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▶ **To cite this version:**

Ettore Recchi, Emanuel Deutschmann, Federica Bicchi. Mobility hub or hollow? Cross-border travelling in the Mediterranean, 1995–2016. Global Networks, 2021, 21 (1), pp.146-169. 10.1111/glob.12259 . hal-03567071

HAL Id: hal-03567071

https://sciencespo.hal.science/hal-03567071

Submitted on 11 Feb 2022

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Mobility hub or hollow? Cross-border travelling in the Mediterranean, 1995–2016

EMANUEL DEUTSCHMANN,[*] ETTORE RECCHI[†] AND FEDERICA BICCHI[‡]

[*]*Georg-August University Göttingen, Göttingen, Germany/ European University Institute, Florence, Italy*
emanuel.deutschmann@uni-goettingen.de (corresponding author)

[†]*European University Institute, Florence, Italy/ Sciences Po, Observatoire Sociologique du Changement (OSC), CNRS, Paris, France*

[‡]*European University Institute, Florence, Italy/ London School of Economics, London, England*

Abstract *The Mediterranean is often portrayed as a hub of human mobility. In this article, we test this widespread view by exploring the structure of travel flows in the region over the last two decades (1995–2016). We find that mobility is much higher and increasing more strongly along the northern than along the southern shore, thus creating a growing mobility divide. South–north and north–south movements are even scarcer and stagnate or even decline over time. With a Gini coefficient of .87, mobility flows are distributed extremely unequally across country pairs in the Mediterranean. Community detection algorithms reconfirm that mobility predominantly takes place in disparate clusters* around *the Mediterranean, not across it. These findings imply that a 'neo-Braudelian' view of the Mediterranean as a mobility hub is less justified than a 'Rio Grande' perspective that conceives of the Mediterranean as a mobility hollow. Multivariate regression models for network data suggest that geographical distance and, to a lesser extent, political visa regulations, explain the unequal mobility structure better than differences in economic well-being.*

Keywords INEQUALITY, MEDITERRANEAN, MOBILITY, SOCIAL NETWORK ANALYSIS, TRAVEL, VISA REGULATIONS

Human mobility in the Mediterranean has captivated the collective imagination for millennia, reaching back at least to the eighth century BC, when Homer's *Odyssey* recounted the ten-year journey of the king of Ithaca across the Mediterranean Sea. Today, mobility in the area is no longer restricted to kings and seafarers. Rather, cross-

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border mobility has become widespread and affordable for increasingly large parts of society, with the worldwide number of cross-border journeys rising dramatically in recent decades (Deutschmann 2016; Recchi et al. 2019; Roser 2019). While cross-border mobility has now become a popular topic of social science research both globally (Reyes 2013; Sun et al. 2016) and in regions such as Europe (Kuhn 2015; Recchi 2015), we still know relatively little about the structure of travels in the Mediterranean. This is surprising given that (a) the Mediterranean was and continues to be a focus for public debates on a particular type of cross-border mobility – seeking refuge[1] – and (b) that the northern and southern states of the region have made political efforts to enhance cooperation and exchange across the Mediterranean, which require a clear benchmark on whether such increased interaction is actually visible in the form of rising cross-border mobility. There is thus a need for more comprehensive knowledge about mobility patterns in the region. In this article, we set out to fill this gap by exploring the network structure of human cross-border mobility in the Mediterranean between 1995 and 2016 and by providing potential political, economic and geographical explanations for it.

We argue that, theoretically, two mutually exclusive ideal types of how mobility in the Mediterranean is structured can be distinguished in the literature. The first one treats the Mediterranean as a mobility *hub*, namely as a region with a densely interconnected network of cross-border movements. The second one is the opposite and regards the Mediterranean as a mobility *hollow*, namely as a space where cross-border movements are relatively scarce. We will test empirically which of these two imageries of cross-border movement captures the empirical reality more adequately. To do so, we first follow a 'deductive' approach in which the countries bordering the Mediterranean are divided into north and south to examine the structure of mobility flows between and within these sub-regions. Second, an 'inductive' approach is used in which we let a community detection algorithm search for clusters of mobility in the region from within the data itself. Both methods lead to the same finding – a highly unequal structure of mobility with most flows of people occurring between the countries along the northern shore, supporting the idea of the Mediterranean as a mobility hollow, rather than a hub. In a final analytical step, we test three potential explanations for this structure, including political regulation (selective visa waiver agreements), economic inequality (people from richer countries in the north having more means to travel), and geography (physical proximity facilitating mobility).

The travel data that underlie our analyses covers non-resident visitors who spend at least one night in the receiver country, independently of the specific purpose of the visit. Thus, the data are comprehensive and should cover holiday tourists as much as business travellers and people who visit friends, romantic partners, or family abroad, while excluding 'border, seasonal and other short-term workers' as well as 'long-term students' (UNWTO 2015: 9). Some could argue that we are looking at rather 'banal mobilities' (Obrador Pons et al. 2009) set against the refugees' grave, life-threatening decisions to cross the Mediterranean by boat. However, we take such data as a measure of structural contacts between people from different origins and argue that they can – given their sheer quantity – be sociologically relevant. There is strong empirical evidence that such cross-border contacts are pivotal for the creation of a sense of

community, attachment, common identities and solidarity beyond national borders (Deutsch et al. 1957; Deutschmann et al. 2018; Fligstein 2008; Kuhn 2015; Lijphart 1964; Recchi 2017; Van Mol et al. 2015). Thus, exploring the (fragmented) structure of travels in the Mediterranean may contribute to understanding the (lack of) societal integration and cohesion in the region.

Our analysis starts in 1995 because earlier data on country-to-country travel flows are unavailable.[2] That year, however, is also a symbolical watershed, for in November 1995 the then 15 EU member states and 12 countries from the southern and eastern shores of the Mediterranean signed the Barcelona Declaration and launched the Euro-Mediterranean Partnership, geared at enhancing cooperation and exchanges across the Mediterranean (later referred to as the 'Barcelona Process'). In a sense, the Barcelona Process and subsequent attempts to implement and strengthen it (Bicchi 2007; Khader 2009) were inscribed into the long-standing attempt by European countries to 'construct a region' that includes the southern rim (Adler et al. 2006). The dynamics of human travelling in the two decades following the Declaration are thus a crucial test of its actual socioeconomic impact, assuming that individuals' movements can be seen as a key form of human interaction.

The rest of the article is structured as follows: in the next section we discuss the grand historical narratives on which the two theoretical ideal types are built, the 'neo-Braudelian' idea of the Mediterranean as a mobility hub and the 'Rio Grande' imagery of the Mediterranean as a mobility hollow. Next, we describe in greater detail our research questions and hypotheses before illustrating the data and methods. Then, we present the findings. In the concluding section, we take up the theoretical premises in the light of our empirical results.

Two competing imageries of the Mediterranean

How is mobility in the Mediterranean structured in the early twenty-first century? Two theoretical positions face each other in the literature dealing with this world area, depicting the Mediterranean either as a hub or as a hollow of human mobility flows.

The first perspective follows in the footsteps of the classic work of Braudel (1966), who postulated the unity of a Mediterranean civilization (in the singular), using the sixteenth century as a starting point for his analysis. Braudel based Mediterranean unity on persistent, common material culture and habitat, thus enshrining the shared Mediterranean geographical environment. More recently, a study by Horden and Purcell (2000), which echoes Braudel in showcasing the Mediterranean as 'a discriminable whole', relaunched the perspective of Mediterranean unity (Horden and Purcell 2000: 2). Unlike Braudel, however, they considered unity to stem not just from geography, but also from the human response to it, namely the connectivity between micro-environments (or 'microecologies' as they call them). In their view, the agency of the Mediterranean (conceived as a whole) resides in the thickness of human exchanges across the sea, as well as in the shared battle of humanity against recurring environmental catastrophes, such as famines and earthquakes. Mediterranean unity is thus

made by 'the unique concentration of factors that are not themselves peculiar to the region' (Horden and Purcell 2006: 735).

Horden and Purcell's notion of connectivity represents 'a paradigm shift in Kuhn's sense' (Morris 2003: 31), breaking as it does with the static and, we might add, over materialistic conception of the Mediterranean proposed by Braudel. But, at the same time, Horden and Purcell's work reflects the Zeitgeist and, in particular, the crucial importance of networks in the social sciences, which is at the core of their analysis of connectivity. From this perspective, then, 'the Mediterranean becomes a template for seeing the world of networks, relations and flows through trade and exchange' (Obrador Pons et al. 2009: 158), raising the question of whether 'nowadays, the Mediterranean represents more than ever a space of mobility, a space of constant flux' (Hadj-Abdou 2014: 85) and 'a sea of neighbourhood' to be contrasted with the Atlantic Ocean as a 'sea of distance' (Matvejevitch 2008).

A number of scholars have challenged the idea of Mediterranean unity from both historical and socio-political perspectives. Post-colonialist thinkers see the Mediterranean as an example of contradictory tensions not just across the area or within the concept of a Mediterranean, but also within European attempts to deal with it. Post-colonial analyses postulate a fundamental conflict that juxtaposes the northern shore of the Mediterranean against its southern one. This conflict originates from the incapacity of European actors to confront and redress their colonial pasts. Imaginative geographies can turn distance into difference, as Said (1978) put it, and this is exactly what is happening in the Mediterranean, where the northern shore imagines the southern shore as different and fair game for its rapacious practices. Therefore, the Mediterranean, while perhaps characterized by a multiplicity of crossings, is also prey to the inescapability of its contradictions and ultimately its unsettled nature (Chambers 2008). From this perspective, the Mediterranean exists as a field of tensions, and any description that tries to simplify or pacify the contradictions, is actually promoting a view of the Mediterranean that replicates a skewed power structure (Giaccaria and Minca 2011).

The Mediterranean as a fault line is also a leitmotiv of scholars in the vein of Huntington (1996), in the form of the 'clash of civilizations', with a large number of other contributions coming to the same conclusion from less extreme premises. For instance, because of a similar pattern of wide discrepancies in economic development and migration patterns in a similarly limited stretch of geography, the Mediterranean has been compared with the Rio Grande in America (Bernardie-Tahir and Schmoll 2018; Hadj-Abdou 2014; King 1998). Set against the imagery of the mobility hub is thus 'the tendency to think of the Mediterranean precisely as a space apart' (Obrador Pons et al. 2009: 159). Even Horden and Purcell (2000: 3) acknowledged that Mediterranean unity might be unable to withstand globalization.

Overall, we can thus differentiate between the 'neo-Braudelian' idea of the Mediterranean as a unified mobility hub and the 'Rio Grande' imagery of it as a divided mobility hollow. Which of the two more adequately describes the structure of travel flows in the region over the last two decades is, of course, an empirical question. We now discuss how this empirical issue will be addressed.

Research design

To find out which of the two ideal imageries – mobility hub or mobility hollow – best fits the reality of cross-border mobility in the Mediterranean, we explore how the Mediterranean network of travel flows is structured empirically and how this structure has evolved between 1995 and 2016. In terms of cross-border movements, the neo-Braudelian view (*mobility hub*) entails that journeys across the Mediterranean should be comparatively high and widespread throughout the region. The 'Rio-Grande' perspective (*mobility hollow*), by contrast, suggests that human mobility in the area is relatively low and fragmented, especially along the north–south axis. Figure 1 provides a stylized graphical representation of these two opposing ideas. The empirical reality will of course not be as clear cut as this parsimonious – perhaps even simplistic – opposition. Nevertheless, the two pictures may help understand what the complex empirical reality will be contrasted against.

Figure 1a. Ideal type I: The Mediterranean as a *mobility hub*



Figure 1b. Ideal type II: The Mediterranean as a *mobility hollow*



To carve out which of the two ideal types better fits the empirical network of cross-border flows, we take a twofold approach. First, we follow a 'deductive' procedure, distinguishing northern and southern countries as senders and receivers of travel flows as shown in Table 1. This approach has the merit of being relatively straightforward and in line with the historical narrative about the enduring cleavages in the Mediterranean. However, it might also inadvertently predetermine the structure of flows, potentially hiding agglomerations and voids of mobility along other, unexpected axes.[3] We therefore also resort to an 'inductive' approach, applying a community detection algorithm that automatically detects clusters of densely connected countries within the whole network of travel flows based on the structure of the data per se. The two approaches lead to consistent results: in both cases, the Mediterranean fits the imagery of the 'mobility hollow' better than that of the 'mobility hub'. The inductive approach, however, allows one to fine tune the coarser north–south cleavage, highlighting some sub-area concentrations of mobility and additional changes over time.

Table 1: Division of the Mediterranean countries into north and south

Sub-region	Countries
North	Albania, Bosnia and Herzegovina, Croatia, Cyprus, France, Gibraltar, Greece, Italy, Malta, Slovenia, Spain, Turkey
South	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia

In a final analytical step, we explore three potential explanations for the structure of mobility flows in the Mediterranean – an economic, a political and a geographical one. The *economic* explanation is that travelling requires access to financial means and that these are unequally available throughout the Mediterranean. In fact, in comparison with other parts of the world, the Mediterranean has one of the steepest gradients of prosperity among neighbouring countries (Espon 2010). It is thus possible that tourists from richer countries heading for cheaper destinations to benefit from lower costs dominate the mobility network (Crouch 1995; Massidda and Etzo 2012), or that there are fewer travellers from poorer countries because they lack the resources to be mobile (Delhey et al. 2015; Dwyer et al. 2000; Mau and Mewes 2012). To test this idea, we examine the effect of the prosperity of the sender country on the strength of mobility flows in the region.[4]

The *political* explanation acknowledges that governments regulate access to mobility. Here, we look at the effect of visa regulations, which have been shown to restrict mobility (Czaika and de Haas 2017; Gülzau et al. 2016). Specifically, we examine whether visa waiver agreements between countries increase mobility flows in the Mediterranean region.

The *geographic* explanation is based on the idea that mobility is most likely to occur between nearby countries and decreases fast as distances increase. Past research has shown that this pattern holds for many different types of human cross-border

mobility worldwide and that this factor explains the structure of mobility better than economic, political and cultural factors (Deutschmann 2016, 2017).

There are of course multiple other factors that could potentially explain the structure of travel flows (for example, linguistic communities or historical colonial ties) and a more complex model would be needed to take their relative influence into account. Yet, even without taking these additional factors into consideration, our analysis constitutes an important first step towards understanding the mechanisms behind the unequal structure of mobility flows in the Mediterranean.

Data and methods

Data on cross-border journeys come from the Global Mobilities Project (GMP) at the Migration Policy Centre (MPC) of the European University Institute (www.migrationpolicycentre.eu/globalmobilities/). The dataset was constructed by combining information from 219 excel files, which the World Tourism Organization (UNWTO) kindly provided, one per receiver country/territory. The UNWTO obtains the underlying information through different sources from its member states – administrative records (immigration, traffic counts and other possible types of controls), border surveys or a mix of them (UNWTO 2015: 9). The global harmonization of this data is, of course, as challenging as it is for other types of cross-border mobility such as migration (Poulain et al. 2006). States around the globe differ in their administrative and bureaucratic powers, including their capacity to record border entries and exits (Lee and Zhang 2017). The data thus have their limitations, but we still deem the UNWTO one of the most comprehensive and reliable sources of human cross-border mobility that is available to date. Their data have also provided the base for previous research on global mobility patterns (Deutschmann 2016; Reyes 2013).

One reason for the harmonization of the data contained in the individual receiver-country files being relatively complex was that country-to-country travel flows are reported in 12 different categories, the most common of which is 'arrivals of non-resident tourists at national borders, by country of residence'. Note that the term 'tourists' in this definition does not necessarily mean holiday travellers but rather non-resident visitors who stayed at least one night in the receiver country, independently of the purpose of the visit. The definition also implies that residents returning after a trip or stay abroad are not taken into account (for estimates including returning residents, cf. Recchi, Deutschmann and Vespe 2019). The UNWTO (2015: 9) further specifies the data as follows:

> *Arrivals* data measure the flows of international visitors to the country of reference: each arrival corresponds to one inbound tourism trip. If a person visits several countries during the course of a single trip, his/her arrival in each country is recorded separately. In an accounting period, arrivals are not necessarily equal to the number of persons travelling (when a person visits the same country several times a year, each trip by the same person is counted as a separate arrival).

To create a dataset that is as comprehensive as possible, we included all types of arrival data, based on a certain order of preference that is described in the online supplementary material together with several other decisions and steps that had to be taken to create a unified, standardized, and usable dataset.[5]

The full dataset, which is used in several analytical steps for comparisons between the Mediterranean and the global picture, covers travel flows between 196 countries worldwide (namely 38,220 country dyads). For the main analysis of this article, we created a reduced version of this dataset that contains only the countries that surround the Mediterranean Sea, minus Monaco and Montenegro (for which data were unavailable), plus Jordan (which is usually treated as part of the Mediterranean region although it does not border the shore). Thus, the following countries and territories are included – Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Gibraltar, Greece, Israel, Italy, Jordan, Lebanon, Libya, Malta, Morocco, Palestine, Slovenia, Spain, Syria, Tunisia and Turkey. The Mediterranean dataset thus covers 462 ties between 22 countries. Gibraltar, Libya and Syria have no data on incoming travels but are included as sender countries. In the 'inductive' part of the analysis, we draw on a version of the Mediterranean dataset that contains the absolute numbers of journeys. In all other analytical steps, we use dataset versions that adjust the absolute number of journeys for the population size of the sender country, using World Bank (2018a) data, to make flows between countries of different sizes more comparable.

One limitation of the UNWTO travel data is that 3.8 per cent of all travel arrivals in the global dataset are not reported for a specific sender country, but for meta-categories such as 'other countries in Africa' or 'other countries of the world' (see online supplementary material). It can be assumed that such meta categories are more likely to be constructed for sender countries from which only few and infrequent travel arrivals occur, which may also likely be the case for more distant regions. This structural feature of the data could theoretically lead to a slight underestimation of journeys between the northern and the southern shore of the Mediterranean in our analysis, since these meta categories are excluded from the analysis. However, a robustness check was run to test the extent of the potential bias. By far the largest case of such an occurrence of a meta category in the Mediterranean dataset is a tie of visitors from 'all countries of North Africa' to France. This category contains Algeria, Egypt, Libya, Morocco and Tunisia and covered 2.2 million arrivals in 2016. While this may seem like a large number, we tested whether its inclusion affected the reported results and found that it did not in any meaningful way. For example, the average strength of a south–north tie increases from only 5.13 to 5.25, that is to say, by 2.4 per cent, which does not affect the overall picture at all (see online supplementary material, Figure S2).

Another limitation is that it is difficult to discern between missing values and actual non-flows between countries, which results from the fact that non-flows are not reported as such in the original data (that is to say, country A will only report x travel arrivals from country B if $x > 0$). Over time, the number of reported ties as a fraction of the maximum number of possible ties increases (in the Mediterranean from 30.0 per cent in 1995 to 47.4 per cent in 2016), which could partly be an effect of more previously existing but non-reported ties becoming reported (namely a decrease in the

number of missing values) and partly an effect of previously non-existing travel connections between countries coming into existence (that is a decrease in the number of actual non-ties). While we suspect that a substantial part of the non-reported ties refers to (close to) zero travels between countries and can thus be neglected, we do not have the information with which to estimate the extent to which these two competing explanations hold. To deal with this issue, we created two alternative versions of the Mediterranean dataset. In the first one, all non-reported ties are treated as non-existing (we assume that all empty cells contain zero travel arrivals). In the second one, empty cells were filled with the value reported in the closest available year (when no value was reported for a tie in any year, it was treated as a non-existing connection). Thus, the first version probably *over*estimates the longitudinal growth of travel arrivals in the Mediterranean, whereas the second version *under*estimates it. By reporting results based on the two datasets, we are thus able to estimate the range within which the actual growth rate should lie.

Furthermore, in the first analytical step, we use the average tie strength (also referred to as 'mean degree' in network analytical terminology) to measure travel flows between countries, adjusted for the population size of the sender country. In other words, we look at how many travels per 1000 sender-country inhabitants occurred on average between any country pair in the Mediterranean (or its sub-regions). This measure has several advantages over raw absolute numbers. First, it only takes the reported dyads at each point in time into account and thus provides a conservative estimate of growth over time (which is important given the missing values issue described above). Second, it allows us to compare networks of different sizes in a reasonable way (for example, the Mediterranean with the global travel network). Third, it pays equal consideration to each and every possible dyad, which means that values are less driven by exceptionally high numbers between a select number of country pairs that do not actually stand for the entire region. High values are only likely if many country pairs in a region experience a lot of travel between them, thus providing a 'democratic' and robust measure of travel strength within a region.

In the 'inductive' analysis, we want to let an algorithm detect mobility clusters within the data themselves, without us as researchers interfering by pre-defining the cluster structure *ex ante*. There are now many different community algorithms with different strengths and weaknesses (see Coscia et al. 2011 for an overview). Here, we draw on a modularity-based community detection algorithm (Blondel et al. 2008; Newman 2006) that seems particularly well-suited and that has also been used in past research to detect clusters of human mobility between countries (Delhey et al. 2019; Sun et al. 2016). This algorithm, also called the Louvain method, belongs to the family of density-based community detection approaches. It detects 'dense communities' that consist of 'a set of entities [countries] that are densely connected [via journeys]'. One can further specify that 'to be densely connected, a group of vertices [countries] must have a number of edges [travel flows connecting them with other countries] significantly higher than the expected number of edges in a random graph (which has no community structure)' (Coscia et al. 2011: 523). In other words, modularity enables one to detect clusters by measuring how far the interaction between two nodes deviates from

a uniform random graph with the same degree distribution (see Coscia et al. 2011 for a mathematical definition and a comparison with other community detection algorithms). In our case, this technique thus allows one to partition the network into clusters of countries that are more densely interconnected via travel flows, while countries belonging to separate clusters are more sparsely connected via mobility. We compute the clusters in Gephi (Bastian et al. 2009) and report results based on a resolution of 1.[6] In addition, we represent the results of the cluster analysis comparatively over time via an alluvial diagram drawn in Map Equation (Rosvall and Bergstrom 2010).

Information on economic prosperity, which was required for the last analytical step, was created from World Bank (2018b) data on GDP per capita based on purchasing power parity in current international dollars. For Gibraltar, no GDP values could be obtained, and it was excluded from the analysis in this analytical step. Data on visa waiver agreements were taken from Mau et al. (2015) while data on geographic distance originate from CEPII's GeoDist dataset (Mayer and Zignago 2011). The latter data are based on the spatial distribution of the population of the countries' 25 largest cities and thus consider where people live.

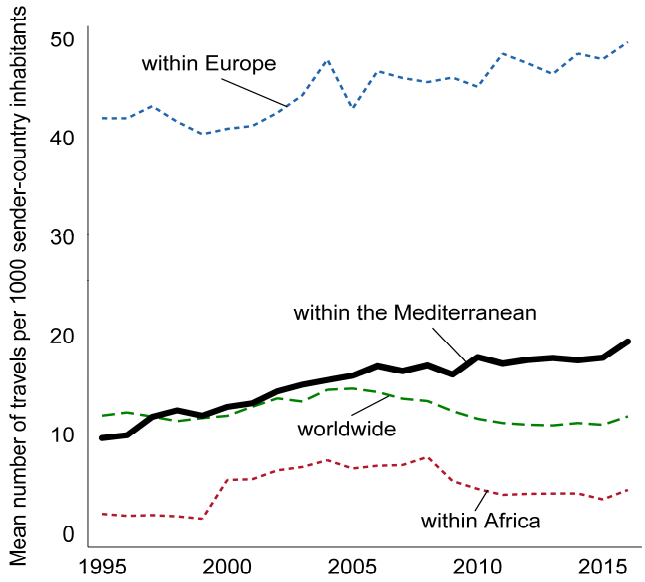
To test the effect of these variables on the network structure of mobility flows, we draw on the multiple regression quadratic assignment procedure (MRQAP) via double Dekker semi-partialling (Dekker et al. 2007). MRQAP takes the relational structure of network data and the resulting interdependence of observations into account (Biggiero and Basevi 2009; Krackhardt 1988). To do that, it first runs a standard multiple regression analysis across the cells of the dependent and independent data matrices. It then randomly permutes the rows and columns of the dependent matrix many times (in this case 2000). This permutation procedure enables one to estimate unbiased standard errors and is thus robust to the autocorrelation between rows and columns (namely interdependence of observations) that arises in network data (Tsai and Ghoshal 1998). Another advantage of this method is its robustness against multicollinearity (Dekker et al. 2003). We show standardized coefficients, which has the drawback that the interpretation of coefficients is less straightforward than for unstandardized ones (as in usual OLS regressions) but the benefit of allowing effect sizes to be compared across independent variables. We conducted all analyses in UCINET 6 (Borgatti et al. 2002).

Results

Over time, the total amount of journeys within the Mediterranean more than tripled from 18.1 million in 1995 to 62.6 million in 2016.[7] This picture of considerable growth is confirmed when we look at the mean number of journeys per 1000 sender-country inhabitants per country pair as a more sophisticated indicator (Figure 2). In the Mediterranean, this number has strongly and continuously increased in the 22 years under study, rising from 9.7 in 1995 to 19.4 in 2016. While it continues to range below Europe, with 49.7 departing international journeys per 1000 sender-country residents in 2016, its mobility levels are way above those of Africa, with 4.4 and no consistent upward trend.[8] The global picture is also one of stagnation, with 12.0 journeys per 1000 sender-country inhabitants between the average country pair in 1995 and 11.9 in 2016.

The Mediterranean, with its high growth rate, overshot the global trend in the 1990s and *appears* to have become a mobility hub in global comparison. However, serious doubt is cast on this interpretation once we open up the black box 'Mediterranean'.

Figure 2: Growth of travels in the Mediterranean in comparison with other world regions, 1995–2016 (population-size adjusted values)



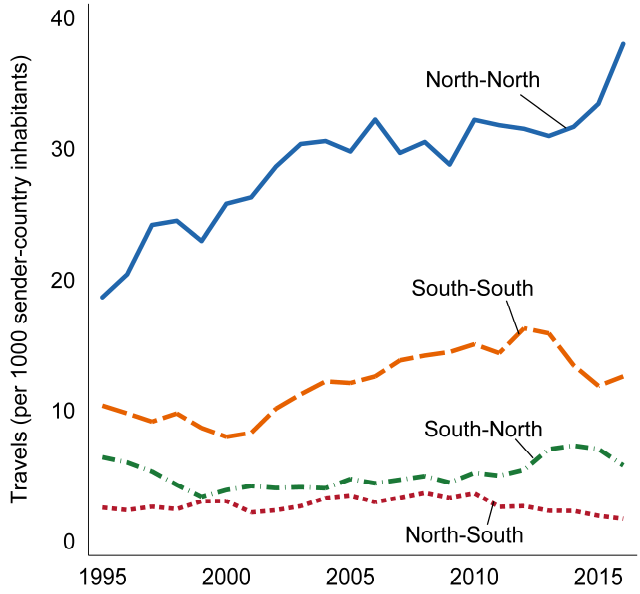
Note: Based on the version of the dataset that contains missing values. The figure shows the mean number of journeys per 1000 sender-country inhabitants per country pair in a specific region.

The Mediterranean as a mobility hollow and extremely unequal travel space

This picture of the Mediterranean as an increasingly salient mobility hub compared with the rest of the world changes dramatically once we introduce the division into north and south (Table 1). As Figure 3 reveals, diverging trends appear when we look at the development of north–north, south–south, north–south, and south–north travel separately. While north–north mobility is very high and strongly increasing over time, south–south mobility is lower and increases only slightly over time. Mobility that actually crosses the Mediterranean Sea, namely north–south and south–north, is very low in comparison and stagnates or even decreases over time. Thus, the Mediterranean seems to increasingly become a separated space – or hollow – of *unequal* mobility.

To explore this unequal structure of mobility flows more systematically, we can draw on the Gini coefficient and the Lorenz curve as two classical measures of inequality. While they are most commonly used to describe degrees of income inequality, they have also been proposed as valuable measures of inequality in spatial mobility and migration (Plane and Mulligan 1997). Figure 4 shows the cumulative distribution of the sizes of travel flows between countries in the Mediterranean in 2016. The dashed diagonal line shows what the distribution would look like in the hypothetical scenario

Figure 3: Population-weighted travel growth within and between North and South, 1995–2016

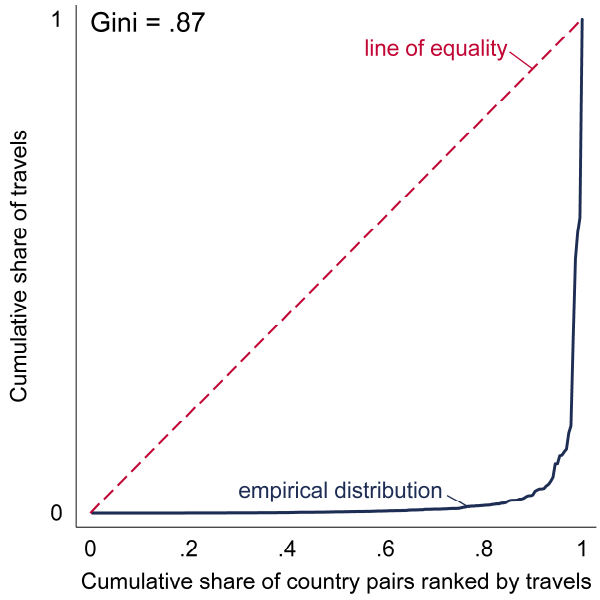


Note: Figure based on population-size adjusted version of the data.

of the same number of journeys occurring between each and every country pair. The solid line, by contrast, shows the actual distribution of flows. This Lorenz curve corresponds to a Gini coefficient of .87. This distribution is thus very unequal (a Gini of 0 denotes perfect equality while a Gini of 1 indicates perfect inequality). Moreover, the distribution of travels remained this unequal over the entire period under study (in 1995, for instance, the Gini coefficient was .86). This Mediterranean mobility Gini is also a lot higher than the one for income inequality in any country on earth, or even the global income Gini, which, at .71, is already very high in comparison (UNDP 2011). Further inspection suggests that the distribution of travels across country pairs in the Mediterranean also follows a power law, revealing a pattern of inequality that is commonly found in highly unequal distributions behind many natural and social phenomena (see online supplementary material).

All this illustrates that cross-border travelling in the Mediterranean is distributed extremely unequally not only between the north and south, but also across individual country pairs. Most travels occur between a small number of country pairs while most country pairs only experience a small number of journeys. A closer look at the data reveals that the large majority of journeys take place in the France–Italy–Spain triangle. In fact, the France–Italy–Spain triad constitutes only 1.3 per cent of all country dyads in the Mediterranean but covers 56.5 per cent of all travel flows in the Mediterranean in 2016 (in 1995, this value was 63.7 per cent). Movements between most other country pairs are rather small by comparison.

Figure 4: The unequal distribution of travel flows between countries in the Mediterranean, 2016



Note: A Gini coefficient of 0 denotes complete equality, 1 indicates extreme inequality.

Community detection algorithm confirms that the Mediterranean is a mobility hollow

In the next step, we let the modularity community detection algorithm automatically find clusters of countries in the travel data per se. This allows us to check whether the above findings can be replicated using this inductive approach that does not require predefined categories. Figure 5 shows the resulting clusters – within which countries are more densely connected via mobility than between them – mapped in 1995, 2005 and 2015. The colours of the circles (corresponding to countries) and lines (corresponding to travel flows) denote the cluster (see digital version for colours): the green, 'European' cluster revolves around France, Spain and Italy, which we already know produce the highest volume of mobility in the whole region. The red cluster includes Slovenia, Croatia and Bosnia-Herzegovina, and reflects their pre-existing unity as Yugoslavia, which apparently persists in terms of human flows between the nation-states created after its dissolution. The purple cluster identifies dense and prevailing flows within the Middle East, including Cyprus and Turkey. Finally, the dark grey cluster captures the intensity of travels across the Maghreb. Morocco is an exception, as it consistently forms part of the Europe-centred cluster due to solid flows with France, Italy and Spain. This link seems to be the only one that shows a mobility community spanning persistently *across* the two shores of the Mediterranean.[9] All other clusters are built *around* the Mediterranean, reconfirming the finding of the Mediterranean as a mobility hollow.

Figure 5a: Communities detected in the Mediterranean travel network (absolute flows), 1995

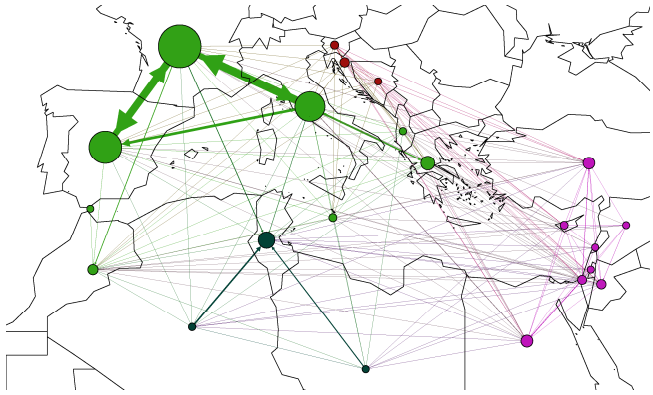


Figure 5b: Communities detected in the Mediterranean travel network (absolute flows), 2005

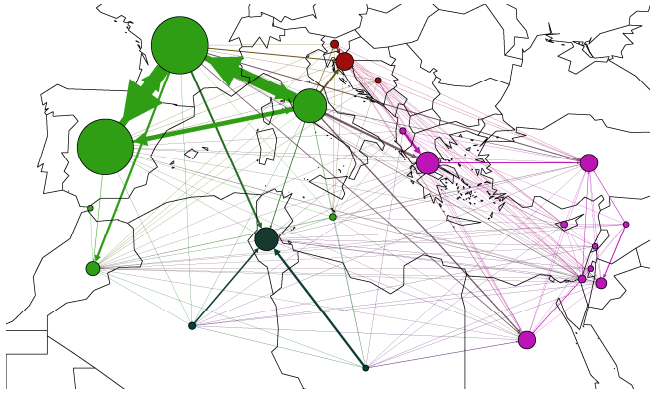
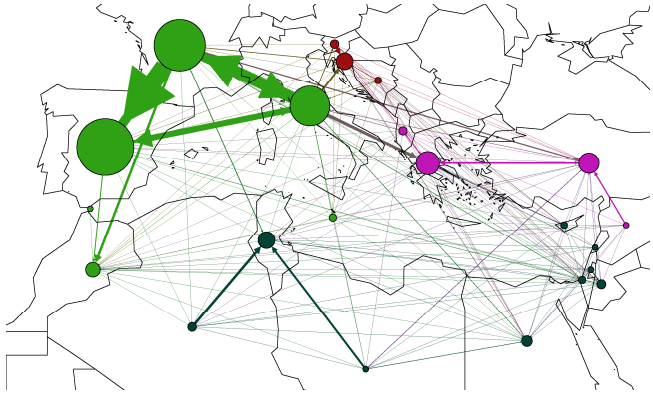


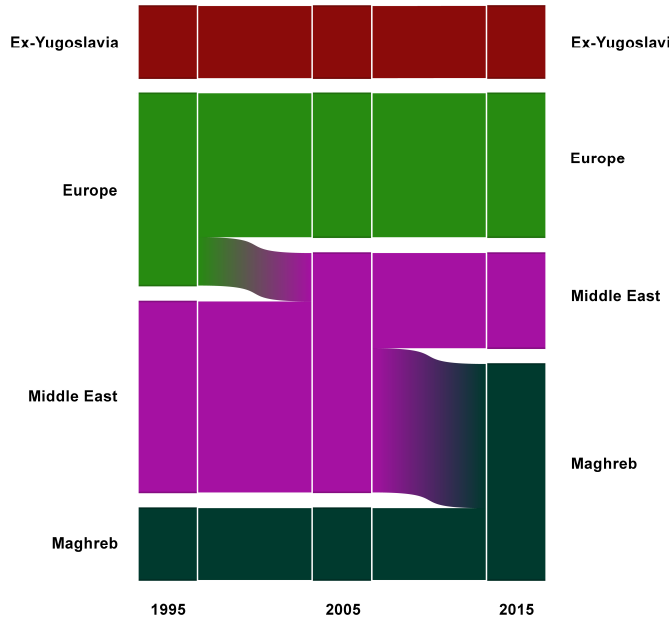
Figure 5c: Communities detected in the Mediterranean travel network (absolute flows), 2015



Note: Maps are based on a modularity resolution of 1. For these graphs the version of the network with absolute numbers of travel flows and imputed values from the closest available year is used.

Comparing the three subgraphs in Figure 5 reveals that this regionalized structure of mobility clusters built around the Mediterranean is also quite stable over time. In fact, there are only two major changes in the two decades examined. The first one is the shift of Greece and Albania, from 2005 onwards, out of the Europe-centred cluster (with France, Italy, Spain, Gibraltar and Malta) into the 'Middle-Eastern' cluster. This change is probably due to an intensification of movements to and from Turkey. One could contend that, from a mobility perspective, it is not Turkey that comes closer to the EU, but Greece that is attracted into a Levantine mobility circuit. Albania follows this shift because of its strong mobility links to Greece. In a sense, such a change parallels the position of Morocco in the west, evidencing two north–south 'bridge' ties. The second change arises in 2015. A range of countries from the south-eastern corner of the Mediterranean switches from the purple Middle Eastern cluster to the former 'Maghreb' cluster. This shift signals that the clusters are not entirely stable and fixed. However, at all stages, the clusters are hinged mainly *around* the Mediterranean, not across it. The alluvial diagram in Figure 6, in which the width of the clusters is proportional to the number of countries contained in them, provides an overview of these changes and the overall systemic stability in the cluster structure over time.

Figure 6: Communities detected in the Mediterranean travel network over time



Note: The thickness of the cluster depends on the number of countries involved.

Searching for explanations: economic inequality, political regulation, or geography?

We conclude our analyses by testing three potential explanations for the structure of mobility flows in the Mediterranean – economic well-being, political regulation and

geography. So far, our analysis suggested that each of them *might* play some role: regarding economic well-being, we saw that the large majority of journeys take place in the France–Italy–Spain triangle, which are also among the richest nations of the region.[10] Furthermore, looking at developments over time (Figure 3), one can see that north–north travels plateaued in the 2003–13 period, only to pick up quite strongly in the most recent three years, maybe as an effect of economic recovery from the Euro-crisis. Theoretically, economic well-being could play a role in three different ways – via prosperity in the sender country, via prosperity in the receiver country, or via the difference in prosperity between the sender and receiver country. A prior look at the bivariate correlations of these three variables with the strength of travel flows in the Mediterranean over time shows that only the prosperity of the sender country is significantly correlated with higher mobility (see online supplementary material for details). Therefore, we decided only to include this variable in the multivariate MRQAP model, which has to be sparing due to the relatively few degrees of freedom.

Regarding political regulation, a unique mobility-friendly legal framework – the EU free movement regime (Recchi 2015) – could increase travel on the northern shore. Conversely, the need for non-EU citizens to apply for visas may curb mobility from the south. To look at this factor systematically, we consider the presence or absence of visa waiver agreements as a variable. Regarding geography, Figure 5 clearly showed that the emerging clusters are geographically proximate. Furthermore, a closer look at the Italy–Spain–France triad reveals that the Mediterranean Sea could be acting as a geographical barrier in keeping movements between Italy and Spain to a lower level than those between Italy and France and Spain and France (see Table A1 in the Appendix). To examine the role of this factor, we take the geographical distance between countries into account, as discussed above.

To test the relative strength of these three[11] explanations systematically, we run a series of MRQAP models. Table 2 shows the results, presenting standardized coefficients. Models 1 to 3 contain the individual three variables separately. While all three factors have significant effects, the effect is relatively small (.118) and only significant at the 95 per cent confidence level for GDP (model 1). The effects are larger for visa waiver agreements (.187; model 2) and geographic distance (-.238; model 3). The latter two are significant at the 99.9 per cent confidence level. The sizes of the R-squareds from the three individual models (1–3) and the full model (4), in which the three variables are contained simultaneously, reconfirm this hierarchy. While the effect of GDP is no longer significant in model 4 (.069; $p>.1$), visa waiver agreements now have a weaker effect that is only marginally significant (.104; $p<.1$). The impact of physical distance, by contrast, remains relatively large and highly significant (-.210; $p<.001$). We can thus conclude that in explaining the structure of mobility flows in the Mediterranean, geography seems to trump political regulation, which in turn trumps economic inequality.[12] Even in the twenty-first century, the Mediterranean Sea and its underlying geography presents a major obstacle to crossing the shores, not just in the oft-discussed case of refugees, but also in the case of the legal short-term trips studied here.

Table 2: MRQAP models predicting travels (in 2010, per 1000 sender-country inhabitants)

	(1)	(2)	(3)	(4)
Economic well-being				
GDP (sender country)	.118*			.069
Political regulation				
Visa waiver agreement (1=yes)		.187***		.104†
Geography				
Distance			-.238***	-.210***
Intercept	.000***	.000***	.000***	.000***
Adjusted R^2	.009	.031	.053	.065
Observations	222	225	231	217

Note: Standardized coefficients shown. Based on 2000 permutations. Data from 2010 for all variables. $p < .001$***, $p < .01$**, $p < .05$*, $p < .1$†

Summary and discussion

In this study, we examined the structure of travel flows between Mediterranean countries and its development over time. We found that cross-border journeys in the Mediterranean

(a) are distributed extremely unequally in the region;
(b) take place predominantly *around* the Mediterranean Sea, not across it;
(c) are driven more strongly by the geographical distances and political travel regulations between countries than by economic inequality.

The first finding results from the fact that most of the travel flows occur between the European countries along the northern shore (particularly within the France–Italy–Spain triangle). In the two decades examined, these north–north mobility flows also increased more quickly than south–south movements. South–north or north–south mobility is even scarcer and stagnated or even declined over time. As a consequence, the mobility divide in the Mediterranean has grown over time, contrary to demands for increased exchange and cohesion in the region expressed by political representatives in the Barcelona process. With a Gini coefficient of .87, mobility flows are distributed extremely unequally across country pairs in the Mediterranean. Although this form of inequality exceeds the already high levels of economic inequality both within and between countries, it has thus far received relatively little attention. Yet, since trans-national mobility has been shown to have huge effects on life chances, well-being and world views (Delhey et al. 2015; Gerhards et al. 2017; Kuhn 2015; Van Mol et al. 2015), there is no immediate reason to argue that such a spatial mobility divide is morally more acceptable or less severe in its social and political consequences.

Overall, the disparity in the volume of mobility between the northern shore and the rest of the region questions a narrative that emphasizes the unity of the Mediterranean,

both as a comparatively dense area of travel and the seat of a widespread and all-encompassing network of flows. Mobility tends to occur *around* rather than *across* the sea, a finding that community detection algorithms in the inductive analysis have reconfirmed. This implies that the 'neo-Braudelian' view of the Mediterranean as a mobility hub is less justified than the 'Rio Grande' one that conceives of the Mediterranean as a mobility hollow. Thus, our findings are in line with an interpretation of the region as a divided 'space apart' (Obrador Pons et al. 2009: 159), put forward by critical scholars in the postcolonial and other traditions. At the same time, a landscape composed of 'mobility clusters' situated in separate sub-regional areas – which was particularly visible in the inductive community detection analysis – is partially in line with Horden and Purcell's (2000) portrayal of the Mediterranean being composed of distinct 'microecologies'.

On the third finding, multivariate regression models for network data suggest that geographical distance – and visa regulations to a lesser extent – has more explanatory power for the unequal mobility structure than differences in economic well-being. The strong role of geographical distance is interesting insofar as, in a way, it marks a return to Braudel's (1966) classic analysis of the Mediterranean through the back door. As discussed at the outset of this article, in his description of the Mediterranean in the sixteenth century, he emphasized the role of a shared geographical environment in uniting the region. Our analyses show that geography is still a meaningful force five centuries later, although its influence on the structure of human mobility flows in the Mediterranean is both divisive (when countries are further apart) and uniting (when they are close). Studies of *global* cross-border movements similarly conclude that distance is the most relevant (albeit not exclusive) structuring force (Deutschmann 2016).

At the same time, the significant influence of visa waiver agreements on travel flows highlights the role of political travel regulations in potentially uniting the region. The 1995 Barcelona declaration called for increased interaction across the Mediterranean. Most recently, this desire for more cross-regional mobility was again emphasized in the European Council's Conclusions that 'Africa is our neighbour, and this must be expressed by increased exchanges and contacts amongst the peoples of both continents' (Council of the EU 2018). Our research suggests that the existing and increasing fragmentation of travel in the Mediterranean can be at least partially overcome by visa waiver agreements for travellers from the southern shore. The extent to which political actors across the area are actually committed to pursuing such a policy objective that may lead to a more equal structure of travel flows in the Mediterranean remains to be seen.

Acknowledgements

We presented an earlier version of this article to the EUI's Migration Policy Centre's 2018 Annual Conference in Florence and thank its participants for their invaluable comments. We are indebted to the UNWTO for granting us access to the data used in this study and for inviting us to a meeting in Madrid to learn more about the data and their collection. Furthermore, we thank Auke Aplowski and Monika Verbalyte for excellent advice in constructing some of the graphs and two anonymous reviewers at *Global Networks* for important suggestions and comments that helped improve the article. All remaining errors are our own.

Notes

1. At the peak of the so-called 'refugee crisis', in 2015, more than a million refugees crossed the Mediterranean by sea (UNHCR 2018). Of the 25,949 migrants who lost their lives on the move worldwide in the 2014–17 period, 10,877 (41 per cent) did so in the Mediterranean, the large majority of them by drowning (IOM 2018). Understandably, given the tragedy of the loss of human lives and the polarizing political and social forces that these events unchained, the Mediterranean came under the spotlight as a catalyst of human mobility. In this article, we look beyond the dramatic but exceptional upsurge of refugee flows and track instead the structure of human journeys in countries bordering the Mediterranean Sea. Compared with the salience of the South–North mobility of asylum seekers in the public discourse, this actually dominant modality of mobility in the Mediterranean – legal, short-term visits to other countries – has remained invisible. Even at the peak of the crisis, in 2015, according to UNHCR (2018), such arrivals exceeded the number of refugee arrivals by a factor of 65; according to the UNWTO data we use (see below), there were one million refugee arrivals by sea in the Mediterranean in 2015 against 65.5 million cross-border travels in all. Whereas the historical development of migration and asylum-seeking in the Mediterranean has been well-studied (Collyer and King 2016; Hadj-Abdou 2014; Livi Bacci 2010; Mountz and Loyd 2014; Schmoll et al. 2015; Wolff and Hadj-Abdou 2017), mobility in the broader sense remains rather under researched.
2. The UNWTO has information on travel flows between *some* countries for the years prior to 1995, but it does not release these data on the grounds that they are too sparse and partially unreliable (personal communication with UNWTO staff, March 2018).
3. In some cases, it also requires rather arbitrary decisions, for example, on whether to allocate Turkey to the north or south. The 'inductive' approach of letting the material 'speak for itself' does not necessitate such forced categorizations.
4. In addition, we tested whether a higher differential in economic wellbeing between countries in the Mediterranean leads to more mobility between these countries. This would be in line with the income differential hypothesis in neoclassical economic migration research (Haug 2000) and the widespread idea in sociology that global wealth disparities are the main driver of international migration (Wobbe 2000: 21). However, we find no significant effect of this variable (cf. online supplementary material). Moreover, the Mediterranean is also an area characterized by political instability, particularly on its southern and eastern shores. We therefore also tested whether the deterrent effect of terrorist attacks could explain the unequal structure of mobility flows in the region using the global terrorism index (IEP 2012) as a source. However, no significant effect was found.
5. Supplementary material may be found online in the Supporting Information section.
6. Higher resolutions increase the number of communities, up to the limit of equating them to the number of units/countries, whereas lower resolutions decrease their number, until only one community is left (Lambiotte et al. 2009).
7. These numbers may overestimate growth slightly since, as discussed above, the number of non-reported values appears to be higher in earlier years. If we impute these non-reported values by taking the value from the closest available year – which should in fact lead to an underestimation of growth – the number of journeys still doubles from 31.7 million in 1995 to 64.0 million in 2016. It is thus reasonable to assume that the actual absolute growth rate lies somewhere between a doubling and tripling.
8. 'Europe' and 'Mediterranean' as well as 'Africa' and 'Mediterranean' are not disjoint units in these calculations. Rather, 'Europe' and 'Africa' are both partly composed of Mediterranean countries.

9. Note that at first sight, the maps in Figure 5a–c may appear closer to the one presented as the mobility hub ideal type (Figure 1a) than the mobility hollow ideal type (Figure 1b). However, this is only because even very minor flows are shown in Figure 5. The main focus here must be on the fact that the clusters of different colours are predominantly situated around the Mediterranean instead of spanning across it.
10. In 2016, France and Italy were the two richest countries in the Mediterranean (GDP p.c. 41,343 current international $ and 38,371 current international $, respectively), followed by Malta and Israel, with Spain ranking fifth (World Bank 2018b).
11. Security advice and travel warnings may also deter north–south mobility. In the 2000s, south–south mobility was also rising at good pace (see Figure 3). But there is a severe turning point from 2012–13 onwards, which could be influenced by the Arab Spring, regime change in Egypt, and eventually the civil wars in Libya and Syria (Lanquar 2011). In parallel, the southern Mediterranean shore has been sending a lower number of travellers northbound and has received a declining number of arrivals from countries located in the northern Mediterranean. Mounting insecurity is likely to have made outcoming travel more difficult and inhibited incoming tourism (see Drakos and Kutan 2003 for a discussion of how terrorist attacks retrench tourism). The decrease in all mobility that involves the south (south–south, south–north, north–south) during the last years under study (approximately 2013–16) is the negative mirror image of the stark increase in mobility within the north during the same time (see Figure 3). The effect of the perceived security situation on mobility flows is, however, hard to quantify. As mentioned above (note 4), we did test whether the deterrent effect of terrorist attacks could explain the unequal structure of mobility flows in the region using global terrorism index data (IEP 2012). However, no significant effect could be found.
12. This finding does not necessarily imply that economic well-being does not matter at all. It has been shown that economic gaps are an important predictor of the structure of visa waivers (Mau et al. 2012). Thus, the economic could lie behind the political. Similarly, the economically well-off countries in the Mediterranean are geographically close to each other.

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Appendix

Table A1: The 20 country pairs with the largest number of travel flows

Rank	2000			2015		
	Sender	Receiver	Arrivals	Sender	Receiver	Arrivals
1	Italy	France	7,869,000	France	Spain	11,503,609
2	France	Italy	6,033,885	Italy	France	7,594,272
3	France	Spain	5,622,456	France	Italy	6,483,089
4	Spain	France	2,995,000	Spain	France	6,091,464
5	Italy	Spain	2,137,961	Italy	Spain	3,907,288
6	Spain	Italy	1,368,057	Spain	Italy	1,974,043
7	Italy	Croatia	1,011,634	France	Morocco	1,563,568
8	France	Tunisia	997,882	France	Greece	1,522,100
9	Slovenia	Croatia	848,888	Algeria	Tunisia	1,481,312
10	Italy	Greece	823,245	Italy	Greece	1,355,327
11	France	Morocco	813,865	Libya	Tunisia	1,215,832
12	Italy	Egypt	752,166	Slovenia	Croatia	1,191,998
13	Albania	Greece	717,263	Turkey	Greece	1,153,046
14	Libya	Tunisia	685,208	Italy	Croatia	1,111,428
15	Algeria	Tunisia	611,620	Syria	Turkey	844,283
16	Greece	Italy	605,756	France	Turkey	792,133
17	France	Greece	602,353	Greece	Turkey	712,148
18	France	Turkey	419,184	Spain	Morocco	626,896
19	Greece	France	405,000	Tunisia	Algeria	575,300
20	Italy	Tunisia	393,891	Albania	Greece	491,381

Supporting Information

Additional supporting information may be found online in the Supporting Information section.