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**Research Article**

# Conflict or Distance: What Determines the International Trade[1]

**Ilhom Temurov[2] and Yilmaz Kilicaslan[3]**

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## Abstract

This paper aims to examine the impact of distance and conflict on the dynamics of Turkish international trade by using a gravity type model. Since the gravity model of international trade would work only if there is no conflict, we incorporate conflicts into the model. Three questions have motivated this study: (1) What are the determinants of trade performance? (2) How does conflict impacts international trade? (3) How does conflict between trading partners affect the impact of distance on trade? In order to explain the impact of different types of conflict on trade relations, we defined and measured two different types of conflict: Diplomatic and security. In our analysis, we also control for the impact of Arab-Spring on trade relations of Turkey. We use dynamic panel data models to explore the impact of conflict and proximity by using UN COMTRADE bilateral trade data of Turkey for the period 1990-2013. The estimation results show that while diplomatic conflicts have no significant impact on trade, security conflicts affect trade relations negatively. We also found that Arab Spring had a negative impact on the trade relations. Moreover, we found in this study that geographical distance reduces the negative impact of conflict on trade.

**Keywords:** Gravity, Conflict, Arab-Spring, GMM, Turkey.

**JEL Codes**: C23, F14, F51

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[2] Department of Economics, Anadolu University, Eskisehir, Turkey.
[3] **Corresponding Author,** Department of Economics, Anadolu University, 26470, Eskisehir, Turkey.
ykilicaslan@anadolu.edu.tr

## 1. Introduction

The World economy depends increasingly on the process of globalization and deep interdependence among the countries. This puts more emphasis on the relations among countries. One of the most important forms of inter-country relations is said to be international trade. Foreign trade is important for the development of any economy, though in varying degrees. Therefore, all countries are participating in international division of labour and foreign trade with at different rates.

Taking into account of current integration processes and economic conditions, not only basic market rules are regulating the trade but also there are other factors that play key roles on trade relations such as politics, cultural aspects, similarities among countries, and physical distance. This paper focuses on the impact of conflict issues on international trade by using the gravity approach and provides evidences from Turkish bilateral trade flows.

There is a substantial amount of studies addressing the impact of distance on international trade. Many studies conclude that there is a negative relation between distance volume of trade (see Tinbergen, 1962; Anderson, 1979; Deardorff, 1984).

Chang et al. (2004) concluded that if conflict leads to end or at least a decrease of trade, then countries with the greatest gains from trade face the highest costs of conflict and therefore keep on less conflict and the most cooperation. Robst et al. (2007) concludes that distance indeed has an effect on trade and conflict. Trade reduces conflict when partners are close, but has a greater effect on trading when countries are more distant from each other.

In spite of the fact that the Gravity Model is not a new strategy and is widely used after 1970s, there is a huge gap in Turkish trade and conflict literature. To the best of our knowledge, there is only one study (Değer, 2004) investigating the impact of conflict and distance between countries on international trade. We, therefore, aim to contribute to the literature on the gravity approach to international trade by incorporating conflict. In addition, in order to define other factors determining trade performance, we control for the similarities among countries, exchange rates and factor endowment between trading partners.

Our dynamic panel data models estimated by using UN COMTRADE bilateral trade data of Turkey for the period 1990-2013 show that while diplomatic conflicts have no significant impact on trade, security conflicts affect trade relations negatively. We also found that geographical distance reduces the negative impact of conflict on trade.

The study is organized as follows: section 2 presents a summary of the empirical background for the gravity approach and political determinants of the international trade. Section 3 discusses the definition of conflict and its measurement. Section 4 introduces the conflict issues between Turkey and the other countries and examines the impact of conflict on trade descriptively. Section 5 describes the data and the empirical methodology and presents the results from the dynamic panel estimations. Finally, section 6 is reserved for the main conclusions and policy implications.

## 2. Gravity model and political determination of international trade

### 2.1. The concept of gravity model

International trade is the oldest form of international economic relations. It has existed long before the formation of the current world economy and industrial revolution and increased exponentially. Therefore, the development of international trade is one of the sources of global economic growth by triggering the innovations and expanding markets in the long run.

In this process, the political stability and the distance between countries are very important for further development of international trade.

Trade is one of the central elements in a complex system of international relations, mediating practically all types of international division of labour and linking all countries into a single world system. Trade is the mean through which countries satisfy their unlimited needs. From the classical to modern trade relations, there have been various attempts to empirically model the international trade flows. Gravity approach has been a particularly successful econometric approach that has been adopted to analyse interactions among different kinds of variables. The main idea behind it comes from the gravity theory in physics from which it also derives its name. Tinbergen (1962) and Poyhonen (1963) were the first to apply the gravity equation to examine international trade flows to explain the impact of geographic distance on the international trade relations. Since then, the gravity model has been frequently used in the literature in investigating the determinants of international trade flows.

Gravity model was criticised in the 1960's as a purely empirical proposition to explain bilateral trade flows and for lacking the theoretical support. At the end of the 1970's, the gravity equation was "legitimized" by a series of theoretical articles that demonstrated that the basic gravity equation form was consistent with various models of trade flows. Currently the gravity model is widely used to explain paradoxes of international trade. Empirical applications of gravity model expanded to cover a diversity of issues such as the impact of geographical distance, regional trade agreements, national borders, currency unions, wars, disputes and conflicts on trade.

Gravity model utilize the gravitational force concept as an analogy to explain the volume of trade among the countries. Gravity model establish a baseline for trade-flow volumes as determined by gross domestic product (GDP), population, and geographic distance. The effect of other variables on trade flows may then be assessed by some proxies used in the equation. In many instances, gravity models have significant explanatory power, leading Deardorff (1998) to refer to them as a "fact of life"

The gravity model for trade is analogous to the Newtonian physics function that describes the force of gravity. The model explains the flow of trade between trading countries as being proportional to their economic "mass" ($GDP_i$ and $GDP_j$) and inversely proportional to the distance between them ($Dist_{ij}$). The model can be simply specified as follows:

$$Trade_{i,j} = \alpha \frac{GPD^{\beta}{}_i GDP^{\gamma}{}_j}{Dist^{\delta}{}_{i,j}} \quad (1)$$

where $Trade_{i,j}$ is the value of the bilateral trade between country $i$ and $j$, $GDP_i$ and $GDP_j$ are GDP of country $i$ and $j$. $Dist_{i,j}$ is a measure of the bilateral distance between the two countries and α stands for a constant of proportionality.

Gravity Model is estimated in terms of natural logarithms. Equation 1 can be transformed to log-linear form as follows:

$$lnTrade_{i.j} = \alpha + \beta lnGDP_i + \gamma lnGDP_j - \delta lnDist_{i.j} \quad (2)$$

In general, the expected signs here are $\beta > 0$ and $\gamma > 0$. In the second alternative, mass in equation 2 is associated with both GDP and population (POP). In this case, equation 2 becomes:

$$lnTrade_{i.j} = \varphi + \beta_1 lnGDP_i + \beta_2 lnPOP_i + \gamma_1 lnGDP_j + \gamma_2 lnPOP_j - \delta lnDist_{i.j} \quad (3)$$

With regard to the expected signs on the population variables, these are

typically interpreted in terms of market size and are therefore positive ($\beta_2$, $\gamma_2 > 0$). In the third alternative, mass in equation 3 is associated with GDP per capita. In this case, equation 3 becomes:

$$lnTrade_{i.j} = \varphi + \beta_1 ln\frac{GDP_i}{l_i} + \gamma ln\frac{GDP_j}{l_j} - \delta lnDist_{i.j} \quad (4)$$

After being introduced by Tinbergen (1962), the gravity model was considered to be a useful physical analogy with empirical validity. Subsequently, however, connections have been made to with the key elements of the trade theory.

Anderson (1979) was the first to do this, employing the product differentiation by country of origin, commonly known as the "Armington assumption"[4]. By specifying demand under the Armington assumption, Anderson (1979) helped to explain the relevance of income variables in the gravity model. This approach was also adopted by Bergstrand (1989) who more thoroughly specified the supply side by providing another approach to the theoretical foundations of the gravity model by implementing it on the monopolistic competition model of New Trade Theory. In this model the product differentiation by country-of-origin approach is replaced by differentiation among producing firms.

### 2.2. Conflict and international trade

The relationship between political conflict and trade has long been attracted substantial interest. The literature on conflict examines the interactive effect of distance and trade on international conflict and cooperation. Polachek (1980) argues that trade reduces disputes because trade raises the costs of conflict on the trading partners. Trade and conflict relationship received more close attention when Polachek (1997) examined how trade influences conflict using a Social Welfare Function. In this study, Polachek (1997) finds that (1) the greater the level of trade between countries, the lower the conflict between them (Polachek (1997; 301), (2) there is a positive relation between the elasticity of the trade and conflict between trading partners, the less the conflict (Polachek (1997; 302), and finally democracy reduces conflict and increases cooperation (Polachek (1997; 305-306)

The seminal work of Morrow (1999) examines the logic of a common argument, that international trade prevents conflict due to possible economic loss by using a game theoretic model to examine how trade influences the relative resolution of disputes and concludes that trade reduces willingness to fight in both the initiator and the target county.

The relationship between trade and conflict has received substantial empirical investigation as well. Numerous studies have found that trade reduces conflicts. Morrow (1999) discusses the possibility of indirect effects of conflict on trade, presented by Pollins (1989), and which have not been explicitly tested. Morrow (1999) indicated that the countries that have close interest to those of the United States, as measured by similarity in the United Nations voting, have higher level of trade with the United States.

A number of studies have focused more specifically on the impact of war on trade, and here too, there has been some debate. Barbieri and Levy (1999) argue that wars do not always disrupt trade. The authors examine seven trade partners, each of which experienced a single war in the period under consideration, and find that war was associated with a serious disruption in trade in only one of these cases. However, authors acknowledge that the small sample makes generalization difficult. Indeed, Kastner (2007) considered larger number of cases and found that wars, and in particular long period wars, have a negative impact on trade.

[4] It represents the substitution between products of different countries, and is based on the assumption made by Armington (1969) that products traded internationally are differentiated by country of origin.

Some studies that examined correlation between trade and conflict indicate that the states would have relatively low militarized disputes when they have good trade relations. Political relations between states can directly and indirectly influence their trade. When two trade partners are in political conflict issue and one have good economic position over another then it may consider restricting trade to advance its side of the conflict. Morrow et al. (1998) show that the political relationship between two states strongly influences the trade flows between them. This mainly indicates that two partner countries with high trade relations have high politic interaction while countries with low trade have relatively poor political relations. The main finding of Morrow et al. (1998) that is directly related to our topic is that the occurrence of a militarized dispute has no statistically significant effect on trade in the year of the dispute, i.e. the dispute has a postponed impact.

Conflicting interests can impact trade negatively even when there is little potential for escalation to war or comprehensive trade sanctions, since states sometimes signal in ways that can harm trade even when bargaining over relatively low level of disagreements. For example, after the 2001 spy plane incident between the United States and China, Beijing signalled its displeasure with US reconnaissance policy by suggesting it might purchase more Airbus planes and fewer Boeing planes in the future.

Short of war, diplomatic and security conflicts can seriously harm international trade, not only between conflicting partners but also for the rest of the world. For example, last embargo on Islamic Republic of Iran (IRI) cut all trade relations of IRI with US and Europe. The ongoing economic sanctions against Russia is also another example. These are bringing serious damages on the economy of the implementing countries as well as the global economy. These are samples of the direct effects where political conflict leads to trade restriction. Conflict can also have an indirect effect on trade flows by increasing the perceived risk of trading companies and other economic agents involved.

## 3. Definition of conflict and conflict index

According to Khudoykina (1998), the term "conflict" is used in a variety of senses: as a synonym for international dispute, international military problems or refer to all situations, conflict is simply the contradiction in the relations. The word "conflict" comes from «conflictus» (lat. - «Collision") and stands for clash between the parties. The meaning of "conflict" is well-defined and differentiated in 12 areas of scientific knowledge studying conflicts. Despite the differences in the definition of the term "conflict" in international law and economics, the classification given below suits best to the purpose of this study as we are mainly interested in the economic consequences of the conflict. These are: diplomatic disputes, territorial claims, economic contradictions, and military conflicts (including war).

To determine the interrelationship between conflict and trade, we used the data on conflicts reported in Çakmak (2013) and Wikipedia (2015). We have defined and used three types of conflicts in this study: The first is directly related to Turkish foreign relations both political and economical and the two others are the world conflicts ongoing globally. We make several pre-assumptions in defining the conflict: We named the political disputes between Turkey and any other country as Diplomatic Conflict (DC). We defined the Security Conflict (SC) as the conflict with the military involved. Diplomatic Conflicts are accepted to be short term and the Security Conflicts are accepted to be long term and have postponed impacts. Iran Embargo by UN Security Council accepted as both as Security Conflict and Diplomatic Conflict. The conflict in Persian Gulf is considered to be both diplomatic and security conflicts. Finally, we took the Arab Spring as another type of conflict.

Thus, we took three types of conflicts in this study: Diplomatic Conflict, Security Conflict, and Arab Spring. Diplomatic Conflict is directly related to Turkey while Security Conflict is more likely related to the global conflicts. Conflicts of Turkey with other countries and the conflict that are not directly related with Turkey are summarized in Table 1.

## 4. The impact of conflict on international trade: A Descriptive Look

The empirical analysis is based on UNCOMTRADE (2015) data, TurkStat (2015) and World Bank (2015) databases for Turkey for the period 1990 to 2013. All variables are in real terms and reflected in US Dollars. Data set contains import and export of Turkey to the partner countries. The panel includes 23 years for 60 countries.

Examination of the trade between Turkey and other countries in the case of different kinds of crises helps us to make a visual analysis of the impact of conflict on trade. In this analysis, we indicate all the conflict issues on the graphs that are denoting the trend of trade volume. Note that we cannot exactly separate the impact of 2008 World Financial Crisis (WFC) on trade from the impact of crises happened in the fallowing year 2009.

Figure 1 illustrates the trade volume between Turkey and the countries with which there had mostly been diplomatic conflicts. Despite the seemingly complex political relations with Greece, trade relations between Turkey and Greece show positive and growing trend throughout the period. Overall, for the period under review, we observed 5 crises between Turkey and Greece. Considering the rate of turnover, we acknowledge the fact that none of the conflicts had any significant impact on trade relations (see Figure 1). Regarding the dynamics of trade with Israel, we see two different years of conflict: In 2009, along with WFC, there was also an incident between Turkey and Israel, well known as "one minute"[5] after which these two countries became alienated from the perspective of politics and diplomacy. But the figure suggests that this incident did not have any serious impact on the trade volume of the two country. Although there is a decrease in trade in 2009, we cannot determine whether this decline is completely due to "one minute" conflict or WFC. We can indicate only one conflict issue between Sweden and Turkey resulting form acceptance of Armenian Genocide. It however seems that this conflict did not affect both the trend or the dynamics of total trade.

Iran is one of the most important trading partners of Turkey. Moreover, these two countries have many common interests in the Middle East region. In 2006, when the UN Security Council started to implement an embargo on Iran, Turkish trade relations with Iran did not deteriorate, but increased (see Figure 2). The average annual growth rate of trade volume between Turkey and Iran has reached a growth rate of about 25% during the period from 2006 to 2013.

Trade relations with France were also not affected from the conflict in 2011. In 2011 trade volume between these two countries reached its maximum level. To our opinion, the financial crisis in Europe is the main reason of following slight decline of trade. The impact of the conflict could be observed more clearly in trade relations between Turkey and Iraq. Trade between Turkey and Iraq decreased sharply during the First Gulf War (1991-1991). Trade volume decreased by 90% in 1991 compared to 1990. Trade relations, then, did not improve, but rather had a negative trend from the 1991 to 2003. As shown in figure, trade volume between these two countries was quite low in the period of 1998 to 2003. At the

[5] "One Minute" conflict is the conflict occurred in January 29, 2009 during the speech of Turkish Prime Minister Recep Tayyip Erdoğan in Davos at the World Economic Forum.

**Table 1. Conflict Events of Turkey, 1990 – 2013**

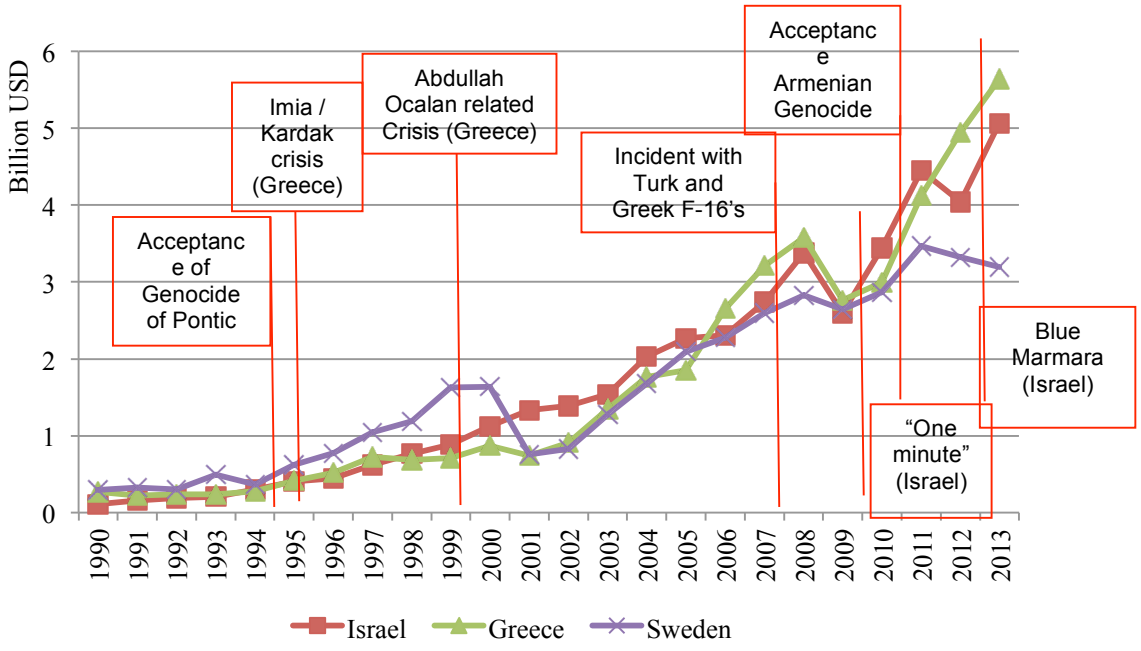
| № | Country | Year(s) | Type of conflict | Definition of conflict |
|---|---|---|---|---|
| 1 | France | 2011 | DC | France Government officially recognized Armenia Genocide by Ottoman Empire |
| 2 | Sweden | 2010 – 2012 | DC | Swedish Government officially recognized Armenia Genocide by Ottoman Empire |
| 3 | Greece | 1994 | DC | Greek government recognized the Genocide of Pontic Greeks by Ottoman Empire |
| 4 | Greece | 1999 | DC | Capture of Abdullah Öcalan and alleged role of Greece in his escape |
| 5 | Iran | 2006 – 2013 | DC | UN Security Council Resolutions and International Sanctions against Iran |
| 6 | Israel | 2009 – 2012 | DC | Israel Gaza conflict, position of Turkey Government related to State Palestine; "One minute" conflict in Davos forum 2009 and cooling relationships following after |
| 7 | Germany | 1992 | DC | Nevruz crisis in Turkey and position of German Government |
| 8 | USA | 2003 | DC | The 1st March 2013 Document: Refusal of the GNAT (Grand National Assembly of Turkey) to provide the Turkish bases for the transfer of NATO forces to start operations in Iraq. |
| | | 2010 | DC | Diplomatic issues raised because of Wiki leaks publications |
| 9 | China | 2009 | DC | Positions of Turkish Government against Chinese actions in Xinjiang |
| 10 | Algeria | 2011, 2012 | SC / AS | Arab Spring and spillovers with minor and major protests in other countries |
| 11 | Libya | 2011 | SC / AS | |
| 12 | Jordan | 2011, 2012 | SC / AS | |
| 13 | Morocco | 2011, 2012 | SC / AS | |
| 14 | Egypt | 2011, 2012 | SC / AS | |
| 15 | Lebanon | 2011, 2012 | SC / AS | |
| 16 | Tunisia | 2011 | SC / AS | |
| 17 | Saudi Arabia | 2011 | SC / AS | |
| 18 | Kuwait | 2011 | SC / AS | |
| 19 | Syria | 2011 - 2013 | SC / AS | |
| 20 | Iraq | 1990 - 1991 | SC | First Gulf War |
| | | 2003 – 2011 | SC | Iraq War |
| 21 | Kuwait | 1990 - 1991 | SC | First Gulf War |
| 22 | Georgia | 1990 – 1995 | SC | Georgia Internal War |
| 23 | Iran | 2006 – 2013 | SC | UN Security Council Resolutions and International Sanctions against Iran |
| 24 | Slovenia | 1990 – 1994 | SC | Slovenia Internal War |
| 25 | Azerbaijan | 1992 – 1994 | SC | Nagorno – Karabakh conflict |

**Source:** Authors' elaboration based on Çakmak (2013) and Wikipedia (2015)
**Legend:** DC: Diplomatic conflict, SC: Security conflict, AS: Arab Spring.

beginning of the Second Gulf War in 2003, trade volume started to increase and has been growing since then. Even the WFC affected neither the trend nor the dynamics of the total trade between Turkey and Iraq.

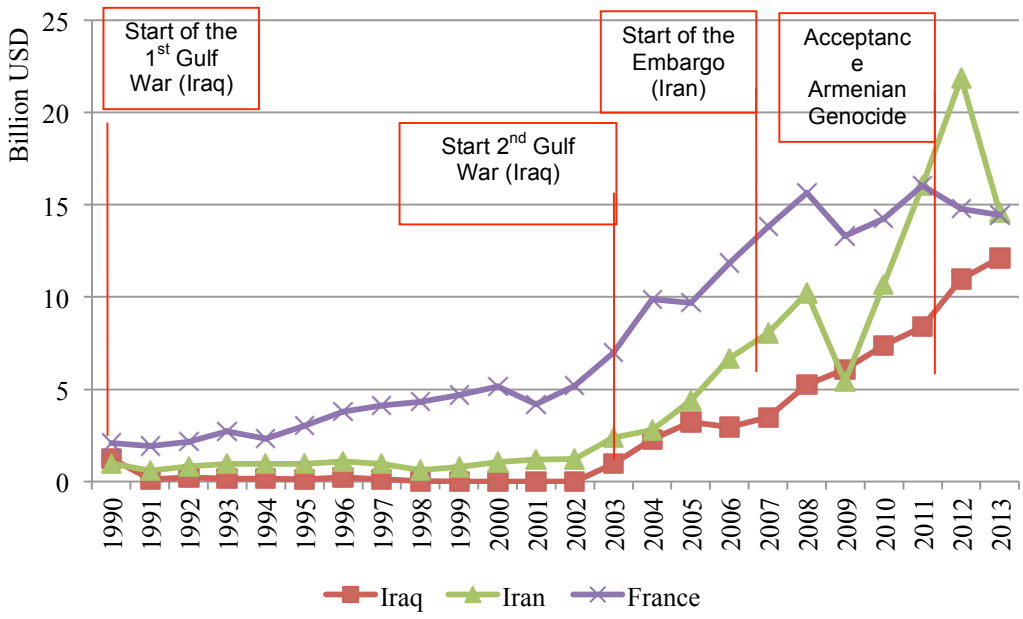
Figure 3 presents trade relations of Turkey with four Arab states that were highly influenced by "*Arab Spring*". Influence of the "*Arab Spring*" on trade was strongly negative, except the trade with Egypt. "*Arab Spring*" in Egypt did not last long and had less severe consequences for society, compared to Syria or Libya. There was a sharp decline of Turkish trade volume with Algeria in 2011 compared with 2010. This sharp decline however was temporary. The trade with Algeria was quite stable after 2011. The significant impact of of "*Arab Spring*" on Turkish foreign trade was observed in the trade with Libya and Syria. Trade volume between Libya and Turkey have sharply declined in 2011 due to "*Arab Spring*". This sharp decline was temporary too. There was a 300% growth in 2012 compared to 2011. Trade relations between Turkey and Syria have two conflict periods: First was the diplomatic conflict in the period of 1990–1998, because of accommodation of Abdullah Ocalan in Syria. In this period, although the trade with Syria was volatile, it had a slight increasing trend. This dynamic continued until 2006, after which trade volume had shown a sharp increase and reached its maximum level in 2010. We, then, observe a sharp decline during the WFC period and following "*Arab Spring*" conflict. The decrease lasted until 2012 and indicated a loss of 77% compare to 2010.

**Figure 1. Trade dynamics of Turkey by conflicting countries, 1990 – 2013**



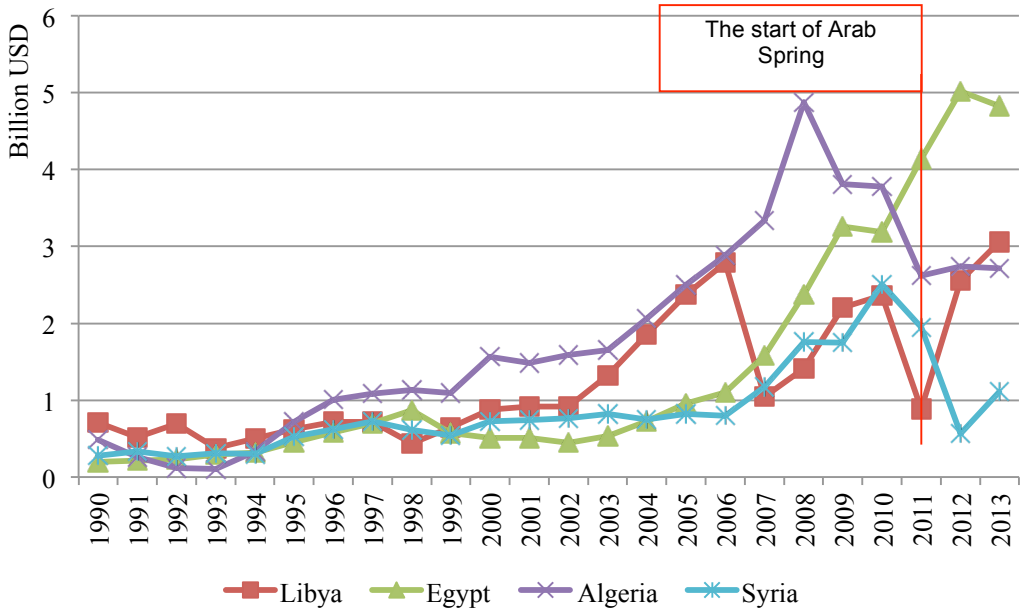

**Source**: UN COMTRADE, 2015.

**Figure 2. Trade Dynamics of Turkey by Conflicting Countries, 1990 – 2013**




**Source**: UN COMTRADE, 2015.

**Figure 3. Trade Dynamics of Turkey by Conflicting Countries, 1990 – 2013**




**Source**: UN COMTRADE, 2015.

In sum, our descriptive analysis of the trade relations in the presence of conflicts have many implications: First, diplomatic conflicts have neither negative nor positive impact on trade. These types of conflicts are mostly political have no impact on business relations. Second, the impact of security conflicts on trade is usually negative. Even in the case of security conflicts, on the other hand, trade relation may exhibit increasing trend. Turkey and Iraq trade could be an example for such a case. Third, the impact of "*Arab Spring*" conflict on trade is also negative. This result can easily be seen in the volatile dynamics of trade shown in Figure 3.

## 5. Distance, Conflict and Trade: An Econometric Approach

We use different econometric methodologies in the estimations of the gravity model since the nature of the gravity approach is static but we use a dynamic model. Thus, while fixed-effects model might lead to consistent estimators of the coefficients for a static model, the same estimation methodology may not give consistent estimators for the dynamic model. Estimation of the dynamic gravity equation, thereby, may require other estimation techniques which would give more consistent estimators.

According to the Matyas (1998) the most appropriate estimation methodology is Generalised Method of Moments (GMM) due to simultaneity bias resulting from the existence of lagged dependent variable. The other reason for selecting the GMM estimator is that GMM takes into account econometrical problems such as endogeneity and autocorrelation and gives more appropriate results. Thus, to avoid any possible inconsistencies, we use one-step GMM estimation method proposed by Arellano and Bond (1991).

As a result, we use a standard dynamic log linear equation model augmented to account for the impact of distance on trade relations as suggested by Tinbergen (1962). We control for the effect of conflicts both on the intercept and slope by including dummy variables for conflict and cross terms between conflict dummies and distance. Lastly, we include several exogenous variables in the model to control for various economic factors. The estimated model can be represented as follows:

$$LNT_{i,t} = \beta_0 + \beta_1 LNT_{i,t-1} + \beta_2 LNDIST_{i,t} + \beta_3 LNGDP_{i,t} + \beta_4 LNGDPTR_t + \beta_5 LNSIM_{i,t} + \beta_6 LNRER_{i,t} + \beta_7 RLFAC_{i,t} + \beta_8 WFC + \beta_9 C + \beta_{10} GC + \mu_t + \varepsilon_{i,t}$$

where *LNT* is log of total trade, *LNDIST* is log of distance, *LNGDP* is log of GDP of the partner country, *LNGDPTR* is log of GDP of Turkey, *LNSIM* is country similarity index, *LNRER* is the log of bilateral exchange rate, *RLFAC* is the relative factor endowment, *C* is a group of conflict variables, *GC* is the interaction of distance and conflict variables and *WFC* is 2008 financial Crisis[6] dummy. *i* and *t* denote country and time period while $\mu_t$ control for time while $\varepsilon_{i,t}$ is the usual error term.

Total trade (*LNT*) is measured as the sum of exports and imports for Turkey. The first lag of *LNT* in the equation above measures the speed of adjustment, or the so-called "catch-up"[7] factor. The coefficient of the lag of trade is expected to be positive and less than one.

[6] Financial Crisis of 2008-2009, dummy is used for the year 2009 as post crisis effect

[7] The decision to include a lagged dependent variable is really a theoretical question. It makes sense to include a lagged dependent variable if you expect that the current level of the dependent variable is determined by its past level. In that case, not including the lagged dependent variable will lead to omitted variable bias and the results might be unreliable. As we use dynamic model and trade relations are dependent on the previous relations we are testing the "catch-up" effect to see how strongly the trade in the current year depends on the trade in the previous year.

Distance (*LNDIST*) is the logarithm of the distance between capital cities of Turkey and partner country. The coefficient of distance is expected to be negative according to the gravity model hypothesis.

*LNGDP* and *LNGDPTR* is the partner Country's and Turkey's GDP, respectively. The coefficients are expected to be positive.

Country similarity index (*LNSIM*) captures the relative size of two countries in terms of GDP. The larger this measure is the more similar two countries in terms of GDP, the higher the share of overall trade. It is also clear that the larger the overall economic space the higher the total volume of trade should be. SIM is calculated as follow:

$$SIM = [1 - \frac{GDP_{i,t}}{(GDP_{i.t} + GDPTR_t)^2} - \frac{GDPTR_t}{(GDP_{i.t} - GDPTR_t)^2}]^2$$

Bilateral exchange rate (*LNRER*) is the value of exchange rate index between trading countries. Lane and Burke (2001) find that exchange rate volatility is negatively associated with the level of international reserves in a large cross-section of countries in the period 1981–1995. Abrams (1980) identifies a negative impact of exchange rate uncertainty on bilateral trade. The higher the real exchange rate index (*LNRER*) the cheaper are products from country *i* for consumers in country *j* and, therefore, we expect a positive sign of *LNRER*. *LNRER* is calculated as follows:

$$RER = \frac{Deflat_{i.t}}{DeflatTR_t} * \frac{Ex\_rate_{i,t}}{Ex\_rateTR_t}$$

Relative factor endowment (*RLFAC*) is capital endowment ratio. Theoretically, the larger this difference is the higher the volume of trade is, and the lower the share of intra-industry trade. This variable is expected to be negative. *RLFAC* is calculated as follow:

$$RLFAC = |ln\frac{K_{i,t}}{L_{i,t}} - ln\frac{KTR_t}{LTR_t}|$$

We use two types of Conflict dummies: Diplomatic Conflicts and Security Conflicts and Arab Spring (see Table 1). The dummy variables are equal to 1 if a conflict between Turkey and trading partner have occurred in a year and null otherwise. We expect a negative sign for these dummies as the conflicts build additional barriers to business and make cooperation more difficult. These difficulties make trade even more difficult from the perspective of gravity type of model. Thus, we control for the interaction between conflict and distance by including the multiplication of specific conflict dummy with distance variable. A positive sign for these variables will show the decrease of distance impact.

Before moving on to the results of the estimated model, let's first evaluate the correlations between the variables included in the econometric model estimated. Table 2 presents pairwise correlations among the variables used in the econometric models. According to this table, the correlation between Turkey's GDP and the trade with partner countries was found to be positive and statistically significant. Correlation analysis once more gives evidence on positive relation between trade and GDP and negative relation between distance and trade, which is fundamental assumption of Gravity Model. Note that there is a positive correlation between conflict and the trade, which is an unexpected result. This outcome may also due to calculation of a pairwise correlation between a dummy variable and a continuous variable. There is a negative correlation between all conflict dummies and distance variable (*LNDIST*) although not al of them are significant. This is not surprising because conflicts are more likely to emerge with nearer countries. The last thing to note that

distance variable (*LNDIST*) has negative and significant correlation with trade variable (*LNT*) as expected.

### 5.1. Estimated results

The estimation results for different specifications of the gravity model with difference conflict variables are reported in Table 3[8].

The results first suggest that the "catch-up" process is important and trade of the current year depends significantly and positively on the trade volume of the previous year. Secondly, GDP of the partner country and GDP of the exporting country (i.e. Turkey in our case) are also positively related to the trade volume. They turned out to be significant and positively related with trade in all models. Moreover, estimated elasticity of trade with respect to GDP of partner country is around 0.06 and reporter country is around 0.5 which are theoretically consistent.

We found that there is a strong, statistically significant, and negative relationship between trade and distance as expected. This implies consistency with gravity theory and indicates that an increase in geographical distance between trading partners is detrimental, i.e. decreases trade growth. Moreover, estimated elasticity of distance variable is relatively high with 0.1.

The results also suggest that relative factor endowment, *RLFAC*, and relative country size similarity, *LNSIM*, do not have significant impact on trade in any of the model specifications. These terms are expected to show how relative factor endowment difference and relative country similarity would impact the trade for Turkey. However, while both partner's GDP and exporters GDP have highly significant and positive impact on trade, we found no significant relation between the trade and relative country size similarity and relative factor endowment.

The conflict variables were found to have negative impact on trade, especially when considering security conflicts. World Financial Crisis, WFC, also have a negative and significant level of impact on trade. Diplomatic Conflict do not have a statistically significant impact on trade. On the other hand, security conflict's impact on trade is negative and statistically significant. Estimated elasticity for both Arab Spring (AS) and Security Conflict (SC) are above 1 which states high rate of impact. The elasticity coefficient for AS is estimated about -1.6 and for SC is about -1.8. This also implies that impact of Security Conflict is higher than Arab Spring.

The interaction term, between Distance and Conflict, suggests that distance decreases the negative impact of conflict on trade, and vice versa, expect for the case of diplomatic conflict. According to Gravity Model, distance expected to have a negative sign and conflict also has negative sign. But the interaction term has a positive and significant sign, which means the negative impact of conflict is reduced when the distance is higher in the case of both Security conflicts and Arab Spring.

[8] Since the conflict dummies are not mutually exclusive, there may be a possible multicollineratiy if an estimation equation includes all of them. In order to avoid such a problem, we add conflict variables and their interactions with distance, separately.

**Table 2. Pairwise Correlations, 1990 – 2013**

| Variables | LNT | LNGDP | LNGDPTR | LNDIST | RLFAC | LNSIM | LNRER | WFC | AS | DC | SC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LNT** | 1.000 | | | | | | | | | | |
| **LNGDP** | 0.627** | 1.000 | | | | | | | | | |
| **LNGDPTR** | 0.498** | 0.156** | 1.000 | | | | | | | | |
| **LNDIST** | -0.122** | 0.404** | 0.005 | 1.000 | | | | | | | |
| **RLFAC** | 0.330** | 0.592** | 0.006 | 0.094** | 1.000 | | | | | | |
| **LNSIM** | 0.228** | 0.440** | -0.007 | 0.033 | 0.466** | 1.000 | | | | | |
| **LNRER** | -0.255** | -0.236** | -0.362** | -0.070** | -0.440** | -0.109** | 1.000 | | | | |
| **WFC** | 0.115** | 0.026 | 0.226** | -0.001 | 0.021 | -0.013 | -0.034 | 1.000 | | | |
| **AS** | 0.047 | -0.038 | 0.193** | -0.079** | -0.040 | -0.029 | -0.012 | -0.024 | 1.000 | | |
| **DC** | 0.132** | 0.057** | 0.127** | -0.050 | 0.040 | 0.045 | 0.035 | 0.098** | -0.016 | 1.000 | |
| **SC** | 0.014 | -0.139** | 0.080** | -0.137** | -0.072** | -0.097** | 0.094** | -0.004 | 0.564** | 0.178** | 1.000 |

**Source**: Author's calculations based on UNCOMTRADE (2016), Turkish Statistical Institute (2016), WDI (2016), and WB (2016) databases.
Note: * significant at 10%; ** significant at 5%; *** significant at 1%

**Table 3. Determinants of International Trade, Impact of Conflict, 1990-2013. (Difference GMM model, the dependent variable is the log of total trade)**

| VARIABLES | Gravity Model | Arab Spring | Diplomatic Conflict | Security Conflict |
|---|---|---|---|---|
| LAGLNT | 0.906*** | 0.905*** | 0.906*** | 0.905*** |
| | [0.018] | [0.017] | [0.017] | [0.016] |
| LNGDP | 0.061*** | 0.063*** | 0.061*** | 0.063*** |
| | [0.019] | [0.018] | [0.018] | [0.017] |
| LNGDPTR | 0.511*** | 0.525*** | 0.514*** | 0.513*** |
| | [0.057] | [0.056] | [0.058] | [0.053] |
| LNDIST | -0.109*** | -0.111*** | -0.111*** | -0.111*** |
| | [0.028] | [0.027] | [0.029] | [0.027] |
| RLFAC | -0.002 | -0.002 | -0.002 | -0.002 |
| | [0.011] | [0.011] | [0.011] | [0.011] |
| LNSIM | -0.004 | -0.004 | -0.004 | -0.004 |
| | [0.003] | [0.003] | [0.003] | [0.003] |
| LNRER | 0.007* | 0.007** | 0.007* | 0.007** |
| | [0.004] | [0.004] | [0.004] | [0.004] |
| WC | -0.464*** | -0.468*** | -0.464*** | -0.464*** |
| | [0.041] | [0.041] | [0.041] | [0.041] |
| AS | | -1.596*** | | |
| | | [0.573] | | |
| ASD | | 0.193** | | |
| | | [0.075] | | |
| DC | | | -0.169 | |
| | | | [0.463] | |
| DCD | | | 0.015 | |
| | | | [0.063] | |
| SC | | | | -1.796* |
| | | | | [0.940] |
| SCD | | | | 0.247* |
| | | | | [0.133] |
| CONSTANT | -12.331*** | -12.696*** | -12.403*** | -12.408*** |
| | [1.391] | [1.369] | [1.404] | [1.301] |
| Observations | 889 | 889 | 889 | 889 |
| Number of country | 54 | 54 | 54 | 54 |
| F Stat | 2219*** | 1747*** | 1799*** | 2040*** |
| AR(1) test statistic | -4.363*** | -4.382*** | -4.365*** | -4.379*** |
| AR(2) test statistic | 1.080 | 1.090 | 1.070 | 1.260 |
| Sargan Test | 834.4*** | 831.4*** | 834.5*** | 834.2*** |
| Hansen Test | 65.55 | 49.49 | 390.6 | 87.28 |

**Notes:** Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%
A-B1: Arellano-Bond test that average auto covariance in residuals of order 1 is 0.
A-B2: Arellano-Bond test that average auto covariance in residuals of order 2 is 0.
Sargan: Sargan test of over-identifying restrictions.
Hansen: Hansen test of over-identifying restrictions

## 6. Conclusion

This paper provides evidence on the inter-relations between conflict, geographical proximity and trade for about 60 countries with different characteristics from 1990 to 2013. In order to do so, we first developed a new conflict index. We have defined some assumptions that involved in selection of conflict index and we argued that this new index reflects the degree of conflict relations among Turkey and other countries and world security conflict as well.

We found that gravity model fits for the case of Turkish trade implying that distance matters for international trade. Our findings show that while diplomatic conflicts among countries do not have strong significant impact on trade, both security conflicts and Arab Spring affected Turkish trade negatively. In other words, if there is a conflict issue between trading partner counties there is a decrease on trade relations between them. The estimation results also showed that interaction term between conflict and distance has a positive sign implying that the negative impact of conflict is reduced when the distance between trading partners is higher.

The results obtained in this study allow us to argue that global trade relations also related to politics. Conflict among trading partners induces risks and raise the transactions costs and thereby lower the volume of international trade. The findings in this study imply that countries should have well developed political and economic strategies for sustainable trade relations. The main aim of them should be the reduction of conflict and enhancing cooperation through trade and multi-dimensional politics. One way preventing the emergence of conflicts among parties would be creating political or economic cooperation and unions. To conclude, the main policy derived from this study for any economy would be "Don't fight" and "Don't let the others fight" simply because reducing conflicts increases trade which enhances growth and welfare of all parties.

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