

News Sentiment in Destination Countries and Migration Choices: Evidence from Libya

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ABSTRACT

This paper examines the impact of changes in the sentiment of migration-related news in destination countries on migrants' movement choices in Libya, the most important gateway to Europe. Using data on news from all destination countries and geo-localized data on migrants in all the IOM-Flow Monitoring Points (FMPs) in Libya, we show that a more negative tone in the news coverage in migrants' preferred destinations increases the length of their stay in Libya, thereby hindering the pace of their migration journey. The effect is significant solely for migrants originating from Western African countries and situated in FMPs located in the western part of Libya, or in locations where they are more likely to have access to the news. The change in news tone, in contrast, exhibits no impact when the economic conditions in the destination country are highly favorable, or when the prevailing tone of migration-related news is already predominantly negative. Finally, we demonstrate that a deterioration in the news tone does not induce migrants to return to their country of origin. Instead, it prompts them to redirect their migration trajectory toward another destination country.

Keywords: Migration, news sentiment, GDELT, Libya, Europe

JEL codes: F22, J61, L82.

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Contents

1	Introduction	2
2	Literature	4
3	Migration in Libya	5
4	Data	7
4.1	Migration data	7
4.2	News articles data	8
4.3	Other data	10
5	Empirical strategy	11
6	Results	12
6.1	Main results: News tone and migrants' movements	12
6.2	Robustness	16
6.3	Heterogeneity	19
6.3.1	Country of origin and FMP location	19
6.3.2	Type and numerosity of migration news	19
6.3.3	Economic conditions in destination countries	22
6.4	Additional results: News tones and spillover effects across destination countries .	23
7	Concluding remarks	25
A	Appendix: Additional tables	32
B	Appendix: Additional figures	35
C	Appendix: Migration in Libya - Additional information	38
D	Appendix: Robustness - Spatial Analysis	40

1 Introduction

Migration is one of the most politically polarizing issues in advanced countries. This polarization is evident in the markedly different way through which the news portrays migration and its effects. While there are a number of studies looking at how migration-related news articles impact opinions and votes in destination countries¹, little is known about how the sentiment of news articles influences migration flows toward these countries. Addressing this question has taken on heightened significance given the recent surge in the adoption of unfavorable rhetoric in political messages from populist leaders, which aim to dissuade migrants from seeking entry into Europe or the United States.²

This paper contributes to filling this gap by studying how changes in the sentiment of migration-related news published in migrants' preferred destination countries affect their movements in Libya. Libya is the country with the largest number of international migrants in all of North Africa and a major gateway to Europe from Africa.³ By showing to what extent changes in the tone of news articles in destination countries impact the choices of migrants in Libya, we contribute to a better understanding of the determinants of the movements of migrants within an important destination and transit country and along one of the most important irregular migration routes to Europe.

Our analysis combines two main data sources. First, we use data on irregular migrants in Libya produced by the International Organization for Migration (IOM). In particular, we use geo-localized monthly data collected by the IOM in 167 Flow Monitoring Points (FMPs) in Libya during the period 2017-2020. For each FMP, we have information on the country of origin of the migrants located in the area, their preferred countries of destination, and their length of stay at the FMP. Second, we use data on the tone of migration-related news articles published in any of the destination countries of the migrants at the FMPs in Libya. The news articles data are taken from the Global Database of Events, Language, and Tone project (GDELT).⁴

¹See for instance, [Benesch et al. \(2019\)](#); [Meltzer et al. \(2021\)](#); [Couttenier et al. \(2023\)](#); [Djourelouva \(2023\)](#)

²An example of this is the message by the Italian Prime Minister Giorgia Meloni on September 16th 2023, see <https://youtu.be/gFrSJyF7xfU?feature=shared> or that of Florida Governor Ron DeSantis <https://www.foxnews.com/politics/desantis-warns-migrants-bused-texas-dc-florida-do-not-come>

³One important reason why Libya is the preferred transit country to Europe is because of the lack of border and internal controls that characterize the country since the beginning of the Civil War in 2011.

⁴GDELT represents a rich source of information to study migration coverage in the news. This database captures and analyzes events worldwide. In particular, it registers and codifies many global events and the sentiment connected with their coverage, by collecting all online news released every 15 minutes, machine-translating them into English, and categorizing each piece of news by subject, sentiment and tone, location, and entity (organizations and individuals), among other things.

We study the effect of changes in the sentiment of migration-related news in migrants' destination countries on their movements in Libya. Our results show that a heightened negative tone in the news in destination countries increases the share of migrants opting to stay in the FMPs in Libya for an extended duration. Because migration flows in Libya tend to be unidirectional (i.e. most of migrants move from South to North, toward the coast from where they may cross to Europe)⁵, we interpret the effect of the news tone on migrants' movements between FMPs within Libya to be also informative of its effect on their migration journey. In particular, our interpretation of the result, which suggests that a deterioration in the news tone leads to prolonged stays in FMPs, implies that a more negative sentiment in migration-related news prompts migrants to delay their journey, as they await improved conditions in destination countries.

To validate these results, we conduct two placebo tests and we provide suggestive evidence indicating that the impact of news tone is more pronounced in areas where migrants are more likely to have access to the internet. We also show that our results are robust to a number of checks including: alternative ways of measuring the sentiment of the news; alternative samples; increasingly demanding regression specifications, and the use of spatial regression analysis to account for spatial autocorrelation in migrants' movement choices. Next, we characterize the conditions under which migrants are more likely to be affected by changes in the news tone. Results indicate that the effect of the news tone on migrants' decisions is larger for whom, where, and when we expect it to be so, corroborating our interpretation of the empirical results. In fact, heterogeneity results show that the worsening in the news tone slows down the migrants' movements in Libya only for those coming from West African countries (who usually make a step-by-step journey to Europe) or who are located in the West part of Libya (i.e. the part of Libya from which most of migrants are transiting), when the migration-related news articles are more numerous and mostly positive, or when economic conditions in destination countries are unfavorable.

Finally, we test for the possibility of spillover effects of the news tone across countries. Our findings indicate that as the sentiment of migration-related news declines in a particular country, migrants tend to shift their preference to other countries as their desired destinations. In addition, we find that this substitution does not occur between European and non-European

⁵This aspect of migration in Libya (i.e. migration flows mainly having the same direction) is similar to that of migration from Central American countries toward the U.S., suggesting that our approach can be used in different contexts.

countries. We interpret these findings as suggesting that, while there may be substitution across destinations that are similar, a deterioration in news tone in European countries does not prompt migrants to return to their country of origin.

The rest of the paper is organized as follows. Section 2 discusses the relevant literature. Section 3 provides background information on migration in Libya. Section 4 describes the data. Section 5 presents the empirical strategy and Section 6 discusses the results. Section 7 concludes.

2 Literature

Our paper is related to the small—but rapidly growing—literature looking at the effects of media exposure on migration choices.⁶ A few studies document a positive association between Internet access and migration intentions and aspirations (Pesando et al., 2021; Grubanov-Boskovic et al., 2021)⁷. Adema et al. (2022) uses individual-level data from 112 countries to provide causal evidence that an increase in mobile internet access heightens the desire to migrate and actual migration by lowering the cost of acquiring information on potential destinations. Other studies look at the effect of exposure to other media as well. For instance, Farré and Fasani (2013) find that exposure to TV reduces internal migration in Indonesia. Wilson (2021) shows that exposure to newspaper articles and TV news providing information about potential labor market opportunities increased migration to areas mentioned in the news.

More generally, our paper is related to the literature on the effect of information on migrants’ decisions. For instance, Shrestha (2019) shows that, in the context of migration from Nepal to Malaysia and to the Gulf countries, information on migrants’ mortality rates lowers migration outflows in subsequent months. On the other hand, Baseler (2023) shows that providing information on urban earnings in Kenya increases migration to the capital. Several papers using randomized controlled trials also explore the role of risk information and perceptions in the decision-making process of migrants. Bah et al. (2023) show that providing information and testimonials about the risks of backway migration from Gambia to Europe reduces migration intentions in the five years that follow the information treatment. Similarly, Tjaden and

⁶Another important source of information for prospective migrants is the migration networks in the destination country. Migration networks provide migrants with information about the migration process and economic opportunities which help shaping their migration decision. (Munshi, 2003; McKenzie and Rapoport, 2010; Beine et al., 2015; Giulietti et al., 2018; Bredtmann et al., 2020).

⁷Böhme et al. (2020) propose a measure of migration intentions in origin countries using a Google Trends Index, which reflects aggregate online search intensities for migration-related search terms.

Dunsch (2021) find that peer-to-peer information transmission on the dangers and potential risks associated with irregular migration raised risk awareness and reduced irregular migration intentions in Senegal. Importantly, Bertoli et al. (2020) emphasize that acquiring information about destinations can be costly for migrants. As a consequence, flows from countries where obtaining information is more costly or where individuals have stronger priors are less responsive to variations in economic conditions in destination countries.⁸

Our paper differs from these previous studies in two main aspects. First, this paper is the first to empirically assess the impact of migration-related article news in destination countries on migration decisions. Second, in our analysis, we study the effect of changes in the *content* of migration-related news (i.e., their sentiment), thus improving on previous studies that used metrics for media access and exposure. To the best of our knowledge, we are the first to use this feature of the GDELT dataset to study migration issues.⁹

Finally, our paper, contributes to the small literature on migration in developing countries and in particular in Libya (see, for instance, Di Maio et al. (2023)). At the same time, by providing novel evidence on the determinants and on of timing of the migrants' movements within Libya, it is also related the studies looking at the determinants of the migration flows to Europe (Friebel et al., 2023; Deiana et al., 2023; Battiston, 2022).

3 Migration in Libya

Libya is the country with the largest number of migrants in North Africa. In 2020, Libya hosted approximately 571,400 migrants, which corresponds to 12% of its total population (IOM, 2020; UN-DESA, 2020). Migrants in Libya are very heterogeneous in terms of nationality, background, motivation for migration, and preferred final destination (IOM, 2018b; UNHCR, 2019).

Libya has been an important destination for migrants since the 1970s. For decades, individuals from sub-Saharan Africa, the Middle East and North Africa, and Asia have moved to Libya to work (UNHCR, 2019). During the Gaddafi regime, economic migrants accounted for

⁸There is some evidence that migrants' knowledge of the political orientation at destination influences their location choices. Bove et al. (2022) show that government ideology influences the choice of migration destination, with migration flows increasing when the destination country's government is relatively more left-wing relative to the origin country's government. Bracco et al. (2018) show that the election of an anti-immigration mayor from Lega Nord in Italy resulted in a decline in the number of immigrants entering the same town.

⁹Until recently, GDELT has been mainly used to study macroeconomic or financial aspects (see for instance Bayer et al. (2020); and Consoli et al. (2021)). An exception is Deiana et al. (2023) using the Pope's visit to Lesbos Island in April 2016 and his message about the critical refugee situation to analyze how persuasion modifies beliefs, particularly in the case of messages coming from a charismatic leader.

more than 50% of the total Libyan labour force ([World Bank, 2015](#)).

Since 2011, the security situation in Libya has been critical. The country has experienced a prolonged period of conflict, which started with the fall of the Gaddafi regime and the First Libyan Civil War and continued with the Second Libyan Civil War in 2014.¹⁰ The conflict has transformed the characteristics of the migration phenomenon in Libya, deeply affecting flows to, within, and from the country ([Cummings et al., 2015](#)). In addition to continuing to be an important destination country for foreign workers, Libya has also become a transit country for migrants. Due to the dissolution of the Libyan State and the absence of a government able to control the territory, migration routes through the country have remained unguarded, turning Libya into a main gateway to Europe for irregular migrants ([Friebel et al., 2023](#); [UNHCR, 2019](#)). As a consequence, migrants flows to Europe significantly increased until 2018 when sea arrivals from Libya dramatically decreased due to the enforcement of new measures aimed at reducing migrants crossing through the Mediterranean Sea ([UNHCR, 2019](#)).

Libya serves as the arrival point for two of the most significant irregular migrant routes to Europe (Figure A1) ([IOM, 2017a](#)). While a large number of migrants still move to Libya to work, most of them transit through the country to reach its northern coastal provinces. From there, they attempt to cross the other side of the Mediterranean Sea ([Mixed Migration Hub, 2015](#); [IOM, 2015](#); [UNHCR, 2017a](#)).

Migrants from East Africa typically enter Libya by crossing the Sudanese border, gaining access to the district of Kufra in the southeast. Meanwhile, migrants from West and Central Africa predominantly arrive from Niger and make their way to the southern district of Sebha. Other entry points include the districts of Ras Jedir at the Tunisian border, Ghat at the Algerian border, and Salloum at the Egyptian border ([UNHCR, 2019](#)). Information on and analysis of the internal movements of migrants within Libya are very scarce. One exception is [Di Maio et al. \(2023\)](#), which documents the large migrant movements within the country, the differences across the various migrant routes in Libya, their evolution over time, and how migrants sort into these routes according to their nationality.

¹⁰The Second Libyan Civil War is one of the most geopolitically relevant conflicts of our times ([Fitzgerald and Toaldo, 2016](#)). The conflict is characterized by two rival governments claiming authority over Libya, one (based in Tripoli) controlling the West of the country and the other (based in Tobruk) controlling the East part of the country. In 2017, a cease-fire was reached and the parties agreed that a presidential election would be held in 2018. However, since then the election date has been postponed several times. See also [Eriksson and Bohman \(2018\)](#) for a discussion of the determinants, characteristics, and evolution of the Second Civil War.

4 Data

4.1 Migration data

Data on migrants and their movements are from the IOM’s Libya Displacement Tracking Matrix (DTM). The DTM tracks the movements of migrants using the data collected at the IOM Flow Monitoring Points (FMPs) located in the Libyan territory (IOM, 2016).¹¹ The DTM is the only source providing reliable data on migration flows in Libya.

In our empirical analysis, we use data from the Baseline Assessment Surveys (BAS) component of the DTM for the period June 2017 to February 2020.¹² The BAS collects information on migrants located, arriving, and departing from a specific FMP.¹³ Data are collected daily and reported weekly. The original data are an unbalanced weekly panel at the FMP level (i.e., not every week do we have a data registration for each FMP). For each survey wave, the DTM reports for each FMP the three most common countries of origin, the three most common countries of destination, the percentage of migrants by length-of-stay category (e.g., less than 2 weeks, less than 3 months, more than 6 months).¹⁴

The primary method of data collection at each Flow Monitoring Point (FMP) is through Key Informants (KIs) interviews (IOM, 2016).¹⁵ To corroborate the accuracy of the information they provide, IOM implements a very strict quality control procedure (IOM, 2017b). While information is not directly collected from migrants, DTM data have been collected repeatedly and cross-checked since 2017 and have been used in several official reports. These data are considered the best source of information—in terms of accuracy and coverage—available at the moment on migration flows in Libya.

Figure 1 shows the physical map of Libya and the location of the 167 FMPs used in our analysis. The FMPs are located across all of Libya. Importantly, there are FMPs in both the

¹¹An FMP is a major transit point for (irregular) migration flows (IOM, 2016).

¹²The period of analysis begins with the first wave of the DTM data for Libya in 2017 and ends when the DTM methodology for data collection changed in 2020 making the comparison with following waves difficult.

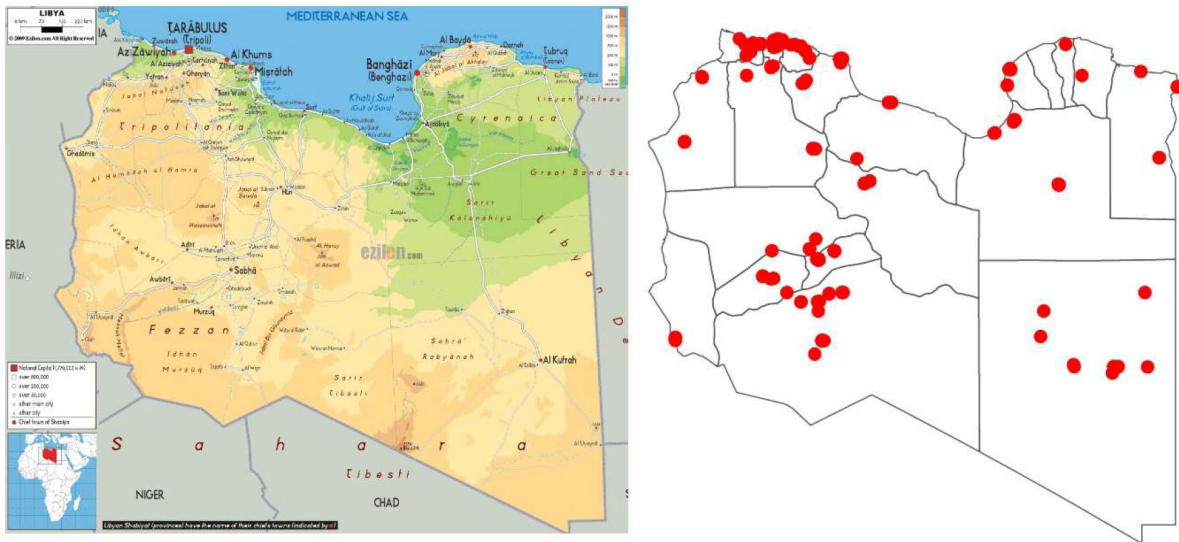
¹³FMPs were chosen with the objective to identify major migration transit points (IOM, 2016).

¹⁴The structure of the DTM data imposes certain limitations on the analysis. For instance, DTM data do not provide information on whether a group of migrants registered in a survey wave in a given FMP was previously recorded in another survey wave in a different FMP. This implies that DTM data do not allow to follow the same pool of migrants across time.

¹⁵A Key Informant (KI) is a “person within the community who, due to his or her position, has access to specialized knowledge about the situation and context of the populations residing within. KIs can be local officials, religious, community, or tribal leaders, government administrators, local humanitarian workers, representatives of displaced groups, or others.” Numbers and characteristics of KIs vary only slightly across survey rounds. As a reference point, we report those from Round 18 (February–March 2018). During that round, 1,360 KIs interviews were conducted, in all 100 Baladiyas in Libya. Around 38% of KIs interviewed were representatives from divisions within the Baladiya office, 15% were representatives from local humanitarian or social organizations, and 9% were local crisis committee representatives. Around 10% of KIs were female and 90% male (IOM, 2018a).

areas controlled by the (Tripoli-based) Government of National Accord and by the (Tobruk-based) House of Representatives (see Section 3). There are FMPs at all the entry points to Libya, at all the important crossroads, close to the largest cities (especially close to Tripoli), and in both the desert areas (South) and the coastal areas (North).

Figure 1: Location of the IOM Flow Monitoring Points (FMPs) in Libya (2017-2020)



Notes: On the left, the figure shows the physical map of Libya (Source: Worldometer. Accessible from <https://www.worldometers.info/maps/libya-map/>). On the right, the figure shows the location of the IOM FMPs in Libya (Source: IOM Data).

Most migrants located in the FMPs in Libya come from sub-Saharan African countries. During our period of analysis, the most common origin countries are: Niger, Egypt, Chad, Sudan, and Nigeria. The destination countries for migrants in Libya are mostly European ones. Yet, some migrants want to stay in Libya or to return home. In our data, the list of most common destination countries include: Italy, France, Germany, Libya, and Niger. These data confirm that migrants in Libya are very heterogeneous in terms of nationality and migration plans (IOM, 2018b; UNHCR, 2019). Our empirical strategy accounts for this important characteristic of migration in Libya by controlling for differences across the FMPs in terms of the origin and the destination countries of the migrants located in these areas.

4.2 News articles data

Data on news articles are retrieved from the Global Database of Events, Language, and Tone (GDELT). GDELT is an open-source news database built combining advanced natural language

and data mining techniques to monitor news at the global level in real-time. The project gathers meta-data from print, television, and online news sources globally (every 15 minutes) and translates it into English from more than 65 languages (Leetaru, 2015).

In our analysis, we use GDELT 2.0 Global Knowledge Graph (GKG), the most comprehensive version of the GDELT dataset. We use it to identify news related to migration and to measure their sentiment for the period 2017-2020 for all the destination countries of the migrants located in the FMPs in Libya. GDELT in fact identifies for each news the corresponding source and, in particular, its nationality.¹⁶

The GDELT algorithm extracts from the content of the news the major themes discussed in it (Leetaru and Schrodt, 2013),¹⁷ categorizes them into topics using the taxonomy provided by the World Bank Topical Ontology,¹⁸ and then ranks topics in order of importance, so as to make it possible to identify the primary focus of each news article. In our work, we assume that migration-related news are those news whose top 3 topics are related to migration/refugees/borders/displacement.¹⁹

An important feature of GDELT is that it provides a numerical variable measuring the tone of each news article. The tone is calculated as the positive score minus the negative score, where the positive (negative) score is the share of all words in the article found to have a positive (negative) connotation.²⁰ In practice, a news article has a positive (negative) tone score if the share of words with a positive connotation is larger (smaller) than that with a negative connotation. This tone variable has been shown to perform similarly to human-coded sentiment scores and other sentiment indicators (Ribeiro et al., 2016).

¹⁶In order to place news outlets geographically in space, and associate them to a given country, GDELT uses the *Geographic Source Lookup*, a procedure which follows a step-by-step procedure. For each news, GDELT first identifies the top level domain (TLD) of the outlet’s website where the news was published. Intuitively, the TLD is the final section of a website: e.g., “.de”, “.fr”, “.it”, “.uk”, etc. The news is then associated to the country holding the control of the TLD (e.g., Germany controls the TLD “.de”, France controls the TLD “.fr”, etc.). If one news was published using a TLD not specific to a country (e.g., “.co”), GDELT looks at the content of the news, and identifies what is the country with the largest number of news associated to the same content in the same period. The news is then matched to this country. In doing so, GDELT relies on the assumption that journalism tends to suffer from a strong geographic bias, and consequently news outlets mostly cover events physically proximate to them far more often than they do with events on the other side of the world. For additional information see <https://blog.gdeltproject.org/mapping-the-media-a-geographic-lookup-of-gdelts-sources/>.

¹⁷For the list of themes, see http://data.gdeltproject.org/documentation/GDELT-Global_Knowledge_Graph_CategoryList.xlsx

¹⁸For additional information, see <https://blog.gdeltproject.org/world-bank-group-topical-taxonomy-now-in-gkg/>

¹⁹To be more specific, we considered the following World Bank topics: “MIGR”, “BORDER”, “REFUG”, and “DISPL”.

²⁰Gdelt Global Knowledge Graph (GKG) Data Format Codebook V2.1.

4.3 Other data

Economic activity in Libya We use two additional data sources to create a proxy for the level of economic activity and of conflict intensity in the neighborhood of the FMPs. To compute a proxy for economic activity, we use the intensity of night lights in the corresponding month. Night lights data are often used as a reliable measure of economic activity when data to construct traditional economic indicators, such as the gross domestic product (GDP), are missing or badly measured, as in our case.²¹ In our analysis, we use the night lights data as recorded by the United States Air Force satellites and distributed by the Visible Infrared Imaging Radiometer Suite (VIIRS).²²

Conflict intensity For each FMP, we also construct a time-varying measure of conflict intensity. Data on conflict events are sourced from the PRIO/Uppsala Armed Conflict and Location Event (ACLED) dataset. ACLED covers conflict events worldwide for the period 1997-2022, providing location, in terms of latitude and longitude, date, and characteristics of a wide range of conflict-related events.²³ Event records are derived from a variety of sources, including reports from war zones, humanitarian agencies, and research publications. Information from local, national, and international media is reviewed daily (Raleigh et al., 2010). Our main measure of conflict exposure is the number of conflict events that occurred in the 5 km radius of the FMP’s location during the corresponding month.

Internet coverage Data on the geo-localization and the speed connection of cell towers in Libya are collected by OpenCellid (<https://opencellid.org>), the world’s largest open database of cell towers, and distributed by GSMA (<https://www.gsma.com>), a non-profit industry organisation that provides a source of data and analysis for the mobile industry worldwide. Data from Libya cover all the network operators present in the country: Almadar Ajadeed, Libyana, and LibyaPhone Mobile. Data are available only for a single year: 2021 for the operators Almadar Ajadeed and LibyaPhone Mobile, and 2019 for Libyana.

²¹Data on the Libyan economy are extremely limited. The Libyan Bureau of Statistics and Census (BSC) conducted the last census of Libyan businesses in 2006. Official data on economic activity were collected only until 2011. After that, statistics on the Libyan economy have been largely unreliable due to the limited capacity of government services (Rahman and Di Maio, 2020).

²²VIIRS data are designed to consistently measure the radiance of light coming from earth in a wide range of lighting conditions. They feature a high spatial accuracy and comparability across time (Gibson et al., 2020).

²³Conflict events in the ACLED dataset are categorized as follows: (1) battle (government regains territory); (2) battle (no change of territory); (3) battle (non-state actor overtakes territory); (4) headquarters or base established; (5) nonviolent transfer of territory; (6) remote violence; (7) riots and protests; (8) strategic development; (9) violence against civilians.

Economic data for destination countries Employment rate at the country level is provided by the International Labour Organization (ILO), while GDP per capita is from the World Bank (WB). The variables *Employment Rate (annual)* and *GDP per capita (annual)* in destination countries are created as follows. For each FMP i , we identify the destination countries indicated by migrants residing at FMP i during month m in year y . Then, we calculate the average employment rate and GDP per capita of these countries in year y . The variables *Employment Rate (monthly)* and *GDP per capita (monthly)* are imputed from the annual variables.²⁴

5 Empirical strategy

Our main regression model is:

$$Y_{i,m,t} = \beta_0 + \beta_1 \text{News Tone Destinations}_{i,m-1,t} + \beta_2 \text{Nightlights}_{i,m-1,t} + \beta_3 \text{Conflict}_{i,m-1,t} + \beta_4 \text{Stay}_{i,m,t} + \beta_5 \text{Return}_{i,m,t} + \theta_i + \phi_{m,t} + \gamma_o + \mu_d + \epsilon_{i,m,t} \quad (1)$$

where $Y_{i,m,t}$ is the share of migrants in the FMP i in month m in year t who are long-stayers, i.e., report being in that location for more than 6 months.²⁵ *News Tone Destinations* $_{i,m-1,t}$ is the average tone of all migration-related news articles published in month $m - 1$ in year t in the top 3 destination countries for migrants in FMP i .²⁶ *Nightlights* $_{i,m-1,t}$ is the intensity of night lights within a 5 km radius of FMP i in month $m - 1$ and year t and *Conflict* $_{i,m-1,t}$ is the number of conflict events within a 5 km radius of FMP i in month $m - 1$ and year t . We control for the possibility that migrants are not planning to leave Libya using *Stay* $_{i,m-1,t}$, a dummy taking value one if Libya is one of the top 3 destination countries for migrants in FMP i , and for the possibility that migrants are planning to return home (returnees) using the dummy *Return* $_{i,m-1,t}$ taking value one if one of the countries of origin is also one of the top 3 destination countries for migrants in FMP i . θ_i is the FMP fixed effects and $\phi_{m,t}$ is the year-month fixed effects. γ_o is the countries of origin fixed effects (top 3 nationalities) and μ_d is the destination

²⁴This is done with the formula $x_y * (1 + (\#m - 1) * \frac{x_{y+1} - x_y}{11})$, where x_y and x_{y+1} indicate the value of the variable recorded respectively in the year when the observation was recorded and in the following one, while $\#m$ indicates the number of the month in which the observation was recorded.

²⁵Other categories available in the IOM data are: share of migrants in the FMP staying in there for: between 3 and 6 months, less than 3 months, and less than 2 weeks.

²⁶The tone of a given article news is likely to reflect the attitude towards migration of the media outlet on which it is published, e.g., its political orientation. However, this is unlikely to be a concern for the interpretation of our results. Our analysis uses the variation across time of the average tone of all news across all outlets in a given destination country. Thus, unless the number of outlets varies systematically across periods, our measure captures - given the political orientation of all the outlets in a given country - the variation in the tone of migration news across time.

countries fixed effects (top 3 destinations).²⁷ By including country-of-origin fixed effects we are able to compare, for a given FMP, the effect of the news tone on migrants’ decisions to move between two months of the same year when the FMP’s composition of migrants is the same. By including country-of-destination fixed effects instead, our model compares, for a given FMP, the effect of the news tone on the migrants’ decision to move between two months of the same year when the FMP’s preferred country-of-destination is the same. As a result, by adding both sets of fixed effects, we filter out possible confounding effects from our estimates that are due to the time-invariant characteristics of the FMP, the common characteristics of all FMPs in Libya in a given month, and the time-invariant characteristics of both migrants’ nationality and their destination country.²⁸ As robustness check, we will also include country of destination-specific time trends and country of origin-specific time trends. Finally, $\epsilon_{i,m,t}$ is the error term. Standard errors are clustered at the FMP level. Descriptive statistics for all variables used in the analysis are reported in Tables A1 and A2.

6 Results

6.1 Main results: News tone and migrants’ movements

Table 1 reports the estimation results from our regression model 1. The outcome variable is the share of migrants in the FMP who are long-term stayers, i.e., reporting having been in that location for more than 6 months. Column 1 shows the results of the baseline specification in which we control only for the full set of fixed effects. Results indicate that a worsening in the average tone of the news in the destination countries increases the share of migrants who remain in the FMPs for a long period.²⁹ This result is also confirmed when we control for the local level of economic activity and conflict intensity (column 2), and for the presence of returnees and migrants who plan to remain in Libya (column 3).³⁰

As discussed in Section 3, Libya is the main gateway for irregular migrants to Europe.³¹ The

²⁷Two characteristics of our data allow us to include these additional fixed effects. First, the countries of origin (i.e., the national composition) of migrants in one FMP is not constant (i.e., it is not a time-invariant characteristic of the FMP) and varies across FMPs observed in the same period. Second, migrants’ (preferred) destination countries vary within a FMP across time and across FMPs in the same period.

²⁸The inclusion of country-of-origin by planned destinations fixed effects is instead not feasible because there are not enough degrees of freedom to identify a model specification including them.

²⁹A higher news tone means a more positive tone in migration-related article news in destination countries.

³⁰While the worsening in the tone of the news increases the share of longer-stayer migrants in the FMP, there is no effect on the share of shorter-stayer migrants. Columns 1-3 in Table A3 show that the shares of migrants remaining in the FMPs for less than 2 weeks, between 2 weeks and 3 months, or between 3 and 6 months do not change with the average tone of the news in the destination countries.

³¹One of the main reasons why Libya is preferred to other neighboring countries as transit point to Europe is

direction of migration in Libya is largely unidirectional: most of migrants tend to move North-West, toward the coast from where they embark to Europe (for more details, see Appendix C). Hence, we construe the influence of news tone on migrants’ movements between FMPs within Libya as informative about its effect on the timing of their migration journey. To put it differently, prolonged stays in an FMP due to a worsening news tone implies that a more negative sentiment in migration-related news contributes to a delay in migrants’ journey toward their destination countries.³²

Table 1: News tone and migrants’ movements

Dep. Variable	Share of migrants in the FMP who are long-stayers		
	(1)	(2)	(3)
News Tone Destinations	-0.0314** (0.0172)	-0.0312** (0.0177)	-0.0312** (0.0177)
Intensity of night lights within 5 km		0.0097 (0.0593)	0.0099 (0.0592)
Number of conflicts within 5 km		-0.0101 (0.0179)	-0.0102 (0.0179)
FMP with migrants planning to remain in Libya (1 = Yes)			0.0019 (0.0270)
return home (1 = Yes)			0.0045 (0.0369)
FMP FEs	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes
Number of Observations	1,568	1,568	1,568

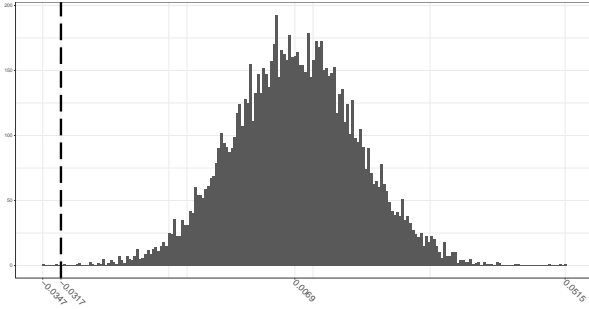
Notes: OLS regression results. Standardized OLS estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. The dependent variable *Share of migrants in the FMP who are long-stayers* is the share of share of migrants in the FMP i in month m in year t who report being in that location for more than 6 months. The variable *News Tone Destinations $_{i,m-1,t}$* is the average tone of migration news in the top 3 destination countries for migrants in FMP i in month $m - 1$ in year t . All other variables are defined in Tables A1 and A2 and additional details are provided in Section 4. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Validation To corroborate these results, we conduct two exercises. First, we conduct two placebo tests. Second, we present suggestive evidence indicating that the impact of news tone

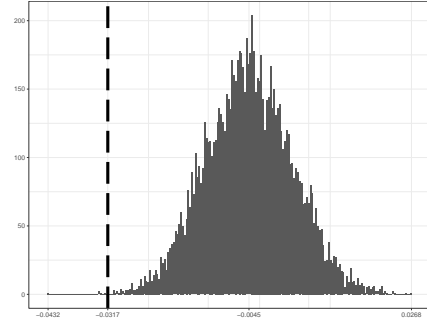
because of the lack of border and internal controls (UNHCR, 2019).

³²A possible concern with this interpretation of our results is that a worsening in the news tone may also have an impact on the choice of migrants to remain in Libya. If this is the case, the estimation of our model specification would be biased by the endogeneity of the dummy variable “FMP with migrants planning to remain in Libya (1 = Yes)” with respect to the main explanatory variable, *News Tone Destinations $_{i,m-1,t}$* . Reassuringly, when the latter variable is regressed against the former, controlling for both FMP and year-month fixed effects, we find that its estimated effect is small (0.0104) and not statistically significant (p.value = 0.6219), suggesting that the choice to stay in Libya is not determined by a change in the tone of the news in destination countries.

Figure 2: Spatial and time placebo tests



(a) Effect of the news in the top destination countries for *other* FMPs



(b) Effect of the news in the FMP's top destination countries but in *another* time

Notes: The dotted line indicates the estimated coefficient for the explanatory variable in the main regression specification (see Table 1 column 2). Placebo results obtained with 10,000 replications.

is more pronounced in areas where migrants are more likely to have access to the internet.

Placebo tests Figure 2 shows the results of two placebo tests. In the first one, we randomly assign to migrants in a specific FMP (during a given month) the tone of the news from the destination countries of migrants from *another* FMP (in the same month). If migrants' movements are influenced by the tone of the news in their destination countries, we should expect a null effect of news in countries that are not relevant to the migrants' decisions. In the second test, we assign to migrants in a specific FMP the tone of the news from their destination countries published in random month. If migrants' movements are influenced by the tone of the news in destination countries in the month before, we should expect a null effect for news published in a period not relevant to the migrants' decisions. Our hypotheses are both confirmed by the results reported in Figure 2, respectively in Panels (a) and (b). The average placebo effect is almost zero and it is significantly smaller in comparison to the observed effect of the news tone.³³

Internet access Our argument is that migrants' movement choices are influenced by the tone of news published in their preferred destination countries. The assumption is that migrants are able to access and read the news. While we do not have information on mobile ownership nor on individual-level Internet usage, Table 2 provides suggestive evidence that the news tone affects only migrants who are more likely to be able to access them. Column 1 shows that the

³³For Panel (a), 5 observations out of 10,000 are lower than the observed effect: i.e., probability of error is 0.0005%. For Panel (b), 2 observations are lower than the observed effect: i.e., probability of error is 0.0002%.

Table 2: **Validation: Effect of the news and internet access**

Dep. Variable	Share of migrants in the FMP who are long-stayers		
	(1)	(2)	(3)
News Tone Destinations *			
<i>Nightlights</i>			
Low intensity	0.0342 (0.0599)		
Medium intensity	-0.0464 (0.0456)		
High intensity	-0.1234*** (0.0496)		
<i>FMP network coverage</i>			
Not present		-0.0787 (0.1077)	-0.0708 (0.1061)
Present*		-0.0309* (0.0172)	
High-speed connection			-0.0437* (0.0228)
Low-speed connection			0.0223 (0.0185)
Other controls	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes
Number of Observations	1,568	1,568	1,568

Notes: OLS regression results. Standardized OLS estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. The variable *FMP network coverage Present* is a dummy variable which takes the value 1 if the FMP is within a 5 km radius from a cell tower, and zero otherwise. The variable *FMP network coverage Not present* is equal to $1 - \text{FMP network coverage Present}$. The variable *High-speed connection* is a dummy variable which takes the value 1 if the FMP is within a 5 km radius from a 4G cell tower, and zero otherwise. The variable *Low-speed connection* is a dummy variable which takes the value 1 if the FMP is within 5 km radius from a 3G or 2G cell tower, and zero otherwise. All other variables are defined in Tables A1 and A2 and additional details are provided in Section 4. “Other controls” include: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *FMP with migrants planning to remain in Libya (1 = Yes)*; *FMP with migrants planning to return home (1 = Yes)*. *, ** *** indicate statistical significance at the 10%, 5%, and 1%, respectively. Sources: IOM, VIIRS, GDELT, OpenCellid, ACLED

effect of the tone of the news in the destination countries increases with the level of economic activity around the FMP. As long as night lights are a proxy for economic activity and thus for the presence of Internet access, these results indicate that the effect is stronger in areas where migrants are more likely to read the news and to use them to take their decisions. Columns 2 and 3 offer additional corroborating evidence of this possibility using available information on internet coverage in Libya.³⁴ The results indicate that the impact of the news tone is significant only in areas with Internet coverage and a high-speed connection. The fact that changes in the tone of the news exert an effect in areas where migrants are more likely to read the news substantiates our interpretation of the main findings.

³⁴See Section 4.3 for details on the data on Internet coverage.

6.2 Robustness

Our results are robust to a number of checks, shown in Table 3.

Alternative measure of News Tone Our main explanatory variable $News\ Tone\ Destinations_{i,m-1,t}$ is computed as the mean of the tone of all the migration-related news articles published in a given month in the (preferred) destination countries of the migrants located in the FMP.³⁵ Alternatively, one may want to account for the possibility that what matters is, instead, the predominant tone of the articles. For this reason, in this exercise we consider the effect exerted by the median value of the tone of all the news articles. Results in column 1 show that the magnitude of the effect is unchanged if we use this alternative measure for the news tone.

Measurement error in the News Tone The variable $News\ Tone\ Destinations_{i,m-1,t}$ is constructed considering the news published in the top 3 destination countries of the migrants located in the FMP. Because the majority of migrants are long-term stayers (see Fig. A2), our analysis makes the plausible assumption that the 3 top destinations in the FMP reflect the preferences of this group of migrants. However, this may not be always the case. In these situations, the variable $News\ Tone\ Destinations_{i,m-1,t}$ is likely to suffer from measurement error if its effect is tested against the relocation decisions of long-stayer migrants. In order to deal with this issue, we identify those cases in which the set of preferred destinations in the FMP is most likely representing long stayers: i.e., when the percentage of long stayers in the FMP is very high at month m (equal or more than 75%), and the number of arrivals at month $m+1$ is equal to zero.³⁶ Results in column 2 show that our findings are qualitatively unchanged also when considering only this sub-sample of FMPs: i.e., they are robust to correcting for the potential measurement error of the variable $News\ Tone\ Destinations_{i,m-1,t}$.

Change in the number of migrants in the FMP One possible concern with our result is that the reduction in the share of long-stayer migrants in the FMP may mechanically be driven

³⁵The tone for each news article is provided directly by GDELT. The tone of a news articles is computed as the difference between the positive and the negative score assigned to that news article by GDELT. For additional information, see Section 4.2.

³⁶This is done with the following procedure. For each FMP i , we select those observations relative to months in which the percentage of long stayers is higher than 75%. We refer to this set of observations as *set 1*. Then, for each FMP i , we select those observations relative to months in which the number of arrivals is equal to zero. We refer to this set of observations as *set 2*. Next, for each observation at month m in *set 1* relative to FMP i , we check whether it exists an observation at month $m+1$ in *set 2* also relative to i . If this is the case, we select both observations (i.e. the one in *set 1* and the one in *set 2*). We refer to this set of observations as *set 3*. Finally, we estimate equation 1 using the sub-sample of the dataset including only the observations from *set 3*.

Table 3: News tone and migrants’ movement: Robustness checks

Dep. Variable	Share of migrants in FMP who are long-stayers					
	(1)	(2)	(3)	(4)	(5)	(6)
News Tone Destinations (median)	-0.0312*					
	(0.0177)					
News Tone Destination		-0.4025***	-0.1052*	-0.1582***	-0.0331*	-0.0255*
		(0.1302)	(0.0564)	(0.0503)	(0.0170)	(0.0163)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year-month fixed FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes	Yes	Yes	Yes
Country of destination * time trend	No	No	No	No	Yes	No
Country of origin * time trend	No	No	No	No	No	Yes
Regression Model	OLS	OLS	OLS	Fractional Probit	OLS	OLS
Sample	Full	Restricted	No Arrivals	Full	Full	Full
Number of Observations	1,568	201	239	1,568	1,568	1,568

Notes: Results from OLS in columns 1 to 3, and 5 to 6. Results from Fractional Probit in column 5. *Restricted* sample includes only FMPs for which the percentage of long stayers in the FMP at month m is equal or more than 75%, and the number of arrivals at month $m+1$ is equal to zero. *No Arrival* sample includes only FMPs in which no migrants arrived at month m . For columns 1-3, and 5-7, standardized estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. The variable “Number of migrants present in the FMP” counts the average number of migrants found in one FMP over all the weeks for which a registration is present during a month. The variable “Number of migrants arrived in the FMP” is the sum of migrants arrived in one FMP during a month. All other variables are defined in Tables A1 and A2 and additional details are provided in Section 4. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

by arrivals. Column 3 shows that this is not the case: results are qualitatively confirmed when considering only FMPs in which there were no arrivals at month m .

Alternative estimator OLS estimates can be potentially biased when using a share value as the dependent variable, as in our case. In these situations, one possibility is to use a fractional probit estimator (Papke and Wooldridge, 1996). Reassuringly, results reported in column 4 show that our estimates are qualitatively unchanged when using this estimator, suggesting that the OLS estimation is unlikely to lead to any significant bias.

Time trends in origin and destination countries Our results are robust to augmenting our model specification with country-of-origin specific time-trends (see column 5).³⁷ These fixed effects control for all the (linearly) time varying characteristics in the origin country that may influence the movement decision of any national group of migrants. Finally, column 6 shows that

³⁷Note that this can be done because - as discussed in footnote 27 (Section 5), in each FMP, the set of origin countries and of destination countries is not constant across time. It follows that country-of-origin specific time trends are not collinear with year-months fixed effects.

our results also hold when we add to our baseline specification country-of-destination specific time-trends accounting for all the characteristics which (linearly) change across time in the destination country that influence the movement decision of any national group of migrants.

Spatial analysis The presence of spatial autocorrelation in the migrants’ movement choices across FMPs is a threat to our model identification, also possibly leading to biased estimates.³⁸ For instance, this is the case if migrants—because they belong to FMPs located in the same area—are exposed to common shocks (e.g., an increase in conflict intensity, a drop in economic activity, etc.), and thus they make similar movement choices. In the case of Libya, defining what is to be considered “the same area” is not trivial: for instance, the common choice of using the boundaries of the administrative areas is unlikely to be informative in the context of a conflict-affected country that lacks a ruling government for more than ten years. As an alternative, we assume that exposure to common shocks is a function of the distance between FMPs. Consequently, we re-estimate Equation 1 using a Spatial Error Model (SEM), allowing us to test various hypotheses regarding the role that common exposure to shocks might play (i.e., all FMPs are exposed to the same shock, but its impact varies based on the distance of FMPs from it, or only FMPs in close proximity experience common shocks). Results are shown in Table A4 columns 1 and 2. Our main result is qualitatively unchanged, i.e., news tone influences migrants’ decisions to stay, and the statistical significance of its effect is now even stronger than in our baseline model.

Another situation in which the outcome of one FMP is spatially autocorrelated with the outcome of a different FMP is when the migrants’ movement choices affect the composition of both the sending and the receiving FMPs in the same way.³⁹ We model this form of spatial autocorrelation using the Spatial Lag Model, again testing two different hypotheses (i.e., each FMP influences all other FMPs, but its impact depends on its distance from the other FMPs, or it affects only FMPs in its vicinity). The results are reported in Table A4, respectively in columns 3 and 4. Also in this case, all our results are qualitatively unchanged, and we find no evidence that spatial autocorrelation introduces any significant bias in our estimates.

³⁸In Section D, we describe in detail the econometric aspects and the interpretation of the results obtained using the various spatial models discussed in this paragraph.

³⁹For instance, this is the case if migrants who have been staying for a long time in one FMP leave it (reducing the share of migrants who stay there for more than six months) and move to another FMP (reducing also the share of migrants who stay there for more than six months). Another case is the one in which migrants in different FMPs are in contact with one another, and the choice to postpone the journey to Europe by those in one FMP (thus increasing the share of migrants who stay there for more than six months) influence migrants in other FMPs to do the same (increasing as well the share of migrants who stay there for more than six months).

6.3 Heterogeneity

6.3.1 Country of origin and FMP location

Table 4 shows a set of heterogeneity results which help us characterize the conditions under which the news tone have a larger impact on migrants' choices.

We begin by testing a well-known characteristic of migration in Libya, namely that there are two different migration modalities to reach Europe: migrants from West Africa make a multi-step journey, while migrants from East Africa make few stops through Libya on their way to Europe (see UNHCR, 2017b; Di Maio et al., 2023).⁴⁰ Results reported in Table 1, column 1, are consistent with this anecdotal evidence: the effect of the tone of the news is significant only in FMPs in which there is a large presence of migrants coming from West African countries, those making a slower journey to Europe. Importantly, our results indicate that there is a non-small share of migrants who, no matter how negative the sentiment toward migrants in destination countries is, do not slow down their journey toward Europe. These migrants are coming from East African countries, consistently with anecdotal evidence indicating that they are those traveling through Libya faster and with fewer stops (Di Maio et al., 2023).⁴¹

Next, we consider the differential effects of news on the migrants located in different areas of Libya. Results in column 2 show that a worsening in the tone of the news slow down the movements of migrants only in FMPs located in the West part of the country. This aligns with the fact that the primary migration route to Europe passes through the Western region of Libya, while migration is notably low from the Eastern region (see Section 3).

6.3.2 Type and numerosity of migration news

We now investigate the periods during which the news tone is more likely to influence migrants' movement decisions. Table 5 column 1 looks at the differential effect of the change in the tone of the news depending on which type (positive vs negative) of migration-related news

⁴⁰Anecdotal evidence indicate that these migrants often stops in a locality until they save enough money (often by being employed informally) to be able to continue their journey (UNHCR, 2017b)

⁴¹There is one possible concern with our interpretation of the findings related to the role of smugglers in determining migrants' movement decisions in Libya (Friebel et al., 2023). While our data do not allow us to distinguish between voluntary or forced choices in the timing (and direction) of the migration journey, there are two elements that support our interpretation of the empirical results. First, as long as the presence of smugglers does not change at the local level over time, our fixed effects already account for their influence on migrants' movements. Second, as shown above, our results are consistent with the well-known differences in the migration journey of migrants coming from different parts of Africa. The fact that we find a significant effect of the news only for migrants following a multi-step journey (i.e., migrants who may spend a (long) period in a given FMP before making the next movement) corroborates our interpretation of the results as suggesting that the tone of the news does influence migrants' movement choices.

Table 4: **Heterogeneity: Country of origin and FMP location**

Dep. Variable	Share of migrants in FMP who are long-stayers	
	(1)	(2)
News Tone Destinations *		
<i>FMP with a major group of migrants is from</i>		
West Africa	-0.0710*** (0.0273)	
East Africa	0.0664 (0.0455)	
<i>FMP located in</i>		
West Libya		-0.1570** (0.0698)
East Libya		-0.0348 (0.0486)
Other controls	Yes	Yes
FMP FEs	Yes	Yes
Year-month FEs	Yes	Yes
Country of destination FEs	Yes	Yes
Country of origin FEs	Yes	Yes
Number of Observations	1,568	1,568

Notes: OLS regression results. Standardized OLS estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. All variables are defined in Tables A1 and A2 and additional details are provided in Section 4. “Other controls” include: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *FMP with migrants planning to remain in Libya (1 = Yes)*; *FMP with migrants planning to return home (1 = Yes)*. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

has prevailed in the period.⁴² The results indicate that migration choices are only influenced by the changes in the tone of the news in months in which there are mostly positive news. In particular, we find that, in this case, a reduction (increase) in the tone of news increases (decreases) the percentage of migrants who decide to remain longer in the FMPs. Instead, in months in which there are mostly negative news or an equal number of positive and negative news, the change in the average tone has no effect on migrants’ decisions. These are important results that speak to the idea—pursued by several right-wing political parties in Europe—that increasing the negative signals toward migration and consequently adopting a more negative tone in the news on migration may discourage irregular migrants from attempting to reach Europe. Our results indicate that persistently pursuing this strategy is unlikely to produce the intended results: migrants do not take into account the (further) worsening in the news sentiment when the tone of the news on migration in destination countries is already mostly negative. Column 2 further explores this heterogeneity by checking if the effect of the tone of

⁴²We define a news to be positive (negative) if it has a positive (negative) score. The positive (negative) score is the percentage of all words in the article found to have a positive (negative) connotation (see Section 4.2).

the news varies depending on how relevant migration is in the public discourse in that period. Results show that the effect is significant only in months in which there are many news on migration. Finally, column 3, which combines these two aspects, shows that migrants' journey plans are influenced by the tone of the news only in periods during which there are many news on migration and they are mostly positive.

Table 5: **Heterogeneity: Type and numerosity of migration news**

Dep. Variable	Share of migrants in FMP who are long-stayers		
	(1)	(2)	(3)
News Tone Destinations *			
<i>Type of news (during the month)</i>			
mostly negative	0.0070 (0.0242)		0.0072 (0.0243)
same number of negative and positive	-0.0254 (0.0233)		-0.0240 (0.0235)
mostly positive*	-0.0573* (0.0324)		
		many news about migration	-0.0777** (0.0383)
		few news about migration	-0.0070 (0.0493)
<i>Number of news (during the month)</i>			
		many news about migration	-0.0607** (0.0246)
		few news about migration	-0.0048 (0.0198)
Other controls	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes
Number of Observations	1,568	1,568	1,568

Notes: OLS regression results. Standardized OLS estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. All variables are defined in Tables A1 and A2 and additional details are provided in Section 4. “Other controls” include: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *FMP with migrants planning to remain in Libya (1 = Yes)*; *FMP with migrants planning to return home (1 = Yes)*. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Taken altogether, these results suggest that the worsening in the tone of the news in periods during which there are mostly negative news does not affect migrants' movement decisions. Migrants' movements are slowed down only when—in periods in which there is a lot of attention toward migrants and news is mostly positive—the tone of the news worsens. One possible interpretation is that an exacerbation of the negative sentiment toward migration has no effect on migrants' plans because they may have already discounted the existence of a large negative sentiment against them when taking their initial migration decision. On the contrary, when

the migrants perceive a worsening (improvement) in the positive attitude toward them, they do change their migration plans and delay (accelerate) the next step in their journey toward their destination countries.

6.3.3 Economic conditions in destination countries

Better economic conditions in destination countries play a crucial role in migrants' choices among potential destinations. To account for the possibility, Table 6 columns 1 and 2 includes GDP per capita and employment rate (at the year and monthly levels, respectively) as additional controls. As anticipated, improved economic conditions in destination countries typically result in migrants spending less time in FMPs in Libya, indicating a tendency for them to move more swiftly toward their final destination. By controlling for the economic conditions, the effects of the news tone is still significant at 10% and its magnitude is only slightly reduced with respect to the baseline specification. In columns 3 and 4, we further explore the role of economic conditions in destination countries by looking at the heterogeneous effect of the news tone in periods characterized by different levels of economic activity and employment rate. The results indicate that a deterioration in the news tone prompts migrants to delay their next migration movement only when the economic conditions in the destination country are unfavorable (low employment rate or low GDP per capita). Conversely, during periods of favorable economic conditions, a worsening in the news tone has no effect, meaning that migration decisions are not influenced by changes in the news sentiment. One possible interpretation of these results is that economic conditions are a strong pull factor: good economic opportunities are able to offset the negative sentiment the migrant may face in the destination country, the latter becoming relevant when the economic conditions are instead unfavorable.

Summarizing Taken altogether, these heterogeneity results—by characterizing the conditions under which the tone of the news is more likely to affect migrants' choices—provide suggestive evidence corroborating our interpretation of the main results from the empirical analysis. The worsening in the news tone slows down migrants' movements in Libya only for those coming from West African countries or located in the West part of Libya, when the migration-related news are more numerous and mostly positive, or when economic conditions in destination countries are unfavorable.

Table 6: **Heterogeneity: Economics conditions in destination countries**

Dep. Variable	Share of migrants in FMP who are long-stayers			
	(1)	(2)	(3)	(4)
News Tone Destinations *	-0.0299* (0.0185)	-0.0300* (0.0185)		
<i>Economic conditions in destination countries (during the month)</i>				
High Employment Rate			-0.0179 (0.0176)	
Low Employment Rate			-0.0292* (0.0175)	
High GDP per capita				-0.0146 (0.0170)
Low GDP per capita				-0.0268* (0.0164)
Employment Rate in destination countries (annual)	-0.0277 (0.0666)			
GDP per capita in destination countries (annual)	-0.2899*** (0.0996)			
Employment Rate in destination countries (monthly)		-0.0310 (0.0663)	-0.0296 (0.0667)	-0.0282 (0.0668)
GDP per capita in destination countries (monthly)		-0.2813*** (0.0981)	-0.2823*** (0.0976)	-0.2825*** (0.0979)
Other controls	Yes	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes	Yes
Number of Observations	1,568	1,568	1,568	1,568

Notes: OLS regression results. Standardized OLS estimated coefficients are reported. Standardization of coefficients is obtained using the formula $\frac{sd(x)}{sd(y)}\beta_x$, where β_x is the point estimate associated to control variable x , while $sd(x)$ and $sd(y)$ indicate the standard deviation or respectively control variable x and dependent variable y . Standard errors clustered at the FMP level in brackets. The variables *High Employment Rate* and *High GDP per capita* are obtained as follow. For each FMP i , we take the distribution of a given variable (either *Employment Rate (monthly)* or *GDP per capita (monthly)*) in year y , and register its median value, call it $\bar{x}_{i,y}$. Then, we create a dummy variable which takes the value 1 if $x_{i,m,y} > \bar{x}_{i,y}$, where $x_{i,m,y}$ is the value of either the variable *Employment Rate (monthly)* or *GDP per capita (monthly)* associated to i at month m in year y , and zero otherwise. The variable *Low Employment Rate* is obtained as $1 - \text{High Employment Rate}$, and the variable *Low GDP per capita* is obtained as $1 - \text{High GDP per capita}$. All other variables are defined in Tables A1 and A2 and additional details are provided in Section 4. “Other controls” include: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *FMP with migrants planning to remain in Libya (1 = Yes)*; *FMP with migrants planning to return home (1 = Yes)*. *, **, *** indicate statistical significance at the 10%, 5%, and 1%.

6.4 Additional results: News tones and spillover effects across destination countries

Our main analysis looks at the effect of news tone on the pace of the migrant’s journey toward the preferred destination country. At the same time, one may expect that the news tone used in one country to have spillover effects on other countries, potentially prompting migrants to alter their final destination.⁴³ For instance, migrants can substitute across destination countries

⁴³There is a large literature documenting the spillover effect of migration and asylum policies in different countries on migration choices (see for instance Boeri et al. (2005); Bertoli and Moraga (2015); Brekke et al. (2016); Görlach and Motz (2021); Bertoli et al. (2022)).

by excluding those having a more negative news sentiment toward migrants. To test for this possibility, we run the following regression model:

$$Preferred_{d,m,t} = \beta_0 + \beta_1 \text{News Tone Destination High}_{d,m-1,t} + \phi_{m,t} + \mu_d + \epsilon_{d,m,t} \quad (2)$$

where $Preferred_{d,m,t}$ is the share of FMPs for which country d in month m in year t is a preferred destination. $\text{News Tone Destinations High}_{d,m-1,t}$ is a dummy variable that takes the value 1 if the tone of the news of country d in month $m - 1$ is in the upper quintile of the news tone distribution in close-by destination countries (i.e. those in the same continent), and 0 otherwise.⁴⁴ $\phi_{m,t}$ is the year-month fixed effects; μ_d is the destination country fixed effects, and $\epsilon_{d,m,t}$ is the error term.

Results in Table 7 suggest the presence of spillover effects in the impact of changes in news tone on the set of preferred destination countries. Column 1 shows the results for the full sample of FMPs: the worsening in the tone of the news in a country (with respect to *other* countries) decreases the share of FMPs for which that country is one of the top 3 preferred destinations among migrants. In Column 2, we conduct our estimates using Spatial Lag Model (SLM).⁴⁵ This allows us to account for the effect that a decrease in the preferences of migrants for moving to country i can be mechanically correlated with an increase of their preferences for i 's close-by countries.⁴⁶ Reassuringly, our results are qualitatively confirmed.

One possible concern with this result is that the triplet of the preferred destination countries can also simply vary because of the change in the composition of the migrants present in the FMP. To account for this, in columns 3 and 4, we report the estimates obtained with the SLM when we restrict the analysis only to FMPs for which the number of migrants does not change across two periods. Results still hold both in the baseline specification (column 3) and when controlling for economic conditions in the destination countries (column 4).⁴⁷

Our results indicate that when the sentiment in migration-related news worsens, migrants tend to switch across destination countries that are close. One important related question is whether this substitution occurs between European and non-European destination countries.

⁴⁴The idea is that a meaningful comparison group is made of countries that are likely to have some similarities and that are not too geographically away one from the other.

⁴⁵Details on the SLM are provided in Appendix D.

⁴⁶Observe that we only register the top three destination countries preferred in each FMP. If one destination country disappears from this triplet, then another destination country must necessarily appear in this list.

⁴⁷The literature using gravity models to study the determinants of migration flows typically finds a strong effect for income and unemployment (Grogger and Hanson, 2011; Mayda, 2010). Di Iasio and Wahba (2023) show that economic factors play a less important role in driving the asylum seekers/refugee flows to EU countries.

Table 7: News tone and changes in preferred destination countries

Dep. Variable	Share of FMPs for which country i is a preferred destination			
	All FMPs		FMPs with constant population	
	OLS	SLM	SLM	SLM
Sample: observations from	(1)	(2)	(3)	(4)
News tone in i higher than in <i>other</i> destinations	0.3854** (0.1651)	0.3798** (0.1602)	0.7758* (0.4082)	0.8198* (0.4199)
Employment Rate (destination country)				0.58954 (1.3711)
GDP per capita (destination country)				1.0019 (1.4756)
ρ [p.value]		-0.1864*** [0.0045]	-0.1812* [0.06781]	-0.1848* [0.06245]
Country of destination fixed effects	Yes	Yes	Yes	Yes
Year-month fixed effects	Yes	Yes	Yes	Yes
Number of Observations	1625	1625	863	846

Notes: Results from OLS in columns 1, results from Spatial Lag Model (SLM) in columns 2 to 4. The variable *News tone in i is higher than the other destinations* is constructed as follows. For country i in month m , we compute the distribution of the tone of the news at m in all planned destinations (including i) belonging to the continent where i is situated. We then create a dummy variable which takes the value 1 if the tone of the news of country i is in the upper quintile of the distribution, and zero otherwise. In columns 3-4, spatial autocorrelation is modelled using matrix W , where the generic ij^{th} is a dummy variable which takes the value 1 if countries i and j are located in the same continent, and zero otherwise. The sample of *FMPs with constant population* is constructed as follows. For each FMP, we only select observations taken in two subsequent months, if there were no migrants arriving at or departing from the FMPs from month $m - 1$ to month m . The parameter ρ is the degree of spatial autocorrelation between outcomes of countries within the same continent. *Employment Rate* and *GDP per capita* are monthly and computed as described in the Note to Table 6. All other variables are defined in Tables A1 and A2. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

This seems not to be the case. Figure A3 shows no correlation between the tone of the news in European countries and the change in the likelihood that among the preferred destinations for migrants there is a non-European country. We interpret these findings as suggesting that—while there may be substitution across destination in the same continent—a worsening in news tone in European countries do not induce migrant to return to their origin country.

7 Concluding remarks

This paper provides the first assessment of the impact of migration-related news on migration choices, by documenting how changes in the news sentiment can affect the migration journey from Libya. Leveraging comprehensive data from the International Organization for Migration (IOM) that offers geo-localized information on migrants across 167 FMPs in Libya, our findings show that a more negative tone of migration-related news articles published in migrants' destination countries increases their length of stay in Libya, thereby impeding the progression of the migration journey. To validate this, we present compelling evidence that underscores that

this effect is significant exclusively in areas where migrants are more likely to have access to the internet.

Our analysis, moreover, demonstrates that the impact of news sentiment on migration decisions is notably pronounced for specific groups of migrants, namely those originating from West African countries, and within certain locations, particularly FMPs situated in the Western part of Libya. Notably, this effect is found to be insignificant during periods when the majority of migration-related news already carry a negative tone or when economic conditions in destination countries are highly favorable. These findings substantiate our interpretation of the empirical results, emphasizing that the impact of news tone on migrants' decisions aligns with our expectations regarding who, where, and when it is most influential.

In a significant contribution to the discourse surrounding migration flow regulation, our paper also sheds light on the dynamics of migrants switching destination countries in response to changes in news sentiment. However, notably, a deterioration in the news tone in European countries does not prompt migrants to return to their countries of origin.

These insights bear crucial implications for policymakers grappling with migration management policy. Our results challenge prevailing notions in the political debate on migration in European countries, particularly dismantling strategies employed by far-right parties that rely on the deterrence effects of negative immigration discourses. Our study underscores that the deterrence effect of a more negative news tone is constrained to specific conditions and particular groups of migrants.

Importantly, our findings demonstrate that a worsening in the news tone triggers spillover effects, increasing migration flows to other European countries, and fails to instigate a willingness among migrants in Libya to return to their country of origin. This not only questions the political sustainability of such strategies but also calls for a more nuanced and evidence-based approach in framing migration-related narratives and policies.

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A Appendix: Additional tables

Table A1: Data Descriptives

Variable Definition		Mean	St. Dev.
Dependent Variables			
<i>Share of migrants who stay in FMP... less than two weeks</i>	Share of migrants who have been recorded to be residing for less than 2 weeks in FMP i during month m .	14.62	10.63
<i>less than 3 months</i>	Share of migrants who have been recorded to be residing for less than 3 months in FMP i during month m .	13.93	11.86
<i>between 3 and 6 months</i>	Share of migrants who have been recorded to be residing between 3 and 6 months in FMP i during month m .	18.45	12.42
<i>more than 6 months</i>	Share of migrants who have been recorded to be residing for more than 6 months in FMP i during month m .	57.10	29.45
<i>Number of FMPs indicating country i as preferred destination</i>	Difference in the number of FMPs indicating country i as preferred destination between month m and $m-1$	-0.23	8.50
Migrant-related news variables			
<i>Avg tone of the news in planned destination (higher is better)</i>	Average tone of news in the top 3 destination countries for migrants in FMP i in month $m-1$. The tone of a news article is obtained from the difference between the positive and the negative score assigned to that article.	-2.79	0.53
<i>Type of news (during the month)...</i>			
<i>Mostly negative</i>	Dummy variable. It takes the value 1 if the positive score of the news in the top 3 destination countries for migrants in FMP is below its annual median, while the negative score is above its annual median. It takes zero otherwise.	0.23	0.42
<i>Same number of negative and positive</i>	Dummy variable. It takes the value 1 if both the positive and the negative scores of the news in the top 3 destination countries for migrants in FMP are above (or below) their annual median. It takes zero otherwise.	0.55	0.50
<i>Mostly positive</i>	Dummy variable. It takes the value 1 if the positive score of the news in the top 3 destination countries for migrants in FMP is above its annual median, while the negative score is below its annual median. It takes zero otherwise.	0.22	0.41
<i>Number of news (during the month)...</i>			
<i>many news about migration</i>	Dummy variable. It takes the value 1 if the monthly number of news in the top 3 destination countries for migrants in FMP is above its annual median. It takes zero otherwise.	0.32	0.47
<i>many news about migration</i>	Dummy variable. It takes the value 1 if the monthly number of news in the top 3 destination countries for migrants in FMP is below its annual median. It takes zero otherwise.	0.67	0.47
Number of Observations		1,568	

Table A2: Data Descriptives

Variable	Definition	Mean	St. Dev.
Economic variables			
Employment Rate (annual)	For each FMP i , we identify the destination countries indicated by migrants residing at i during month m in year y . Then, we calculate the average employment rate. Data Source: International Labour Organization (ILO).	12.04	4.25
Employment Rate (monthly)	Imputed using the variables <i>Employment Rate (annual)</i> . This is done with the formula $x_y * (1 + (\#m - 1) * \frac{x_{y+1} - x_y}{11})$, where x_y and x_{y+1} indicate the value of <i>Employment Rate (annual)</i> in the year when the observation was recorded and the following one, and $\#m$ indicates the number of the month in which the observation was recorded.	11.94	4.31
High Employment Rate	For each FMP i , we take the distribution of the variable <i>Employment Rate (monthly)</i> in year y , and register its median value, call it $\bar{x}_{i,y}$. Then, we create a dummy variable which takes the value 1 if $x_{i,m,y} > \bar{x}_{i,y}$, where $x_{i,m,y}$ is the value the variable <i>Employment Rate (monthly)</i> associated to i at month m in year y , and zero otherwise.	0.45	0.50
Low Employment Rate	For each FMP i , we take the distribution of the variable <i>Employment Rate (monthly)</i> in year y , and register its median value, call it $\bar{x}_{i,y}$. Then, we create a dummy variable which takes the value 1 if $x_{i,m,y} \leq \bar{x}_{i,y}$, where $x_{i,m,y}$ is the value the variable <i>Employment Rate (monthly)</i> associated to i at month m in year y , and zero otherwise.	0.55	0.50
GDP per capita (annual)	For each FMP i , we identify the destination countries indicated by migrants residing at i during month m in year y . Then, we calculate the average GDP per capita. Data Source: The World Bank.	19027.22	10338.14
GDP per capita (monthly)	Imputed using the variables <i>GDP per capita (annual)</i> . This is done with the formula $x_y * (1 + (\#m - 1) * \frac{x_{y+1} - x_y}{11})$, where x_y and x_{y+1} indicate the value of <i>GDP per capita (annual)</i> in the year when the observation was recorded and the following one, and $\#m$ indicates the number of the month in which the observation was recorded.	18934.49	10418.57
High GDP per capita	For each FMP i , we take the distribution of the variable <i>GDP per capita (monthly)</i> in year y , and register its median value, call it $\bar{x}_{i,y}$. Then, we create a dummy variable which takes the value 1 if $x_{i,m,y} > \bar{x}_{i,y}$, where $x_{i,m,y}$ is the value the variable <i>GDP per capita (monthly)</i> associated to i at month m in year y , and zero otherwise.	0.46	0.50
Low GDP per capita	For each FMP i , we take the distribution of the variable <i>GDP per capita (monthly)</i> in year y , and register its median value, call it $\bar{x}_{i,y}$. Then, we create a dummy variable which takes the value 1 if $x_{i,m,y} \leq \bar{x}_{i,y}$, where $x_{i,m,y}$ is the value the variable <i>GDP per capita (monthly)</i> associated to i at month m in year y , and zero otherwise.	0.54	0.50
Control variables			
Intensity of night lights within 5 km	Intensity of night lights in the 5 km radius around the location of FMP i at month $m-1$.	12.75	15.99
Number of conflicts within 5 km	Number of conflicts in the 5 km radius around the location of FMP i at month $m-1$.	2.46	8.94
<i>Some migrants in FMP plan to...</i> remain in Libya (1 = Yes)	Dummy variable. It takes the value 1 if one of the top 3 destination countries for migrants in FMP i in month $m-1$ is Libya, and zero otherwise.	0.45	0.50
return home (1 = Yes)	Dummy variable. It takes the value 1 if at least one country is both a top 3 planned destination and a top 3 origin country for migrants in FMP i in month $m-1$, and zero otherwise.	0.37	0.48
<i>Nightlights...</i>			
Low Intensity	Dummy variable. In each year, we calculate the distribution of the intensity of nightlights in the 5 km radius around FMPs. The variable assigns value 1 to FMPs falling in the lowest 33rd percentile of the distribution. It takes zero otherwise.	0.33	0.47
Middle Intensity	Dummy variable. In each year, we calculate the distribution of the intensity of nightlights in the 5 km radius around FMPs. The variable assigns value 1 to FMPs falling between the 34th and the 66th percentile of the distribution. It takes zero otherwise.	0.33	0.47
High Intensity	Dummy variable. In each year, we calculate the distribution of the intensity of nightlights in the 5 km radius around FMPs. The variable assigns value 1 to FMPs falling in the highest 33rd percentile of the distribution. It takes zero otherwise.	0.33	0.47
<i>FMPs located in...</i>			
East Libya	Dummy variable. It takes 1 if the FMP is located in the area of the country east to the Libyan centroid. It takes zero otherwise	0.56	0.49
West Libya	Dummy variable. It takes 1 if the FMP is located in the area of the country west to the Libyan centroid. It takes zero otherwise	0.44	0.49
Number of Observations		1,568	

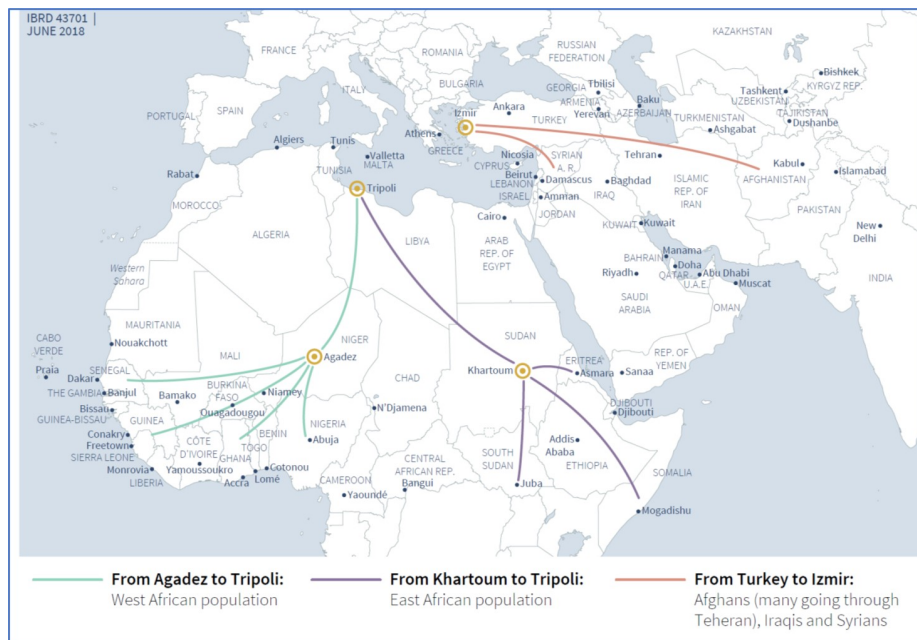
Table A3: News sentiment and migrants' movement: Other groups of migrants

Dep. Variable	Dhare of migrants who stay in FMP		
	Less than 2 weeks	Less than 3 months	Between 3 and 6 months
News Tone Destinations	0.0099 (0.0119)	0.0262 (0.0216)	0.0312 (0.0237)
Other controls	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes
Num. Obs.	1,568	1,568	1,568

Notes: OLS regression results. Standard errors clustered at the FMP level in brackets. Variables are defined in Tables A1 and A2. *Other Controls* includes thew same controls as in Table A11 column 3, namely: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *FMP with migrants planning to remain in Libya (1 = Yes)*; *FMP with migrants planning to return home (1 = Yes)*.. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

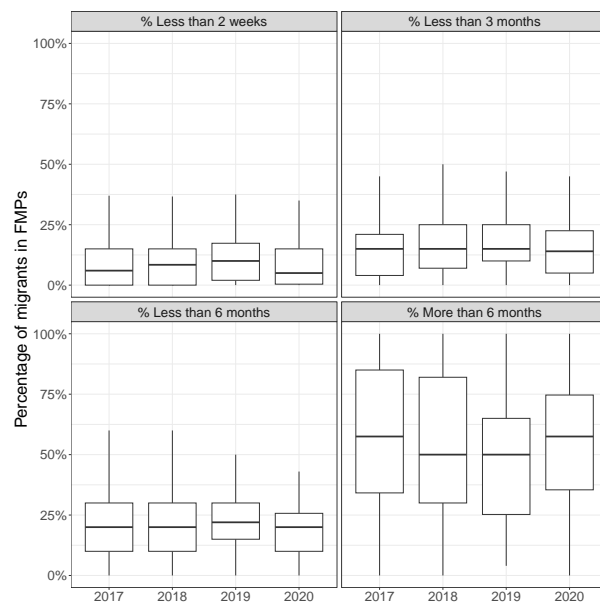
B Appendix: Additional figures

Figure A1: Migration routes to Europe



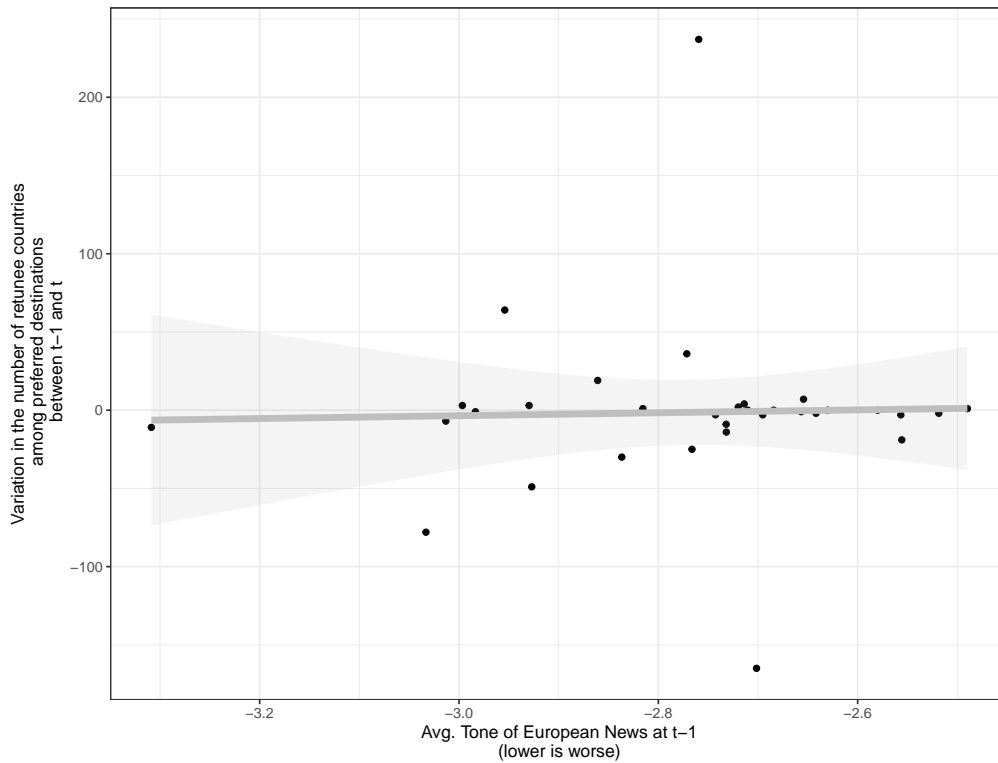
Source: Asylum Seeking in the European Union: Building Evidence to Inform Policy Making, The World Bank, 2018. Accessible from <https://documents1.worldbank.org/curated/en/832501530296269142/pdf/127818-V1-WP-P160648-PUBLIC-Disclosed-7-2-2018.pdf>

Figure A2: Percentage of migrants residing in one FMP by length of stay



Note: The figure shows the boxplot distribution of the share of migrants residing by a given amount of time within Lybian FMPs during a given year.

Figure A3: News in Europe and preference for returning home



Note: for each considered month, we measure the difference in the number of returnee countries indicated among the preferred destinations among FMPs between month $t-1$ and t , registered on the y axis, and the corresponding average tone of the news in European countries appearing among the preferred destinations of migrants in the FMPs at month $t-1$. The black line describes a regression line obtained with model $y_{my} = \alpha + \beta x_{my} + \gamma_y + \epsilon_{my}$, where α is the intercept, y_{my} indicates the value recorded on the y-axis in a given month, x_{my} indicates the value recorded on the x-axis in the same month, γ_y indicates year fixed effects, and ϵ_{my} is the error term. Returnee countries considered: Algeria, Bangladesh, Benin, Burkina Faso, Cameroon, Chad, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Ivory Coast, Jordan, Liberia, Malaysia, Mali, Mauritania, Morocco, Niger, Nigeria, Pakistan, Palestine, Senegal, Sierra Leone, Somalia, Sudan, Syria, Togo, Tunisia.

C Appendix: Migration in Libya - Additional information

Migrants in Libya can be grouped into three categories ([UNHCR, 2017b](#)). First, migrants from neighboring countries (Niger, Chad, Sudan, Egypt and Tunisia) and West and Central African countries (Nigeria, Guinea, Côte d'Ivoire, The Gambia, Senegal, Ghana, Mali, and Cameroon). They mostly report travelling to Libya for economic reasons. Second, migrants from East African countries (Eritrea, Somalia, Ethiopia, and Sudan). They often report having left their countries of origin because of political persecution, conflict, and economic distress. They tend to transit quickly through Libya on their way to Europe. Finally, most of nationals from outside Africa usually originate from non-neighboring Arab countries (Syria, Palestine, and Iraq). They are often fleeing conflict and are more inclined to travel as family units. Most of them are high-skilled and have a higher level of education.

[UNHCR \(2017b\)](#) reports that migrants transiting through Libya usually travel “step-by-step,” in a series of journeys fragmented into several legs. Given the lack of structured and hierarchal smuggling networks in the country, these journeys are often organized by the migrants themselves. Notably, migrants interviewed in Libya said that they are helped in the organization of their journey by friends, acquaintances, or members of their community. During each leg of their “step-by-step” journey, migrants pay the smugglers in charge of each leg separately in cash before departure ([UNHCR, 2017b](#)).⁴⁸ For this reason, migrants have to stop between each leg of the journey to work or receive money from relatives to fund the next leg. As a consequence of these “step-by-step” journeys in Libya, irregular migrants have become an important resource for local economic activities. This is not surprising. Working in Libya is not attractive anymore to regular foreign workers (notably from Egypt and Bangladesh), given the deteriorating security conditions, the high cost of living, and the decline of the Libyan dinar. Thus, irregular migrants are employed as low-cost labor to meet the demand for workforce ([Al-Arabi, 2018](#)). Because of their importance for the local businesses, official bodies (i.e., municipal councils and security directorates) often overlook the presence of irregular migrants. In particular, this is observed in the remote areas of the South, comprised between the regions of Kufra and Ghat, where it is even harder to secure regular foreign workers. Consequently, the increase in smuggling activities has been tolerated by local authorities especially in these

⁴⁸A different option to reach and then travel within Libya is that provided by “organized” illegal journeys from the country of origin to country of destination with a transnational, structured smuggling network. This type of journey however is particularly expensive meaning that large debts are built up, increasing the risk of exploitation and coercion for debt repayment ([UNHCR, 2017b](#)).

areas (Al-Arabi, 2018). UNHCR (2019) reports that in 2018 the Libyan borders with Egypt, Algeria, Tunisia, and Sudan were highly militarized while the southern borders with Niger and Chad were less so and thus easier to cross. Survey evidence indicates that most of the migrants in Libya know very little about the neighboring countries and that, in any case, they do not consider these countries as attractive destinations. Migrants indicate two main reasons: 1) in countries neighboring Libya they expect that there would be less work for migrants; 2) the need for legal documentation would make their stay in those countries more difficult, as most of them do not have documents.

The weak control by the local authorities does not imply that irregular migrants can travel safely across the country. Since the outbreak of armed conflict in 2011, the security situation in Libya has been precarious, and migrants, in particular, have been affected by various forms of protection concerns (UN-OCHA, 2018). Migrants moving along the western or eastern routes⁴⁹ to and through Libya face a lack of rule of law and a prevalence of criminal networks (UNHCR, 2017b). Along the migration routes, they often fall victims to extortion, are beaten, robbed, or detained, and are being subject to trafficking, forced labour, sexual violence and exploitation (IOM, 2019). In addition to the increased threat of armed violence, migrants, in particular those of sub-Saharan origin, have also suffered discrimination by the local population (UNHCR, 2019). Because of security concerns, migrants began to stop less than they used to during their journeys. They became also less inclined to stay for long periods of time in particular in the south of Libya, due in part to the many conflicts that the region has known in the past few years (UNHCR, 2017b).

⁴⁹The report refers to routes entering Libya from the east or southeast (from Egypt, Sudan or Chad) as “eastern routes” and to routes entering from the west or southwest (from Tunisia, Algeria or Niger) as “western routes”.

D Appendix: Robustness - Spatial Analysis

It is plausible to expect that migrants residing in FMPs geographically located close to one another can be exposed to unobserved common shocks: e.g., a sudden increase of conflictual activities, or a general drop in economic activities, pushing all migrants residing in one area to leave their FMPs. The potential presence of unobserved forms of spatial autocorrelation in the decisions of relocation of migrants residing in different areas represent a serious threat to our model identification, because by disregarding them, our estimates could be severely biased.

The identification of areas exposed to common shocks, however, is not trivial: for instance, the use of administrative areas would have little meaning here. At the same time, we can safely hypothesize that exposure to common shocks by migrants could be a function of their distance from one another.

In order to follow this approach, we re-estimate our main model specification using a Spatial Error Model (SEM), a standard model used in spatial econometrics. In practice, with this model we modify equation 1 so that the error term $\epsilon_{i,m,t}$ is now equal to $\lambda W u_{i,m,t}$, where W is an adjacency matrix with the generic i_j^{th} cell measuring the distance between FMPs i and j , and λ is an estimated parameter used to endogenously assess the degree of spatial autocorrelation between observations. As a result, SEM allows us to model unobserved common exposure to shocks among FMPs as a function of the distance between them, without advancing any other hypothesis on the form of spatial autocorrelation potentially at work.

Table A4 column 1, reports the estimates obtained with this model. We find that some forms of spatial autocorrelation in the decisions of relocation of migrants residing in different areas do exist. The parameter λ has in fact a negative and statistically significant impact on the presence of migrants in FMPs. At the same time, we note that our main result is qualitatively unchanged: i.e., a worsening in news tone affects the migrants' decision to remain longer in the FMP. Notably, however, we see that the statistical significance of its effect is now even stronger than that assessed using model 1. Taken together, these two observations suggest that, despite its significant role, neglecting the presence of spatial autocorrelation leads to a negligible bias for our findings and, if anything, disregarding this effect leads our main results to provide a more conservative assessment of the significance of the effect of the news on migrants' relocation decisions.⁵⁰

⁵⁰Observe that while we are able to comment on the difference in the statistical significance of this coefficient estimated by the SEM and the OLS, we cannot discuss the different coefficient's magnitude assessed by these two estimators. The reason is that the quantification of the coefficients provided by the SEM is different from

In the exercise that we have just conducted we have posited that all FMPs can be impacted by the same shock, even though this happens at different degrees depending on the distance between them. A potential problem with this approach is that some FMPs are situated at considerable distances from each other, and it may not be necessarily plausible to expect them to suffer from common shocks. For this reason, we test also a different hypothesis, that is only FMPs close to one another are exposed to common shocks. This is done by changing matrix W in the SEM. This time, the generic ij^{th} cell takes the value 1 if FMPs i and j are located close to one another, and zero otherwise.⁵¹ Closeness between two FMPs is defined as a distance of c.a. 230 kms, that is the minimum distance allowing each FMP to be exposed to a common shock at least with another FMP.⁵² The estimation of the SEM using the new version of W is reported in Table A4 column 2. Reassuringly, all our results are qualitatively confirmed.

Another threat to the identification of our model is represented by the fact that the presence of migrants in one FMP can influence the presence of migrants in other FMPs. For instance, this is the case if migrants who have been staying for a long time in one FMP leave that FMP (reducing the share of migrants who stay there for more than six months) and move to another FMP (reducing also the share of migrants who stay there for more than six months). Another possible hypothesis is that migrants residing in different FMPs are in contact with one another, and the choice to delay the journey to Europe by someone in one FMP (thus increasing the share of migrants who stay there for more than six months) can influence others located in other FMPs to do the same (increasing as well the share of migrants who stay there for more than six months). If this is the case, then we should expect the outcome of one FMP to be spatially autocorrelated with the outcome of a different FMP.

The possibility to model this form of spatial autocorrelation and test whether our results might be biased by the presence of it is provided by the Spatial Lag Model, the workhorse model in spatial econometrics. In practice, with this model we augment equation 1 with the term ρWy , where y is our dependent variable (i.e., the share of migrants who stay in one FMP for more than six months), W is the same adjacency matrix used when estimating the SEM, and ρ is the estimated impact of the relocation choices of migrants in one FMP on the relocation

that adopted when working with OLS.

⁵¹We stress the importance of this exercise of testing the robustness of the SEM estimations to the choice of W . The misspecification of this term can in fact lead to a severe bias in the results.

⁵²Choosing a smaller distance to define closeness is not possible, because SEM can only be estimated when W is invertible. A necessary condition for this to hold is that the row sums of W must be higher than zero: i.e., all FMPs must be correlated at least with another FMP.

choices of migrants in other FMPs.

We test this model adopting both versions of W employed in the estimation of the SEM: i.e., that considering the potential influence of one FMP over all others, and that constraining the influence of one FMP only to closer FMPs. The results are reported in Table A4, respectively in columns 3 and 4. Also in this case, all our results are qualitatively unchanged, and we find no evidence that spatial autocorrelation introduces any significant bias in our estimates.⁵³

Table A4: News sentiment and migrants' movement
Robustness: Spatial Analysis

Dep. Variable	Share of migrants in FMP who are long-stayers			
	(1)	(2)	(3)	(4)
News Tone Destinations	-0.0355*** (0.0127)	-0.0293*** (0.0127)	-0.0314*** (0.0125)	-0.0312*** (0.0125)
Estimator	SEM	SEM	SLM	SLM
Spatial autocorrelation exists between	All FMPs	Closest FMPs	All FMPs	Closest FMPs
λ [p.value]	-0.9425[0.0000]	0.1364[0.0065]	-	-
ρ [p.value]	-	-	0.3571[0.0004]	-0.0012[0.9655]
Other controls	Yes	Yes	Yes	Yes
FMP FEs	Yes	Yes	Yes	Yes
Year-month FEs	Yes	Yes	Yes	Yes
Country of destination FEs	Yes	Yes	Yes	Yes
Country of origin FEs	Yes	Yes	Yes	Yes
Number of Observations.	1,568	1,568	1,568	1,568

Notes: Results from Spatial Error Model (SEM) in columns 1 and 2, Results from Spatial Lag Model (SLM) in columns 3 and 4. In columns 1 and 3, spatial autocorrelation is modelled as a function of FMPs' geographic distance between each other. In columns 2 and 4, spatial autocorrelation is assumed to exist only between FMPs closer than 230km: i.e., the minimum distance allowing each FMP to be influenced at least by another FMP. The parameter λ is the degree of spatial autocorrelation between errors estimated by the SEM model. The parameter ρ is the degree of spatial autocorrelation between outcomes estimated by the SLM model. All other variables are defined in Tables A1 and A2 and additional details are provided in Section 4. "Other controls" include: *Intensity of night lights within 5 km*; *Number of conflicts within 5 km*; *Some migrants in FMP plan to remain in Libya (1 = Yes)*; *Some migrants in FMP plan to return home (1 = Yes)*. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

⁵³Observe that we cannot discuss the different magnitude of the coefficients assessed by the SLM and the OLS. As in the case of SEM, the quantification of the coefficients provided by the SLM is different from that adopted when working with OLS.