when we must make a decision, we often seek other people's views. This applies not only to individuals but also to organizations, whether political, social, or economic (Liu, 2012).

When people read text, they use their understanding of the emotional tone of the words to determine if a portion of the text is positive, negative, or has some other sentiment like surprise or disgust. Text mining tools can be used to analyze the emotional content of text. One method of analyzing the sentiment of text is to consider it as a combination of individual words, with the overall sentiment of the text being the sum of the sentiment of each word. This is not

the only way to perform sentiment analysis, but it is a commonly used approach and can be easily accomplished using tidy data editing tools (Westland, 2020).

The web scraping method often results in large collections of text, such as blog posts or news articles, that need to be divided into natural groups for easier editing and understanding. Thematic modeling or topic modeling, as described by Robinson & Silge (2017), is an unsupervised way to sort these documents, similar to clustering in numerical data. Latent Distribution (LDA) is a popular method for topic modeling. This approach views each document as a mixture of topics and each topic as a mixture of words, allowing documents to overlap in content rather than being in separate groups. This reflects the natural language use. The principles of tidy data can be applied to topic modeling using the same tidy data editing tools. We can use the principles of tidy data, to approach topic modeling (Petropoulos & Siakoulis, 2021).

4.5   Data mining and Text analysis

In the first stage of the process, a test was conducted on each of the 20 websites to determine whether their content is available for web scraping. The choice of thematic posts was completely random, as the purpose was to determine whether it was possible for each website to become a "download" in content and the format of the content after its introduction on Rstudio.

The purpose of the code was to scrape the homepage and the specific tab related to the tag "European Union" on each website. During this process, differences in the construction of the websites and how they allowed their data to be extracted were identified. The most common issue encountered was the variation in URL addresses, as some websites used absolute URLs while others used relative URLs, which hindered the data-mining process. To overcome this, all relative URLs were converted to absolute URLs to facilitate the data extraction.

In the context of data analysis, it is considered necessary to include certain words, such as articles, links, individual letters of the alphabet, and everyday language, as these terms frequently appear in speech and can affect the frequencies of other important words being

analyzed. Furthermore, the data must be cleaned of words or phrases that are commonly used by media as a means of engaging with their audience, such as "follow us on social media for the latest updates" or "subscribe to our newsletter" and "write us your opinion in the comments." Additionally, the extracted texts must also be cleaned of any odd characters or HTML code that may have been extracted during the sampling process, such as "/r" or html code from websites.

The data for each sampling was then analyzed individually for the polarity index. Specifically, the texts were separated from all the publications taken from the original pages, and a polarity analysis was conducted. A similar analysis was also carried out on the publications in the "European Union" tab. Finally, the difference in the polarity index between the publications in the original pages and those in the "European Union" tab was calculated. It should be noted that the placement of the websites between the texts of their original page and the texts from the special "European Union" tab becomes more negative in the publications for the second sampling than for the first.

Table 4-1 Website Polarity Index

Media	1st Sample Diff	2nd Sample Diff
AthensVoice	-0,11	-0,125
Avgi	-0,15	-0,134
Documento	-0,28	-0,152
Efsyn	0,28	0,017
Enikos	-0,18	-0,187
iefimerida	0,04	0,04
in	-0,13	-0,113
Kathimerini	0,02	0,281
LastPoint	-0,11	-0,316

Makeleio	-0,13	-0,276
Nea	-0,09	0,064
News247	-0,05	-0,114
Newsbeast	-0,32	-0,114
Newsit	-0,19	-0,175
OfflinePost	0,02	0,161
PollsandPolitics	-0,1	-0,031
Proto Thema	-0,06	-0,114
Real	-0,03	-0,096
Skai	-0,11	-0,059
Vima	0,06	-0,091

In Table 4-1, we show the differences in the positioning of the polarity index per website between the home page and the specific tab with the tag 'European Union' for each sample. The websites are not strongly polarized against the European Union, but most of them adopt a slightly negative position in polarity.

Then, only the texts that contained words with the roots "euro," "Europe," and the abbreviations "EU" or "E.U." were isolated, so that sentiment analysis could be performed on all of the texts of each instrument. To accurately compare the emotions (Sadness, Happiness, Fear, Disgust) across the media, we created a new index that ranges from 1 to 5. The closer the index is to 1, the less emotional the content of the current media is, while the closer it is to 5, the more emotional it is (Figure 4-2).
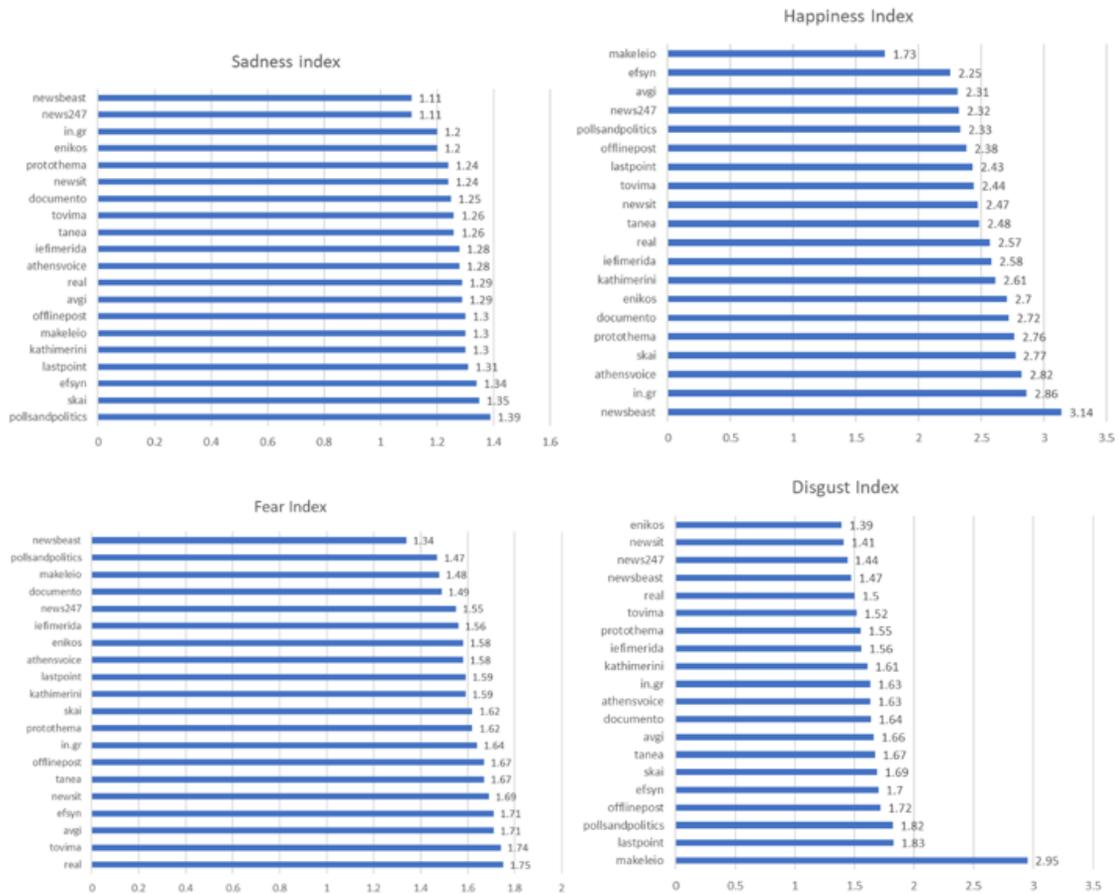
Figure 4-2 Sentiment Analysis Index by website

A topic modeling analysis was then performed on all the texts obtained from the media. After several tests, it was determined that the number of topics that can be accurately identified to analyze the extracted texts is 4. The reason for choosing this number is that it allows for the direct identification of the topics discussed in the texts extracted from the internet. Additionally, it was determined that it was not sufficient to only analyze the main text of the articles, the titles of the articles needed to be included as well in order to properly categorize the terms by title rather than by their position in the dataset (Figure 4-3).
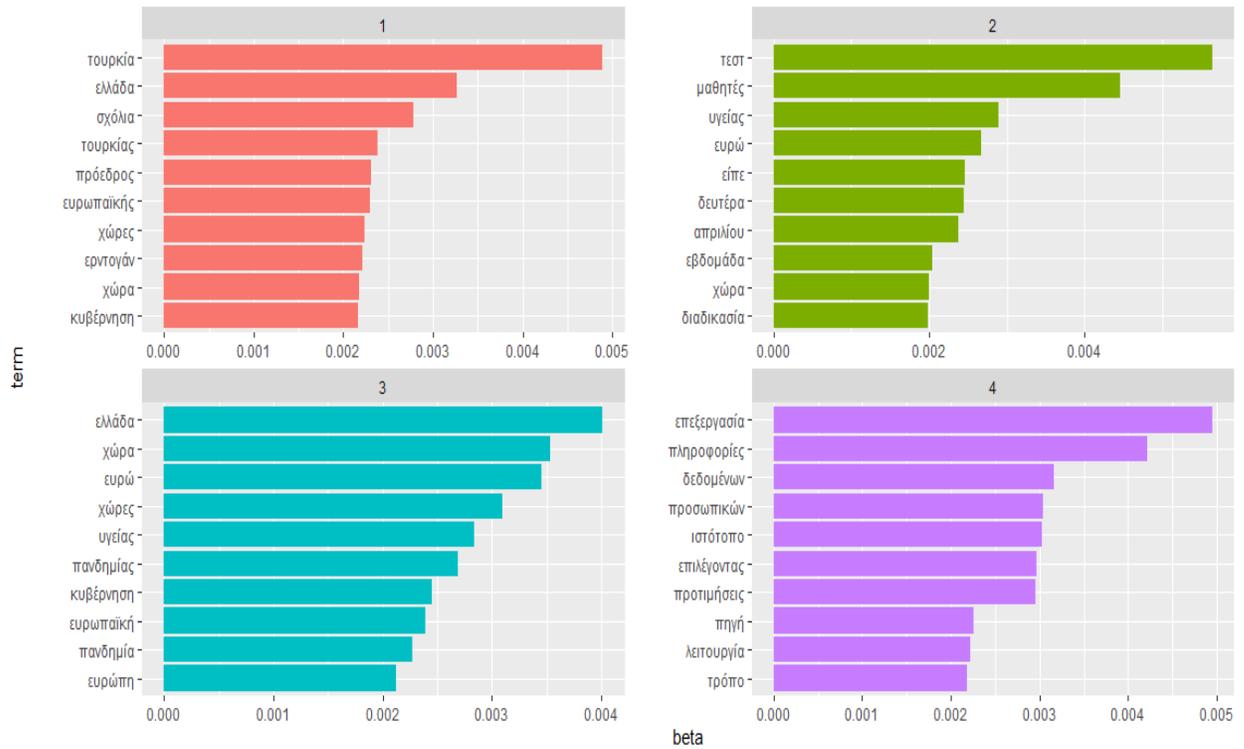
Figure 4-3 Topic modeling: List the top 10 words by subject based on LDA analysis
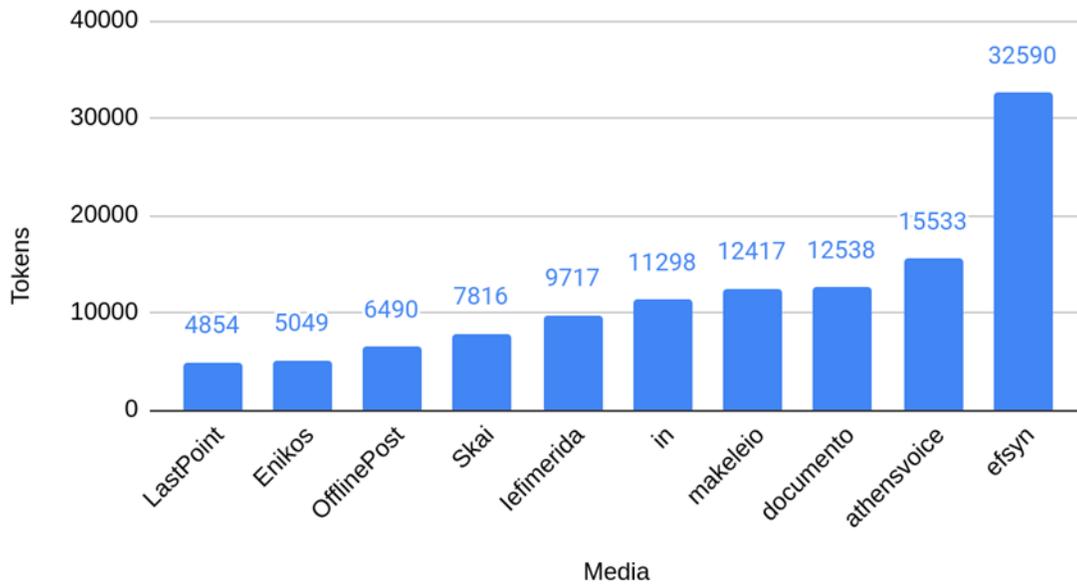

Figure 4-4 Number of tokens per media for the 10 media with the most tokens on this theme

Only the texts relating to "Europe and Covid" and "Turkey, Europe and Greece" were subsequently isolated for further analysis. These texts were converted into tokens per website, to study the presence of websites by subject. In particular, the presentation of the 10 websites with the largest presence per theme was selected. The number of tokens per website was counted, in each of the 2 themes selected for further analysis. The possible definition of the presence of websites by subject is an interesting element, which could help the overall effort to classify websites as positive or negative towards the European Union (Figure 4-4 and Figure 4-5).
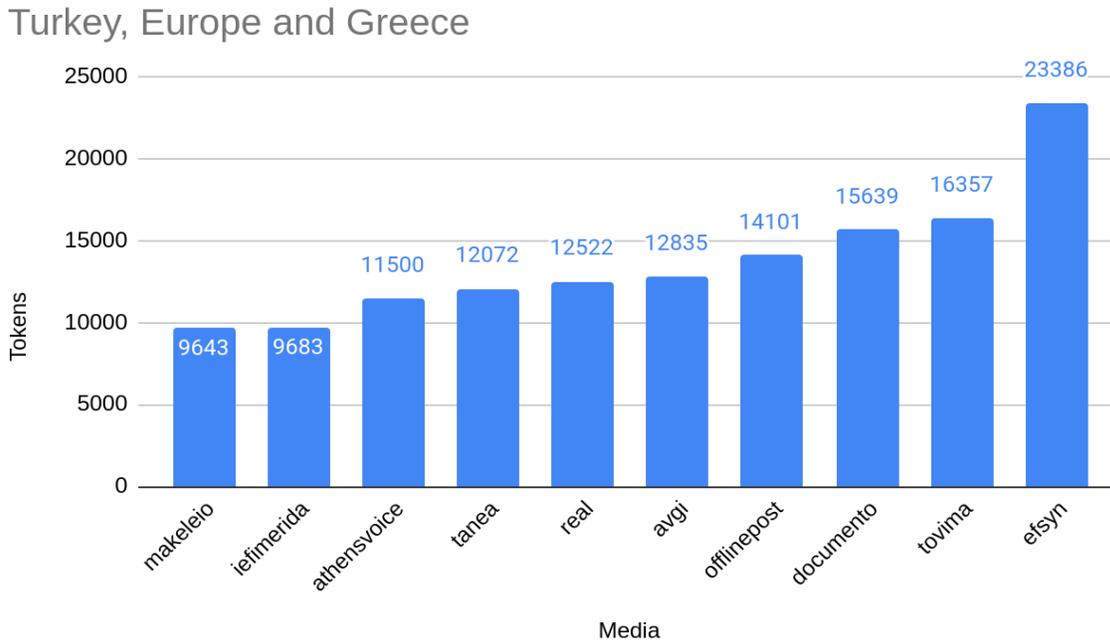
*Figure 4-5 Number of tokens per media for the 10 media with the most tokens on this theme*

A comparison was then made between the two themes in the polarity indicators. On the right-hand table comparing the polarity of the two themes, we see that the media are positioned slightly less favorably when they publish texts on Greek-Turkish relations than on texts related to the coronavirus pandemic (Figure 4-6).
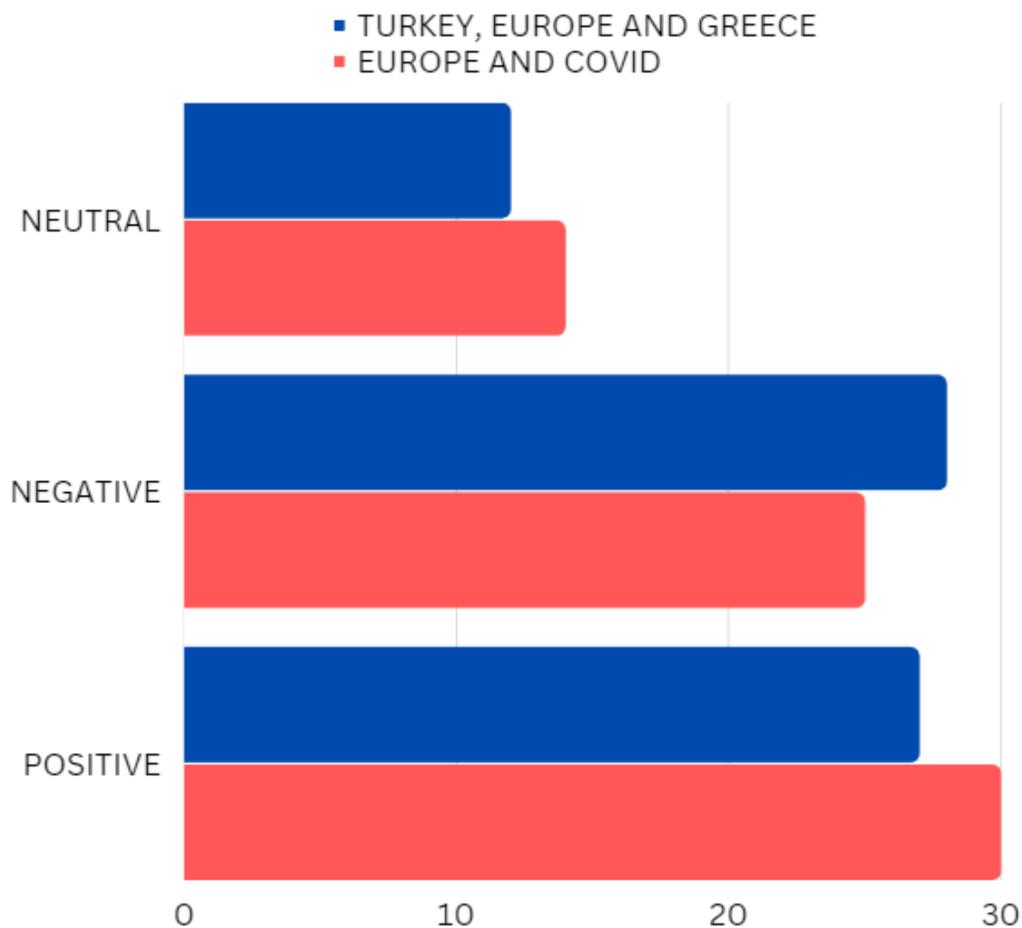
Figure 4-6 Polarity Index by Topic

A comparison was then made between the two themes in the sentiment indicators. For their correct comparison, equivalent weighted sentiment indices were used as before. Similarly, the index ranges from 1-5 (Figure 4-7).
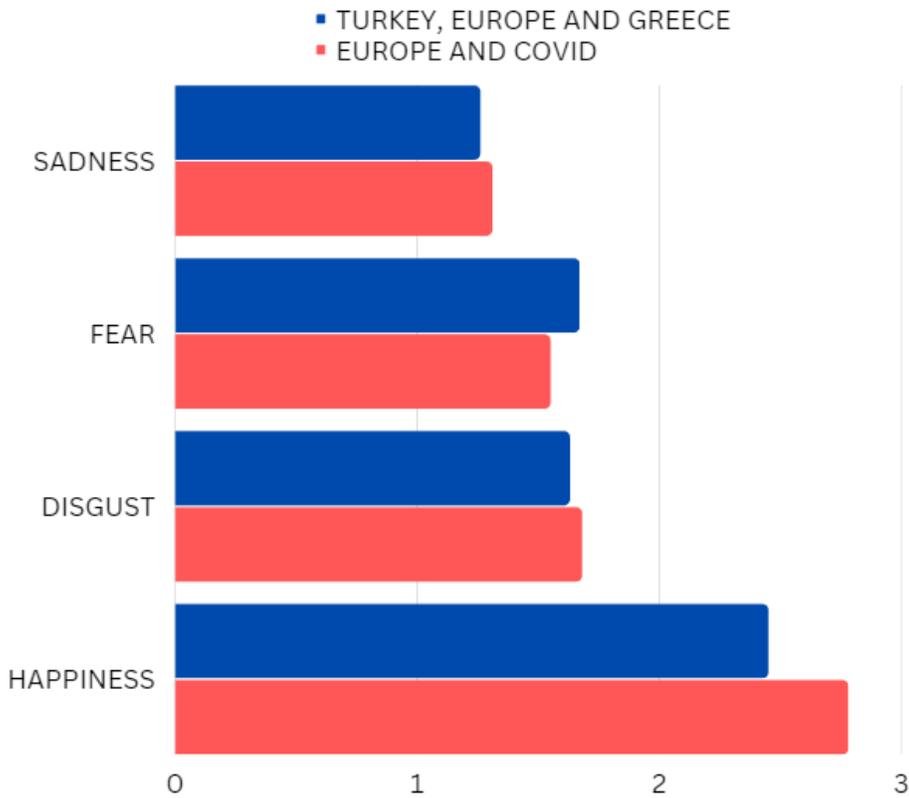
Figure 4-7 Sentiment Analysis by Topic

Figure 4-8 Word cloud (Most negative words - Turkey, Europe, and Greece)

Then, an attempt was made to isolate words with a negative polarity index, by subject matter, to determine which specific words gave a negative character to the texts of the subject matter. Some of these words for the topic about Turkey, Europe and Greece are crisis, weight,

discontent, deprivation, blood, hatred, dogma, mania, indignation, mercy, horror, tension, pressure, mafia boss (Figure 4-8). On the other hand, some of these words for the topic about Europe and Covid are weight, blood, indignation, despair, clinical, horror, eruption, crisis, hunger, loneliness, mania, and pressure (Figure 4-9).

Figure 4-9 Word cloud (Most negative words - Europe and Covid)

4.6   Creating a new lexicon

During the first stage of the study, texts were isolated based on the total number of negative words they contained. In addition to automated identification of texts, we have performed a qualitative assessment of the texts to select those that specifically criticized the European Union and not just those that criticized a person or political party within Greece.

The dictionary was then sorted into 60 words using the following criteria:

- The word must refer to any name of a political person or state which is often found in texts with a negative attitude towards the European Union
- The word should refer to an incident which has become widely known with negative publicity towards the European Union
- The word causes the reader to feel negative

- The word has to be a negative rating for person or condition
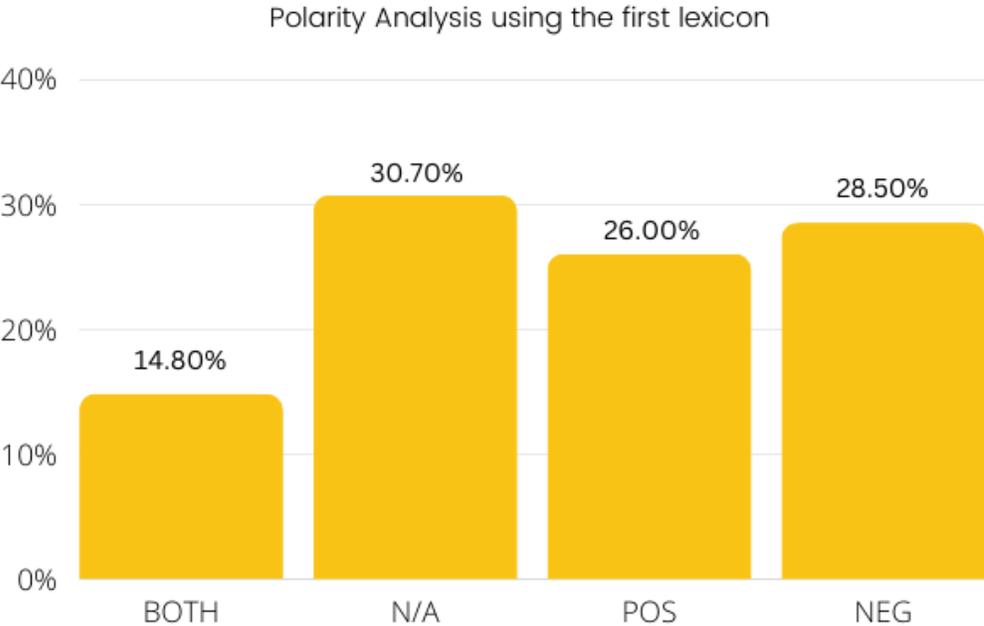
*Figure 4-10 Polarity analysis using the first lexicon*
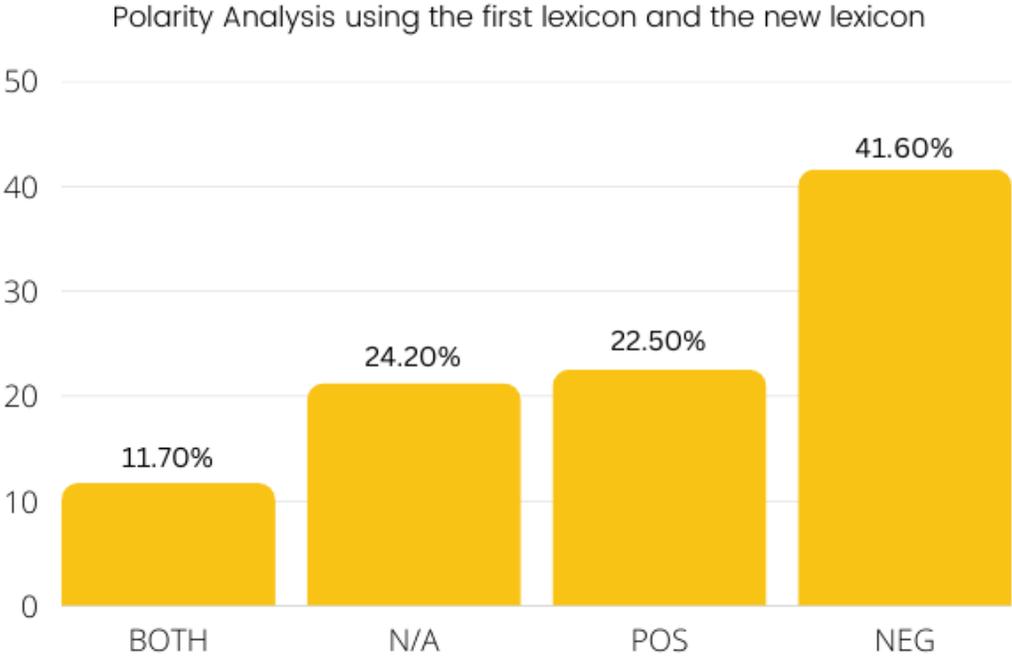
Figure 4-11 Polarity Analysis using the first lexicon and the new lexicon

In order to understand the efficiency of the use of the new lexicon, a comparative sentiment analysis was carried out between the set of words in all the texts that have been drawn up. The first classification was carried out with the basic dictionary (Figure 4-10) while the second classification was carried out after adding the new dictionary to the basic dictionary (Figure 4-11.)

4.7   Concluding remarks and discussion

This study confirmed the usefulness of analyzing large volumes of data by efficiently collecting and analyzing a large number of publications from various websites. The findings showed that media outlets tend to have a positive stance when discussing the European Union on their homepage, compared to articles specifically tagged as "European Union." The texts in the second sample were found to be more negatively positioned than those in the first sample, suggesting a negative emotional tone when a media source discusses the European Union. The media outlets were found to have a balanced emotional tone when discussing Europe in general.

Theoretical analysis of the results suggests that, based on Szczerbiak and Taggart's view, the media outlets analyzed are primarily "soft" Eurosceptics, opposing specific policies in the context of the integration process or expressing opposition to protect national interests. The only exception is makeleio.gr, which is classified as "hard" Euroscepticism, with direct labeling of Greek politicians as "old-traitor" and "genitsarist." The media's support for politicians Orban, Le Pen, and Salvini, known for their anti-immigration stance, shows their preference for parties opposed to the European Union's central immigration policy. Based on Kopecky and Mudde (2002), makeleio.gr is labeled as "Europhobic," while the remaining media outlets are labeled as "Eurofriendly," with significant elements of pessimism towards the European Union's future role as a state.

The most important conclusion of this research is that the negativity of the media outlets analyzed is almost monothematic, but with significant differences in the perspective of criticism. Topic modeling confirmed that the two EU-related topics discussed were "Turkey,

Europe and Greece," and "Europe and covid." The media had a slightly more negative stance when discussing Greek-Turkish relations and a slightly more positive stance when discussing the coronavirus pandemic. The media had a similar attitude in emotional indicators when discussing these topics. Most of the media outlets, which were critical of the European Union, were found to be more humanitarian, supporting better treatment of refugees and migrants and sanctions against Turkey and Belarus to protect human rights. Makeleio.gr, on the other hand, criticized the European Union for tolerating constant migration flows and supported Salvini and Orban's hardline immigration policy. The media also criticized the European Union for disagreement among states on vaccine distribution and financial aid allocation.

Currently, there is no research on automated abstraction and text analysis to determine the position of Greek media on the European Union, particularly Eurosceptics. This work aims to provide an initial mapping of this field and its challenges for researchers, who faced a lack of a topic-based lexicon to immediately determine the placement of a text referring to the European Union. This issue is of significant importance for the development of automated text analysis in Greek.

The comparison of the fear index between the two topics revealed that texts about the European Union-Greece-Turkey had a higher fear index than those dealing with the European Union-coronavirus. This suggests that the media may be more fearful of a consolidated situation like Greek-Turkish relations than of a massive and largely unknown situation like the coronavirus pandemic. This finding could provide a basis for future research on the media's position on Greek-Turkish relations and the causes of their fear of this issue. The topic modeling also showed that the Greek media does not have a significant range of topics, but is almost monothematic, which limits the ability of researchers to analyze the media's position on a range of issues, but also allows for significant analysis of the specific communication stimulus emitted into the public and its implications.

Acknowledgements

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