Trade and Civil Conflicts

Hoda Assem [*]

12 February, 2019

Abstract

War is costly. This paper investigates the impact of civil conflicts on international trade. First, it examines whether bilateral trade between two countries is affected by intrastate or civil violence in either of these states. Second, it investigates if civil conflict has an impact on trade for neighboring countries uninvolved in the conflict. Third, I look if this impact is contemporaneous or persistent through time. In order to achieve these goals, data on intrastate armed conflicts from the major episodes of political conflicts data set is used as well as bilateral trade data from the BACI-CEPII dataset. A gravity model is estimated with the yearly bilateral trade flows from 1989 to 2006 as the dependent variable. Following recent developments in the gravity literature (Yotov and al., 2016), special care is taken to correctly estimate the gravity equation. Production data is used to calculate internal trade flows. Exporter-time, importer-time fixed effects are used and account for any importer or exporter time-varying specific determinants of bilateral trade. Furthermore, country-pair fixed effects control for any time invariant bilateral trade costs and significantly reduce the endogeneity issue. Results show that civil conflicts in a country reduce bilateral trade by over 40%. The impact of civil conflicts is persistent through time and increases with the duration of the conflict. Furthermore, having an additional neighbour involved in a civil conflict significantly reduces bilateral trade whether you share a border with this neighbour or not.

Keywords: Civil conflict, international trade, Spillovers of conflict

JEL classification: F1, F5

---

[*]Paris School of Economics

1 Introduction

War is costly. The economic and financial cost of war for 2014 alone has been estimated at 14.3 trillion dollars or 13.4% of the global economy according to the Global Peace Index (GPI) report. A civil war costs an average developing country 30 years of GDP growth and it takes 20 years for trade to go back to its pre-war level (WDR 2011). Additionally, conflicts, and in particular civil conflicts are highly persistent and localized. In fact, 90% of last decade's civil wars occurred in countries that had already experienced a civil war in the last 30 years (WDR 2011). Conflicts are also more likely to erupt in poor countries. This amplifies the problem trapping these countries in a vicious cycle of poverty, violence and instability.

But how does war destroy trade? On the one hand, destruction of roads and closing borders would greatly increase trade costs leading to less trade. However, conflicts can also impact trade indirectly through several channels. First, destruction of physical and human capital, infrastructure, etc. would lead to lower production and therefore lower trade. In the long run, we can argue that continued conflict can alter the population's risk preferences, trust and preferences for market participation (Callen et al. 2014; Casser et al. 2013). In fact, one can argue that conflicts represent a long term tax on economic activity leading to lower capital formation and a reallocation of resources across sectors (D'Souza et al. 2014).

This paper will focus on one type of war: civil war. While it is true that both civil war and international war have a negative impact on the economy and particularly on trade, I argue that this impact is different for both types of conflicts. On the one hand, international war uses more sophisticated warfare technologies resulting in higher causalities and more destruction of infrastructure, physical and human capital (Collier, 1999). On the other hand, civil wars can be more damaging in the long run. Civil wars undermine the state by destroying institutions as rule of law and property rights while international wars are more likely to strengthen the state (Herbs, 1991). Civil wars are also more likely to cause social disorder, weaken trust and deepen ethnic and religious differences within a society (Collier, 1999). This leads to a deterioration of economic environment which is

very likely to persist for a long time after the end of conflict. Martin et al. (2008b) find evidence that interstate conflicts have large contemporaneous effects on bilateral trade while effects of civil conflicts are more persistent taking up to 25 years to disappear.

The contribution of this paper is twofold. First, I investigate the impact of civil conflict on international trade. In order to achieve this, I estimate a structural gravity model. However, as the civil conflict variable varies by country-time dimension, it is not possible to include both this variable and directional time varying fixed effects. However, including exporter-time and importer-time fixed effects are essential to properly account for multilateral resistance terms (Anderson and Van wincoop,2003). Otherwise, estimates of the impact of civil conflict on trade will be biased. Previous research looking at impact of conflicts on trade has either excluded country-time fixed effects or aggregated conflicts for both exporter and importer countries in one variable, both of which are unsatisfactory methods. I propose using the methodology outlined in Head et al.(2017) and Yotov at al.(2018) to identify and estimate country specific effects. They propose a one step estimation approach where including international trade flows as well as internal trade flows allows for the estimation of country specific effects.

Second, I explore whether spillovers of civil conflicts can impact trade of neighbouring countries uninvolved in the conflict. Making use of the rich data in the Major Episodes of Political Violence dataset (MPEV), the data on neighboring and regional conflict is used to estimate possible spillover effects of intrastate conflicts and regional instability on trade.

This empirical analysis offers robust evidence that civil conflicts in a trading partner is highly detrimental to trade relations. In fact, the presence of a civil conflict in a given country reduces its international trade flows compared to its internal trade flows by over 40%. The analysis shows that the impact of a civil conflict is highly persistent through time and increases with the duration of the conflict. Additionally, the results show that having an additional neighbour involved in a civil conflict has a significant and negative impact on a country's international trade whether this neighbour is contiguous or not. In fact, having an additional contiguous neighbour involved in a civil conflict can reduce international trade by up to 25% while trade can decrease by over

3.5% if an additional non contiguous neighbour is invomlved in a civil conflict.

This paper is related to the literature on the relationship between international trade and conflicts. The two-way relationship between trade and armed conflicts has received considerable attention from both economists and political scientists. On the one hand, the impact of trade on the likelihood of conflict was examined. Two main theoretical arguments are advanced: the liberal school holds that trade promotes peace because interdependence increases the opportunity cost of conflicts. However, the neo-Marxist school argues that asymmetric trade gains can lead to conflict (Polachek, 1980; Barbieri and Schneider, 1999). Martin et al. (2008) build a theoretical model which predicts that the probability of war is lower for countries that trade more bilaterally but higher for countries that engage in multilateral trade. The data seem to support the model's predictions. In fact, empirical evidence shows a negative relationship where by countries that trade more bilaterally are less likely to engage in conflicts (Polachek, 1980; Martin et al., 2008).

On the other hand, there is evidence that conflicts disrupt trade. Pollins (1989) constructs a trade model where importers take into account the price, quality and origin of imports as well as their relationship with the exporting country. He finds evidence of negative impact of conflict on trade. Other papers find similar results; Blomberg and Hess (2006) estimate the impact of terrorism, internal and external conflicts to a 30% tariff on trade. Martin et al. (2008) estimate a 22% fall in trade during a conflict and find that negative effects persist for 10 years after its end.

This paper is also related to research on possible spillovers of conflicts to economies of uninvolved neighbors. The negative effects of a conflict are not limited to countries involved in it. Previous research has found negative spillovers of conflicts on economic growth and trade of neighbors (Quershi, 2013; De Groot, 2010; Mirza et al.,2010). There is some evidence of positive spillovers on distant neighbors, in other words countries far enough from conflict to be deemed "safe" (De Groot, 2010; Mirza et al.,2010). A possible explanation is redirection of trade from conflict plagued countries to more peaceful countries in the same region which are more likely to have similar resources (De Groot, 2010).

The rest of the paper is organised as follows. Section 2 describes the data used

as well as some stylized facts of trade and war. Section 3 offers a brief review of the structural gravity model and explains the empirical strategy used. section 4 discusses the results obtained. Section 5 concludes.

2   Data and Descriptive Statistics

This paper uses four main sources of data: trade, production and gravity related data over the period 1989-2006 obtained from CEPII and civil conflict data from the Major Episodes of Political Violence (MEPV) database provided by Center for Systemic Peace (CSP).

The first data set concerns the international bilateral trade flows. I will use the BACI trade data set provided by the CEPII. The BACI data set provides bilateral trade flows at the product level. Individual trade flows are identified by the exporter i, the importer j, the product category k and the year t. The data set provides information on both the value (v,in thousands of US dollars) and quantity (q, in tons) of trade. Several levels of HS dis-aggregation are available: HS92, HS96, HS02, HS07 and HS12. For the purpose of this paper, trade flows are aggregated at the country pair-year level giving yearly bilateral trade flows.

Secondly, data on production and internal trade flows are obtained from the TradProd database provided by the CEPII. The data is provided at the sectoral level for 26 industrial sectors. Again, the data is aggregated at the country-year level. Thirdly, standard gravity variables are obtained from the CEPII's gravity data set. This gravity database gives information concerning standard gravity variables as GDP of importer and exporter countries, bilateral distance, common language, colonial link, etc. Merging these 3 data sets together gives trade, production and gravity data for over 140 countries for the period 1989-2006.

Finally, to measure civil conflict, I will use the MEPV data set. The MEPV data set comprises 328 episodes of major armed conflicts over the period 1946-2012. For the purpose of this paper, I will focus on the countries and time period for which trade and production data is available, namely 142 countries for the period 1989-2006.

A major episode of political violence is defined by the systematic and sustained use of lethal violence by organized groups resulting in at least 500 directly related deaths over the episode[1]. The data set scores every episode of armed conflict on a score from

---

[1]http://www.systemicpeace.org/inscr/MEPVcodebook2016.pdf

0 to 10, 10 being the highest level of violence. This score reflects the effect of political violence and warfare on the societies directly affected, this includes fatalities, casualties, resource depletion, destruction of infrastructure, population dislocations and psychological trauma. And the scores are directly comparable across time, place and type of conflict.

Two types of conflicts are identified, interstate conflicts and intrastate conflicts. The former includes violence or wars between at least two states while the latter includes civil or ethnic violence or wars in at least one state. The variable on civil conflict measures the magnitude of all episodes of intrastate violence in a given country in a given year; this includes civil violence, civil war, ethnic violence and ethnic war. The variable on interstate conflicts measures the magnitude of all episodes of interstate violence in a given country in a year; this includes international violence and international war.

Additionally, the MPEV data set recognizes that the stability of any state is affected not only by its own conflicts but also by those in its immediate and general proximity. Therefore, the data set includes variables that measure conflicts in contiguous neighbours defined as states sharing a land or water border of two miles width or less (immediate proximity), as well as variables that measure conflicts in a country's politically relevant region (general proximity). In fact, each state in the MPEV dataset is assigned a politically relevant geopolitical region and the conflict's magnitude score is summed for each state in that region for each year, this score is then assigned to each state in the region for each year. Each region therefore has a unique score and states in the same region have the same score. For straddle states located in more than one region, the average score is assigned. Isolated islands insulated from regional context have no regional score. The dataset divides the world into 10 regions: West Africa, North Africa, East Africa and South Africa, Middle East, South Asia, East Asia, South America, Central America and Europe/North America.

Table 1 gives some summary statistics for the MEPV data set. The data set on conflict cover the period 1989 to 2006. The first four rows give information on the presence and the intensity of civil and interstate conflicts in a country respectively. The mean score of civil conflicts is 0.7 while that of interstate conflicts is 0.1. The average value is very low as the majority of the countries in the sample has not experienced any violence. More

precisely, according to table 1, 80% of the sample has experienced no civil conflicts in a given year compared to over 97% for interstate conflicts.

The following four rows focus on conflicts in contiguous neighbours. According to the data set, one contiguous neighbour is, on average, involved in a civil conflict in a given year compared to 0.1 involved in an interstate conflict. The average intensity of civil conflicts in neighboring states is 3.2 while that of interstate conflict is 0.3. For regional variables, 4 regional neighbours are on average involved in a civil conflict in a given year with an average intensity of 13.3. This clearly shows that the incidence of civil violence is much higher than that of interstate violence.

The level of armed conflicts has been on the decline since 1990's. Figure 1 shows the evolution of both types of conflicts over the period 1946-2012. The level of interstate violence has been low and has remained fairly constant over the period while civil violence has a much higher magnitude and has increased since 2010. Figure 2 shows the evolution of conflicts for each region separately. It is obvious that conflicts are more prevalent in certain regions as West Africa, the Middle East and South-central Asia ans East Asia.

3 Empirical Strategy

3.1 Review of the Structural Gravity Model

The structural gravity model can be derived theoretically from a large class of micro-economic foundations. It can be given by the following equation:

$$X_{ij} = Y_i E_j \frac{T_{ij}}{\Pi_i P_j} \tag{1}$$

where X_{ij} represents bilateral trade flows between exporter i and importer j. In order to better understand equation 1, it can be decomposed into 2 terms. The first term is the size term $Y_i E_j$ where Y_i denotes total value of production in exporter i and E_j denotes total value of expenditure in importer j. The size term captures the hypothetical level of frictionless trade between i and j assuming no trade costs.

The second term $\frac{T_{ij}}{\Pi_i P_j}$ captures the effect of trade costs which derives a wedge between realized and frictionless trade (Yotov et al., 2016). The term t_{ij} denotes bilateral trade costs between i and j which includes bilateral distance, common language, trade agreements, etc... The structural terms Π_i and P_j represent the outward and inward multilateral resistance terms respectively (Anderson and Van wincoop, 2003). These terms capture the fact that bilateral trade between two countries i and j doesn't only depend on their sizes and bilateral trade costs but also on how isolated they are from the rest of the world. This means that any change in trade costs between any two countries in the world would affect all other countries (Yotov et al, 2018).

The gravity model is the workhorse of empirical trade literature. It has been used extensively to estimate the impact of various determinants of bilateral trade. To obtain reliable estimates of trade determinants, it is crucial to estimate the gravity equation in a theoretically consistent manner. The structural gravity model can be estimated econometrically as follows:

$$X_{ijt} = \exp(lnS_{it} + lnM_{jt} + lnD_{ij} + \beta Z_{ijt}) + e_{ijt} \tag{2}$$

where X_{ijt} represent trade flows between exporter i, importer j in year t. S_{it}, M_{jt}, D_{ij} represent origin-time, destination-time and country-pair fixed effects respectively. Z_{ijt} should include all trade- related bilateral variables that varies in time as regional trade agreements. e_{ijt} is the error term.

Several recommendations are put forth by the empirical trade literature in order to obtain a theoretically consistent structural gravity model (Heid et al., 2014; Yotov et al.,2016). Firstly, exporter-time and importer-time fixed effects, S_{it}, M_{jt}, are included in order to properly account for the multilateral resistance terms (Hummels, 2002; Feenstra, 2016). In addition to controlling for the multilateral resistance terms, directional time-varying fixed effects absorbs the size variables, Y_{it} and E_{jt} as well as any other country-specific variable that varies over time (Yotov et al., 2016). Secondly, PPML is used instead of OLS to estimate the gravity model. The reason is PPML takes into account zero trade flows which are otherwise dropped from the estimation when the gravity model is estimated in log-linear form with OLS. Additionally, trade data suffer from heteroscedasticity and PPML can help overcome this problem (Santos Silva and Tenreyro, 2006; Yotov et al., 2016). Thirdly, country-pair fixed effects ,D_{ij}, are included in the gravity equation as a way to reduce the endogeneity of trade determinants. In fact, country-pair fixed effects absorb all observable and unobservable time-invariant trade costs that may be correlated with both the variable of interest and the error term (Baier and Bergstrand, 2007; Yotov at al.,2016). Finally, Both international and intranational trade flows are included in the model. The inclusion of intranational flows allows the estimation of country-specific trade determinants. Additionally, this is consistent with gravity theory as consumers choose among domestic as well as foreign varieties (Yotov et al., 2016). This last recommendation will be discussed in more detail in the following section.

3.2 Identification Strategy

As discussed in the previous section, directional time-varying fixed effects must be included in order to properly account for the multilateral resistance terms. Failure to include these fixed effects will lead to biased and inconsistent gravity estimates (An-

derson and Van Wincoop, 2003). Including exporter-time and importer time fixed effect will however absorb any observable or unobservable country-specific time-varying trade cost. However, this paper is interested in estimating the impact of civil conflict on bilateral trade. Since civil conflict is a country-specific variable that varies with time, I will be unable to estimate it using the traditional gravity model specification discussed in the previous section.

There are several solutions proposed by the empirical trade literature when estimating the impact of country-specific variables within a gravity model. First, constructing a new bilateral variable that takes into account both the exporter and the importer countries (Anderson and Marcouiller, 2002; Yu et al., 2015; Alvarez et al., 2018). However, this solution is unsatisfactory since it is difficult to interpret this new variable. Another solution is to include the variable of interest without the directional time fixed effects which means that the estimates are unreliable.

A simple and theoretically consistent solution to this issue is to include intranational trade flows in addition to the international flows usually used. This allows the identification of country specific variables as civil conflict within a structural gravity model even with directional time-varying fixed effects. Heid et al. (2017) proposed the addition of intranational trade flows to gravity estimates in order to identify the impact of unilateral non-discriminatory trade policies on bilateral trade as most favored nation tariffs on the importer side and export subsidies on the exporter side. Yotov et al. (2018) extended this approach to identify the impact of national institutions on bilateral trade. They argued that national institutions applied equally to exports and imports, therefore it is not possible to disentangle the impact of institutions on exports and imports separately.

In order to estimate the impact of civil conflicts on international trade, I estimate the following gravity equation:

$$
\begin{aligned}
X_{ijt} = exp[lnS_{it} + lnM_{jt} + lnD_{ij} + Z_{ijt} + NationalCivilConflict_{it} \\
+ ContiguousCivilConflict_{it} \\
+ RegionalCivilConflict_{it}] + e_{ijt}
\end{aligned}
\tag{3}
$$

which is similar to the gravity equation explained in the previous section. An interaction term $NationalCivilConflict_{it}$ is added which interacts a dummy variable for international trade equal to 1 if trade flow is international and 0 if it is domestic with a measure of national civil conflict. This interaction term measures the differential impact of civil conflict on international trade compared to internal trade.

Furthermore, this paper is interested in measuring possible spillovers of civil conflicts to neighbouring countries. For this purpose, two other interaction terms are defined: $ContiguousCivilConflict_{it}$ and $RegionalCivilConflict_{it}$. The first interaction term multiplies the dummy for international trade with a measure of civil conflicts in contiguous countries i.e. countries that the exporter share a border with. The second interaction term multiplies the dummy for international trade with a measure of civil conflicts in neighbouring non-contiguous countries i.e. neighbouring countries that the exporter doesn't share a border with.

4 Estimation Results

This section discusses the estimation results obtained. First, I show the partial equilibrium estimates of the impact of a domestic civil conflict on international trade. Then, I examine the spillover effect of civil conflicts in neighbouring countries on international trade. Finally, the validity of these results are examined for different kinds of conflicts and for different specifications.

A first set of estimation results are shown in table 2. I use the PPML estimator which is attractive for two reasons. First, it addresses the problem of heteroskedasticity of trade data (Santos silva and Tenreyro,2006). Second, unlike OLS estimator, PPML can use the information contained in the zero trade flows. Table 2 also uses data on trade flows from 1989-2006. From an econometric perspective, panel data is preferable to cross sectional data as it improves the efficiency of the estimates as well as allows us to capture the impact of a country's civil conflict on its trade relations over time. The panel setting also allows the use of country-pair fixed effects which controls for all observable and unobservable time invariant bilateral determinants of trade that may be correlated with civil conflict. Additionally, all specifications include exporter-time and importer-time fixed effects which are crucial to properly control for the multilateral resistance terms and obtain reliable gravity estimates (Anderson and Van Wincoop,2003). This rich structure of fixed effects greatly mitigates the endogenity problem and signifies that the identification of the impact of civil conflict on trade is due to the time variation in this variable only. Finally, the standard errors are clustered at the country-pair level in all estimations in order to account for possible correlations for given country pairs in the error term.

Table 2 presents the results for civil conflict presence. Column 1 in Table 2 reports the results of the gravity equation with the standard gravity variables to proxy for bilateral trade costs. These include the logarithm of bilateral distance (*Distance*)), whether the two countries share a border(*contiguity*), share a common language (*Commonlanguage*), have colonial ties (*Colonialrelationship*) or are in a trade agreement (*RTA*). I have also included the exporter-time and importer-time fixed effects. The results show that bilateral distance has a significant negative impact on international trade while contiguity, com-

mon language, colonial ties and trade agreements have positive significant impacts.The estimates of column 1 are comparable with those of the gravity literature and therefore establish the representativeness of the sample.

The results in column 2 are obtained with the same specification as column 1. However, I include an interaction term, $Nationalcivilconflict$. This variable interacts a dummy for international trade flows and a dummy for the presence of civil conflict in the exporter. Therefore, this variable will be equal to one if there is a civil conflict in i in year t and $i\&j$ are two different countries. As mentioned before, the interaction term can be defined on the exporter or the importer side without any impact on the estimates because civil conflict affects a country both as an exporter and an importer. Yotov et al.(2018) demonstrates empirically the equivalence of the estimates obtained on the exporter side, importer side and using domestic flows. The interaction term is equal to zero for domestic trade. This means that the impact of civil conflict on trade can be identified even in the presence of exporter-time and importer-time fixed effects. However, the interaction term now captures the differential impact of civil conflict on international trade relative to internal trade (Heid et al, 2017; Yotov et al, 2018). Column 2 shows that presence of a civil conflict in a country has a significant negative impact on its international trade relative to domestic trade.

In the next column, country-pair fixed effects are added to the gravity equation. This specification is indeed more demanding as the identification of the impact of civil conflict on trade is now entirely due to time variation within a given country-pair. As expected, the estimated coefficient of the interaction term is still negative and significant albeit of smaller magnitude as the dyadic fixed effects eliminate the cross sectional variation in the data. The coefficient for the interaction term is equal to -0.57 which indicates that presence of a civil conflict in a country is expected to reduce its international trade relative to its internal trade by $(e^{-0.57} - 1) * 100 = -43.4\%$. This signifies that a country's international trade is nearly halved if it is involved in a civil conflict.

Turning to the third and forth columns, I investigate the spillover effects of a civil conflict on neighbouring countries. In column 3, I introduce an additional regressor ($Contiguouscivilconflict$) which interacts the dummy for international trade flows with a

dummy variable equal to 1 if there is a civil conflict in at least one bordering country to i in year t. In column 4, I add an interaction term which takes into account the presence of a civil conflict in at least one non-contiguous neighbor of the exporter i in year t. This means a state in the same region as the exporter but not sharing a border. The coefficients of both variables are insignificant which implies that there is no spillover effects. The mere presence of a civil conflict in a neighbouring country whether contiguous or not has no impact on a country's international trade flows relative to domestic trade.

In order to further investigate the spillover effect of civil conflicts on neighbouring countries, table 3 uses a different measure of contiguous and regional civil conflicts. In table 3, I use the number of neighbouring countries involved in a civil conflict instead. Therefore for contiguous civil conflict, the number of bordering countries involved in a civil conflict is used. As for regional civil conflict, I use the number of non-contiguous countries in the same region that are involved in a civil conflict. The interaction term now interacts the dummy for international trade flows with the number of neighbouring countries involved in a civil conflict. The results show that an additional neighbour involved in a civil conflict has a significant negative impact on a country's international trade flows. According to table 3, having an additional contiguous neighbour involved in a civil conflict reduces a country's international trade by 25% while having an additional non-contiguous neighbour involved in a civil conflict reduces international trade by 3.5%. This could imply that it is not having a neighbouring civil conflict that destroys trade but rather it is the increase in regional violence and political instability that has this impact.

As a robustness check, table 4 and 5 replicate the same specifications in table 3 using the intensity of the civil conflicts instead. According to the MPEV, the intensity of a civil conflict is measured on a scale form 1 to 10, with 10 being the highest level of conflict. The interaction term for domestic civil conflict is insignificant indicating that a one unit increase in the intensity of civil conflict doesn't deferentially impact international trade relative to internal trade. This result combined with the previous one could mean that the mere presence of a civil conflict in a country can be highly detrimental to its international trade regardless of the intensity of this conflict. However, in column 3 and 4, the coefficients for contiguous and regional violence are now negative and significant

indicating that an increase in the intensity of civil conflicts in neighbouring countries does affect a country's international trade.

Table 5 weights the intensity of conflict in neighbouring countries by the total number of neighbours. Therefore, the interaction term now interacts the dummy for international trade with the average intensity of civil conflicts in neighbouring countries. The average intensity of civil conflicts for contiguous countries equals the total intensity of civil conflicts in contiguous countries divided by the total number of bordering countries. Similarly for the average intensity of civil conflicts for non-contiguous countries. Contiguous and Regional civil conflict are still negative and significant while that of domestic conflict is insignificant. A one unit increase in the average intensity of contiguous civil conflicts can reduce international trade relative to internal trade by almost 25% while a one unit increase in the average intensity of non-contiguous civil conflicts can reduce international trade relative to internal trade by over 34%.

According to the previous results, the presence of a civil conflict in a country in a given year could reduce its international trade by over 40% relative to its domestic trade while a one unit increase in the intensity of this conflict has no significant impact. But how does the eruption of a civil conflict in a country destroy its international trade? A civil conflict can destroy international trade through several channels. First, conflicts, civil or otherwise, could lead to the destruction of infrastructure, physical and human capital. This would lead to lower production and therefore lower trade both domestically and internationally. In all the previous specifications, the level of GDP is controlled for using exporter-time fixed effects. Therefore, conditional on a country's level of GDP, these results show that a civil conflict can still destroy international trade. Another channel is through increasing trade costs. Destruction of roads, infrastructure, telecommunications networks etc. can greatly increase trade costs leading to lower trade with the rest of the world. Additionally, civil conflicts undermine the state by destroying institutions as rule of law and property rights (Herbs, 1991). They are also more likely to cause social disorder, weaken trust and deepen ethnic and religious differences within a society (Collier, 1999). All of this leads to the deterioration of the economic environment which is very likely to persist for a long time after the end of conflict.

In order to shed more light on the channels through which civil conflict can impact trade, I will distinguish between different types of domestic civil conflicts. The MEPV data set distinguishes between two types of civil conflicts: political conflicts and ethnic conflicts. Political conflicts include conflicts between rival political groups as the Greek civil war of 1946. The ethnic conflicts, however, refer to conflicts involving the state agent and a distinct ethnic group as the ongoing ethnic war in Myanmar. Table 6 estimates the impact of the presence of these different types of civil conflicts in a country on its international trade. Again the variable of interest in introduced as an interaction term between the dummy for international trade and the dummy for civil conflict in order to estimate it in the presence of directional-time varying fixed effects. I find that the eruption of an ethnic civil conflict in a given country in a given year can reduce its trade by almost 50% while the political civil conflicts have no impact on international trade. Table 7 replicates the same specifications using the intensity of the episodes instead and finds results similar to table 4.

Most conflicts , particularly civil conflicts are persistent and last a long time. In this sample, a civil conflict lasts an average of 15 years. Therefore it is important to study the dynamic effects of these civil conflicts. Table 8 introduces new regressors for civil conflicts. In column two, the interaction term interacts the dummy for international trade with a dummy that is equal to one if a new conflict erupts in country i in year t. This variable is insignificant indicating therefore it doesn't matter if the conflict is new or ongoing. In column 3, I introduce the duration of the civil conflict and in column 4, the duration squared. Both variables are negative and significant indicating that the more persistent a civil conflict, the more negative effect it has on international trade.

5 Conclusion

This paper investigates the impact of civil conflict on international trade. In order to carry this out, I use international trade and production data from 1989-2006 provided by BACI-CEPII data set. Additionally, I use data on civil conflict from the MPEV data set for the same period. For this purpose, a gravity model is estimated with exporter-time, importer-time and country pair fixed effects. Presence of directional time varying fixed effects is crucial to obtain consistent and reliable estimates. However, this means country-time specific variables as civil conflict can't be estimated. In order to fix this issue, I use a one step estimation method outline by Head et al.(2017) and Yotov et al. (2018) where internal trade data is used to identify the impact of civil conflict on international trade.

This paper finds that the presence of civil conflicts in a country has a highly detrimental effect on trade flows. A civil conflict in a given year can in fact decrease trade by over 40% in this year. This effect is in fact persistent over time as the duration of conflict negatively impacts international trade. Distinguishing between political and ethnic civil conflicts, I find that it is in fact ethnic conflicts that destroy trade rather than political ones. This could imply that the main channel through which civil conflicts impact international trade is by causing social disorder and deepening ethnic and religious differences within a society. This can lead to deterioration of the economic environment affecting economic relations with the rest of the world.

Additionally, this paper examines spillover of civil conflicts to neighbouring countries. It finds that having an additional contiguous country at war can reduce international trade flows by up to 25% while an additional non-contiguous country being involved in a civil conflict can reduce trade by 3.5%.

6 References

1. Ades, A. and Chua, H. (1997). "Thy neighbor's curse: regional instability and economic growth." Journal of Economic Growth, 2 (3): 279–304.

2. Álvarez, I.C., Barbero J., Rodríguez-Pose A., and Zofío,J.L. (2018). "Does Institutional Quality Matter for Trade? Institutional Conditions in a Sectoral Trade Framework." World Development, 103(C): 72-87.

3. Anderson, J.E. and Van Wincoop, E. (2003). "Gravity with Gravitas: A Solution to the Border Puzzle." American Economic Review, American Economic Association, 93(1):170-192.

4. Anderson, J.E. and Marcouiller, D. (2002) "Insecurity and the Pattern of Trade: An Empirical Investigation." Review of Economics and Statistics, 84 (2): 342-352.

5. Baier, S.L. and Bergstrand, J.H. (2007). "Do Free Trade Agreements Actually Increase Members' International Trade?" Journal of International Economics, 71(1), 72-95.

6. Barbieri, K. and Schneider, G. (1999). "Globalization and Peace: Assessing New Directions in the Study of Trade and Conflict." Journal of Peace Research, 36(4): 387-404.

7. Blomberg, S.B. and Hess, G. (2006). "How Much Does Violence Tax Trade?" Review of Economics and Statistics, 88(4): 599–612.

8. Callen, M. , Isaqzadeh, M., Long, J.D. and Sprenger, C. (2014). "Violence and Risk Preference: Experimental Evidence from Afghanistan." American Economic Review, American Economic Association, 104(1):123-148.

9. Cassar, A., Grosjean, A.and Whitt,S. (2011). "Social Cooperation and the Problem of the Conflict Gap: Survey and Experimental Evidence from Post-War Tajikistan." Discussion Papers 2011-15, School of Economics, The University of New South Wales.

10. Collier, P. (1999). "On the economic consequences of civil war." Oxford Economic Papers, 51(1):168-183.

11. D'Souza, A. (2014). "Conflict and Trade: Implications for Agriculture and Food Security," Food, Resources and Conflict, December 7-9, 2014. San Diego, California 197200, International Agricultural Trade Research Consortium.

12. De Groot, O. (2010). "The spillovers of conflict on economic growth in neighboring countries in Africa." Defense and Peace Economics, 21 (2):149–164.

13. Feenstra, R.C. (2016). "Advanced International Trade: Theory and Evidence." 2nd Ed.: Princeton University Press.

14. Glick, R. and Taylor, A.M. (2010). "Collateral Damage: Trade Disruption and the Economic Impact of War." the Review of Economics and Statistics, 92 (1): 102–107.

15. Head, K. and Mayer,T. (2014)."Gravity Equations: Workhorse, Toolkit, and Cookbook." Sciences Po Economics Discussion Papers 2013-02, Sciences Po Department of Economics.

16. Heid, B., Larch, M. and Yotov, Y. (2017). "Estimating the Effects of Non-discriminatory Trade Policies within Structural Gravity Models." School of Economics Working Paper Series 2017-10, LeBow College of Business, Drexel University.

17. Hummels, D. (2002). "Toward a Geography of Trade Costs". unpublished, retrieved from http://www.krannert.purdue.edu/faculty/hummelsd/research/toward/tgtc.pdf.

18. Karam, F. and Zaki, C. (2015). "How did Wars Dampen Trade in the MENA Region?" Working Papers 933, Economic Research Forum, revised Aug 2015.

19. Martin, P., Mayer, T. and Thoenig, M. (2008a). "Make Trade not War?" Review of Economics Studies, 75(3): 865 – 900.

20. Martin, P., Mayer, T. and Thoenig, M. (2008b). "Civil Wars and International Trade." Journal of the European Economic Association, MIT Press,6(2-3):541-550.

21. Mirza, D., Sousa, J., and Verdier, T. (2010). "Terrorism Networks and Trade: Does the Neighbor Hurt?" CEPII Working Paper No. 2010-04. CEPII, Paris.

22. Murdoch, J. and Sandler, T. (2002). "Economic growth, civil wars, and spatial spillovers." Journal of Conflict Resolution, 46 (1):91–110.

23. Murdoch, J. and Sandler, T. (2004). "Civil Wars and Economic Growth: Spatial Dispersion." American Journal of Political Science, 48 (1):138–151.

24. Polachek, S. (1980). "Conflict and Trade." Journal of Conflict Resolution, 24(1):57-78.

25. Pollins, B. (1989). "Conflict, Cooperation, and Commerce: The Effect of International Political Interactions on Bilateral Trade Flows." American Journal of Political Science 33:737–61.

26. Qureshi, M.S. (2013). "Trade and thy neighbor's war." Journal of Development Economics, 105(C): 178-195.

27. Santos Silva, J.M.C. and Tenreyro, S. (2006). "The Log of Gravity." The Review of Economics and Statistics 88(4): 641-658.

28. World Bank. (2011). "Reducing Conflict Risk: Conflict, Fragility and Development in the Middle East and North Africa." Sustainable Development Department, Middle East and North Africa Region, the World Bank, Washington D.C.

29. Yotov, Y.,Piermartini,R., Monteiro,J-A. and Larch, M. (2016). "An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model." World Trade Organization and the United Nations Conference on Trade and Development.

30. Yotov, Y., Beverelli, C., Alexander, K., and Larch, M. (2018). "Institutions, Trade and Development: A Quantitative Analysis."School of Economics Working Paper Series 2018-3, LeBow College of Business, Drexel University.

31. Yu, S.,Beugelsdijk, S., and de Haan,J. (2015). "Trade, Trust and the Rule of Law." European Journal of Political Economy, Elsevier. 37(C):102-115.

Figures

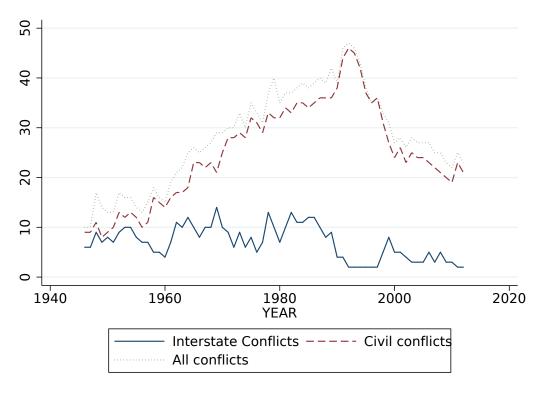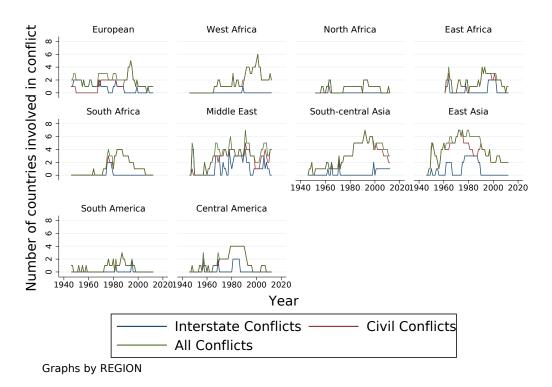Figure 1: Evolution of conflicts 1946-2012

Figure 2: Evolution of conflicts by region 1946-2012

Graphs by REGION

Source: Constructed by the author using the "Major Episodes of Political Violence (MPEV)" database, Center for Systemic Peace "CSP"

Tables

Table 1: Summary Statistics

Variable	Obs	Mean	Std.	Dev.	Min
Year	2,895	1998	5	1989	2006
Presence of National Civil Conflict	2,894	0.20	0.40	0.0	1
Average Intensity of National Civil Conflict	2,894	0.7	1.7	0.0	10.0
Presence of National Interstate Conflict	2,894	0.024	0.15	0.0	1
Average Intensity of National Interstate conflict	2,894	0.1	0.5	0.0	6.0
Number of Contiguous Neighbours in Civil Conflicts	2,893	0.9	1.1	0.0	7.0
Number of Contiguous Neighbours in Interstate Conflicts	2,893	0.1	0.4	0.0	3.0
Average Intensity of Contiguous Civil Conflict	2,893	3.2	4.5	0.0	29.0
Average Intensity of Contiguous Interstate Conflict	2,893	0.3	1.2	0.0	13.0
Number of Regional Neighbours in Civil Conflicts	2,894	4.0	2.3	0.0	10.0
Number of Regional Neighbours in Interstate Conflicts	2,894	0.3	0.8	0.0	4.0
Average Intensity of Regional Civil Conflict	2,894	13.3	8.4	0.0	40.0
Average Intensity of Regional Interstate Conflict	2,894	1.0	2.7	0.0	18.0

Source: Constructed using the "Major Episodes of Political Violence (MPEV)" database,
Center for Systemic Peace "CSP"

Table 2: Presence of civil conflict and international trade

Variables	(1)	(2)	(3)	(4)	(5)
Distance)	-0.473***	-0.452***			
	(0.0118)	(0.0116)			
Contiguity	0.598***	0.613***			
	(0.0211)	(0.0213)			
Common language	0.309***	0.309***			
	(0.0200)	(0.0199)			
Pair in colonial relationship	0.255***	0.267***			
	(0.0398)	(0.0398)			
RTA	0.770***	0.797***	0.0653	0.0632	0.0628
	(0.0201)	(0.0204)	(0.0440)	(0.0437)	(0.0436)
National civil conflict		-1.303***	-0.569*	-0.570*	-0.559**
		(0.105)	(0.321)	(0.315)	(0.279)
Contiguous civil conflict				-0.150	-0.152
				(0.128)	(0.126)
Regional civil conflict					-0.209
					(0.588)
Observations	344,871	344,871	321,324	321,324	321,324
R-squared	0.863	0.868	0.987	0.987	0.987
Importer time FE	YES	YES	YES	YES	YES
Exporter time FE	YES	YES	YES	YES	YES
Country Pair FE	NO	NO	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (5) include exporter-time and importer-time fixed effects while Models (3) through (5) additionally include country pair fixed effects.

Table 3: Number of countries in civil conflict and international trade

Variables	(1)	(2)	(3)
RTA	0.0653	0.0515	0.0504
	(0.0440)	(0.0435)	(0.0432)
National civil conflict	-0.569*	-0.474**	-0.421*
	(0.321)	(0.226)	(0.223)
Number of contiguous neighbours in a civil conflict		-0.353***	-0.333**
		(0.119)	(0.130)
Number of non-ontiguous neighbours in a civil conflict			-0.0443***
			(0.0124)
Observations	321,324	321,324	321,324
R-squared	0.987	0.987	0.987
Importer time FE	YES	YES	YES
Exporter time FE	YES	YES	YES
Country Pair FE	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (3) include exporter-time, importer-time fixed effects and country pair fixed effects.

Table 4: Intensity of civil conflict and international trade

Variables	(1)	(2)	(3)	(4)	(5)
Distance	-0.473***	-0.458***			
	(0.0118)	(0.0115)			
Contiguity	0.598***	0.611***			
	(0.0211)	(0.0210)			
Common language	0.309***	0.315***			
	(0.0200)	(0.0198)			
Pair in colonial relationship	0.255***	0.268***			
	(0.0398)	(0.0401)			
RTA	0.770***	0.780***	0.0702	0.0510	0.0493
	(0.0201)	(0.0199)	(0.0437)	(0.0433)	(0.0429)
National civil conflict		-0.317***	-0.102	-0.0839	-0.0770
		(0.0195)	(0.147)	(0.0995)	(0.0962)
Contiguous civil conflict				-0.117***	-0.116***
				(0.0302)	(0.0299)
Regional civil conflict					-0.0144***
					(0.00407)
Observations	344,871	344,871	321,324	321,324	321,324
R-squared	0.863	0.868	0.987	0.987	0.987
Importer time FE	YES	YES	YES	YES	YES
Exporter time FE	YES	YES	YES	YES	YES
Country Pair FE	NO	NO	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (5) include exporter-time and importer-time fixed effects while Models (3) through (5) additionally include country pair fixed effects.

Table 5: Weighted Intensity of civil conflict and international trade

Variables	(1)	(2)	(3)
RTA	0.0702	0.0610	0.0576
	(0.0437)	(0.0424)	(0.0420)
National civil conflict	-0.102	-0.0924	-0.0743
	(0.147)	(0.135)	(0.115)
Contiguous civil conflict		-0.285**	-0.269*
		(0.143)	(0.138)
Regional civil conflict			-0.424***
			(0.135)
Observations	321,324	321,324	321,324
R-squared	0.987	0.986	0.986
Importer time FE	YES	YES	YES
Exporter time FE	YES	YES	YES
Country Pair FE	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (5) include exporter-time and importer-time fixed effects while Models (3) through (5) additionally include country pair fixed effects.

Table 6: Presence of Ethnic and Political Civil conflicts and international trade

Variables	(1)	(2)	(3)
RTA	0.0630	0.0754*	0.0627
	(0.0437)	(0.0458)	(0.0437)
Ethnic conflict	-0.670**		-0.669**
	(0.324)		(0.320)
Political conflict		-0.204	-0.194
		(0.419)	(0.379)
Observations	321,324	321,324	321,324
R-squared	0.987	0.987	0.987
Importer time FE	YES	YES	YES
Exporter time FE	YES	YES	YES
Country Pair FE	YES	YES	YES

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (3) include exporter-time , importer-time fixed effects and country pair fixed effects.

Table 7: Intensity of Ethnic and Political Civil conflicts and international trade

Variables	(1)	(2)	(3)
RTA	0.0688	0.0756*	0.0687
	(0.0434)	(0.0458)	(0.0434)
Ethnic conflict	-0.131		-0.131
	(0.182)		(0.183)
Political conflict		-0.00528	-0.0180
		(0.0826)	(0.0799)
Observations	321,324	321,324	321,324
R-squared	0.987	0.987	0.987
Importer time FE	YES	YES	YES
Exporter time FE	YES	YES	YES
Country Pair FE	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (3) include exporter-time , importer-time fixed effects and country pair fixed effects

Table 8: Dynamic effects of conflict: New vs Persistent Conflicts)

Variables	(1)	(2)	(3)	(4)
RTA	0.0653	0.0765*	0.0643	0.0581
	(0.0440)	(0.0459)	(0.0438)	(0.0433)
Civil conflict	-0.569*			
	(0.321)			
New civil conflict		-0.342		
		(0.234)		
Duration of civil conflict			-0.0319***	-0.0726***
			(0.0108)	(0.0192)
Duration of civil conflict^2				0.00151***
				(0.000484)
Observations	321,324	321,324	321,324	321,324
R-squared	0.987	0.987	0.987	0.987
Importer time FE	YES	YES	YES	YES
Exporter time FE	YES	YES	YES	YES
Country Pair FE	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Robust standard errors clustered by country pair are presented in parentheses. ***, ** and * represent statistical significance at the 0.01, 0.05 and 0.10 levels, respectively. The results in this table are estimated from the gravity equation (3) for 142 countries from 1989 to 2006. Models (1) through (4) include exporter-time , importer-time fixed effects and country pair fixed effects