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Economic Interdependence and Conflict in MENA

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Abstract

Militarized conflict worldwide has been on a declining trend after World War II while trade and economic interdependence have been in-creasing rapidly. Whether trade and economic interdependence promote peace and whether conflict harms trade ties between countries are critical questions which have been studied widely in the conflict literature. A strand of this literature finds that bilateral trade reduces the probability of militarized conflict while multilateral trade increases the probability of conflict. In this research, we ask whether the relationship between trade and conflict is different for the MENA region as compared to the rest of the world. Using the dataset on Militarized Interstate Dispute between 1960 and 2014, we find that trade is not disrupted significantly after a conflict episode in the region. We find that unlike previous studies, both bilateral and multilateral trade induce conflict in the overall MENA region, however, as for oil rich countries, the increase in bilateral trade links is associated with lower probability of militarized conflict. RTAs within the region almost do not have an impact, due to their low effects on regional trade. Deeper RTAs may have had a different impact. Furthermore, countries with higher export sophistication are more likely to engage in conflict in the region. Finally we do not find a statistically significant relationship between FDI flows and conflict in general, but FDI outflows seem to be more deterrent for conflict than inflows.

Keywords: Conflict, FDI, MENA, Trade
JEL Classifications: D74, F15, F21, F51

1 Introduction

Militarized conflict worldwide has been on a declining trend after World War II, while trade and economic interdependence have been increasing rapidly. The MENA region has gathered more attention for conflicts than for economic integration in the last decades. The objective of this paper is to study if these two phenomena are formally linked, in other words if the low level of integration is one of the catalyzers of the recurrence of conflicts in the Middle East and North Africa. We focus mainly on the relationship between trade and conflict occurrence in the region.

Many scholars have investigated the links between economic interdependence and conflict in the three past decades. Barbieri (1996) finds that extensive economic interdependence increases the probability of militarized disputes (MID) and this result is even stronger when relationships are asymmetric. However, Gartzke and Li (2003) consider that the results of Barbieri are due to the variable of economic interdependence used, namely the proportion of bilateral trade to a state's total trade, while Oneal and Russett (1999) for instance use the ratio of bilateral trade to a state's gross domestic product. For Gartzke and Li, the latter reflects better the weight of trade with a given partner in a country's economy.

Keshk et al. (2004) consider that previous studies are fragile because they estimate separately trade and conflict equations. Using a simultaneous equations estimation they find that the effect of bilateral economic interdependence on MID is non significant. Relying on a similar methodology, Kim and Rousseau (2005) find that among the two liberal pillars, it is increased political participation that reduces conflict and not economic interdependence.

For Polachek and Seiglie (2007) empirical analysis should focus on gains from trade and not trade levels. These gains are inversely proportional to import and export demand and supply price elasticities. The authors find higher effects of trade on conflict reduction, particularly exports. They also find that democracies have less conflicts because they have more trade exchanges.

According to Martin et al. (2008), bilateral trade reduces conflict while multilateral trade increases the probability of bilateral conflict. Given the endogeneity of trade and conflict, they use instruments namely the Generalized System of Preferences and an index of economic remoteness. They find that the former results are mainly valid for proximate countries and that more bilateral trade increases the probability of conflict with third countries.

Hegre et al. (2010) challenge the results of Keshk et al. (2004) and Kim and Rousseau (2005) because they would mean that countries behave irrationally, but also because their trade equations take into account gravity aspects while their conflict equations do not. When they include the gravity model in the MID equation the authors find that trade interdependence reduces conflict.

For Li and Reuveny (2011) the expectations on the variation of the prices of exports (decrease) and imports (increase) are what matter the most for conflict. They just argue for mainstreaming heterogeneity across trade flows and activities when analyzing the impact of trade on conflict.

As for the impact of FDI, Lee and Mitchell (2012) show that while FDI has no impact on the emergence of new territorial claims, higher bilateral FDI flows reduce the risk of escalation of conflicts to severe levels, due mainly to the opportunity costs of violence.

Our main objective in this paper is to determine if dynamics of conflict and economic interdependency through trade and FDI are similar or different in MENA from what we observe in the rest of the world and why. In this study, we are careful not to claim causal relationships as conflict, trade and FDI are highly endogenous and it is difficulty to find convincingly exogenous instruments. Hence, our main aim is to present careful analyses on the correlations between economic interdependency and conflict for the MENA region and discuss how the dynamics might be different. We first investigate whether conflict disrupts trade in the region.

We find that there is no statistically significant decline in bilateral trade, but trade flows start picking up after 8 years following a militarized conflict. We then ask whether increased interdependency through trade and FDI is associated with a decline in probability of conflict. Unlike in the literature, we find that increased bilateral links are associated with higher probability of militarized conflict in the MENA region. However, whether a country is oil-rich matters. In that case, the predictions of Martin et al. (2008) hold; bilateral trade is negatively associated with conflict. Furthermore, access to large markets outside MENA through trade agreements such as with EU increases the probability of conflict, as countries become less dependent on regional trade. We show that one of the other channels why bilateral trade flows are positively associated with conflict could be the improvements in export sophistication. Countries with more sophisticated production are more likely to engage in conflict in the region and the results are not driven by outlier countries. Finally, we do not find a statistically significant association between the overall bilateral and multilateral FDI flows and probability of conflict. However, we do find that the FDI outflows in other MENA countries are more deterrent for conflict than the inflows they receive.

2 Interdependence through Trade

2.1 Data and Methodology

We focus on trade interdependency within the MENA region[1] during the 1960-2014 period. Trading partners include USA, USSR, China and the EU. Trade data are from the Direction of Trade and Statistics (DOTS)-IMF database. Exports are in FOB and imports in CIF value. Regional trade agreements' information is from the WTO-RTA database.

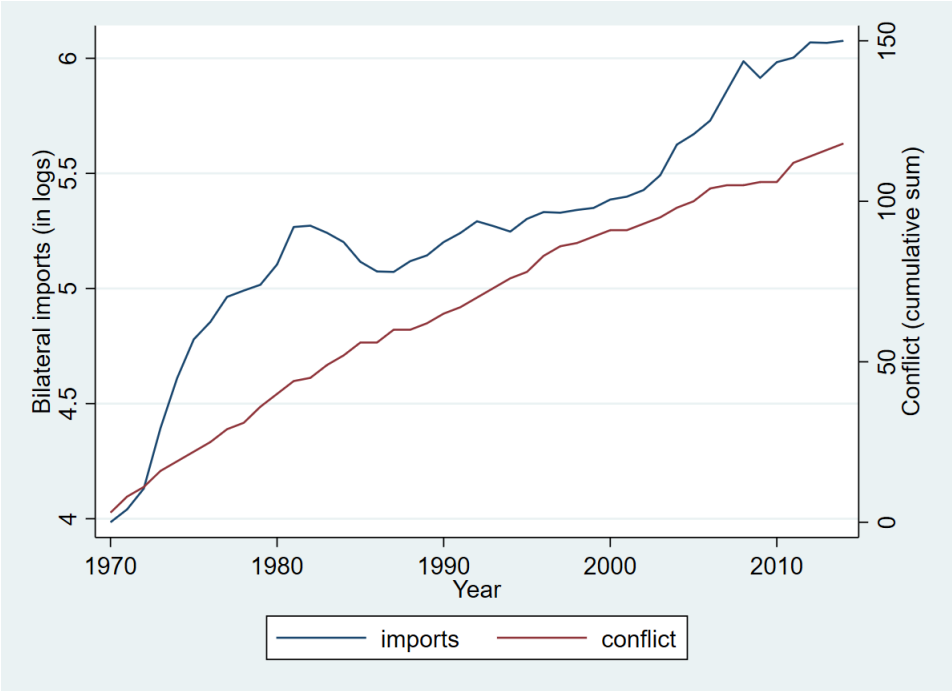
[1] MENA countries are Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey and United Arab Emirates. Oil-rich MENA countries are Algeria, Bahrain, Egypt, Iraq,Kuwait, Libya, Oman, Qatar, Saudi Arabia, United Arab Emirates.

Table 1: Militarized Conflict Intensity in the MENA Region (1960-2014)

Hostility level of MID	**Frequency**	%
3- Display of force	105	31.8
4-Use of force	203	61.5
5- War	22	6.7
Total	330	100

Data on conflict is from the Correlates of war (COWAR) project Militarized Interstate Dispute data (Version 5.0). The MIDB dataset has one record per participant per dispute. We rely on the 3 strongest out of 5 hostility levels, namely; Display of force, Use of force and War.

Figure 1: Bilateral Imports and Conflict in the MENA region



We build on Martin et al. (2008) to investigate the two way relationship between conflict and trade. We start by estimating whether trade is disrupted following a conflict episode by relying on a traditional gravity equation, which accounts for price changes by considering all variables relative to the U.S.[2]

$$ln\frac{m_{ijt}}{m_{iut}} = ln\frac{GDP_{jt}}{GDP_{ut}} + \sum_{k=1}^{K}\beta^k RTA_{it}^k + X_{ij}\gamma + \sum_{\rho=0}^{20} Conflict_{i,j,(t+\rho)} + \sum_{\rho=-5}^{-1} Conflict_{i,j,(t+\rho)} + \epsilon_{ijt} \tag{1}$$

where m_{ijt} denotes the value of imports by country i from country j at time t, m_{iut} denotes the value of imports by country i from U.S. at time t, X_{ij} are trade partner dyadic controls, *RTA* are dummy variables on membership of trade agreement at t, and *Conflict* is a dummy variable representing conflict between countries i and j at time t.

In the next stage, we look at the other way around and investigate how deterrent trade openness is for conflicts. We follow the specification by (Martin et al., 2008) but also include interactions of oil exporter indicator with bilateral and multilateral trade openness to document whether the relationship is different for resource rich countries in the MENA.

$$\begin{aligned} Pr(MID_{ijt}) = {} & \varphi_0 + \varphi_1 ln\left(\frac{m_{ijt}}{GDP_{it}} + \frac{m_{jit}}{GDP_{jt}}\right) + \varphi_2 ln\left(\sum_{h\neq j,i}^{R}\frac{m_{iht}}{GDP_{it}} + \frac{m_{jht}}{GDP_{jt}}\right) \\ & + \varphi_3 OilEx * ln\left(\frac{m_{ijt}}{GDP_{it}} + \frac{m_{jit}}{GDP_{jt}}\right) + \varphi_4 OilEx * ln\left(\sum_{h\neq j,i}^{R}\frac{m_{iht}}{GDP_{it}} + \frac{m_{jht}}{GDP_{jt}}\right) \\ & + X_{ij}\varphi_5 + \Omega_{ijt}\varphi_6 + \sum_{k=1}^{K}\beta^k RTA_{it}^k + \epsilon_{ijt} \end{aligned} \tag{2}$$

The first logarithmic term represents the simple arithmetic average of bilateral import flows over GDP as a measure of bilateral openness and the second one represents multilateral trade openness (the arithmetic average of total imports of the two countries excluding their bilateral imports divided by their

[2]The literature shows that ignoring prices can lead to biases in estimations (Anderson and Van Wincoop, 2004). We follow Martin et al. (2008) and eliminate price indexes in the bilateral trade equation by choosing the imports from the U.S. as a benchmark of comparison for all imports of each importing country

GDPs). The third and fourth terms are the interactions of bilateral and multilateral trade with the oil exporter dummy. The theoretical model by Martin et al. (2008) predicts that $\varphi_1 < 0$, $\varphi_3 < 0$ and $\varphi_2 > 0$, $\varphi_4 > 0$. In other words, their model predicts that as countries' dependence on bilateral trade increases, the probability of conflict should decline. On the other hand, countries more open to global trade should have a higher probability of war because multilateral trade openness decreases bilateral dependence to any given country and the cost of a bilateral conflict. Our aim in this paper is to document whether these predictions also characterize the association between conflict and economic interdependence for the MENA region.

A common problem in the trade literature is the missing trade data. In our estimations, we do not manipulate the dataset by assuming missing trade is zero trade, but our results are robust to replacing missing values with zero and including zero trade dummies in our regressions.

The direction of causality between trade and conflict is notoriously difficult to establish due to endogeneity problems. Although we use the lagged values of trade and trade agreements in different specifications, in this study our main aim is to document the associations and we certainly do not claim causality. Martin et al. (2008) use the Generalized System of Preferences (GSP) and an index of economic remoteness of the two countries to instrument bilateral and multilateral trade openness. The GSP consists of schemes of tariff preferences granted by developed countries to developing countries and facilitates access of least developed countries (LDCs) to markets of rich countries. The study uses the eight to fourth lags of the instrument to leave time for the GSP program to show its effect on the trade structure of recipient countries. We chose not to use this instrument due to main two reasons. First, there might be insufficient variation in the data for this instrument covering the MENA region. Second, we fear our IV coefficients would be hard to interpret given that we already rely on the lags of our main variables of interest. Instead, we prefer to document the correlations between economic interdependency and conflict in a clear, analytical way. Hence, all the results we show should be interpreted from this perspective.

2.2 *Results: Trade after Conflict*

We start our analysis by documenting how conflict disrupts trade flows in the MENA region. Our aim is to assess the association between past military conflicts on both bilateral and multilateral trade patterns and compare the results with other countries studied in the literature. Table 2 displays our estimation results. The dependent variable in columns (1) and (2) is the natural log of bilateral imports whereas in column (3), it is the natural log of bilateral imports relative to the imports from U.S. The latter specification addresses the concerns over omitting price indexes in gravity equations.

Our results suggest that conflict does not disrupt trade flows in a meaningful way in the MENA region. Although the specifications in columns (1) and (2) show an immediate negative impact one year after a conflict episode by the

order of around 30 percentage points, our preferred specification in column (3) shows null effects. In order to compare our results with the evidence for the rest of the world, in Figure 2 we display the same coefficients on conflict dummies as an event-study type for 5 years before and 20 years following a conflict. Excess trade ratio is defined as the levels above and below zero and this zero level can be thought as "natural level of trade". Martin et al. (2008) find that prior to conflicts, relative imports fall significantly and they only start recovering after almost two decades of peace. In the case of MENA, we do not find that relative imports decline significantly prior to a conflict, but we do find that trade flows move above the natural level much sooner than the rest of the world. More specifically, we find that there is a statistically significant increase in relative imports 8 to 13 years after a conflict episode in the MENA region whereas it is on average 17 years for all countries.

Why could MENA differ from the rest of the world? One potential explanation for the difference in trade dynamics could be that the trade flows are already low between MENA countries and conflicts are much more frequent in the region. A recent report by the World Bank show that the region suffers from poor logistics' performance, inefficient customs, high infrastructure costs, the inadequacy of legal frameworks for investments, and high trade costs (Arezki et al., 2020). Our MID data shows that between 1961 and 2014, there are 134 unique disputes involving 2 to 15 MENA countries at a time.[3] This corresponds to a rate of about 0.4 militarized conflict per year in the region. Hence, surviving export firms in the region might be accustomed to operate under a relatively hostile environment. Overall, these facts might be among the main reasons why trade is not disrupted significantly in the first place and increases above the natural levels relatively quicker.

Next, we plot the RTA membership coefficients that we get by running the same regression in column (3) of Table 2 but with the fifth lags of RTA dummies. The reason for using the lagged values is because the trade agreements might require some time for the effects to kick in. Figure 3 shows the coefficients of RTA dummies as well as the 95 percent confidence intervals. It is important to highlight once again that trade agreements are also highly endogenous and we do not claim any causal impact. However, the results unfortunately show no clear positive correlation between regional trade agreements and bilateral trade flows in the MENA region. Most of the coefficients are centered around zero, with the exception of The Common Market for Eastern and Southern Africa (COMESA) and Economic Cooperation Organization (ECO). The coefficients are positive and statistically significant for these COMESA and ECO, whereas they are negative and statistically significant (at 10 percent level) for the WTO. The suggestive evidence based on our correlations shows that in general, the regional trade agreements might not have been as effective as desired to promote trade flows in the MENA region. This raises two issues, first the enforcement of RTAs in the region and second their depth. Deeper RTAs may have had more

[3]There are in total 330 militarized disputes between 1964-2014 for the MENA region, however some disputes extend over years as well as increase coverage. Hence, the unique number conflicts are smaller than the total.

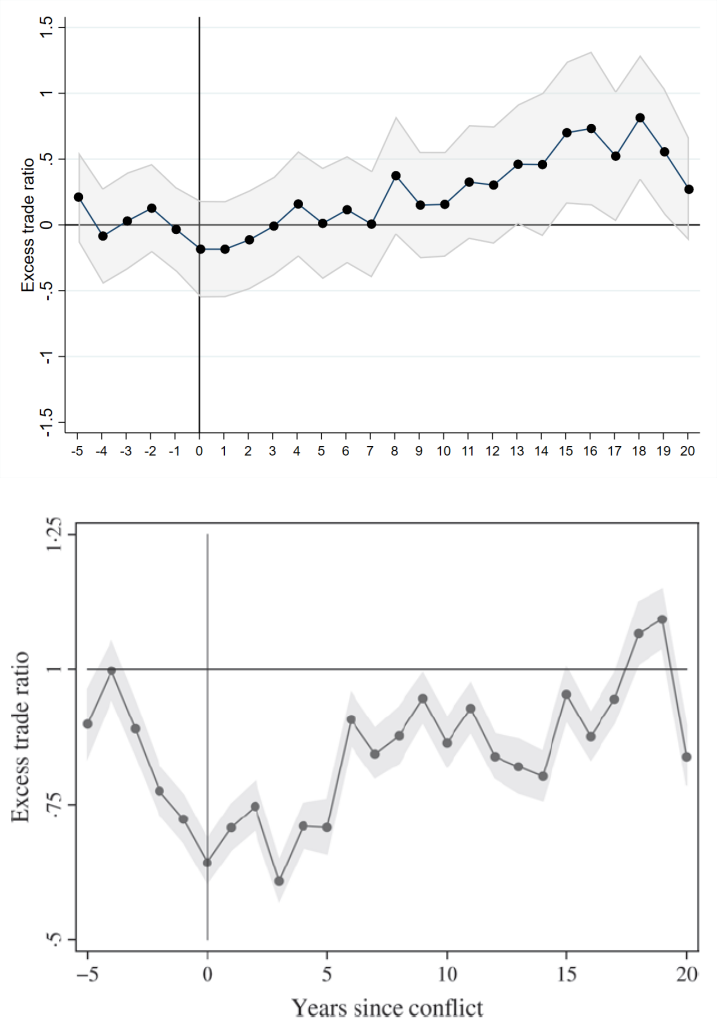
impact on trade and on conflict.

Table 2: Association Between Conflict and Trade

Dependent var:	ln imports		ln m_{ijt}/m_{iut}
	Model 1	Model 2	Model 3
ln GDP destination	0.883***	0.883***	0.651***
	(0.0558)	(0.0558)	(0.0994)
ln GDP origin	0.792***	0.789***	
	(0.0688)	(0.0696)	
Oil rich country	-0.352*	-0.348*	
	(0.209)	(0.210)	
Contiguity	-0.265	-0.260	
	(0.258)	(0.257)	
Similarity in language	0.755***	0.755***	
	(0.206)	(0.206)	
Common colonizer	0.0256	0.0275	
	(0.181)	(0.181)	
ln distance	-1.496***	-1.492***	
	(0.108)	(0.108)	
bil MID + 0 years	-0.136	-0.0949	-0.184
	(0.171)	(0.183)	(0.187)
bil MID + 1 years	-0.360**	-0.318*	-0.184
	(0.167)	(0.176)	(0.187)
bil MID + 2 years	-0.269	-0.228	-0.113
	(0.166)	(0.178)	(0.192)
bil MID + 3 years	-0.324*	-0.286	-0.00894
	(0.172)	(0.184)	(0.191)
bil MID + 4 years	-0.316*	-0.277	0.159
	(0.180)	(0.189)	(0.205)
bil MID + 5 years	-0.277	-0.236	0.0116
	(0.184)	(0.195)	(0.216)
bil MID + 6 years	-0.182	-0.144	0.115
	(0.185)	(0.195)	(0.208)
bil MID + 7 years	-0.409**	-0.372*	0.00612
	(0.198)	(0.208)	(0.207)
bil MID + 8 years	-0.412*	-0.378*	0.374
	(0.217)	(0.226)	(0.230)
bil MID + 9 years	-0.320	-0.287	0.151
	(0.208)	(0.216)	(0.207)
bil MID + 10 years	-0.299	-0.267	0.156
	(0.214)	(0.222)	(0.203)
bil MID - 1 years		-0.0219	-0.0346
		(0.161)	(0.164)
bil MID - 2 years		0.158	0.127
		(0.194)	(0.172)
bil MID - 3 years		0.223	0.0297
		(0.193)	(0.188)
bil MID - 4 years		0.286	-0.0846
		(0.198)	(0.186)
bil MID - 5 years		0.371*	0.212
		(0.203)	(0.175)
Observations	11,303	11,303	11,900
R-squared	0.434	0.434	0.037
Trade agreement dummies	Yes	Yes	Yes
Year dummies after conflict	Yes	Yes	Yes
Year dummies before conflict	No	Yes	Yes
Pair fixed effects	No	No	Yes

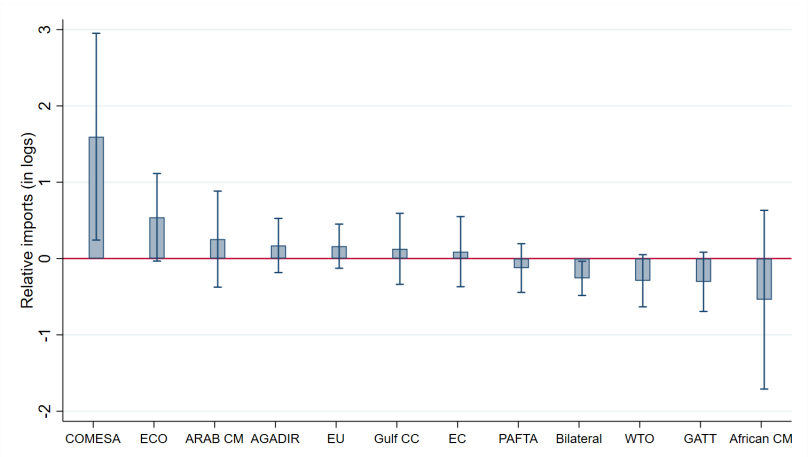
Note: Robust standard errors are clustered at dyad level. Coefficients on year dummies before and after a conflict are exhibited in Figure 2

Figure 2: Trade after conflict episodes: Comparison with Martin et al. (2008) for the whole world



Note: The top panel exhibits the coefficients on year dummies before and after a conflict episode in the MENA region. It is based on column (3) of Table 2. The bottom panel exhibits the estimates by Martin et al. (2008) for the whole world.

Figure 3: Trade agreement membership and contemporaneous trade



Note: The coefficients are based on the specification in column (3) of Table 2 but using the fifth lags of the RTA dummies.

2.3 *Results: Conflict after Trade*

The previous set of results show that there is no statistically significant disruption on trade immediately after a conflict episode. However, one of the key questions that we ask in this paper is whether interdependence through trade creates incentives for MENA countries to enhance political ties and leads to a reduction in the probability of conflict. To this aim, we reverse the question and estimate Equation 2 up to 7 lags where we use the probability of conflict as the dependent variable.

As explained before, theory predicts that incentives for conflict decline with stronger ties through bilateral trade whereas the increase in multilateral trade might reduce the cost of conflict with a single country and trigger conflict. Our results which are displayed in Table 3 show that these predictions generally do not hold for the trade within MENA region. There is no statistically significant association between the contemporaneous bilateral trade flows and probability of conflict, however probability of conflict increases with the second and third lags of bilateral trade. The size of the coefficients is moderate. A 10 percent increase in bilateral trade flows leads to an increase of about 0.05 percentage points increase in probability of conflict. This corresponds to roughly 2 percent increase in the overall probability of conflict. Although the coefficients for the remaining lags are positive, they are statistically insignificant. As for the multilateral trade, there is no statistically significant correlation between the lags of trade and conflict episodes up to the fourth lag. However, the coefficients for the fourth, sixth and the seven lags are highly significant and point to an economically strong relationship between conflict and multilateral trade. A 10 percent increase in multilateral trade is associated with about 0.20 percentage

points increase in the probability of conflict. This corresponds to a 7 percent increase in the overall probability of conflict in the MENA region.

Next, we investigate whether the dynamics of trade and conflict are different for oil exporters in the MENA region. The coefficients in rows (5) and (6) describe the relationship for oil rich countries. Once again, we do not see a clear pattern, although the behaviour of the oil exporters validates the predictions of theoretical models more closely than the overall region. More specifically, in line with the theory, increases in the first, second and third lags of bilateral trade are associated with a 0.075 to 0.09 percentage points decline in the probability of conflict. These coefficients correspond to a decline of about 3.3 percent decline in the probability of conflict for oil rich countries within MENA. As for the multilateral trade, we do not find a statistically significant relationship for these subset of MENA countries.

As mentioned before, episodes of conflict are relatively more frequent in the MENA region than the rest of the world. Hence, an interesting question to ask is whether conflict is business as usual but motives for engaging in wars are different in the MENA region. In Table 7 of Appendix A, we run the same regressions but we use probability of war as our dependent variable. Once again, in this set of analysis, we find that the relationship between bilateral, multilateral trade and probability of war is in line with the predictions of the theory neither for the oil exporters, nor for the whole MENA region. And in fact, the coefficient of multilateral trade is negative for oil exporter countries which could be a result of fear of international sanctions associated with wars.

We next investigate whether regional agreements discourage conflict in the MENA region. Table 3 displays the coefficients of dummies for membership of various trade agreements up to seven lags. In order to present the estimates in an interpretable way, in Figure 4 we plot the coefficients of the fifth lags with 95 percent confidence intervals. Although we do not claim any causal impact, our basic estimations show that regional trade agreements may not be visibly effective tools for conflict reduction. Most coefficient estimates are centered around zero and the only agreement which is negatively correlated with conflict after 5 years of signature seems to be the WTO. The coefficient size is such that the WTO membership is associated with about 2.6 percentage points decline in the probability of conflict. On the other hand, PAFTA, ARAB Common Market memberships and EU trade agreements are positively correlated with conflict probability for the MENA countries. While it is hard to interpret the positive coefficients for the first two memberships, trade agreements with the EU might lead to a reduction in dependence among countries in the region and might reduce the relative costs associated with conflict.

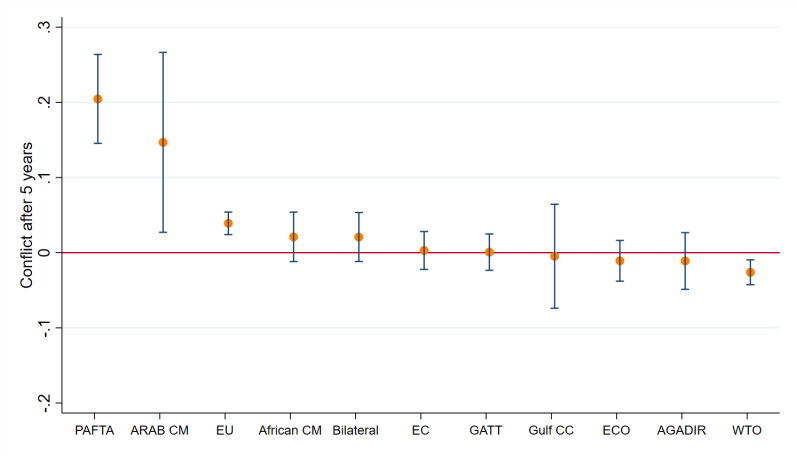
Our analysis shows that the trade and conflict dynamics in the MENA region are generally different than the rest of the world. Unlike the predictions of the theory, bilateral trade flows are positively correlated with probability of conflict for the whole region while they are negatively correlated for oil exporting countries. In the next section, we investigate whether what countries produce in the MENA region might explain the different dynamics we presented in the first two parts.

Table 3: Association between Trade and Conflict

Dependent var: conflict dummy	(1) Contemporaneous	(2) Lag 1	(3) Lag 2	(4) Lag 3	(5) Lag 4	(6) Lag 5	(7) Lag 6	(8) Lag 7
Ln bilateral openness	0.000559	0.00322	0.00567**	0.00458*	0.00171	0.00419	0.00253	0.00537
	(0.00217)	(0.00248)	(0.00246)	(0.00256)	(0.00341)	(0.00257)	(0.00243)	(0.00335)
Ln multilateral openness	0.00541	0.00457	0.00304	0.00310	0.0231***	0.0106	0.0132**	0.0251***
	(0.00716)	(0.00681)	(0.00623)	(0.00654)	(0.00633)	(0.00677)	(0.00641)	(0.00570)
Oil rich country	0.0287	0.0435	0.0894**	0.112***	0.129***	0.160***	0.163***	0.246***
	(0.0357)	(0.0369)	(0.0382)	(0.0399)	(0.0406)	(0.0419)	(0.0416)	(0.0501)
Ln bilateral openness * Oil rich	-0.00828	-0.00908*	-0.00785*	-0.00746*	-0.00539	-0.00206	0.00188	0.000808
	(0.00561)	(0.00535)	(0.00442)	(0.00384)	(0.00451)	(0.00386)	(0.00369)	(0.00470)
Ln multilateral openness * Oil rich	0.000673	0.0119	0.00459	-0.00457	-0.0145*	-0.0102	-0.0150	-0.0220**
	(0.00836)	(0.00832)	(0.00879)	(0.00991)	(0.00811)	(0.00946)	(0.00954)	(0.00922)
Peaceful years	-0.00476***	-0.00491***	-0.00519***	-0.00500***	-0.00526***	-0.00494***	-0.00491***	-0.00513***
	(0.000574)	(0.000599)	(0.000621)	(0.000599)	(0.000629)	(0.000647)	(0.000647)	(0.000667)
WTO membership	-0.0313***	-0.0239**	-0.0214**	-0.0215**	-0.0393***	-0.0261***	-0.0187**	-0.0133
	(0.0104)	(0.0101)	(0.00994)	(0.00939)	(0.0104)	(0.00844)	(0.00851)	(0.00892)
GATT membership	-0.0333***	-0.0120	-0.0105	-0.0127	-0.00462	0.000697	-0.00690	-0.00394
	(0.0123)	(0.0125)	(0.0136)	(0.0129)	(0.0125)	(0.0123)	(0.0118)	(0.00987)
GCC membership	-0.0130	-0.00588	0.0272	-0.0327	-0.00345	-0.00479	0.00782	0.0317**
	(0.0149)	(0.0255)	(0.0320)	(0.0269)	(0.0105)	(0.0353)	(0.0116)	(0.0149)
PAFTA membership	-0.0662**	0.0814**	0.0378**	-0.0207**	0.0223	0.205***	-0.0914***	-0.0236**
	(0.0281)	(0.0403)	(0.0191)	(0.00968)	(0.0194)	(0.0302)	(0.0354)	(0.0110)
African Common Market	0.189	-0.0145	-0.0638*	-0.143***	-0.216***	0.0210	-0.0202	-0.0767*
	(0.176)	(0.0169)	(0.0326)	(0.0483)	(0.0565)	(0.0168)	(0.0312)	(0.0413)
Agadir Agreement	0.0419***	0.0294***	0.0161*	0.0313***	-0.0541	-0.0111	-0.0442***	-0.0253**
	(0.00719)	(0.00704)	(0.00924)	(0.00715)	(0.0439)	(0.0192)	(0.0165)	(0.0126)
Arab Common Market	-0.000124	0.182***	0.248***	-0.0848***	-0.0390	0.147**	0.249***	-0.107***
	(0.0525)	(0.0676)	(0.0917)	(0.0209)	(0.0402)	(0.0611)	(0.0894)	(0.0283)
ECO	0.0264**	0.102*	-0.0404**	0.00666	0.0436	-0.0108	0.00237	-0.0401
	(0.0122)	(0.0597)	(0.0174)	(0.0133)	(0.0478)	(0.0138)	(0.0129)	(0.0628)
EC trade agreement	0.00472	0.00692	-0.00314	0.00738	-0.00964	0.00292	-0.00423	-0.00500
	(0.0152)	(0.0151)	(0.0143)	(0.0130)	(0.0132)	(0.0129)	(0.0115)	(0.0122)
EU trade agreement	0.0243***	0.0290***	0.0335***	0.0308***	0.0360***	0.0391***	0.0331***	0.0281***
	(0.00680)	(0.00669)	(0.00703)	(0.00759)	(0.00783)	(0.00763)	(0.00779)	(0.00888)
Bilateral trade agreement	0.0272*	0.000944	-0.0296***	0.000539	0.0206	0.0208	0.0159	0.00808
	(0.0150)	(0.0115)	(0.00935)	(0.00531)	(0.0137)	(0.0166)	(0.0185)	(0.0130)
Observations	9,614	9,351	9,069	8,790	8,526	8,275	8,026	7,780
R-squared	0.020	0.020	0.023	0.019	0.024	0.026	0.024	0.022
Pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Past conflict dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors are clustered at dyad level.Additional controls include number of peaceful years since the last conflict and time effects. Estimation results are based on bilateral trade flows between 1960 and 2012.

Figure 4: Past Trade Agreement Membership and Conflict



Note: The coefficients on RTA dummies are based on the specification in column (5) of Table 3.

3 Economic Complexity

So far, in our analysis we investigated whether there might be differentiated relationship between conflict and economic interdependence for oil exporters. We find that bilateral trade interdependence is negatively correlated with conflict for oil exporters in the region. One reason why this could be the case is because the natural resource production could constitute a large share in total GDP, so that export sophistication could be rather limited. Furthermore, these countries might be more vulnerable to commodity price shocks.

In order to understand how improvements in export sophistication are related with conflict probability, we rely on the Economic Complexity Index (ECI) and Rankings developed by Hausmann et al. (2014). As explained in the Atlas of Economic Complexity; *"The Economic Complexity Index is a ranking of countries based on the diversity and complexity of their export basket. High complexity countries are home to a range of sophisticated, specialized capabilities and are therefore able to produce a highly diversified set of complex products."* The index and the rankings are available since 1995 for all MENA countries in our dataset except for Syria, Iraq and Sudan. As of 2012, Israel has highest economic complexity index followed by Turkey and Tunisia in our dataset. Their rankings among all 133 countries in the Atlas dataset are 21, 38 and 43 correspondingly.

As before, we estimate a linear probability model that includes several controls, dyadic fixed effects, RTA dummies and country specific time trends. We hypothesise that not only own export sophistication but also trading partners' sophistication could be relevant. Table 4 displays our findings.

We find that countries with more sophisticated exports are more likely to

Table 4: Economic Complexity and Conflict

Dependent var: conflict dummy	All MENA		Excl. Israel	All MENA		Excl. Israel
Economic complexity index, origin	0.0110*	0.0189**	0.0213***			
	(0.00572)	(0.00786)	(0.00808)			
Economic complexity index, destination	0.00549	0.00531	0.00474			
	(0.00773)	(0.00750)	(0.00787)			
Economic complexity ranking, origin				-0.000308*	-0.000428*	-0.000451*
				(0.000180)	(0.000242)	(0.000245)
Economic complexity ranking, destination				-0.000171	-0.000168	-0.000168
				(0.000221)	(0.000213)	(0.000225)
WTO membership	-0.0440**	-0.0508**	-0.0517**	-0.0421**	-0.0502**	-0.0515**
	(0.0173)	(0.0255)	(0.0258)	(0.0172)	(0.0256)	(0.0259)
PAFTA membership	-0.0516***	-0.0643***	-0.0456***	-0.0515***	-0.0643***	-0.0457***
	(0.0188)	(0.0186)	(0.00784)	(0.0188)	(0.0186)	(0.00785)
Agadir Agreement	0.0233***	0.0268***	0.0257***	0.0231***	0.0273***	0.0264***
	(0.00628)	(0.00641)	(0.00644)	(0.00640)	(0.00648)	(0.00650)
EU trade agreement	-0.0121	-0.0264***	-0.0178**	-0.0122	-0.0268***	-0.0184**
	(0.00753)	(0.00805)	(0.00774)	(0.00753)	(0.00805)	(0.00775)
Bilateral trade agreement	0.0313**	0.0286*	0.0285*	0.0310*	0.0282*	0.0279
	(0.0159)	(0.0157)	(0.0171)	(0.0159)	(0.0157)	(0.0170)
Observations	4,800	4,800	4,500	4,800	4,800	4,500
R-squared	0.028	0.031	0.031	0.028	0.031	0.031
Past conflict dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Specific Time Trends	No	Yes	Yes	No	Yes	Yes

Robust standard errors are clustered at dyad level.

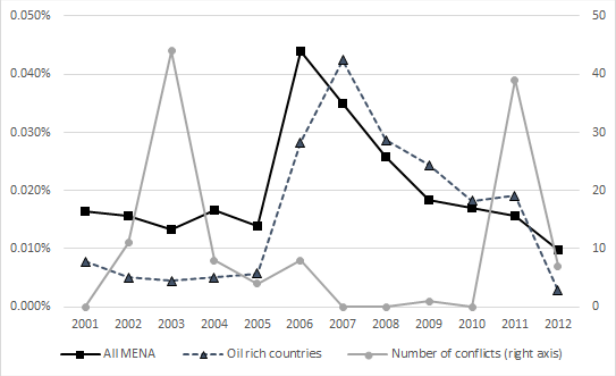
engage in conflict and the coefficients are rather sizable. One point increase in the own index value is associated with about 1.1-1.9 percentage points increase in the probability of conflict, corresponding to about 40 to 66 percent increase.[4] While this feels counter-intuitive, it could be the case that for countries with more sophisticated exports, conflict is less costly in terms of the forgone trade as they might find it easier to divert the trade to other destinations. And this result is certainly not driven by Israel which is a clear outlier in terms of economic complexity in our dataset. In column (3) we re-run our regressions excluding Israel and the positive and significant relationship still holds. On the other hand, we find no association between trade partners' economic complexity and probability of conflict in columns (1) to (3).

Next, instead of relying on the absolute index values, we use country rankings as our variable of interest in columns (4) to (6). ECI rankings could be more informative if countries' export sophistication indexes improve but their relative position do not change significantly. Thus, if there is a positive relationship between export sophistication and conflict probability, there should be a negative relationship with its ECI ranking and conflict.[5] Our results in columns (4) to (6) confirm this. When a country falls ten place in the rankings (so that the ranking number increases by ten), the probability of conflict declines by about 0.4 percentage points, corresponding to about 10 percent decline in the

[4] As of 2012, the highest index value was 2.34 and the lowest was -2.79 for the 133 countries in the data.

[5] The rankings are listed such that highest sophistication is ranked smallest, i.e. as the first country in the list. Thus as a country's ranking value increases, it falls behind other countries.

Figure 5: Total FDI Inflows as a percent of total GDP and conflict episodes in the MENA



conflict probability. Once again we show in column (6) that the results are not driven by Israel.

4 Interdependence through FDI Inflows

In this section, we analyse how informal economic interdependence through FDI flows is associated with conflict in the MENA region. While the bilateral FDI inflows between MENA countries have increased from about 500 million USD in 2001 to 8.6 billion USD in 2011[6], average FDI inflows as a percent of GDP from other MENA countries have not increased as much. As Figure 5 shows, with the exception of years between 2006 and 2008, average FDI inflows between MENA countries as a percent of GDP remained fairly stable and as low as 0.015 percent for most years between 2001 and 2012. The World Bank data shows that during the same period, total FDI inflows to the MENA region from the rest of the world was about 1.1 percent of region's GDP. Based on these figures, it is fair to suggest that bilateral FDI links are weak in the region and most of the inflows are directed from third countries. If we consider only the oil rich countries within the MENA region, the FDI inflows within the region seems to be even weaker.

In establishing the relationship between conflict and interdependence through FDI flows, we estimate the following equation;

[6]Source: Unctad Investment statistics and trends

$$Pr(MID_{ijt}) = \varphi_0 + \varphi_1 ln\left(\frac{fdi^I_{ijt}}{GDP_{it}} + \frac{fdi^O_{jit}}{GDP_{jt}}\right) + \varphi_2 ln\left(\sum_{h\neq j,i}^{R} \frac{fdi^I_{iht}}{GDP_{it}} + \frac{fdi^O_{jht}}{GDP_{jt}} + \right)$$
$$+ \varphi_3 OilEx * ln\left(\frac{fdi^I_{ijt}}{GDP_{it}} + \frac{fdi^O_{jit}}{GDP_{jt}}\right) + \varphi_4 OilEx * ln\left(\sum_{h\neq j,i}^{R} \frac{fdi^I_{iht}}{GDP_{it}} + \frac{fdi^O_{jht}}{GDP_{jt}} + \right)$$
$$+ X_{ij}\varphi_5 + \Omega_{ijt}\varphi_6 + \sum_{k=1}^{K} \beta^k RTA^k_{it} + \epsilon_{ijt} \tag{3}$$

where fdi^I_{ijt} denotes the value of FDI inflows received by country i from country j at time t, fdi^O_{jit} denotes the value of FDI outflows by country i to country j at time t. We measure bilateral FDI openness by the sum of inflows and outflows received as a ratio of the host and destination country GDPs. Similarly we measure multilateral openness by the sum of inflows and outflows other than the partner country. X_{ij} are trade partner dyadic controls, *RTA* are dummy variables on membership of trade agreement at t and Ω_{ijt} is additional controls such as the number of peaceful years since the last conflict. As before, we interact Oil Exporter dummy with our variables of interest to understand whether oil exporting countries have different behavioral responses under the presence of interdependence through FDI flows.

Our data source is UNCTAD's Investment Statistics and Trends and the data covers years between 2001 and 2012 for which the statistics on bilateral FDI flows for each MENA country are nearly complete. We estimate equation 3 contemporaneously and then with respect to lags. Since the time horizon for our data is limited, we run the regressions up to 5 lags. As before, we highlight that our results do not necessarily imply a causal relationship between the FDI interdependence and conflict episodes as these variables are highly endogenous and it is notoriously difficult to find valid instruments or exogenous variation that can be exploited as a quasi-natural experiment.

Table 5 summarizes our findings. Our estimations suggest that conflict probability is not statistically associated with overall bilateral or multilateral FDI flows at any lags. Furthermore, the relationship is also insignificant for oil exporting countries in the region. This finding might not be entirely surprising as the FDI flows between MENA countries are very low and such levels could be insufficient to exert a reasonably credible punishment mechanism over conflict. However, it could also be the case that pooling the inflows and outflows might be masking the differential effects of the two types of FDI investments. Host countries might have fewer incentives to pursue conflict when another country is an important net investor in the host country. Or if a country's private sector is an important investor in another country, the businesses can exert some

Table 5: Association between FDI Openness and Conflict

	(1) Contemporaneous	(2) Lag 1	(3) Lag 2	(4) Lag 3	(5) Lag 4	(6) Lag 5
Ln bilateral FDI openness	-0.004	-0.00437	-0.00587	0.0124	0.0103	0.0123
	(0.005)	(0.00567)	(0.00609)	(0.0101)	(0.00881)	(0.0157)
Ln multilateral FDI openness	0.003	0.00662	0.00784	-0.000930	-0.00333	-0.0143*
	(0.005)	(0.00431)	(0.00515)	(0.00527)	(0.00646)	(0.00777)
Oil rich country	0.251***	0.262**	0.132	0.131	0.0528	0.0549
	(0.088)	(0.103)	(0.108)	(0.135)	(0.107)	(0.165)
Ln bilateral FDI openness * Oil rich	-0.004	-0.00141	-0.00485	-0.0123	-0.0132	-0.0176
	(0.005)	(0.00613)	(0.00702)	(0.00963)	(0.00921)	(0.0153)
Ln multilateral FDI openness * Oil rich	-0.006	-0.0103*	-0.00870	0.000249	0.00147	0.00473
	(0.006)	(0.00566)	(0.00735)	(0.00694)	(0.00850)	(0.00840)
WTO membership	-0.066**	-0.0803**	-0.0864**	-0.0255	-0.0426**	-0.0350***
	(0.031)	(0.0386)	(0.0382)	(0.0166)	(0.0175)	(0.0127)
Agadir membership	0.040***	0.0352***	0.0222***	0.0130*	-0.0543	-0.00739
	(0.006)	(0.00695)	(0.00810)	(0.00719)	(0.0407)	(0.0261)
EU trade agreement	0.043***	0.0606***	0.0635***	-0.0252	-0.0192	0.00792
	(0.013)	(0.0129)	(0.0168)	(0.0163)	(0.0131)	(0.0126)
Bilateral trade agreement	0.028	0.00262	-0.0121	-0.0118	-0.0122	0.0342*
	(0.019)	(0.00904)	(0.00865)	(0.00758)	(0.0178)	(0.0191)
Observations	3,562	3,238	2,918	2,655	2,438	2,163
R-squared	0.039	0.040	0.034	0.030	0.032	0.036
Dummies for missing FDI	Yes	Yes	Yes	Yes	Yes	Yes
Country specific time trends	Yes	Yes	Yes	Yes	Yes	Yes
Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors are clustered at dyad level. Additional controls include number of peaceful years since the last conflict and time effects. Estimation results are based on bilateral flows between 2001 and 2012.

lobby power to their governments and this could lower the political incentives for conflict.

In Table 6, we investigate whether FDI inflows are different than FDI outflows in terms of generating disincentives for conflict. Our results show no association between conflict probability and FDI inflows but we do find a negative significant correlation with FDI outflows contemporaneously and at the first lag. In terms of the magnitude, the association is reasonably large. Doubling the FDI outflows (from the mean 0.02 percent to 0.04 percent) is associated with a reduction of around 0.01 percentage points decline in the probability of conflict, corresponding to about 31 percent decline in the probability of conflict with a receiver country. Considering that the bilateral FDI flows between the MENA countries are weak, these results might suggest that encouraging investments has the potential to contribute to conflict reduction efforts.

Interestingly, the coefficient for the third lag of FDI inflows is positive and significant for the whole MENA region and negative for the oil exporters within the region. While it is hard to undercover the exact reasons, this coefficient is likely to pick up the impact of Syrian Civil War, the Yemeni Crisis and Iran-Saudi Arabia proxy war in 2011. As Figure 5 shows, number of conflicts skyrocketed in 2011. Turkey alone engaged in three different disputes with hostility level 3 that involved 8 other MENA countries in 2011. In fact if we exclude disputes that involve Turkey and Syria or the Year 2011, the coefficient on the third lag is no longer significant.[7] While the data horizon is too limited to establish more robust conclusions, our analysis provides suggestive evidence

[7]Results available upon request

Table 6: Association between FDI Inflows, Outflows and Conflict

	(1) Contemporaneous	(2) Lag 1	(3) Lag 2	(4) Lag 3	(5) Lag 4	(6) Lag 5
Ln FDI inflows (% of GDP)	0.002	-0.00258	-0.00941	0.0265**	0.0101	0.00678
	(0.005)	(0.00642)	(0.00636)	(0.0115)	(0.00944)	(0.0153)
Ln FDI outflows (% of GDP)	-0.012*	-0.0115*	-0.00949	0.00380	0.00706	0.00518
	(0.007)	(0.00695)	(0.00763)	(0.00954)	(0.0122)	(0.0162)
Oil rich country	0.334***	0.386***	0.252*	-0.0632	-0.0845	-0.0457
	(0.121)	(0.140)	(0.144)	(0.167)	(0.178)	(0.262)
Ln FDI inflows (% of GDP) * Oil rich	-0.007	-0.00125	-0.00267	-0.0254**	-0.0148	-0.0137
	(0.006)	(0.00709)	(0.00654)	(0.0110)	(0.00997)	(0.0140)
Ln FDI outflows (% of GDP)* Oil rich	0.009	0.00811	0.00411	-0.000469	-0.00943	-0.00994
	(0.007)	(0.00745)	(0.00800)	(0.00975)	(0.0122)	(0.0156)
Observations	3,650	3,326	3,006	2,725	2,450	2,163
R-squared	0.032	0.031	0.025	0.032	0.028	0.028
Dummies for missing FDI	Yes	Yes	Yes	Yes	Yes	Yes
Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
RTA dummies	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country specific time trends	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors are clustered at dyad level.

that MENA countries' FDI investments in other countries are likely to be more deterrent for conflict than the FDI inflows they receive. In fact, potentially the FDI investments could be more effective than the trade flows in reducing conflict in the region.

5 Conclusion

In this study, we find that dynamics of conflict in the MENA region are in general different from the rest of the world. While our analysis is merely correlational, we show that there is no significant trade disruption after a conflict, but trade increases above the natural level much faster than the time horizon documented in the literature. We also find that unlike in the literature, increased bilateral links is associated with higher probability of militarized conflict. One potential explanation is the steady improvements in product sophistication in the region. We find that countries with higher export sophistication are more likely to engage in conflict in the region. We also show that countries are rather heterogenous in the MENA and whether a country is oil-rich matters. Predictions of the theoretical models hold when considering conflict with oil-rich countries. Bilateral trade is negatively associated for these subset of countries. Furthermore, access to large markets outside MENA through trade agreements such as with EU increases the probability of conflict, as countries become less dependent on regional trade. RTAs within the region almost do not have an impact, due to their low effects on regional trade. Deeper RTAs may have had a different impact. Furthermore, countries with higher export sophistication are more likely to engage in conflict in the region. Finally we do not find a statistically significant relationship between FDI flows and conflict in general, but FDI outflows seem to be more deterrent for conflict than inflows.

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6 Appendix

Table 7: A1: Association between War and Conflict

Dependent var: war dummy	(1) Contemporaneous	(2) Lag 1	(3) Lag 2	(4) Lag 3	(5) Lag 4	(6) Lag 5	(7) Lag 6	(8) Lag 7
Ln bilateral openness	-0.00116	-0.000288	-0.00186	-0.000431	-0.000205	-0.00245	-0.000421	-0.00153
	(0.00183)	(0.00177)	(0.00146)	(0.00161)	(0.00144)	(0.00199)	(0.00192)	(0.00210)
Ln multilateral openness	0.00435	0.0103***	0.00694*	0.00310	-0.00152	-0.00212	-0.00352	0.00141
	(0.00324)	(0.00302)	(0.00362)	(0.00571)	(0.00585)	(0.00763)	(0.00977)	(0.00759)
Oil rich country	0.0303*	0.0455***	0.0174	-0.00110	-0.0157	-0.0162	-0.0176	0.00383
	(0.0167)	(0.0168)	(0.0173)	(0.0176)	(0.0211)	(0.0231)	(0.0232)	(0.0238)
Ln bilateral openness * Oil rich	0.000722	5.02e-07	-0.000194	-0.000873	-0.00157	-0.00298	0.000240	0.00348
	(0.00225)	(0.00228)	(0.00214)	(0.00209)	(0.00210)	(0.00274)	(0.00242)	(0.00264)
Ln multilateral openness * Oil rich	-0.00799*	-0.0118***	-0.00780*	-0.00427	0.00557	0.000558	0.00479	-0.00249
	(0.00422)	(0.00420)	(0.00468)	(0.00649)	(0.00714)	(0.00757)	(0.00829)	(0.00707)
Peaceful years	0.000382**	0.000272	0.000283	0.000356**	0.000250	0.000381*	0.000909***	0.000585***
	(0.000167)	(0.000166)	(0.000174)	(0.000147)	(0.000165)	(0.000222)	(0.000215)	(0.000209)
WTO membership	0.00126	0.00641	0.00771*	0.0115***	0.00651*	0.0112***	0.00483	0.00703**
	(0.00394)	(0.00401)	(0.00410)	(0.00410)	(0.00380)	(0.00358)	(0.00320)	(0.00314)
GATT membership	0.00288	0.0114***	-0.00139	-0.0139*	0.000118	-0.00312	0.00871	-0.00103
	(0.00435)	(0.00406)	(0.00592)	(0.00757)	(0.00692)	(0.00623)	(0.00557)	(0.00631)
GCC membership	-0.248***	0.0196***	0.000704	0.00953	0.00497	0.00643	0.00823	0.0432***
	(0.0408)	(0.00629)	(0.00410)	(0.00604)	(0.00505)	(0.00541)	(0.00752)	(0.0104)
PAFTA membership	-0.0168***	-0.0154***	-0.0101***	-0.00818***	-0.00753***	-0.00564**	-0.00515*	-0.00876***
	(0.00230)	(0.00243)	(0.00232)	(0.00268)	(0.00252)	(0.00281)	(0.00307)	(0.00270)
African Common Market	0.0384***	0.0392***	0.0352***	-0.158***	-0.261***	0.0182	0.0164*	0.0319***
	(0.00606)	(0.00744)	(0.00572)	(0.0518)	(0.0602)	(0.0120)	(0.00905)	(0.00845)
Agadir Agreement	-0.00973***	-0.00975***	-0.0108***	-0.00994***	-0.00926***	-0.00898***	-0.00788**	-0.0109***
	(0.00194)	(0.00188)	(0.00175)	(0.00221)	(0.00221)	(0.00257)	(0.00343)	(0.00317)
Arab Common Market	-0.0313***	0.165**	0.370***	-0.0836***	-0.0382***	-0.0453***	0.604***	-0.0343***
	(0.00883)	(0.0718)	(0.0832)	(0.0143)	(0.00802)	(0.00900)	(0.0855)	(0.00988)
ECO	0.0268***	0.0249***	0.0241***	0.0243***	0.0230***	0.00532	0.0239***	0.0264***
	(0.00299)	(0.00271)	(0.00288)	(0.00303)	(0.00284)	(0.0114)	(0.00333)	(0.00328)
EC trade agreement	0.00687	0.00661	-0.00801	0.0166**	0.0186**	0.0336***	-0.0383***	-0.00544
	(0.00964)	(0.00981)	(0.00809)	(0.00783)	(0.00871)	(0.00918)	(0.0118)	(0.0101)
EU trade agreement	0.00895***	0.00418	0.0113***	0.0105***	0.0115***	0.0119***	0.0188***	0.0165***
	(0.00322)	(0.00271)	(0.00246)	(0.00275)	(0.00269)	(0.00246)	(0.00267)	(0.00245)
Bilateral trade agreement	0.00483***	0.00268**	0.00240**	0.00158	0.00396***	-0.00222	0.00587***	0.00542***
	(0.00133)	(0.00132)	(0.00106)	(0.00134)	(0.00112)	(0.00301)	(0.00158)	(0.00164)
Observations	9,614	9,351	9,069	8,790	8,526	8,275	8,026	7,780
R-squared	0.019	0.008	0.027	0.006	0.006	0.007	0.086	0.004
Pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Past war dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors are clustered at dyad level.Additional controls include number of peaceful years since the last war and time effects. Estimation results are based on bilateral trade flows between 1960 and 2012.