A Appendix

Figure A1: Main routes connecting Africa and Middle East to Europe

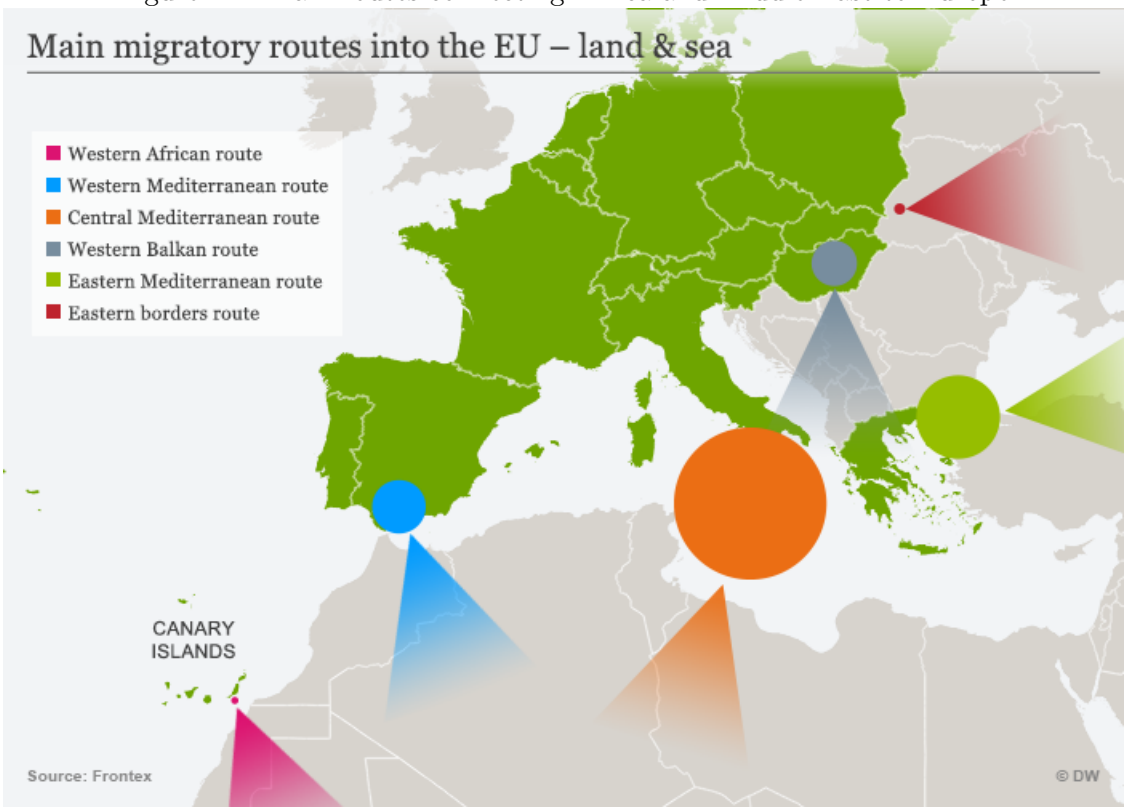
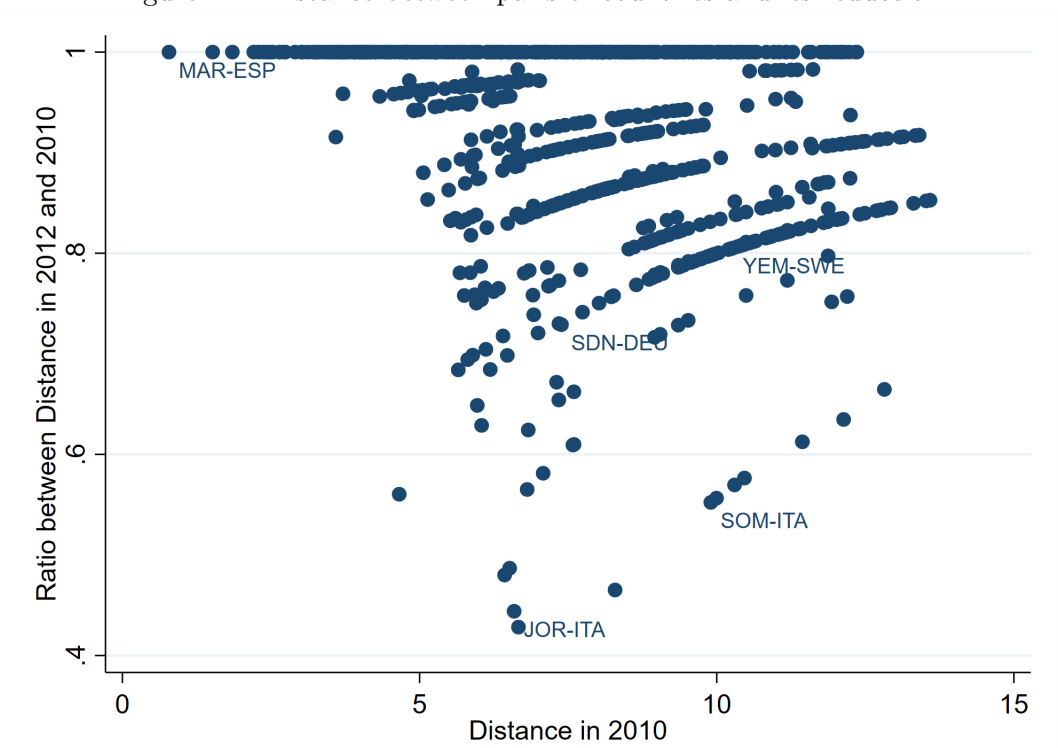
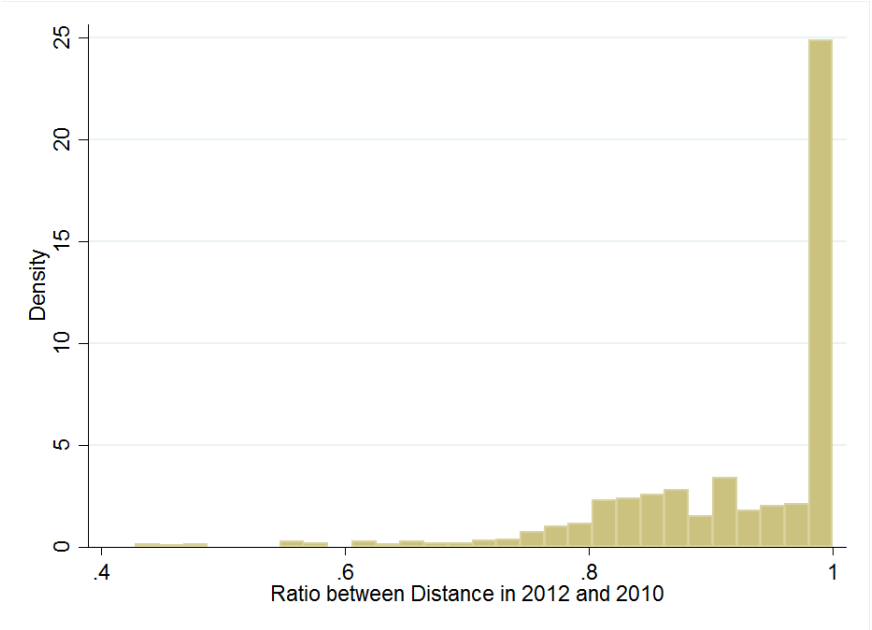


Figure A2: Distance between pairs of countries and its reduction



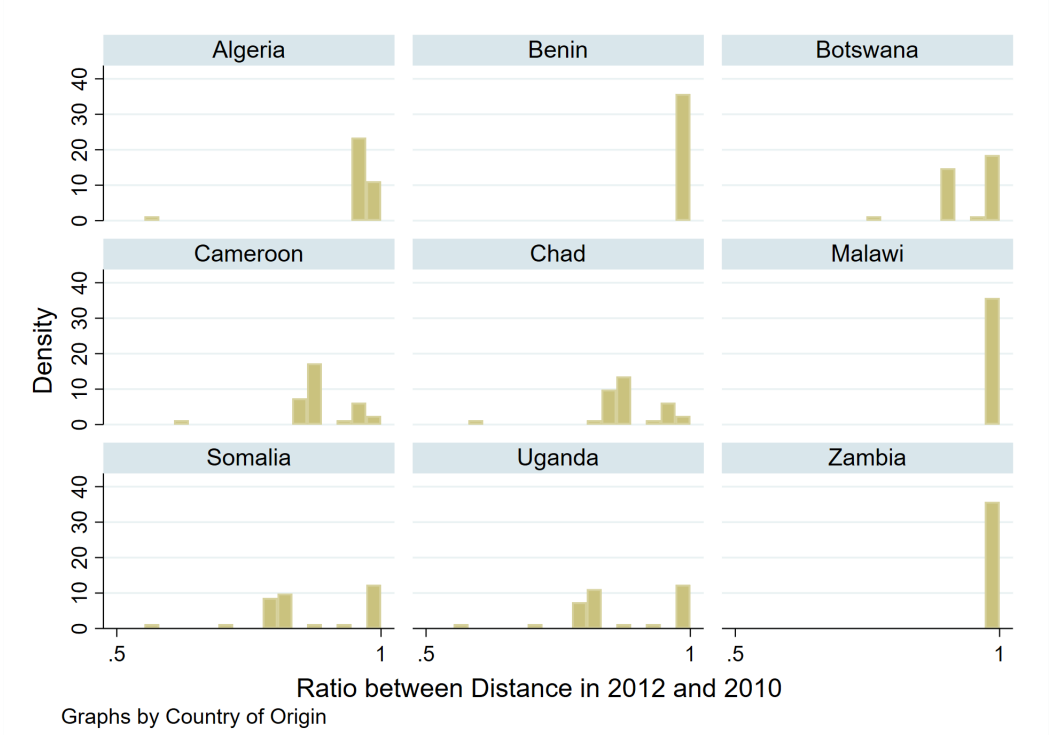
Notes: The figure shows, for each country pair, the ratio between distance in 2012 and 2010 against the distance in 2010, in 1,000 Kilometres.

Figure A3: Distribution of the 2012-2010 distance ratio.



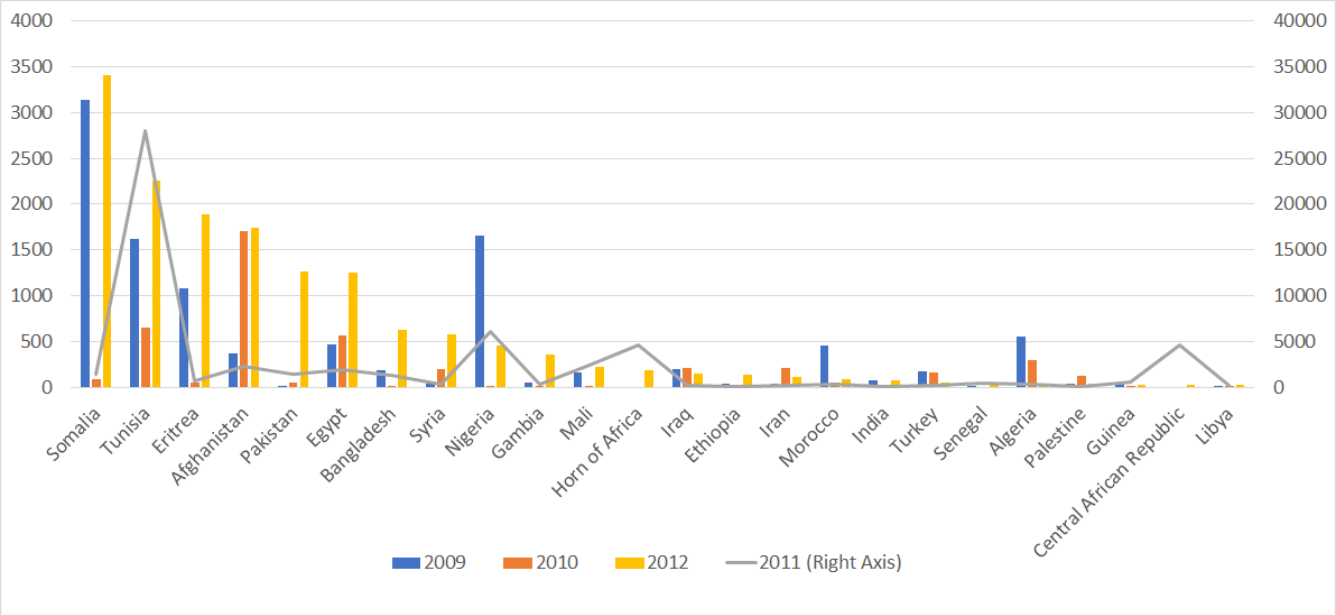
Notes: The figure shows the distribution, calculated among country pairs, of the ratio between distance in 2012 and 2010.

Figure A4: Distribution of the drop in smuggling distance



Notes: The figure plots the distribution of the drop in smuggling distance from all European countries between year 2010 and 2012 by selected country of origin. Source: Frontex.

Figure A5: Detected illegal migrants across the Central Mediterranean Route by country of origin



Notes: The figure shows the number of detected illegal migrants (i.e. detected border crossings) arriving in European territory across the Central Mediterranean Route from selected origin countries in years 2009 to 2012. Arrivals for year 2011 are reported on a different scale (right). Source: Frontex

Figure A6: Land and sea irregular migration routes from Africa in 2012

Source: iMap (http://www.imap-migration.org/)

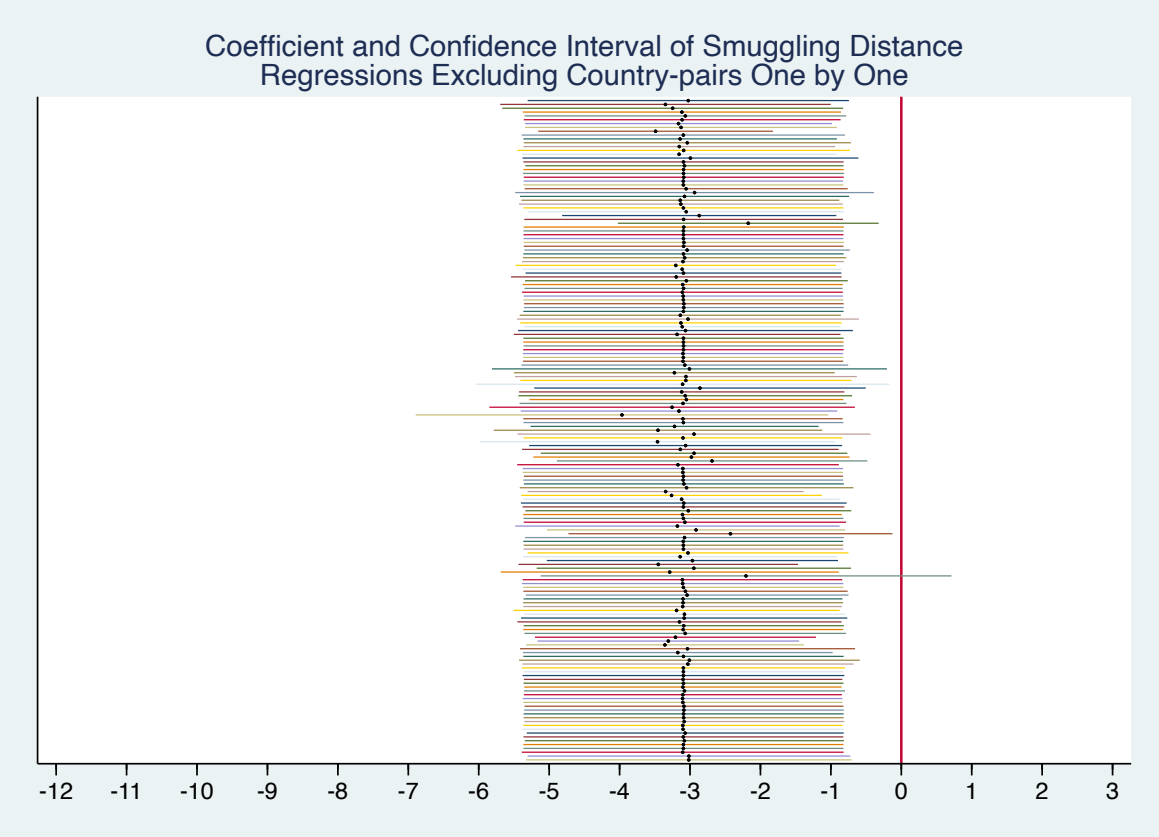
Table A1: The impact of *weighted distance* on bilateral migration intention

	Main specification	East vs West	SSA	Rule of Law	Internet
Distance	-2.627***	-3.865***	-2.313**	-1.017	-2.519**
	(0.904)	(0.976)	(1.145)	(1.487)	(0.984)
Distance * WestAfrica		3.347***			
		(0.669)			
Distance * SSA			-0.534		
			(1.416)		
Distance * Low ROL				-0.355**	
				(0.181)	
Distance * Low Internet penetration					2.256**
					(1.009)
N	431	431	431	431	431
OriginXYear f.e.	YES	YES	YES	YES	YES
DestinationXYear f.e.	YES	YES	YES	YES	YES
Pair f.e.	YES	YES	YES	YES	YES

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The dependent variable country-level bilateral migration intention. Smuggling distance is the shortest path connecting origin and destination countries obtained with the Dijkstra algorithm described in Section 4.2 where sea links weights twice than links over land. Results are estimated with PPML, the sample includes years 2010, 2012, 2013. All regressions include a set of individual-level controls plus country-pair and country-year fixed effects. Standard errors clustered at the level of origin country and destination country are reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Figure A7: Coefficient plot of regressions eliminating country pairs one-by-one



B Appendix

Here we provide evidence on migration dynamics in the Mediterranean context by using Frontex data on actual arrivals via different land and sea routes in the time period of the study. The opening of the CMR results in a new smuggling network making a number of African countries closer to Europe than before. If this change entails a change along other routes as well, e.g. crowding out other neighboring smugglers or making the journey through other routes more costly or difficult for some reasons, this general equilibrium effect will offset or confound the identification of a change in smuggling bilateral distances. By using route-specific bilateral data we provide aggregate evidence that no major change or diversion of flows occurred along other routes throughout the region in the period under study.[48] This is not surprising given the sudden shock occurred in the Libya hub and the short time-span we consider in the 'natural laboratory' that is Africa at the turn of 2011. [49] It is important, though, in order to rule out a general equilibrium effect whereby the direct effect of the CMR shock is offset by potential migrant relocation along other routes.[50]

The empirical specification therefore is as follows:

$$M_{ot}^{R} = \gamma_1 T_{ot} + \delta_o + \tau_t + \epsilon_{ot} \tag{6}$$

where M_{ot}^{R} is the number of immigrants from country o arriving to Europe in month t using the smuggling route R, which can be either the CMR or any other route. T_{ot} is our treatment variable, which is equal to one after January 2012 for those countries o that get closer to at least one European destination country. δ_o are country fixed effects (or a dummy for the treated countries) and τ are month fixed effects or simply the usual pre-post dummy. ϵ_{ot} is an i.i.d. error term.

Table B1: The impact of CMR opening on monthly arrivals in Europe

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Migrants through CMR			Migrants through other routes		
γ_1	14.3542***	14.3542***	9.2879***	-0.1319	-0.1319	-1.7470
	(3.6010)	(3.6501)	(3.1716)	(12.9292)	(13.0729)	(9.4965)
Lagged Migrants			0.3688**			0.6943***
			(0.1698)			(0.1468)
Observations	864	864	864	864	864	864
Country FE	YES	YES	YES	YES	YES	YES
Post 2011 dummy	YES	NO	NO	YES	NO	NO
Month FE	NO	YES	YES	NO	YES	YES

Notes: The dependent variable is the monthly flow of migrants arriving in Europe using the CMR (columns 1 to 3) or any other routes (columns 4 to 6). The estimation sample is the 12 months of 2010 and the 12 months of 2012. Results are estimated by means of OLS. All regressions include a set of country fixed effects and a dummy for months in year 2012 (columns 1 and 4) or monthly dummies (other columns). Columns 3 and 6 include the one month lag of the dependent variable. Robust standard errors are reported in brackets. *** p<0.01, ** p<0.05, * p<0.1

Results presented in the first three columns of Table B1 show that the opening of the CMR significantly increases irregular flows (arrivals) through that route – this is so even after controlling

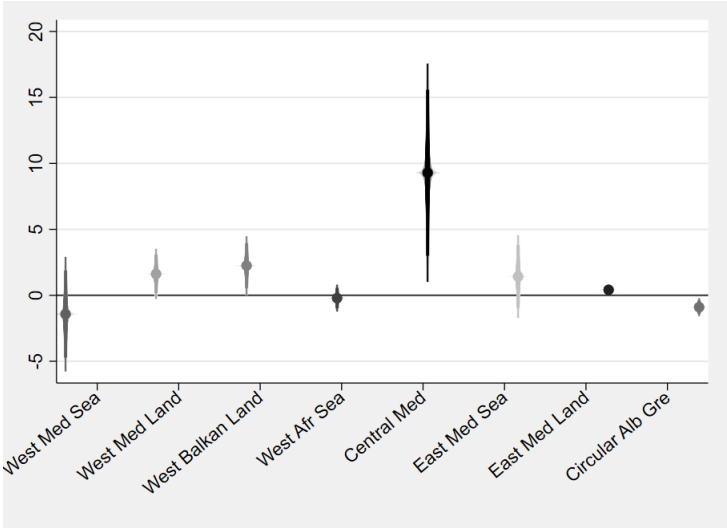
[48] Indeed our analysis might suffer from the presence of people from different countries already in Libya in 2010 that managed to move only in 2012.

[49] It not unlikely that other diversion effects are at work later on throughout the region, i.e. starting from 2013, depending on migration (rescue and enforcement) policies implemented in the area. This is a reason why we focus on 2010-2012 only.

[50] This general equilibrium effect is mechanically muted in our empirical model, though, as outlined in the following section.

for the lagged flow of migrants that take into account short-term network effects (second row). Importantly, once we use immigrant flows arriving through any other route as the dependent variable, results on the coefficient of the treatment are small, negative and non-significant. These results are also confirmed estimating equation 6 for each route. Results for the estimates of each γ_1 are reported in Figure B1.

Figure B1: Aggregate estimates by route



Notes: The figure shows the estimated coefficient γ_1 and 95% and 99% confidence intervals from a set of regressions on each route separately based on Equation 6, where the treatment variable is a dummy taking value one if the origin country, between 2010 and 2012, got closer to at least one European country. Lagged monthly flows, country and month dummies are included in the specification.

This analysis suggests that, in the period we consider, no diversion of flows has been triggered by the opening of the CMR. This aggregate empirical setting is reassuring once we implement our individual-level analysis as presented in Section 6.[51]

[51] Results hold even when expanding the sample to months of years 2009 and 2013 and including year 2011 among the non-treated. Also, when using a stricter definition of treatment (i.e. countries that got closer to at least two destinations), results remain unchanged.

C Appendix: Intentions vs Actual migration

In this section we provide evidence of correlation between actual migration data and intentions from the GWP. Data on bilateral asylum applications over time is available both from the UN (UNHCR Population Statistics Reference Database on the number of applications) and Eurostat. We use population data from the World Bank WDI to calculate the share of asylum applicants from these two sources.

Figure C1 shows the linear prediction with confidence intervals between the share of bilateral asylum application and share of migration intentions (in total origin country population) over the period we use in our main specifications (i.e. 2010-2013). There is a significant positive correlation between bilateral migration intentions and actual migration measured by asylum applications, with the magnitude being larger for intentions. Indeed, this is likely to be the case since actual asylum applications are smaller than intending migrants and may under-represent true migration figures.

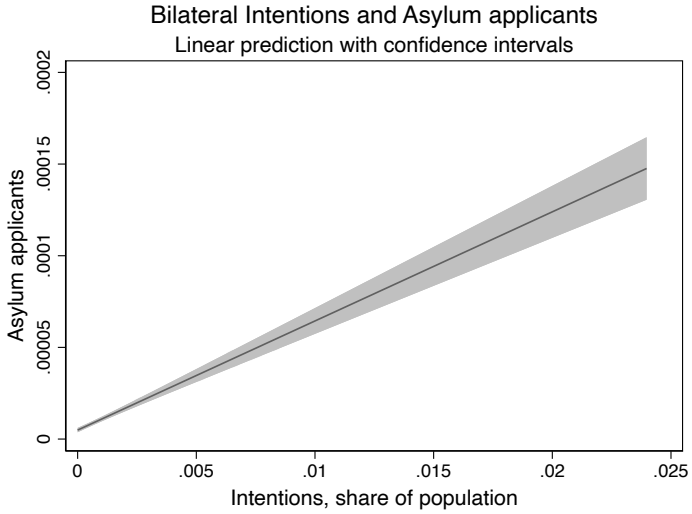


Figure C1: Migration intentions and Asylum applicants
Note: Asylum applications in the total origin population obtained from Eurostat; migration intentions are the share of intentions in origin population.

In table C1 we further explore the correlation between asylum applicants and intentions, and run OLS regressions with different fixed effect models. In the first two columns we use bilateral asylum application from Eurostat as the dependent variable (as a share of origin country population), while in the second two column the dependent variable is the bilateral asylum application from the UN dataset. Across all specifications, the correlation is positive and highly significant. Results indicate that with a one percentage point increase in bilateral migration intentions, bilateral asylum applications increase by 0.001 point when we include both country-year and pair fixed effects.

Table C1: Asylum applications and migration intentions

Dep.:Asylum applications	Eurostat	Eurostat	UN	UN
Intentions	0.0012	0.0011	0.0027	0.0011
	(0.0004)***	(0.0004)***	(0.0006)***	(0.0004)***
R^2	0.79	0.84	0.92	0.84
N	2,879	2,879	2,253	2,879
OriginxYear f.e.	NO	YES	NO	YES
DestinationxYear f.e.	NO	YES	NO	YES
Pair f.e.	YES	YES	YES	YES

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: The dependent variable is the share of asylum applications in the total origin population; in the first two columns based on data from Eurostat, in the second two column from UN. Migration intentions are the share of intentions in origin population.

D Appendix

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E Appendix

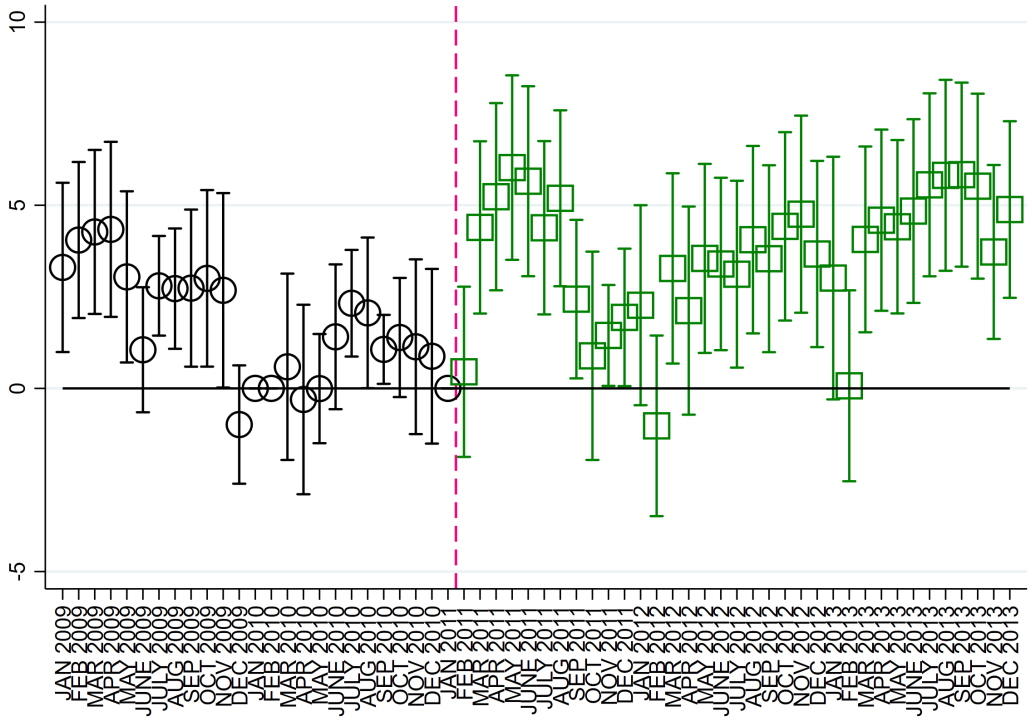
In this Appendix, we start from the results presented in Table 7 and Figure 7 and we provide some robustness for the results. Extending the sample to year 2009, during which the Friendship Treaty between Italy and Libya have been ratified and subsequently put into operation, delivers qualitatively similar results. Table D1 shows that coefficients roughly halve with respect to those obtained for the period 2010-2013 (corresponding to a -3 elasticity for the log distance specification and, in the case of 20% distance drop indicator, a 470% increase in flows). The corresponding event study analysis (Figure D1) suggests that 2009 was a year in which the closing of the CMR was not yet effective as coefficients in that year, while smaller than in the post-January 2011 period, are positive and often significant, though compatible with a gradual implementation of a stricter closing of the CMR that reached its maximum enforcement in 2010. Finally, results hold also when we restrict the sample to years 2010 to 2012, and even excluding all the months of year 2011, see Tables D2 and D3.

Table D1: Effect of distance drop on actual flows, 2009-2013.

Dependent variable:	Migrants			
	(1)	(2)	(3)	(4)
Log(Distance)	-3.089***			
	(0.500)			
Distance Drop		1.263***		
		(0.149)		
Distance Drop (20%)			1.741***	
			(0.167)	
Distance Drop (40%)				1.902***
				(0.226)
OriginXMonth FE	YES	YES	YES	YES
OriginXRoute FE	YES	YES	YES	YES
Observations	5581	5581	5581	5581
Pseudo R-squared	0.88	0.87	0.88	0.88

Notes: The dependent variable is the monthly flow of migrants arriving in Europe using the WMR, the CMR, and the EMR between January 2009 and December 2013. All PPML regressions include sets of origin-month and origin-route pair fixed effects. Explanatory variable is the log of bilateral distance (column 1) and an indicator for distance dropping by more than 0, 20%, and 40% after the Arab Spring (columns 2 to 4, respectively). Standard errors clustered at the level of country of origin are reported in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Figure D1: Dynamic effects, years 2009-2013



Notes: Dynamic effects of the shortening of bilateral smuggling routes by at least 20% on bilateral flows of migrants by month. Coefficients and 95% confidence intervals. Time period is January 2009 - December 2013, with January 2011 as the baseline omitted month. Saturated leads-lags version of Equation 5, which includes origin-month, route and origin-route pair fixed effects. Standard errors are clustered by country of origin.

Table D2: Effect of distance drop on actual flows, 2010-2012.

Dependent variable:	Migrants			
	(1)	(2)	(3)	(4)
Log(Distance)	-5.172***			
	(1.435)			
Distance Drop		1.065***		
		(0.194)		
Distance Drop (20%)			2.864***	
			(0.282)	
Distance Drop (40%)				2.698***
				(0.357)
OriginXMonth FE	YES	YES	YES	YES
OriginXRoute FE	YES	YES	YES	YES
Observations	3377	3377	3377	3377
Pseudo R-squared	0.88	0.86	0.88	0.87

Notes: The dependent variable is the monthly flow of migrants arriving in Europe using the WMR, the CMR, and the EMR between January 2010 and December 2012. All PPML regressions include sets of origin-month and origin-route pair fixed effects. Explanatory variable is the log of bilateral distance (column 1) and an indicator for distance dropping by more than 0, 20%, and 40% after the Arab Spring (columns 2 to 4, respectively). Standard errors clustered at the level of country of origin are reported in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table D3: Effect of distance drop on actual flows, 2010 and 2012.

Dependent variable:	Migrants			
	(1)	(2)	(3)	(4)
Log(Distance)	-4.624***			
	(1.782)			
Distance Drop		1.083***		
		(0.274)		
Distance Drop (20%)			2.649***	
			(0.330)	
Distance Drop (40%)				2.900***
				(0.406)
OriginXMonth FE	YES	YES	YES	YES
OriginXRoute FE	YES	YES	YES	YES
Observations	2013	2013	2013	2013
Pseudo R-squared	0.89	0.88	0.89	0.89

Notes: The dependent variable is the monthly flow of migrants arriving in Europe using the WMR, the CMR, and the EMR for all months in years 2010 and 2012. All PPML regressions include sets of origin-month and origin-route pair fixed effects. Explanatory variable is the log of bilateral distance (column 1) and an indicator for distance dropping by more than 0, 20%, and 40% after the Arab Spring (columns 2 to 4, respectively). Standard errors clustered at the level of country of origin are reported in brackets. *** p<0.01, ** p<0.05, * p<0.1.