Love the buyer and loathe the seller:

A directed approach on trade and conflict*

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Abstract

The analysis of the effects of international trade on interstate conflict has almost exclusively resorted to the relation between total bilateral trade and total bilateral conflict, simply toting flows in both directions. This paper empirically explores the determinants of bilateral conflict taking into account the direction of each trade flow and the direction of conflict. Building a continuous event-based measure of interstate conflict, and suggesting a spatial model in the network of dyads, I estimate a dynamic model for emitted conflict that controls for received conflict. Results show that exports and imports have opposite effects, while the former has a pacifying effect the latter promotes conflictive relations. From a policy standpoint, this finding suggests that balanced trade – and not just trade – shall be encouraged in order to reach more peaceful international relations.

Keywords: interstate conflict, international trade, trade patterns, conflict measures

JEL codes: F51, F14

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1. **Introduction**

The recent proliferation of international conflicts in some regions renovates the need for a better understanding of the determinants of international conflict. Globalization, and particularly the observed increase in the volume of international trade, could be failing as the means for peace that the most widespread theoretical approach has long been advising. While most of the literature has focused on the importance of total bilateral trade on peace, in this paper I explore the different roles played by import and export flows. A careful treatment of the direction of trade is the main methodological contribution in this paper. It shows that the effects of imports and exports on conflict are indeed very different.

To understand the causal links behind international militarized conflict, in particular to weigh the differences between exports and imports in their effects on political disrupts, is theoretically relevant as well as critical for public policy. The international community has been promoting a sustained process of trade liberalization, based on the economic benefits of free trade. But the political consequences of increased trade are far from being clear. It is relevant to know if some kinds of trade instead of promoting peace promote conflict, and our findings suggest that trade flows promote peaceful relations form the seller to the buyer, but may increase conflict behaviors in the destination country towards the origin. This evidence gives support to the realist approach to international relations, as well as to the neo mercantilist views. Thus, our results alert about unbalanced trade potentially triggering militarized disputes.

Even if a bilateral trade deficit is not a bad thing *per se*, a mercantilist belief could still be imprinted in some political interpretations and attitudes. A recent example is given by one of the strong U.S. presidential candidates for the 2016 election, who refuses to rule out launching a war against China as a means to solve the bilateral trade deficit in the U.S.[1]. The idea reminds the 19th century's Opium Wars and their origins in the British trade deficit with China, among a long list of historical conflicts against trade "enemies". Turning to the present and to reasonable arguments, a strong correspondence is apparent between developed countries' conflict targets and their providers of some strategic resources, mainly because of the role of Middle East. The motives for concentration of political violence in this region are certainly diverse, but the issue is giving rise to an idea of "resource wars" through which powerful countries seek to increase their control over regions producing strategic goods. From a policy point of view, it is worth noting that since every trade deficit contributes to other countries' trade surpluses, the promotion of peaceful relations should consider the need of encouraging balanced bilateral relations, so for each trading partner the conflictive effect of increased imports is partially or totally offset by an increase in exports.

Some theoretical foundations for a directed model have been already developed in a recent paper by Li and Reuveny (2011), but to our knowledge there is no empirical research that preserves this critical methodological trait in its full potential. Doing it requires to coherently solve several challenges. First, there is a well-known problem of endogeneity because of reverse causation from conflict to trade, which I face using an Instrumental Variables approach. Additionally, endogeneity also appears as a consequence of omitted variables if reciprocal effects are not taken into account: conflict from country

[1] The New York Times, 26th March 2016, "Donald Trump Expounds on His Foreign Policy Views". www.nytimes.com/2016/03/27/us/politics/donald-trump-transcript.html

A to country B will depend in some extent on conflict from B to A. This second problem has received scarce attention, mostly because it being hidden in the widely used undirected approaches. I address this issue by means of spatial components in the model, where space contiguities link each dyadic observation with its reverse flows. Also, most of the existing empirical literature looks at the impact of trade on conflict in a static framework. I propose to estimate a dynamic model where both past values of conflict and trade are allowed to affect the current conflict levels, and this gives additional insights on the dynamics of the adjustment. Last but not least, my approach conceptualizes conflict as a directed notion, allowing the distinction between the levels of conflict from A to B and from B to A. This distinction is not possible in the use of war or Militarized Interstate Disputes (MID) as outcome variables. Events datasets are being increasingly used to overcome the limitations of a discrete or qualitative dependent variable, but only few exceptions exploit the direction of conflict. Furthermore, these approaches frequently mix up conflict events with the qualitatively different events of cooperation between countries. Building an event-based conflict variable, which is directed and continuous, I propose an innovative distinction between conflict escalation and de-escalation events which are the focus of our analysis, and pure cooperative events that are left aside.

The heart of the liberal argument for the pacifying effects of trade is the existence of an opportunity cost of conflict, which can also be seen as an exit cost from trade, based on the assumption that the increase in conflict will bring some degree of exit from beneficial trade relations. This could be an oversimplified view, since on the one hand what is generally seen as the encompassing category called "trade" involves two substantially different flows, with presumably very different exit costs. Following Crescenzi (2003, 2005) and Peterson (2014) in considering exit costs as the losses incurred by states when adjusting to the interruption of trade, it is straightforward to see the qualitative differences of the adjustment to a loss of a destination market for domestic production and the adjustment to a loss of an origin from where domestic agents procure imported final or intermediate goods.

On the other hand, some kinds of conflict do not reduce trade, but maintain or increase trade. Typically, a conflict such as an invasion or occupation could be motivated by the will to assure the provision of natural resources or strategic goods which might be at risk. This is the point where some realist approaches focus, seeing countries' vulnerabilities as a main driver for aggressive actions. It is hard to discard it in the case of securing imports, since these behaviors are well known and documented. At the same time, it may be difficult to think of it as a valid purpose nowadays in the case of destination markets for exports. An invaded country can easily provide resources, but most sure will not be an attractive customer. This paper avoids relying on the trade deterrent effect of conflict, and assumes an encompassing view in which exported and/or imported values could increase.

From an econometric point of view, the overwhelmingly extended practice of using total trade in both directions as the relevant trade variable is mathematically equivalent to estimating a model with exports and imports, as long as an arbitrary constraint is added imposing the equality of both coefficients in magnitude and sign. To my knowledge this constraint has never received the necessary theoretical backing, and its empirical testing is also lacking in the applied literature. This paper's main purpose is to get rid of the equality constraint, and as I will show the results cast serious doubts on its validity.

Peterson (2014) is the most recent effort to directly measure exit costs and include them in a conflict model, with the distinguishing feature of considering both exit costs arising from interrupted export

and import flows.[2] Previous literature had only treated the latter flows, assuming export supplies as perfectly elastic (Polachek and McDonald, 1992; Polachek and Seiglie, 2007; Crescenzi, 2003, 2005; Maoz, 2009). Even if the author's contribution focuses on the effects of trade in both directions, his conclusions do not allow to separately weigh the effects of import and export flows.

Thus, the direction of trade flows might be of interest, but what about the direction of conflict? International engagements can be also interpreted as a directed flow, with actions executed by an "actor" towards a "target". Consistent with the undirected popular idea of two countries being symmetrically "at war" most international relations studies use the dyadic-based undirected MID data[3]. In some cases, a directed version of this variable is used, identifying one of the two countries as the aggressor, frequently based on the first movers' information. This approach could be named as uni-directional approach, since it constraints to the existence of only one direction for conflict.[4] Finally, using other data sources (typically, event data) one could think on a proper directional approach, where different conflict levels could be observed simultaneously for each direction in a dyad. In a normative sense, coherence between the levels of analysis in trade and conflict variables is theoretically important, and its definition in a level where a defined social entity exists is a necessary condition for the use of a meaningful model. The latter is also empirically fruitful, since as Ray (2001) posits, the loss of directionality obscures "who does what to whom".[5]

Beck and Baum (2000) use directed dyadic information looking for evidence of trade as deterrent of conflict initiation. In order to capture the direction in their dependent MID variable they use Correlates of War (COW) information on first movers, even if as they acknowledge this may be problematic (see, as they suggest, the famous example of Poland starting the WWII). Regarding the trade variable, they do not use the directedness of trade flows, adding imports and exports for the moving partner (they argue that using imports and export variables was problematic because of multicollinearity). Recouping directions of conflict and trade has an additional advantage in that it makes possible to control for the spatial dependence of conflict (see Luo, 2012). Spatial effects can appear both as spatially correlated errors (which arises when omitted variables follow a spatial pattern, can be controlled for using pair-clustered standard errors to avoid estimators' inefficiency), and as spatial autocorrelation in the dependent variable (spatial lags which may bias the estimators in case of being inadequately omitted). Spatial autocorrelation can be of a geographic kind, meaning that conflict from A to B is correlated with conflict from A's neighbors to B, or from A to B's neighbors (or eventually from A's neighbors to B's neighbors). Even if this kind of spatial autocorrelation may be relevant, this paper focuses on a second type of spatial autocorrelation, arising from the directed nature of our data which leads to expect a strong association between conflict from A to B and conflict from B to A. This is theoretically linked to the literature on reciprocation behaviors.

Studies in political science often focus on explaining conflict, taking trade as a proxy for interdependence. The empirical evidence is somehow ambiguous, since many studies find support for the "trade promotes peace" hypothesis (Polachek, 1980; Maoz and Russett, 1993; Oneal and Russett,

[2] Estimating the elasticities of demand for imports and supply for exports at the product level, Peterson computes bilateral exit costs allowing to verify his main hypothesis, stating that the likelihood of conflict initiation is higher when one of the partners has high exit costs given the other one has low exit costs, and is lower when both of them have high exit costs.

[3] Militarized Interstate Disputes can have different hostility levels, but this is an attribute of conflicts, without distinction of the hostility level carried out by each of the members of the dyad.

[4] See examples in Benett and Stam (2000), Beck and Baum (2000), Ray (2001), Davies (2002), among others.

[5] The debate on the levels of analysis has a long standing tradition in political science. See e.g. Waltz (1959), or Singer (1961).

1997; Kim, 1998; Russett and Oneal, 2001; Gartzke and Li, 2003a,b; among others), while other authors find no effects or even positive effects of trade on conflict (Barbieri, 1996, 2002; Beck, Katz and Tucker, 1998; Green, Kim and Yoon, 2001; Keshk, Pollins and Reuveny, 2004; Goenner, 2004, among others).[6] Inversely, in economics the focus is often on explaining trade between countries, and conflict is used as an explanatory variable. Here again the empirical evidence is mixed, most papers showing that conflict is a deterrent of trade, with some evidence on the continuation of trade relations even in the presence of armed conflicts.[7]

In the last ten years researchers have started to bring together the political science and the economics traditions, giving rise to a new approach that takes into account the cross causation of conflict and trade. From an econometric point of view, the problem is one of endogeneity, which means that estimation will be inconsistent unless an exogenous source of variability is used to properly identify causal effects. The literature considering the simultaneous determination of trade and conflict is developing rapidly. Introduced in the eighties by Polachek (1980), Gasiorowski and Polachek (1982) and Pollins (1989), this specification issue started to be empirically taken into consideration by Mansfield's (1994) and Polachek's (1997) estimations of simultaneous equations models. Using a Three-Stages OLS regression, Polachek finds support to the liberal peace hypothesis, and Kim (1998) expanded the argument presenting simultaneous equation model estimations where the obtained effect of trade on conflict is much stronger than the reciprocal one. A thorough treatment of the endogeneity issues in the frame of a directed model is a second methodological contribution of this paper.

This line of research has been rapidly criticized because of its lack of dynamic structure in the model, as it only considers the contemporaneous effects of each variable on the other. The first strategy to deal with this problem was presented by Beck, Katz and Tucker (1998) and consisted the inclusion in the conflict regression of a variable reflecting the number of continued years of peace (together with regression splines).[8] Their results contradicted the significant coefficient of trade literature, but were rapidly reversed by a series of papers showing the non-robustness of their conclusion when longer time series or alternative specifications were considered (Oneal and Russett, 1999; Gartzke, Li and Boehmer, 2001). The present paper takes up the duration of peace between countries in order to deal with the issue of sample selection, while tackling the temporal dependence through the specification of a dynamic model where current conflict depends on its own past and lagged effects from trade to conflict are also allowed. These dynamic patterns have received scant attention, except for a strand of papers using Vector Autoregression (VAR) in the simultaneous equations modeling of trade and conflict (Reuveny and Kang, 1998; Keshk, Pollins and Reuveny, 2004; Kim and Rousseau, 2005).

The most recent literature turns to Panel Data techniques and face the endogeneity problem through an IV strategy (Robst, Polachek and Chang, 2007; Martin, Mayer and Thoning, 2008; Lee and Pyun, 2009; Parlow, 2011). Trade has been instrumented by remoteness variables, non-reciprocal trade agreements like concessions granted by the Generalized System of Preferences, and even annual

[6] For a complete review of the mixed results found in this literature, see Barbieri and Schneider (1999).

[7] Among others, Anderton and Carter (2001a) find evidence in favor of the trade disruption hypothesis. Barbieri and Levy (2001) contradict the former article and say that there is not enough evidence to support their conclusion. Anderton and Carter (2001b) respond with new evidence in favor of the trade disruption hypothesis. Kastner (2007) analyses the case of mainland China and Taiwan and illustrate how commerce can also flourish even in the presence of very hostile relations. His hypothesis is that the effects of international political conflict on trade are less severe in cases where internationalist economic interests have relatively strong political clout domestically. Barbieri and Schneider (1999) is another classical reference showing that trade can be unaffected by (short) conflicts.

[8] Due to the use of event history datasets, the inclusion of "peace years" variables in logit models turns them to Cox (1972) proportional hazards models with an unspecified baseline hazard (Beck and Baum, 2000).

rainfalls. The present paper contributes to this line of work with the use of dynamic panel data methods and proposing an innovative external instrument for trade.

The paper is organized as follows. Section 2 presents the theoretical model and analyzes some comparative statics for the expected effects of trade on conflict. Section 3 describes the empirical strategy followed and the data. Results are shown in Section 4 together with some sensitivity and robustness checks. Section 5 concludes.

2. A reduced model for directed conflict and trade

In the line of Polachek (1980, 1992), many authors used the expected utility approach assuming that the existent level of trade directly increases the cost arising from a conflict (Polachek, Robst, and Chang, 1999; Robst, Polachek, and Chang, 2007). In these models the cost of lost trade comes from conflict reducing a country's supply for its imports and demand for its exports, increasing thus the domestic price of imported products and decreasing the price received for exported goods, i.e. a terms of trade effect. Li and Reuveny (2011, LR hereafter) propose a more general model, in which Polachek's approach becomes a particular case, admitting the possibility of both positive and negative effects of conflict on the prices of imports and exports. An important contribution of this paper is the formulation in terms of directed dyads, since this allows analyzing the differential effects of imports and exports, instead of aggregate trade in both directions.

These price effects depend on the elasticities of import demand and export supply, being higher the easier to find alternative sources or destinations or the easier to substitute a particular product with other products. Depending on the magnitudes of the shifts produced by conflict in a partial equilibrium demand and supply model, and depending also on the price elasticities of these curves, the effect of conflict on the price of imports/exports can be positive or negative. Thus, rational political leaders who maximize social utility (subject to some trade surplus in each good) will respond to higher exports with higher conflict when the price of exports rises with conflict, and will respond to higher exports with lower conflict when the price of exports decreases with conflict. An analogous reasoning works for imports, where faced with higher imports the leader responds with higher conflict if the price of imports decreases with conflict and responds with lower conflict if the price of imports increases with conflict. Since elasticities vary by sector, their strategy consists in decomposing trade (through a selection of specific sectors) and use the elasticities estimated in Reuveny (2001) to verify if the effects of each sector trade flow is the expected one.

Our approach is built taking LR's model as a general setting, which we extend in order to fully capture the different roles of emitted and received conflict. This distinction is necessary since a country decides the level of conflict sent against a partner, while the level of conflict received is decided by the partner. Since a country's bilateral exports are also the partners' bilateral imports, an increase in this particular trade flow will affect conflict in both directions, and a rational decision maker would take both effects into account.

Consider a country i which is a rational unitary actor who maximizes the utility coming from consumption and conflict with a generic partner j. I assume a utility function $U(EC_i, C_{ij}, C_{ji})$ where utility depends positively on the economic consumption (EC_i) and the level of conflict sent towards j (C_{ij}), while depending negatively on the level of conflict received from j (C_{ji}). Following LR, I also assume that country i's maximization is subject to maintaining a certain trade surplus (TS):

$$TS = \sum_{p=1}^{P} X_{pi} \cdot PX_p(C_{ij}, C_{ji}) - M_{pi} \cdot PM_p(C_{ij}, C_{ji}) \tag{1}$$

Where X_{pi} and M_{pi} are country i's exported and imported volumes respectively, of each product $p = 1, \dots, P$, and PX_p and PM_p are the prices which depend on the levels of conflict in both directions. Thus, country i maximizes $U(EC_i, C_{ij}, C_{ji})$ subject to (2) choosing C_{ij} and taking EC_i and C_{ji} as given. Solving this maximization program for a specific product $\tilde{p}$ leads to the following two expressions (as shown in Appendix 1):[9]

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} = -\lambda \frac{PX_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ij}} + \lambda \sum_{p=1}^{P}(\blacksquare)\right] + PM_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ji}} + \lambda \sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{\left[U_{C_{ij}C_{ij}} + \lambda \sum_{p=1}^{P}(\blacksquare)\right]^2 + \left[U_{C_{ij}C_{ji}} + \lambda \sum_{p=1}^{P}(\blacksquare\blacksquare)\right]^2} \tag{3}$$

$$\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}} = \lambda \frac{PM_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ij}} + \lambda \sum_{p=1}^{P}(\blacksquare)\right] + PX_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ji}} + \lambda \sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{\left[U_{C_{ij}C_{ij}} + \lambda \sum_{p=1}^{P}(\blacksquare)\right]^2 + \left[U_{C_{ij}C_{ji}} + \lambda \sum_{p=1}^{P}(\blacksquare\blacksquare)\right]^2} \tag{4}$$

Where λ is the shadow price of the trade surplus constraint, and in the sake of readibility I am using the symbol ■ to refer to $(X_{pi} \cdot PX_{pC_{ij}C_{ij}} - M_{pi} \cdot PM_{pC_{ij}C_{ij}})$ and the symbol ■■ to refer to $(X_{pi} \cdot PX_{pC_{ij}C_{ji}} - M_{pi} \cdot PM_{pC_{ij}C_{ji}})$. Note that both terms represent a second order change in country i's trade balance with country j when i increases conflict towards j, but while ■ considers how the effect of C_{ij} on prices change with C_{ij}, the term ■■ reflects how the effect of C_{ij} on prices change with reverted conflict C_{ji}. Observe also that except for the last term in numerators and denominators the solutions coincide with the simpler situation analyzed by LR, where no reverse effects are allowed.

In order to reach more explicit expressions of these results I also follow LR in modelling supplies and demands for imports and exports as linear functions (which are sector specific even if the notation omits this index). Country i's demand for the imported product p from j (M_{pi}^D), and j's supply of product p to be sold in i (M_{pi}^S), would be given by:

$$M_{pi}^S = \alpha_0 + \alpha_1 PM_p + \alpha_2 Y_j - \alpha_3 C_{ij} \tag{5}$$

$$M_{pi}^D = \beta_0 - \beta_1 PM_p + \beta_2 Y_i - \beta_3 C_{ij} \tag{6}$$

Where except for the last term in each equation these are typical linear demand and supply functions depending on prices (PM_p) and incomes (Y_i, Y_j). The last term gathers the effects of conflict in shifting supply or demand to the left.[10]

An analogous reasoning can be done for exports of product p, obtaining i's supply of product p to j, as well as j's demand for product p exported from i.

$$X_{pi}^S = \gamma_0 + \gamma_1 PX_p + \gamma_2 Y_i - \gamma_3 C_{ij} \tag{7}$$

[9] An important assumption is that all countries are equal on how they react with conflict to increases in imports and exports. See details in Appendix 1.

[10] As the authors argue, this can be a consequence of many things, as political decisions to restrict trade in order to decrease own dependence on a foe or restrict the opponent gains from trade, increased trade costs (because of risk, delays or damages), or bargaining strategies. In our setting an additional linear term in C_{ji} could be added, at the cost of increase complexity without relevant contributions to our model, where reverse effects are channeled through prices. Note that equations (5) to (8) are the same than in LR's model.

$$X_{pi}^{D} = \delta_0 - \delta_1 PX_p + \delta_2 Y_j - \delta_3 C_{ij} \tag{8}$$

Using trade equilibrium identities ($M_{pi}^{D} = M_{pi}^{S}$; $X_{pi}^{S} = X_{pi}^{D}$), it is easy to obtain expressions of PM_p and PX_p.

$$PM_p = \frac{-\alpha_0 + \beta_0}{\alpha_1 + \beta_1} + \frac{\alpha_2}{\alpha_1 + \beta_1} Y_i - \frac{\beta_2}{\alpha_1 + \beta_1} Y_j + \frac{\alpha_3 - \beta_3}{\alpha_1 + \beta_1} C_{ij} \tag{9}$$

$$PX_p = \frac{-\gamma_0 + \delta_0}{\gamma_1 + \delta_1} - \frac{\gamma_2}{\gamma_1 + \delta_1} Y_i + \frac{\delta_2}{\gamma_1 + \delta_1} Y_j + \frac{\gamma_3 - \delta_3}{\gamma_1 + \delta_1} C_{ij} \tag{10}$$

Thus, the partial derivatives needed in equations (3) and (4) are easily obtained as:

$$PM_{\tilde{p}C_{ij}} = \frac{\alpha_3 - \beta_3}{\alpha_1 + \beta_1} \;\; ; \;\; PM_{\tilde{p}C_{ij}C_{ij}} = PM_{\tilde{p}C_{ij}C_{ji}} = 0 \tag{11}$$

$$PX_{\tilde{p}C_{ij}} = \frac{\gamma_3 - \delta_3}{\gamma_1 + \delta_1} \;\; ; \;\; PX_{\tilde{p}C_{ij}C_{ij}} = PX_{\tilde{p}C_{ij}C_{ji}} = 0 \tag{12}$$

These results significantly simplify the expressions for the effects of exports and imports on conflict, and substituting (11) and (12) in (3) and (4):

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} = -\lambda \frac{\frac{\gamma_3 - \delta_3}{\gamma_1 + \delta_1}\left[U_{C_{ij}C_{ij}}\right] + \frac{\alpha_3 - \beta_3}{\alpha_1 + \beta_1}\left[U_{C_{ij}C_{ji}}\right]}{\left[U_{C_{ij}C_{ij}}\right]^2 + \left[U_{C_{ij}C_{ji}}\right]^2} \tag{13}$$

$$\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}} = \lambda \frac{\frac{\alpha_3 - \beta_3}{\alpha_1 + \beta_1}\left[U_{C_{ij}C_{ij}}\right] + \frac{\gamma_3 - \delta_3}{\gamma_1 + \delta_1}\left[U_{C_{ij}C_{ji}}\right]}{\left[U_{C_{ij}C_{ij}}\right]^2 + \left[U_{C_{ij}C_{ji}}\right]^2} \tag{14}$$

Since both denominators are always positive, the signs of the derivatives depend on their numerators.

In the simpler LR case, reverse effects are absent and hence the second term in each numerator is null. Regarding the first term, the authors are able to discuss the sign of (13) and (14) based on the reasonable assumptions that the marginal utility of conflict is positive ($U_{C_{ij}} > 0$) and declining with conflict sent towards j ($U_{C_{ij}C_{ij}} < 0$). Knowing that $\lambda, \alpha_1, \beta_1, \gamma_1, \delta_1$ are all positive, the effects of imports and exports on conflict unambiguously depend on the sign of $(\gamma_3 - \delta_3)$ and $(\alpha_3 - \beta_3)$, giving a relevant new insight on how imports and exports would have different and even opposite effects on conflict. An increase in exports from i to j could affect optimal conflict from i to j making it rise (if $\gamma_3 > \delta_3$), fall (if $\gamma_3 < \delta_3$), or stay unchanged (if $\gamma_3 = \delta_3$). An analogous reasoning can be done for the effects of imports, where again the sign of the effect on optimal conflict depends on the relationship between the magnitudes of the shifts in supply and demand produced by a unit change in conflict from i to j.

The inclusion of reverted conflict proposed here calls into question LR's results. For one side because the sign of $U_{C_{ij}C_{ji}}$ is not theoretically clear, being related to case specific situations whose analysis would require strategic considerations. The utility of increasing conflict may increase or decrease when another country increases in one unit the level of conflict sent, and this has to do with the convenience or inconvenience of escalations and de-escalations.

A second reason for ambiguity is that now the shifts in demands and supplies in both imports and exports markets matter for the effect of, say, exports on the level of conflict. Through the inclusion of reversed conflict, we see that what happens in the export market for country i will also be perceived by country j in his import market. Then j will react accordingly and country i could anticipate j's reaction when evaluating his own decisions. In fact, this second reason for ambiguity is only due to fact that we do not observe $\alpha_3, \beta_3, \gamma_3$, and δ_3, and the model could reach a clear prediction in these parameters were estimated (under a certain assumption for $U_{C_{ij}C_{ji}}$).

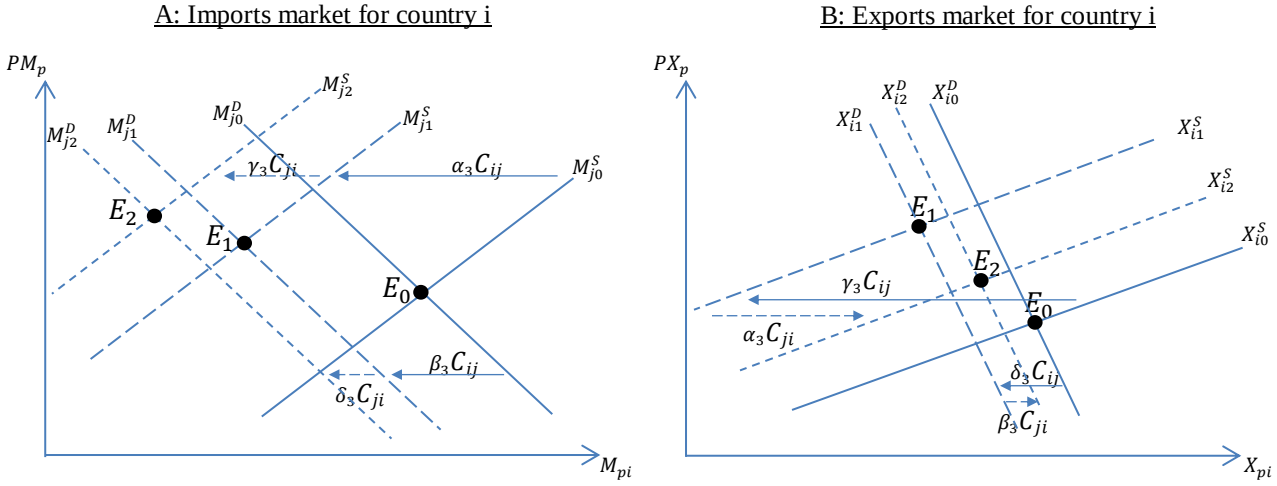
Arbitrarily assuming $U_{C_{ij}C_{ji}} > 0$, if $(\gamma_3 - \delta_3)$ and $(\alpha_3 - \beta_3)$ have equal signs, the effect of imports and exports on reversed conflict will partially or totally offset the effect of directed conflict on exports and imports markets. On the contrary, if $(\gamma_3 - \delta_3)$ and $(\alpha_3 - \beta_3)$ have opposite signs the reversed conflict effects would stress the direct effects of emitted conflict. Whether an offsetting reversed conflict effect produces a change in the sign of the derivatives (13) and (14) will depend on the sign of their numerators, which are fairly complex expressions including variables like $U_{C_{ij}C_{ij}}$ and $U_{C_{ij}C_{ji}}$ which are unobservable.

The interplay between imports and exports effects, through the presence of the reversed conflict term, is illustrated in Figure 1 for the case where $U_{C_{ij}C_{ij}} < 0$, $U_{C_{ij}C_{ji}} > 0$, $(\gamma_3 - \delta_3) > 0$, and $(\alpha_3 - \beta_3) > 0$. The first terms in the numerators in (13) and (14) show the direct effects, the positive sign in (13) reflects that a conflict would increase the price of exports, so conflict is convenient. The negative sign of the first term in (14) shows that increasing also the price of imports there would be also a negative effect of conflict. The second terms in the numerators of (13) and (14) can stress or offset the previous results. In our example this term is negative in the equation (13) for the effect of exports, so reverse conflict effects are offsetting direct effects: import price rises for country i, meaning that export price falls for country j, leading country j to decrease conflict against country i. At the same time, the second term in (14) is positive, so reverse effects stress the direct effect in the imports market (increased conflict from i to j increases the price of country i's exports, i.e. the price of country j's imports, leading country j to increase conflict against country i).

Figure 1

Direct and reverse effects of conflict from *i* to *j* by market

$U_{C_{ij}C_{ij}} < 0,\ U_{C_{ij}C_{ji}} > 0, (\gamma_3 - \delta_3) > 0, (\alpha_3 - \beta_3) > 0$



Different signs of $U_{C_{ij}C_{ji}}$, $(\gamma_3 - \delta_3)$, and $(\alpha_3 - \beta_3)$ allow showing that all combinations are possible in terms of conflict being convenient or inconvenient in exports and imports markets. The example in Figure 1 has been chosen in order to represent a complicated case where the effects of imports and exports go in opposite directions, and where in one case reverse conflict stress the direct conflict effects while in the other it offsets them. Similar graphics for all possible combinations can be found in Appendix 2, making clear that reverse effects can stress both imports and exports direct effects.

Summing up, our theoretical model shows that imports and exports will be affected by conflict, thus a rational leader would take these effects into account when facing decisions on increasing or decreasing conflict levels towards a partner. It also shows that these effects of imports and exports can be different from each other, and even have opposite signs, being unable to predict any particular sign in each case. Also, it implies that received conflict from a partner affects imports and exports and alters their effects on emitted conflict against this partner, being then important to control for received conflict in the model explaining emitted conflict. All these features will be taken into account in our empirical design, presented in the next section.

3. **Empirical strategy**

3.1 Conflict as a continuous and directed magnitude

In the existing literature international conflict is generally measured as a discrete (often binary) and symmetric phenomenon. In line with our theoretical model we first focus on obtaining a continuous and directed conflict variable.

The availability of a continuous variable of conflict is important for many reasons. First, it makes possible to observe the evolution of conflict at early stages before it eventually becomes a Militarized Interstate Dispute (MID).[11] Second, sometimes we may observe some level of militarized conflict but no MID is identified for the bilateral relation, and in any case if there is a MID the continuous variable allows a better measurement of its importance. Third, empirical results can be sensitive to the use of a continuous variable and a much larger spectrum of estimation methods is available, making it possible to estimate linear models which have advantages ranging from a simpler parameter interpretation to a better treatment of potential misspecification problems. Especially when dealing with panel data, the use of a continuous dependent variable opens up many possibilities currently unavailable for limited dependent variables. Additionally, a generalized limitation is that there are few observations of MIDs in comparison with the pacific dyad-year observations, so estimation using MIDs could be based in very few particular cases and this is even worse when using war dummies (Lin and Seiglie, 2014).

In order to build a continuous variable of conflict we use event data, a major source of international conflict information alternative to MIDs. Our event data come from the GDELT database[12] of coded international press and newswire agencies cables (daily records).

[11] MIDs are one of the two typical sources of conflict data, the other being events datasets. MIDs are defined as events of conflict consisting in a "threat, display or use of military force by one state, explicitly directed towards the government, official representatives, official forces, properties or territories of another state". The variable has five potential hostility levels: 1-no militarized action, 2-threat to use force, 3-display of force, 4-use of force, and 5-war. In this context a War is a MID causing the death of more than 1000 soldiers in battle (Gochman and Maoz, 1984; Jones, Bremer, and Singer 1996).

[12] The Global Data on Events, Location and Tone (GDELT) Project is an extended version of CAMEO. The complete database contains more than 200 million events, most of them geolocated, and covers daily news for a variety of international press and newswire agencies from 1979 to present. Sources employed to identify events include all international news

The Goldstein Scale classifies events as conflict (negative) or cooperation (positive) actions.[13] An issue of protracted debate is the adequacy of considering that cooperation and conflict are the opposite extremes of a single scale (see Pollins, 1989). Even if this could be intuitively reasonable, it has been shown that when observing countries behavior it is not unusual that cooperation and conflict coexist, and country dyads cannot be divided in a group of cooperative ones and another group of conflictive country-pairs. In this paper we define cooperation not as pure cooperation actions (events where actors unite their efforts towards a certain goal, like giving humanitarian or economic aid, sharing intelligence information or providing military aid) but as specific kinds of cooperative actions that lead to a de-escalation in conflict levels (like declaring truce or ceasefire, surrendering, demobilizing armed forces, receiving peacekeepers or easing military or administrative sanctions). In the same manner, conflict events can be of pure conflict or just a dismantling of cooperation among actors. As our focus is on conflict, and because a number of forms of pure cooperation are already left aside in the CAMEO verbs dictionary, we drop all the events classified as pure cooperation, as well as those conflict events identified as dismantling cooperation. Pure conflict events are assigned positive values, while de-escalation cooperation events are given negative values. After this selection of events, the two can be additively combined into indexes of net conflict.

Another distinction done by the Goldstein Scale (GS) is between material and verbal actions. We focus on material actions, and more specifically with a subgroup of military-related events (the detail of the type of events used is in Appendix 3). This decision is based on our focus on militarized conflict, as it is the one involving the more serious costs and receiving most theoretical and empirical attention. Also, GDELT actors' dictionary allows identifying official national actors, and we keep only the events involving this kind of actors. This means we drop all the sub-national or supra-national actors, as well as non-official national actors. This decision is based on our focus on interstate conflict, and seeks to gain comparability with other studies in the field.

For most dyads there are many events in a year, each one with a score given by the Goldstein Scale. Thus, a whole distribution of GS events' values is available for each directed dyad-year observation, and the new conflict variable requires choosing an appropriate summary measure, being the count, the mean, the median, the maximum and the sum all natural candidates. Given we want to capture both the extensive and the intensive margins of conflict (variations in the number of events and in its importance, respectively), we work with the sums of GS scores for the events found in each directed-dyad-year observation.

In Figure 2 we show the evolution of the material net conflict variable for some particular cases, together with the evolution of bilateral trade and the existence of war between the two involved countries. In general, the graphics show that our conflict variable is successful in signaling the case of wars, since high values of net conflict can be observed in almost all cases. The India – Pakistan case shows one of the differences between working with wars and other sources on conflict data. The war between the two countries took place in 1999, but our conflict variable shows that much more acute confrontation took place in 2001-2002 with the first India – Pakistan standoff, and even in 2008 with a

coverage from AfricaNews, Agence France Presse, Associated Press Online, Associated Press Worldstream, BBC Monitoring, Christian Science Monitor, Facts on File, Foreign Broadcast Information Service, United Press International, and the Washington Post. Additional sources examined include all national and international news coverage from the New York Times, all international and major US national stories from the Associated Press, and all national and international news from Google News with the exception of sports, entertainment, and strictly economic news (Leetaru and Scrhodt, 2013).

[13] The scale proposed by Goldstein (1992) is designed for the three digit WEIS event types (61 categories) and is compatible with CAMEO events codification. It is based on the assessment of a panel of international relations faculty, who place the different possible events along a single scale from "extreme conflict" to "extreme cooperation".

second stand-off between the two nations following the 2008 Mumbai attacks, but then confrontation was defused by diplomatic efforts. On the other hand, sometimes war is on-going (in general coinciding with military occupations) but the conflict level is reduced in comparison with the peaks attended at the beginning of the conflict. The cases of the United States – Afghanistan or United States – Iraq show this pattern.

Figure 2
Evolution of conflict and trade for selected dyads

In the case of Uganda – Rwanda, the "six days war" has run from August 1999 to June 2001, and the graphic shows that our conflict variable really reflects such kind of hostilities. Even if symmetry is not always observed the graphics for Iraq and United States show a fairly symmetric evolution of conflict. However, in this particular case they also tell that conflict from Iraq to United States preceded the war (and high conflict form US to Iraq) in almost five years.

The United States - Libya or Israel – Lebanon cases give eloquent examples of the deterring effects of conflict on trade. On the contrary, the cases of United States – Afghanistan or United States – Iraq show that trade may also flourish during wars. Finally, the evolution of Ecuador – Peru relations show the association between absence of conflict and the slow increase of trade.

In sum, very different patterns can be observed in the dynamic relation of trade and conflict. Trade could decrease even before conflict starts, or at a very early stage of disputes, since agents can anticipate an escalation and also leaders can use trade cuts as a signaling tool to show resolve. The dynamic relationship is even more complicated, since if a signaling cut of trade is credible then it could even decrease conflict in case the other country feels seriously threatened (even before the cut being implemented). Also, trade can increase after some years of war, and this is the case observed

when military occupations take place. The estimation model presented in the next section seeks to take these dynamic patterns into account.

3.2 Dynamics, Directedness, and Endogeneity

As seen in Section 2, a model that takes seriously the directed nature of the phenomenon under scrutiny needs to consider the effects of conflict received from a partner when studying the level of conflict sent against him. The game-theory considerations necessary to properly model escalation and de-escalation decisions are beyond the scope of this paper, which only signals the need to control for the destination-to-origin conflict when estimating a model for the origin-to-destination level of conflict.

Statistically, reciprocity implies a violation of the independence assumption when the population encompasses all the possible pairs of countries. Each dyad (i, j) will be linked with the dyad (j, i) in different ways, leading C_{ji} to be correlated both with C_{ij} and with imports and exports, which makes the omission of C_{ji} problematic. From an empirical point of view, a way to deal with this dependence is through a spatial model, where the directed dyad (i, j) is considered contiguous to its reversed counterpart (j, i).

Three broad types of interaction effects could be considered: endogenous interaction (C_{ij} depends on C_{ji}), exogenous interaction (independent variables for (j, i) are relevant in the model for C_{ij}), and interaction in the error terms (ε_{ij} and ε_{ji} are correlated). Our theoretical model stresses the need for a spatial autoregressive model (SAR) which takes into account the effect of C_{ji} on C_{ij}. The spatial econometrics literature has shown that the omission of this variable would lead to biased and inconsistent estimates (LeSage and Pace, 2009). Clustering standard errors by undirected country-pair we also take into account the possibility of omitted reversed variables that could cause spatial correlation in the error term.[14]

Our database covers the period 1995-2013, allowing for the estimation of a spatial panel data model that takes into account unobserved heterogeneity among dyads (unobserved space-specific and time-invariant variables that affect the dependent variable and whose omission would lead to biased and inconsistent estimates).

Together with spatial effects, it is important to consider the dynamics of the model. For one side, conflict variables tend to be persistent, and conflict in one year is highly dependent on the levels of conflict observed the years before. Also, even if immediate impacts from trade to conflict might occur, the model cannot restrict the possibility of delayed effects, caused because conflict decisions need time to adjust to new situations. Dynamic panel data models deal with the two kinds of patterns, including time lags of the dependent variable and the main regressors respectively.

The resulting dynamic spatial panel data model takes the following form:

[14] Note that we have a sparse network where every directed dyad has just one neighbor, and leads to a matrix of spatial weights that has just one value (equal to one) per row and column. This means that the matrix is originally row-normalized. Note also that this paper omits any consideration of spatial effects related to geographic proximity, which could also be relevant since geographic spillover effects might be present in the conflict relations among countries.

$$C_{ijt} = \sum_{h=1}^{H} \alpha_h C_{ijt-h} + \sum_{l=0}^{L} \beta_l C_{jit-l} + \sum_{n=0}^{N} \gamma_n X_{ijt-n} + \sum_{q=0}^{Q} \delta_q M_{ijt-q} + \sum_{k=1}^{K} \theta_k A_{kijt} + \tau_t + \eta_{ij} + \varepsilon_{ijt} \quad (15)$$

Where C_{ijt}, C_{jit}, X_{ijt}, and M_{ijt} have already been defined; A_{ijt} is a vector of K attributes including a constant and controls for country i, country j, and the pair (i, j); τ_t is a period-specific effect; and $\eta_{ij} + \varepsilon_{ijt}$ is an error term including a pair-specific time-invariant unobserved effect and a reminder disturbance term assumed to be clustered at the undirected pair level.

A main difficulty in the estimation of dynamic and spatial panel data models comes from the fact that the (temporal and spatial) lags of the dependent variable are endogenous by definition, since individual (pair) effects are part of the data generating process of both the current dependent variable and its lags. As is well known, estimating the model in first differences allows eliminating the individual effects, but endogeneity remains because ΔC_{ijt} contains C_{ijt-1}, and $\Delta \varepsilon_{ijt}$ contains ε_{ijt-1}. As proposed by Anderson and Hsiao (1981), under the assumption of $\varepsilon_{ijt} \sim i.i.d.$, lagged levels or lagged first differences of C_{ij} are valid instruments given their high correlation with ΔC_{ijt} and the lack of correlation with the composite error term. However, the simple instrumental variable approach does not fully exploit the available information, and more efficient estimates can be obtained through the Generalized Method of Moments (GMM), applied to dynamic panel data models by Holtz-Eakin, Newey and Rosen (1988) and popularized by Arellano and Bond (1991). Seeing the model as a system of equations, one per year, they propose to instrument each equation with a variable amount of available lags (increasing as t grows), which means that all the possible orthogonality conditions may be used.

Since the number of orthogonality conditions in this setting grows quadratically with the number of available time periods, a common problem in relatively long panels is the proliferation of instruments, which leads instruments to overfit the dependent variable annulling their ability to remove the endogenous component and biasing the results towards the non-instrumented estimation (Roodman, 2008). To avoid this shortcoming researchers tend to limit the amount of used instruments, as we will do here restricting to a maximum lag S the set of instruments for the lagged dependent variable and to a maximum lag R the set of instruments for the reverse conflict and its lags.

In our model, however, endogeneity is a deep problem because of the already mentioned reverse causation from conflict to trade. Even if difference-GMM allows treating endogeneity of other regressors of the model using internal instruments, a preferred strategy to tackle this second source of endogeneity is to find an external source of exogeneity.

In order to obtain such a variable we build what we call synthetic imports and exports. We compute synthetic exports from country i to country j as the exports observed from i to a synthetic destination $\tilde{j}$ which results from averaging K neighbors of j in terms of the similarity between their economic sizes. Thus, neighbors are selected minimizing the difference between countries' GDPs, under the idea that countries of similar economic sizes will tend to have similar bilateral flows with third countries.

Thus, the K-neighbors for j will be the K countries $(k = 1, \dots, K)$ for which the differences between GDPs are lower:

$$min_k \{abs(gdp_{jt} - gdp_{kt})\} \quad (16)$$

Once neighbors have been chosen we average exports from the origin country i to the different destination countries included in the synthetic destination $\tilde{j}$, and this counterfactual flow is used to instrument the exports from i to the real j.

$$X_{i\tilde{j}t} = \frac{1}{K}\sum_{k=1}^{K} X_{ikt} \tag{17}$$

Analogously, synthetic origins for exports average exported values from j's neighbors to i, and the resulting counterfactual flow will be used to instrument exports from j to i, i.e. imports of i from j:

$$M_{i\tilde{j}t} = \frac{1}{K}\sum_{k=1}^{K} M_{ikt} \tag{18}$$

We argue that these variables should not be correlated with conflict from i to j, since this criterion excludes their bilateral trade, and none of it components should be systematically related to C_{ijt}. Our instrument would be questionable if e.g. disrupted trade after an increase in i's conflict towards j was systematically redirected to countries similar in size with j. Even if this can eventually happen in many cases, our identification strategy relies on the assumption of random distribution of spillovers among country sizes. In other words, we are supposing that the trade-network effects of an increase in C_{ijt} to not have any special tendency follow size similarity, so the averaged neighbors $\tilde{j}$ randomly receive negative, null, and positive effects. Also, risks are minimized when using enough neighbors to construct the synthetic partners.

Summarizing our empirical strategy, the complete set of orthogonality conditions for equation (15) is given by:

$$\begin{aligned}
E\left[C_{ij(t-h-s)}\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } h = 1,\dots,H;\ s = 1,\dots,S;\ t = t_0,\dots,T \\
E\left[C_{ji(t-l-r)}\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } l = 0,\dots,L;\ r = 2,\dots,R;\ t = t_0,\dots,T \\
E\left[X_{i\tilde{j}(t-n)}\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } n = 0,\dots,N \\
E\left[M_{i\tilde{j}(t-q)}\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } q = 0,\dots,Q \\
E\left[\Delta A_{kij(t-1)}\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } k = 1,\dots,K \\
E\left[\tau_t\Delta\varepsilon_{ijt}\right] &= 0 \quad \text{for } t = t_0,\dots,T
\end{aligned} \tag{19}$$

Where $t_0 = max\{K+1, L+2, N+2, Q+2\}$. This means that in the most parsimonious specification and instrumenting with just one lag each of the endogenous regressors ($H = 1, L = 0, S = 1, R = 2, N = 0, Q = 0, K = 11, T = 19, t_0 = 3$) we have a minimum of 61 instruments.[15] Thus, the addition of dynamic components or the use of supplementary lags as instruments will rapidly increase the total number of instruments to levels that are not recommended in the literature.

[15] In the general case the total number of instruments is $(S+H-1)*(T-t_0+1)+(L+R-1)*(T-t_0+1)+(N+1)+(Q+1)+K+(T-t_0+1) = (S+H+L+R-1)*(T-t_0+1)+N+Q+K+2$.

3.3 Estimated models

We estimate equation (15) taking logs for every continuous variable, which means we assume an original model (not presented) in which the explanatory variables enter multiplicatively, and all coefficients can be interpreted as elasticities. Given the fact that the measurement unit of our dependent variable is vague, taking logs improves our interpretation of the estimation results.

Our main variables of interest in the model are imports and exports. As we have seen, trade is supposed to measure interdependence, so high current bilateral trade flows mean higher opportunity costs in case of disruption of trade because of bilateral conflict. The opposing realist approach affirms that trade intensifies inequality and can increase dependence on strategic goods, an argument strongly related to dependence on imports and not so pertinent in the case of exports. Our main contribution is to disentangle the potentially different effects of exports and imports, and to test the significance and sign of these theoretically loaded coefficients is one of the objectives of this paper.[16]

We use a fairly typical set of country and pair attributes for the specification of the vector A_{ijt}. In most of the empirical literature conflict models are based on a gravity-type specification, where the likelihood of conflict depends on country sizes and geographic distance, frequently accompanied with a contiguity dummy variable signaling the existence of a common border between the two countries (Boulding, 1962; Hegre, 2008). Given our estimation strategy, both distance and contiguity are dropped when taking differences in our main estimations. Turning to country sizes, we use GDP data in current US Dollars from the World Bank "World Development Indicators" (2015).[17]

We also include variables measuring the level of democracy in each country, a main element in the liberal approach. Democracy is identified as one of the three pillars of the Kantian liberal peace (together with economic interdependence and the role of international organizations), and has widely examined, both theoretically and empirically, as shown by the extensive debate on the "democratic peace" hypothesis (Gowa, 1999; Werner, 2000; Peceny and Butler, 2004; Bennett, 2006; Lektzian and Souva, 2009). The hypothesis states that joint democracy should be associated to less conflict, since in these cases disputes are expected to be diplomatically settled, and it has received profuse empirical support (see e.g., Barbieri, 1996; Goenner, 2004; Oneal and Russett, 1999). Likewise, some evidence exists on the joint authoritarian dyads sharing this same pacifying effect (Peceny, Beer, and Sanchez-Terry, 2002). On the other hand, trade literature has shown that democracies tend to trade more than autocracies (Russett and Oneal, 2001; Bueno de Mesquita and Lalman 1992; Maoz and Russett, 1993; Ellis, Mitchell, and Prins, 2010).

Our directed approach complements this literature, since it makes possible to differentiate if the level of democracy makes a country more peaceful with his partners or rather makes him receive less conflict from third countries. Also, the commonly used "joint democracy" effect can be obtained with the addition of the democracy coefficients for origin and destination countries. We use Polity IV data, where the "polity" variable is a combined score of institutionalized democracy and autocracy variables for a country, resulting from the subtraction of the autocracy score from the democracy score

[16] The operationalization of dependence is an issue of debate: some authors use traded values while others argue in favor of the ratio of trade over the GDP (or total trade) of the country or countries. We use traded values because in a directed setting there is no obvious denominator for the shares, since a given trade flow can represent a large share of one country's GDP and a small share in the other country. Also, as shown by Goldsmith (2013), while GDP shares of bilateral trade can be relevant in the explanation of conflict onset they are hardly associated to escalation, while traded volumes can have a reasonable role both in conflict onset and escalation.

[17] GDPs are not reported in five countries of our sample (Afghanistan, Iraq, Myanmar, North Korea, and Syria). In order to keep these relevant cases we completed the data using different sources.

(Marshall & Gurr & Jaggers, 2014). The resulting index varies in a range from -10 for an extreme authoritarian case, to +10 for the most democratic country.[18]

The number of years of peace (years since the end of the last war) has been widely used since Beck, Katz, and Tucker (1998) recommended to introduce it in a natural cubic spline when estimating a nonlinear model for a binary dependent variable. As we have a linear model for a continuous variable we just include the variable *peaceyears* polynomically (see Carter and Signorino, 2010). We use COW MID database (version 4.01) to compute the number of cumulated consecutive years of peace since 1816 for each dyad-year observation (Gochman and Maoz, 1984; Jones, Bremer, and Singer, 1996).

A final important issue has to do with the existence of internal conflicts or civil wars. Examples of domestic conflicts that produced interstate wars are abundant, the Arab Spring having added a lot of recent cases. Third countries' pacifying interventions are just one of the possible mechanisms of this causal relation, which also can be produced because domestic fights literally cross the border to contiguous countries, or because important domestic conflicts weaken the state capacity to defend the country against external attacks and the opportunity may be taken by rivals, to mention some. The relationship between these two kinds of conflict has been documented (Walt, 1996; Davies, 2002; Trumbore, 2003; Gleditsch, 2007; Schultz, 2010; Yonamine, 2013), and an extensive research shows also that internal conflict tends to disrupt trade (Long, 2008; Blomberg and Hess, 2004; Bayer and Rupert, 2004). In order to measure internal conflict in each country we build a set of variables completely analogous to the described international conflict variables, based on GDELT data and the use of the Goldstein scale.

Our set of controls leaves aside some popular variables, like major power dummies (which signal a few large and powerful countries particularly prone to participate in conflicts), capability ratios, formal alliances, and many cultural or economic dyadic attributes (preferential trade agreements, common currency, common language, common legal system, etc.) In our main econometric specification all the time-unvarying country-specific variables will be lost when taking first differences.

Our database includes 149 countries in a balanced panel (without missing values) over the period 1995-2013 (see the list of countries in Appendix 4), which means 22,052 directed country pairs in 19 years. The original variables are highly disaggregated both in conflict[19] and trade[20] dimensions. Trade data comes from CEPII's BACI database, built with original information from the United Nations Statistics Division (COMTRADE). BACI has the advantage reconciling the declarations of exporters and importers on each trade flow and removing CIF costs from import values, making import and exports flows comparable (Gaulier and Zignago, 2010).

[18] We use their "polity2" version of the variable, where cases of interregnum or anarchy are converted to a neutral 0 score, are cases of transition are prorated across the span of the transition. We recode cases of foreign interruption as -10. In order to obtain a more convenient scale of coefficients, we divide the original scale by 10 and sum 1 before taking logs.

[19] Including continuous and asymmetric measures for verbal, material, and militarized conflict; in each case disaggregated by official and non-official actors. Each observation in these variables must be a synthetic measure obtained in a distribution of seriousness of the events observed from every origin country to every destination.

[20] Overall and disaggregated up to 6 digit of the Harmonized System (1992 version).

4. **Results**

4.1 Baseline estimation

Before proceeding to the estimation of the dynamic spatial panel data model in equation (15), we present a baseline estimation of a static model (in which spatial effects are also omitted). Despite the inclusion of many customary controls, our conflict equations omit several potentially relevant variables that could be correlated with both conflict and trade. In order to avoid this source of bias we include different kinds of fixed effects in the model, like exporter and importer fixed effects (XMFE) and importer and exporter time-varying fixed effects (XMTVFE). Also, as our database is a panel of directed dyads, we are able to control for the existence of unobserved directed-dyad specific effects through the inclusion of country-pair fixed effects. Table 1 reports the OLS estimation for the model without any fixed effects (column 1) together with the IV results using synthetic imports and exports as instruments. The mentioned types of fixed effects are sequentially included in columns 2 to 5, and column 6 adds exporter and importer time-varying fixed effects and directed country-pair fixed effects. Year fixed effects are included in every specification, and in order to reduce simultaneous reverse causality we lag every time-varying explanatory variable two periods.

Table 1
Static specifications without spatial dependence

	OLS	**IV**				
VARIABLES	**Pooled**	**Pooled**	**Pooled + XMFE**	**Pooled + TVXMFE**	**Panel**	**Panel + TVXMFE**
Exports *(second lag in logs)*	0.018*** *[0.002]*	-0.037*** *[0.011]*	-0.128*** *[0.029]*	-0.236*** *[0.082]*	-0.099*** *[0.022]*	-0.343** *[0.158]*
Imports *(second lag in logs)*	0.019*** *[0.002]*	-0.060*** *[0.015]*	0.071* *[0.036]*	0.093 *[0.098]*	0.069*** *[0.027]*	-0.345** *[0.154]*
Peace Years *(second lag)*	-0.007*** *[0.000]*	-0.007*** *[0.000]*	-0.006*** *[0.000]*		-0.005*** *[0.000]*	
Democracy in origin *(second lag in logs)*	0.256*** *[0.018]*	0.428*** *[0.023]*	-0.129*** *[0.026]*		-0.129*** *[0.018]*	
Democracy in destination *(second lag in logs)*	0.165*** *[0.018]*	0.345*** *[0.025]*	-0.160*** *[0.027]*		-0.164*** *[0.019]*	
GDP in origin *(second lag in logs)*	0.146*** *[0.005]*	0.304*** *[0.013]*	0.051** *[0.023]*		0.041*** *[0.014]*	
GDP in destination *(second lag in logs)*	0.126*** *[0.005]*	0.290*** *[0.016]*	0.036* *[0.019]*		0.017 *[0.011]*	
Domestic conflict in origin *(second lag in logs)*	0.354*** *[0.007]*	0.351*** *[0.008]*	0.277*** *[0.007]*		0.277*** *[0.005]*	
Domestic conflict in destination *(second lag in logs)*	0.387*** *[0.007]*	0.383*** *[0.007]*	0.272*** *[0.007]*		0.271*** *[0.005]*	
Distance *(in logs)*	-0.681*** *[0.015]*	-0.866*** *[0.018]*	-0.858*** *[0.046]*	-1.043*** *[0.097]*		
Border	0.895*** *[0.082]*	0.997*** *[0.060]*	1.103*** *[0.084]*	1.608*** *[0.096]*		
Common religion	0.067*** *[0.020]*	0.116*** *[0.016]*	0.073*** *[0.021]*	0.098*** *[0.028]*		
Same country in the past	-0.479*** *[0.112]*	-0.262*** *[0.083]*	-0.209* *[0.118]*	0.010 *[0.154]*		
Hegemon-to-colony	1.149*** *[0.109]*	1.304*** *[0.111]*	0.987*** *[0.119]*	1.099*** *[0.142]*		
Colony-to-hegemon	1.078*** *[0.113]*	1.223*** *[0.115]*	0.977*** *[0.115]*	1.102*** *[0.135]*		
Observations	379,950	379,950	379,950	385,050	379,950	385,050
R-squared	0.503	0.480	0.530	0.537	0.682	0.594
Time FE	YES	YES	YES	NO	YES	NO

Origin & Destination FE	NO	NO	YES	NO	NO	NO
Origin & Destination TVFE	NO	NO	NO	YES	NO	YES
Country-Pair FE	NO	NO	NO	NO	YES	YES
Hansen J p-value		0.00551	0.257	0.257	0.238	0.501
Underidentification K-P p-value		0	0	1.73e-07	0	0.000122
Weak Identif. K-P F Statistic		354.6	72.12	10.28	116.2	5.577
Weak Identif CD F Statistic		1325	182.8	31.49	145.8	7.268

Undirected pair-clustered standard errors in brackets. Results obtained using *ivreg2* (Baum, Schaffer, and Stillman, 2010) and *reghdfe* (Correia, 2015). *** p<0.01, ** p<0.05, * p<0.1

Regarding our main variables of interest, results in Table 1 suggest that higher exports from i to j tend to reduce the level of conflict sent from i to j, while the effects of higher imports are ambiguous, with some evidence of a positive effect on conflict.

Notice that the used instrumental variables work reasonably well, since the validity of the instruments is not rejected by the Hansen J test and both weak identification and underidentification are rejected in almost every model (except for some evidence of weak identification in column 6 that could cast doubts on the atypical result for the imports' coefficient).

According to our reduced model for directed conflict, the main weakness of the results presented in Table 1 comes from the omission of the reverted conflict term, as well as from the static specification in the models.

4.2 Dynamic spatial panel data model

Dynamic models in general are difficult to specify, and a protracted debate exists over the different techniques to reach the adequate depth in lags, both for the autoregressive part and the distributed lags of the regressors. Some authors advocate for a general-to-specific strategy, starting from a generous inclusion of lags and subsequently reducing the dynamics, while others defend starting from the most parsimonious model. In dynamic panel data models, and especially so in difference-GMM strategies, this problem is magnified because of the need of defining also the adequate depth in the number of lags taken as instruments for each endogenous or predetermined variable. The strategy used here has been to explore longer and shorter specifications in each case, discarding all the specifications resulting in statistically insignificant lags as well as those that failed to reject serial correlation in the residuals (from the second order onwards, since first-order autocorrelation is expected). The final selection has been done seeking to keep those lags that were robustly significant across different instruments sets.

Table 2 reports the first results for the dynamic spatial panel data model in equation (15), and shows their robustness to changes in depth of lags used as instruments. The validity of the outcomes, in terms of autocorrelation of residuals and properties of the instruments, preclude other specifications for the length of the dynamic parts of the model. Additional lags of the dependent variable, as well as lags in imports led to invalid results. Columns (1) to (3) share the same dynamic specification, where columns (2) and (3) extend the depth of the instruments for the temporal and spatially lagged dependent variable. An increase in the depth of instruments using the standard Arellano-Bond method would make the total number of instruments to increase excessively, rapidly reaching undesirable figures around 200. In order to avoid instrument proliferation, the reported results use a workaround proposed

by Roodman (2008), consisting in the use of a collapsed matrix of instruments that makes the instruments count to be linear (or even invariant) in the total number of time periods.[21]

Results confirm that imports increase conflict while exports have a pacifying effect. Dissipating the doubts casted in Table 1, it is now clear that the higher the value of country *i*'s imports from country *j* the higher the level of conflict from *i* to *j*. The results for exports show once more a steady and significant negative coefficient. Yet, the negative effect appears as a contemporaneous impact which partially vanishes in the subsequent years. Columns (4) and (5) expand the dynamics of the model including additional lags of the reversed conflict, and again the main results still robust.

Table 2
Dynamic specifications with spatial dependence

VARIABLES	(1)	(2)	(3)	(4)	(5)
Lagged Conflict	0.040***	0.048***	0.044***	0.044***	0.044***
(first lag in logs)	*[0.006]*	*[0.005]*	*[0.005]*	*[0.005]*	*[0.005]*
Reversed Conflict	0.290***	0.301***	0.294***	0.276***	0.280***
(current value in logs)	*[0.009]*	*[0.006]*	*[0.006]*	*[0.010]*	*[0.008]*
Lagged Reversed Conflict				-0.013***	-0.012***
(first lag in logs)				*[0.005]*	*[0.004]*
Exports	-0.173**	-0.211**	-0.203***	-0.174**	-0.172**
(current value in logs)	*[0.085]*	*[0.086]*	*[0.078]*	*[0.077]*	*[0.075]*
Lagged Exports	0.025**	0.031**	0.029**	0.025**	0.025**
(first lag in logs)	*[0.012]*	*[0.012]*	*[0.011]*	*[0.011]*	*[0.011]*
Imports	0.090**	0.092**	0.096***	0.090**	0.088**
(current value in logs)	*[0.036]*	*[0.037]*	*[0.037]*	*[0.036]*	*[0.036]*
Democracy in Origin	0.299	-0.159	0.227	0.258	0.033
(current value in logs)	*[0.782]*	*[0.735]*	*[0.746]*	*[0.773]*	*[0.716]*
Democracy in Destination	-1.892**	-2.288**	-2.592***	-1.943**	-1.922**
(current value in logs)	*[0.919]*	*[0.913]*	*[0.793]*	*[0.795]*	*[0.788]*
GDP in Origin	0.768**	0.499*	0.709**	0.730**	0.601**
(current value in logs)	*[0.336]*	*[0.291]*	*[0.298]*	*[0.329]*	*[0.287]*
GDP in Destination	-2.041***	-2.344***	-2.415***	-2.069***	-2.056***
(current value in logs)	*[0.403]*	*[0.375]*	*[0.278]*	*[0.303]*	*[0.299]*
Domestic Conflict in Origin	0.207***	0.216***	0.210***	0.201***	0.202***
(current value in logs)	*[0.023]*	*[0.023]*	*[0.023]*	*[0.023]*	*[0.023]*
Domestic Conflict in Destination	0.219***	0.225***	0.219***	0.214***	0.216***
(current value in logs)	*[0.023]*	*[0.023]*	*[0.023]*	*[0.023]*	*[0.023]*
Observations	334,654	334,654	334,654	334,654	334,654
Number of pairs	22,350	22,350	22,350	22,350	22,350
Lags instrum Lagged Conflict	1	1 to 3	1 and 2	1	1 and 2
Lags instrum Reverted Conflict	1	1	1 to 3	1 and 2	1 and 2
Number of instruments	29	31	32	31	32
ABAR(1) p-val	0	0	0	0	0
ABAR(2) p-val	0.417	0.58	0.754	0.761	0.784
ABAR(3) p-val	0.63	0.862	0.877	0.638	0.619
Sargan Overidentification Test	2.123	7.394	13.55	2.165	3.469
Sargan p-val	0.547	0.193	0.0351	0.706	0.628
Hansen Overidentification Test	3.08	7.397	10.27	3.129	3.915
Hansen p-val	0.379	0.193	0.114	0.537	0.562

Undirected pair-clustered standard errors in brackets. Results obtained using *xtabond2* (Roodman, 2009).
*** p<0.01, ** p<0.05, * p<0.1

Going beyond our focus on the role of trade variables, results in Table 2 give a new insight on other relevant parameters in the trade and conflict literature. In particular, the coefficient for reversed

[21] This method is equivalent to projecting the explanatory variables onto the full Arellano-Bond set of instruments, while constraining the coefficients on certain lags in the projection to be null (Roodman, 2008).

conflict is to our knowledge the first estimation on how a country reacts when receiving higher conflict, and tells that he will reply in average with an increase of around 30% on the level of conflict sent against the aggressor. Another important thing to observe is that conflict has some persistence, although the autoregressive coefficient is low. Also, regarding the set of controls, these new results show that democracies do not have a particular tendency to be peaceful towards other countries, but instead tend to receive a significantly lower amount of conflict. Finally, large (or rich) countries are slightly more aggressive and receive significantly lower conflict, and countries with higher levels of internal conflict are more prone to conflict in both directions.

4.3 Sensitivity to censure in the conflict variable

One main concern at this stage has to do with the censored nature of our dependent conflict variable, non-negligible since it involves 73% of total observations in the sample. The estimation of equation (15) using Arellano-Bond forced to drop any fixed effect for exporter and importer, and just country-pair characteristics are controlled for (by means of first differencing the model). Thus, any omitted exporter or importer characteristic (whether constant or time-varying) that simultaneously affects the selection process and the level of conflict would produce a selection bias in our results.

Censure and selection are fairly challenging features within the framework of the dynamic panel data models. In fact, the issue is receiving considerable attention nowadays and no consolidated method is available. Since our purpose is just to analyze the sensitivity of the presented results, we follow the simplest strategy on hand, based on strong assumptions that allow applying the classical Heckman selection model to our dynamic panel setting.

Transforming equation (15) in a two-equation dynamic model, where all the explanatory variables except for the lagged dependent variable are gathered in a matrix B_{ijt}, we have:

$$\begin{aligned} C^0_{ijt} &= \alpha^0 C^0_{ijt-1} + B^0_{ijt}\pi^0 + \eta^0_{ij} + \varepsilon^0_{ijt} \qquad \text{for } s^0_{ijt} \\ C^1_{ijt} &= \alpha^1 C^1_{ijt-1} + B^1_{ijt}\pi^1 + \eta^1_{ij} + \varepsilon^1_{ijt} \qquad \text{for } s^1_{ijt} \end{aligned} \tag{20}$$

Where s^0_{ijt} denotes the observations for which the dummy variable $d_{ijt} = 0$, s^1_{ijt} denotes the observations for which $d_{ijt} = 1$, and a selection equation determines the value of d_{ijt} based on a latent variable d^*_{ijt} such that:

$$d^*_{ijt} = z_{ijt}\varphi + v_{ij} + u_{ijt} \quad \text{and} \quad d_{ijt} = 1[d^*_{ijt} \geq 0] \tag{21}$$

Where z is a vector of strictly exogenous variables, v_{ij} is an unobservable individual effect, and u_{ijt} is an error term. Then, following Jiménez-Martín, Labeaga, and Rochina-Barrachina (2009), under a strong set of assumptions we can simply add two classical Heckman's Mills ratios in the main equation, obtained with univariate Probit models for periods t and $t-1$.[22]

[22] We need to assume that (i) the conditional expectation of v_{ij} given the vector of time means of all exogenous variables is linear: $v_{ij} = \bar{z}_{ij}\psi + e_{ij}$; where e_{ij} is random and independent of z_{ij}; (ii) the errors in the selection equation ($w_{ijt} = e_{ij} + u_{ijt}$) are independent of z_{ij} and follow a $Normal(0;\sigma_t^2)$ distribution; (iii) the errors in differences in the main equations and the errors in the selection equation $\left[\left(\varepsilon^0_{ijt} - \varepsilon^0_{ijt-1}\right), w_{ijt}, w_{ijt-1}\right]$ and $\left[\left(\varepsilon^1_{ijt} - \varepsilon^1_{ijt-1}\right), w_{ijt}, w_{ijt-1}\right]$ are trivariate normally distributed and independent of z_{ij}; (iv) there is stationarity in the sense that covariances between errors are constant over time: $\sigma_{\varepsilon^1_{ijt}, \frac{w_{ijt}}{\sigma_t}} = \sigma_{\varepsilon^1_{ijt-1}, \frac{w_{ijt-1}}{\sigma_{t-1}}} = \sigma_0$; and ($v$) there is no first order autocorrelation in the errors of the selection equation. This

In order to estimate the yearly cross-section Probit models for selection into conflict, we use a gravity model approach whose relevance to explain conflict has been shown by Hegre (2008). Thus, we include GDP of origin and destination, distances between most populated cities in each country (taken from CEPII gravity database) and we augment the model with our domestic conflict and democracy variables which we argue can be considered as exogenous. Also, in order to control for all other time invariant characteristics of the countries in the pair, we take advantage of the bilateral nature of the data to add importer and exporter fixed effects. The predicted values of these Probit estimations allow building Heckman's lambdas in the usual way.

Table 3
Sensitivity to the treatment of censure in the conflict variable

VARIABLES	(1)	(2)	(3)	(4)	(5)
Lagged Conflict (t-1) *(first lag in logs)*	0.044*** *[0.005]*	0.172*** *[0.009]*	0.151*** *[0.009]*	0.237*** *[0.010]*	0.215*** *[0.010]*
Lagged Conflict (t-2) *(second lag in logs)*				0.096*** *[0.007]*	0.092*** *[0.006]*
Reversed Conflict *(current value in logs)*	0.280*** *[0.008]*	0.503*** *[0.012]*	0.545*** *[0.013]*	0.523*** *[0.012]*	0.559*** *[0.014]*
Lagged Reversed Conflict *(first lag in logs)*	-0.012*** *[0.004]*		0.052*** *[0.008]*		0.044*** *[0.008]*
Exports *(current value in logs)*	-0.172** *[0.075]*	-0.360* *[0.201]*	-0.419** *[0.200]*	-0.775*** *[0.177]*	-0.680*** *[0.156]*
Lagged Exports *(first lag in logs)*	0.025** *[0.011]*	-0.113** *[0.048]*	-0.082* *[0.045]*		
Imports *(current value in logs)*	0.088** *[0.036]*	1.613*** *[0.286]*	1.396*** *[0.265]*	1.207*** *[0.232]*	1.021*** *[0.200]*
Lagged Imports (t-1) *(first lag in logs)*		-0.529*** *[0.091]*	-0.453*** *[0.082]*	-0.324*** *[0.059]*	-0.280*** *[0.052]*
Lagged Imports (t-2) *(second lag in logs)*		-0.105*** *[0.025]*	-0.092*** *[0.022]*	-0.058*** *[0.018]*	-0.056*** *[0.015]*
Observations	334,654	94,713	94,713	94,713	94,713
Number of pairs	22,350	15,767	15,767	15,767	15,767
Lags instrum Lagged Conflict	1 and 2	1 and 2	1 and 2	1 to 3	1 to 3
Lags instrum Reverted Conflict	1 and 2	1	1	1	1

Undirected pair-clustered standard errors in brackets. Results obtained using *xtabond2* (Roodman, 2009).
*** p<0.01, ** p<0.05, * p<0.1

In Table 3 we present the main coefficients obtained when including Heckman's Lambda and estimate the model only with positive-conflict observations. Column (1) replicates one of the results from Table 2 (column 5) to ease comparability. The last four columns of the table report the results from the selection models, again with different dynamic specifications. Here again our main results still holding, with imports having a conflict-promoting effect, while exports being pacifying. When controlling for selection into conflict both imports and exports effects keep their signs and become higher in magnitude, most of all in the case of imports.

4.4 Structural change

The relation between trade and conflict can vary depending on the groups of countries considered, or the kind of trade being observed. In this section we offer some insights about how the effects of imports and exports change depending on the development status of origin and destination countries, on the prevalence of intra-industry trade or inter-industry trade, or on the type of goods being

last assumption is particularly strong and means to suppose that there are no individual effects in the selection equation or that at least their variance is small enough when compared to the composite error in the selection equation.

exchanged. In our theoretical model this means that the main parameters (α_3, β_3, γ_3, and δ_3) vary across the development divide or for different kinds of goods.

Hegre (2000) has shown that the liberal peace hypothesis only holds for the developed world since, as he states, the utility of trade increases with development. Based on Rosenacre's (1986) notion of peaceful trading strategies being much more effective now than in the past, due to industrial-technological development among other reasons, Hegre broadens the idea to show that the "trade promotes peace hypothesis" is contingent to the socio-economic development level of the involved countries.

In order to test this hypothesis, we divide our countries' sample in three groups (developed, developing and least developed) and run separate regressions for each of the nine possible combinations of these three groups in the origin-destination setting.[23] Our results are shown in Table 4 and they openly contradict Hegre's predictions and outcomes. Imports tend to increase conflict between developed countries, while exports lack their pacifying effect in this subsample. Both trade flows increase conflict in the interaction between developed and developing countries (and this occurs in both directions), while they both have pacifying effects when the analysis is restricted to the relationship from developed to least developed countries.

Table 4
Structural change across the development divide

VARIABLES	Developed to Developed	Developed to Developing	Developed to LDC	Developing to Developed	Developing to Developing	Developing to LDC	LDC to Developed	LDC to Developing	LDC to LDC
Lagged Conflict (t-1) *(first lag in logs)*	0.004 *[0.020]*	0.199*** *[0.052]*	0.121** *[0.052]*	0.245*** *[0.041]*	0.447*** *[0.041]*	0.337*** *[0.071]*	0.123 *[0.092]*	0.588*** *[0.086]*	0.189*** *[0.068]*
Lagged Conflict (t-2) *(second lag in logs)*	0.026* *[0.015]*		0.055** *[0.025]*	0.072*** *[0.016]*	0.100*** *[0.014]*	0.111*** *[0.029]*		0.085*** *[0.033]*	
Reversed Conflict *(current value in logs)*	0.366*** *[0.080]*	0.379*** *[0.022]*	0.419*** *[0.033]*	0.423*** *[0.023]*	0.607*** *[0.024]*	0.669*** *[0.043]*	0.338*** *[0.043]*	0.752*** *[0.052]*	0.699*** *[0.052]*
Lagged Reversed Conflict *(first lag in logs)*	0.011 *[0.015]*								
Exports *(current value in logs)*	0.397 *[0.416]*	1.025* *[0.533]*	-0.435* *[0.226]*	0.971*** *[0.245]*	0.553*** *[0.210]*	0.095 *[0.190]*	-0.724*** *[0.273]*	0.037 *[0.160]*	-0.342** *[0.171]*
Lagged Exports *(first lag in logs)*			0.163* *[0.089]*				0.165** *[0.067]*	-0.125* *[0.071]*	
Imports *(current value in logs)*	2.000*** *[0.570]*	0.549* *[0.329]*	0.107 *[0.157]*	1.015** *[0.460]*	-0.662*** *[0.224]*	-0.045 *[0.109]*	0.502 *[0.313]*	0.088 *[0.161]*	0.367** *[0.165]*
Lagged Imports (t-1) *(first lag in logs)*	-0.709** *[0.299]*	-0.128* *[0.078]*	-0.184** *[0.091]*	-0.235* *[0.135]*	0.078** *[0.034]*		-0.256** *[0.111]*		
Lagged Imports (t-2) *(second lag in logs)*			-0.073* *[0.039]*						
Observations	13,032	18,680	5,473	17,841	23,517	6,178	5,409	5,888	3,467
Number of pairs	992	2,349	1,071	2,332	4,248	1,502	1,075	1,505	791
Lags ins Lagged Conflict	1	1	1 to 3	1	1	1	1 and 2	1	1
Lags ins Reverted Conflict	1 and 2	1	1 and 2	1 and 2	1 and 2	1 and 2	1	1 and 2	1 and 2

Undirected pair-clustered standard errors in brackets. Results obtained using *xtabond2* (Roodman, 2009).
*** p<0.01, ** p<0.05, * p<0.1

In fact, our result for the complete sample of countries only holds for trade and conflict from LDC, towards other LDC or towards developed countries, being even reverted for the relations within the group of developing countries, where imports are pacifying and exports promote conflict. This set of

[23] We use the World Bank classification of Developed and Least Developed Country, and de Developing Country group gathers the rest of countries in the sample.

results calls into question the validity of any study failing to consider the variation that the trade and conflict relation has among different groups of countries. Nevertheless, the theoretical interest on the overall effect from trade to conflict remains, and it might be the case that our last results show differing patterns because trade is different in each of these country groups.

Therefore, we need to weigh the role of the kind of trade or the kind of products being traded. An interesting hypothesis recently put forward by Peterson and Thies (2012) suggests that the effect of trade on conflict depends on whether trade is intra-industry or inter-industry. In the first case, trade is associated with reduced conflict propensity, because exchange of similar products resulting from economies of scale and consumer tastes for variety is mostly a cooperative sort of relationship. On the other side, inter-industry trade provokes vulnerability in trading partners. Peterson and Thies find empirical support for this distinction, but their study does not address properly the endogeneity problem or the spatial aspects.

We measured intra and inter-industry trade in the classical Grubel and Lloyd (1971) spirit and at the 6 digit level of the Harmonized System. The amount of intra-industry trade is by definition equal for the two members of a dyad and is obtained as the sum across products of the minimum between imports and exports. The remainder total bilateral exports or imports for each partner are considered inter-industry trade. The first column in Table 5 reports the results when our trade variables are divided in intra-industry trade and inter-industry imports and exports. Peterson and Thies' hypothesis is confirmed by a negative coefficient showing the pacifying effects of intra-industry trade, and also by a high positive coefficient for inter-industry imports. In line with our previous results, inter-industry exports have a pacifying effect.

A complementary approach is to differentiate the effects according to the kind of goods being traded. The distinction between capital goods, intermediates, and consumption goods is particularly relevant because exit costs are presumably different for each group, and also the involved actors vary. Both for capital and intermediates the main actors concerned are firms, while for the case of consumption goods an interruption of trade would be likely to affect both consumers and firms. Also, the relations between agents in the two countries are possibly more intense in the case of trading capital and intermediate goods, and also existing contracts between firms create tighter bonds and require a deeper knowledge and greater confidence between the two parts.

Table 5

Structural change across types of trade and goods

	(1)		**(2)**	
	Coeff.	s.e.	Coeff.	s.e.
Lagged Conflict (t-1)	0.275***	*[0.011]*	0.180***	*[0.011]*
Lagged Conflict (t-2)	0.104***	*[0.006]*		
Reversed Conflict	0.571***	*[0.011]*	0.542***	*[0.016]*
Intra-Industry Trade	-0.221**	*[0.110]*		
Inter-Industry Exports	-0.570***	*[0.151]*		
Inter-Industry Imports	1.449***	*[0.320]*		
Lagged Inter-Industry Imports	-0.205***	*[0.055]*		
Exports of Capital Goods			0.550	*[0.359]*
Lagged Exports of Capital Goods			-0.105***	*[0.039]*
Exports of Intermediate Goods			0.161	*[0.289]*
Lagged Exports of Intermediate Goods			-0.116**	*[0.053]*
Exports of Consumption Goods			-1.403***	*[0.404]*
Lagged Exports of Consumption Goods			0.152**	*[0.064]*
Imports of Capital Goods			-0.437	*[0.397]*

Lagged Imports of Capital Goods		0.066	*[0.045]*
Imports of Intermediate Goods		0.153	*[0.411]*
Lagged Imports of Intermediate Goods		0.025	*[0.073]*
Imports of Consumption Goods		2.270***	*[0.502]*
Lagged Imports of Consumption Goods		-0.294***	*[0.077]*
Observations	99,295	99,295	
Number of pairs	15,843	15,843	
Lags instrum Lagged Conflict	1	1 and 2	
Lags instrum Reverted Conflict	1	1	

Undirected pair-clustered standard errors in brackets. Results obtained using *xtabond2* (Roodman, 2009). *** p<0.01, ** p<0.05, * p<0.1

We use an aggregation of UNStats' classification of products by Broad Economic Categories (BEC), dividing products in the three mentioned groups. Column 2 in Table 5 reports the results, showing that consumption goods are the ones explaining our main result: a country tends to have higher conflict with those partners from where consumption goods are imported, together with a much pacific attitude towards those countries buying the domestically produced consumption goods. Consistent with the more profound interaction in the case of capital and intermediates flows, these goods have no significant effects for the importing country, and there is some evidence on pacifying effects for the country exporting them.

5. **Conclusions**

The analysis done in previous sections shows one main result: In the evaluation of the effects that international trade has on interstate conflict, both the direction of trade and the direction of conflict matter.

From a theoretical point of view, we based our analysis on Li and Reuveny's (2011) model, showing that both imports and exports are affected by conflict, and that these two effects can be different and even of opposite signs. We extended the model in order to capture also the direction of conflict, since a country decides the level of conflict sent against a partner, but the conflict received is decided by the partner. Given exports for one country are imports for the other, each flow will affect conflict in both directions, and a rational decision maker would take both effects into account. This simple change to the model makes the final equation more intricate. Instead of the clear-cut result in LR framework, with the effect of exports on conflict depending on the magnitudes of the shifts in supply and demand for these exports, we have a complex expression where the sign of this same effect depends on shifts in supply and demand of exports and imports, as well as on a difficult to weigh second derivative of the utility function. Thus, our main theoretical result is that the empirical evaluation of the effects of directed trade on conflict needs to control for the reversed bilateral conflict.

The empirical analysis stressed even more the same idea. Considering a spatial model in the network of dyads, where each directed dyad is linked to the reversed one, we interpreted the model as a spatial autoregressive model with spatially autocorrelated errors, a setting where reverted conflict entered naturally. The estimation of the model using dynamic panel data methods allowed also to consider the dynamics of adjustment, giving also an additional way to tackle the endogeneity of trade variables in a conflict model. Using also an innovative external instrument for exports and imports, together with different kinds of fixed effects, and after taking lags in explanatory variables to avoid simultaneous reverse causality, we believe that the results can be interpreted as causal effects.

The main empirical result in the paper is that exports and imports have opposite effects on conflict. While exports lead to lower conflict against the destination, imports increase conflict against the origin. This is a novel result, which in fact puts into question the liberal idea of "peace through interdependence", arguing in favor of a neo mercantilist interpretation where countries see imports as a source of vulnerability.

The opposite effects of imports and exports may partially cancel out if, as is often the case, trade exists in both directions within a dyad. However, a highly unbalanced bilateral trade could create conflict pressures in the country where the deficit occurs. Thus, from a policy standpoint, our main contribution is to signal that it is not aggregate bilateral trade, but bilateral trade balances, what has to be promoted in order to foster peaceful relations between countries.

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Appendix 1

Country i's maximization problem is:

$$\begin{aligned} &\underset{C_{ij}}{Max} && U(EC_i, C_{ij}, C_{ji}) \\ &s.t. && TS = \sum_{p=1}^{P} X_{pi} \cdot PX_p(C_{ij}, C_{ji}) - M_{pi} \cdot PM_p(C_{ij}, C_{ji}) \end{aligned} \tag{A1}$$

The solution of this maximization problem can be found maximizing the Lagrangian $\mathcal{L}$ with respect to C_{ij} and the shadow price of the trade surplus constraint λ:

$$\mathcal{L} = U(EC_i, C_{ij}, C_{ji}) + \lambda \left[-TS + \sum_{p=1}^{P} X_{pi} \cdot PX_p(C_{ij}, C_{ji}) - M_{pi} \cdot PM_p(C_{ij}, C_{ji}) \right] \tag{A2}$$

The two first order conditions are:

$$\frac{\partial \mathcal{L}}{\partial C_{ij}} = U_{C_{ij}} + \lambda \left[\sum_{p=1}^{P} X_{pi} \cdot PX_{pC_{ij}}(C_{ij}, C_{ji}) - M_{pi} \cdot PM_{pC_{ij}}(C_{ij}, C_{ji}) \right] = 0 \tag{A3}$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = \left[-TS + \sum_{p=1}^{P} X_{pi} \cdot PX_p(C_{ij}, C_{ji}) - M_{pi} \cdot PM_p(C_{ij}, C_{ji}) \right] = 0 \tag{A4}$$

The usual economic interpretation of these first order conditions applies, the detail can be found in Li and Reuveny (2011) online appendix.

The computation of comparative statistics of the first order condition in C_{ij} will give, after some rearrangements and simplifications, the partial derivatives of C_{ij} with respect to exports and imports of a specific good $\tilde{p}$, the market in which we will analyze partial equilibrium results. To proceed we need to obtain the two partial derivatives of $(\partial \mathcal{L}/\partial C_{ij})$ with respect to $X_{\tilde{p}i}$ and $M_{\tilde{p}i}$:

1. <u>Comparative statics with respect to</u> $X_{\tilde{p}i}$:

$$\begin{aligned} U_{C_{ij}C_{ij}} \frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} + U_{C_{ij}C_{ji}} \frac{\partial C_{ji}}{\partial X_{\tilde{p}i}} \\ + \lambda \Bigg[PX_{\tilde{p}C_{ij}} \\ + \sum_{p=1}^{P} \Bigg(X_{pi} \cdot PX_{pC_{ij}C_{ij}} \frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} + X_{pi} \cdot PX_{pC_{ij}C_{ji}} \frac{\partial C_{ji}}{\partial X_{\tilde{p}i}} \\ - M_{pi} \cdot PM_{pC_{ij}C_{ij}} \frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} - M_{pi} \cdot PM_{pC_{ij}C_{ji}} \frac{\partial C_{ji}}{\partial X_{\tilde{p}i}} \Bigg) \Bigg] = 0 \end{aligned} \tag{A5}$$

Rearranging:

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}i}} = \frac{-\lambda PX_{\tilde{p}C_{ij}} - \frac{\partial C_{ji}}{\partial X_{\tilde{p}i}} \left[U_{C_{ij}C_{ji}} + \lambda \sum_{p=1}^{P} \left(X_{pi} \cdot PX_{pC_{ij}C_{ji}} - M_{pi} \cdot PM_{pC_{ij}C_{ji}} \right) \right]}{U_{C_{ij}C_{ij}} + \lambda \sum_{p=1}^{P} \left(X_{pi} \cdot PX_{pC_{ij}C_{ij}} - M_{pi} \cdot PM_{pC_{ij}C_{ij}} \right)} \tag{A6}$$

2. <u>Comparative statics with respect to</u> $M_{\tilde{p}}$:

$$U_{C_{ij}C_{ij}}\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}}+U_{C_{ij}C_{ji}}\frac{\partial C_{ji}}{\partial M_{\tilde{p}i}} + \lambda\left[-PM_{\tilde{p}C_{ij}} + \sum_{p=1}^{P}\left(X_{pi}\cdot PX_{pC_{ij}C_{ij}}\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}}+X_{pi}\cdot PX_{pC_{ij}C_{ji}}\frac{\partial C_{ji}}{\partial M_{\tilde{p}i}} - M_{pi}\cdot PM_{pC_{ij}C_{ij}}\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}}-M_{pi}\cdot PM_{pC_{ij}C_{ji}}\frac{\partial C_{ji}}{\partial M_{\tilde{p}i}}\right)\right]=0 \quad \text{(A7)}$$

Rearranging:

$$\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}}=\frac{\lambda PM_{\tilde{p}C_{ij}}-\frac{\partial C_{ji}}{\partial M_{\tilde{p}i}}\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}\left(X_{pi}\cdot PX_{pC_{ij}C_{ji}}-M_{pi}\cdot PM_{pC_{ij}C_{ji}}\right)\right]}{U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}\left(X_{pi}\cdot PX_{pC_{ij}C_{ij}}-M_{pi}\cdot PM_{pC_{ij}C_{ij}}\right)} \quad \text{(A8)}$$

Assuming all countries share the same effects in reacting with conflict to increases in imports and exports, and using again the identity $M_{\tilde{p}i}=X_{\tilde{p}j}$ and $X_{\tilde{p}i}=M_{\tilde{p}j}$it is possible to use the following two identities to remove the reverse conflict derivatives in (A6) and (A8):

$$\frac{\partial C_{ij}}{\partial M_{\tilde{p}i}}=\frac{\partial C_{ij}}{\partial X_{\tilde{p}j}}=\frac{\partial C_{ji}}{\partial M_{\tilde{p}j}}=\frac{\partial C_{ji}}{\partial X_{\tilde{p}i}} \quad \text{(A9)}$$

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}i}}=\frac{\partial C_{ij}}{\partial M_{\tilde{p}j}}=\frac{\partial C_{ji}}{\partial X_{\tilde{p}j}}=\frac{\partial C_{ji}}{\partial M_{\tilde{p}i}} \quad \text{(A10)}$$

In order to make reading easier, we write the following equations using the symbol ■ to refer to $X_{pi}\cdot PX_{pC_{ij}C_{ij}}-M_{pi}\cdot PM_{pC_{ij}C_{ij}}$ and the symbol ■■ to refer to $X_{pi}\cdot PX_{pC_{ij}C_{ji}}-M_{pi}\cdot PM_{pC_{ij}C_{ji}}$. Thus, using identities (A9) and (A10), we can use equation (A8) to re-write equation (A6) as:

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}}}=\frac{-\lambda PX_{\tilde{p}C_{ij}}-\frac{\lambda PM_{\tilde{p}C_{ij}}-\frac{\partial C_{ij}}{\partial X_{\tilde{p}}}\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)}\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)} \quad \text{(A11)}$$

Rearranging we arrive to the equation in the text:

$$\frac{\partial C_{ij}}{\partial X_{\tilde{p}}}=\frac{-\lambda PX_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)\right]-\lambda PM_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{\left[U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)\right]^{2}+\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]^{2}} \quad \text{(A12)}$$

And after analogous operations, using identities (A9) and (A10) we can use equation (A6) to re-write equation (A8) as:

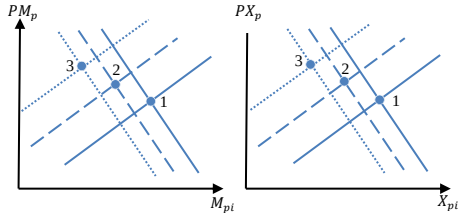
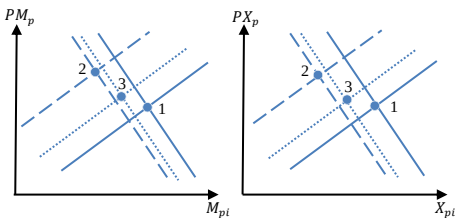
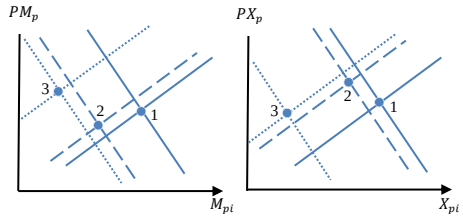
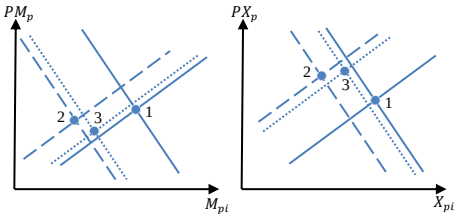
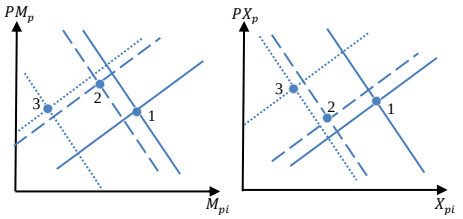
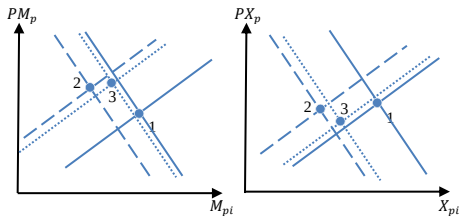
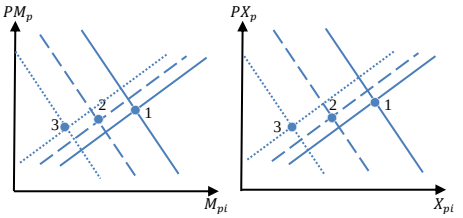
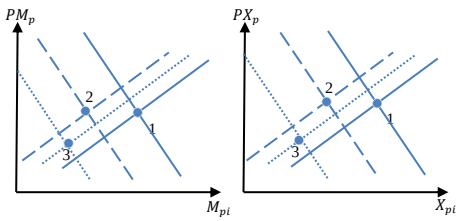
$$\frac{\partial C_{ij}}{\partial M_{\tilde{p}}}=\frac{\lambda PM_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)\right]+\lambda PX_{\tilde{p}C_{ij}}\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]}{\left[U_{C_{ij}C_{ij}}+\lambda\sum_{p=1}^{P}(\blacksquare)\right]^{2}+\left[U_{C_{ij}C_{ji}}+\lambda\sum_{p=1}^{P}(\blacksquare\blacksquare)\right]^{2}} \quad \text{(A13)}$$

Appendix 2

Depending on the signs of $U_{C_{ij}C_{ji}}$, $(\gamma_3 - \delta_3)$, and $(\alpha_3 - \beta_3)$ the effects of emitted and reversed conflict will interact in different ways, leading to gains or losses in imports and exports markets. The figures presented in Table A2 show the basic possible situations. Many different results are however possible, since in several cases the final effect on prices depends on the magnitudes of the different shifts.

Table A2

Basic scenarios for the effects of conflict on import and export prices

	$U_{C_{ij}C_{ji}} < 0$	$U_{C_{ij}C_{ji}} > 0$
Imports: $(\alpha_3 - \beta_3) > 0$ Exports: $(\gamma_3 - \delta_3) > 0$		
Imports: $(\alpha_3 - \beta_3) < 0$ Exports: $(\gamma_3 - \delta_3) > 0$		
Imports: $(\alpha_3 - \beta_3) > 0$ Exports: $(\gamma_3 - \delta_3) < 0$		
Imports: $(\alpha_3 - \beta_3) < 0$ Exports: $(\gamma_3 - \delta_3) < 0$		

Names of curves and relevant points have been omited. Increasing lines are supplies and decreasing lines are demands in every market. Solid lines are the original situation, dashed lines show de impact of the direct effects only, dotted lines show the final situation where direct and reversed conflict terms are taken into account. Initial and final equilibriums are signaled as 1 and 3 respectively.

Appendix 3

Table A3 shows the CAMEO codes used in GDELT database, as well as the Goldstein Scale scores in each case and the frequency of observed events for the whole set of national, subnational and supranational actors. Some of the listed categories will be dropped when restricting our conflict variable to actions among official actors.

Table A3

Actions considered for the conflict variable and their Goldstein Scores

CAMEO Description	GS Score	Frequency (1979-2013)
Retreat or surrender militarily	**10**	7'802
Allow international involvement, not specified below	**9**	378
Receive deployment of peacekeepers	**9**	494
Receive inspectors	**9**	118
Allow humanitarian access	**9**	61
De-escalate military engagement	**9**	539
Declare truce, ceasefire	**9**	1'457
Ease military blockade	**9**	180
Demobilize armed forces	**9**	363
Return, release, not specified below	**7**	9'363
Return, release person(s)	**7**	15'410
Return, release property	**7**	749
Ease economic sanctions, boycott, embargo	**7**	1'442
Ease administrative sanctions, not specified below	**5**	2'892
Ease restrictions on political freedoms	**5**	37
Ease ban on political parties or politicians	**5**	8
Ease curfew	**5**	72
Ease state of emergency or martial law	**5**	2
Ease political dissent	**5**	323
Impose administrative sanctions, not specified below	**-5**	10'684
Impose restrictions on political freedoms	**-5**	1'304
Ban political parties or politicians	**-5**	309
Impose curfew	**-5**	312
Impose state of emergency or martial law	**-5**	255
Arrest, detain, or charge with legal action	**-5**	60'032
Expel or deport individuals	**-5**	3'855
Halt negotiations	**-7**	3'756
Expel or withdraw, not specified below	**-7**	398
Expel or withdraw peacekeepers	**-7**	9
Expel or withdraw inspectors, observers	**-7**	32
Coerce, not specified below	**-7**	1'601
Demonstrate military or police power, not specified below	**-7.2**	4'202
Increase police alert status	**-7.2**	524
Increase military alert status	**-7.2**	901
Mobilize or increase police power	**-7.2**	704
Mobilize or increase armed forces	**-7.2**	4'124
Impose embargo, boycott, or sanctions	**-8**	3'938
Use as human shield	**-8**	13
Attempt to assassinate	**-8**	316
Use tactics of violent repression	**-9**	1'600
Use unconventional violence, not specified below	**-9**	7'864
Abduct, hijack, or take hostage	**-9**	8'983
Sexually assault	**-9**	786
Torture	**-9**	1'477
Seize or damage property, not specified below	**-9.2**	590
Confiscate property	**-9.2**	1'355
Destroy property	**-9.2**	2'483

Table A3 (cont')

Actions considered for the conflict variable and their Goldstein Scores

CAMEO Description	GS Score	Frequency (1979-2013)
Physically assault, not specified below	**-9.5**	4'942
Impose blockade, restrict movement	**-9.5**	1'409
Occupy territory	**-9.5**	7'242
Violate cease fire	**-9.5**	73
Engage in mass expulsion	**-9.5**	36
Kill by physical assault	**-10**	548
Conduct suicide, car, or other non-military bombing, NES	**-10**	1'689
Carry out suicide bombing	**-10**	302
Carry out vehicular bombing	**-10**	225
Carry out roadside bombing	**-10**	12
Assassinate	**-10**	3'618
Use conventional military force, not specified below	**-10**	77'945
Fight with small arms and light weapons	**-10**	18'493
Fight with artillery and tanks	**-10**	3'465
Employ aerial weapons, not specified below	**-10**	3'464
Engage in mass killings	**-10**	800
Engage in ethnic cleansing	**-10**	446

Appendix 4

Afghanistan (AFG)
Angola (AGO)
Albania (ALB)
United Arab Emirates (ARE)
Argentina (ARG)
Armenia (ARM)
Australia (AUS)
Austria (AUT)
Azerbaijan (AZE)
Burundi (BDI)
Benin (BEN)
Burkina Faso (BFA)
Bangladesh (BGD)
Bulgaria (BGR)
Bahrain (BHR)
Bosnia and Herzegovina (BIH)
Belarus (BLR)
Bolivia (BOL)
Brazil (BRA)
Bhutan (BTN)
Central African Republic (CAF)
Canada (CAN)
Switzerland (CHE)
Chile (CHL)
China (CHN)
Ivory Coast (CIV)
Cameroon (CMR)
Congo (COG)
Colombia (COL)
Costa Rica (CRI)
Cuba (CUB)
Cyprus (CYP)
Czech Republic (CZE)
Germany (DEU)
Djibouti (DJI)
Denmark (DNK)
Dominican Republic (DOM)
Algeria (DZA)
Ecuador (ECU)
Egypt (EGY)
Eritrea (ERI)
Spain (ESP)
Estonia (EST)
Finland (FIN)
Fiji (FJI)
France (FRA)
Gabon (GAB)
United Kingdom (GBR)
Georgia (GEO)
Ghana (GHA)
Guinea (GIN)
Gambia (GMB)
Guinea-Bissau (GNB)
Equatorial Guinea (GNQ)
Greece (GRC)
Guatemala (GTM)
Guyana (GUY)
Honduras (HND)
Croatia (HRV)
Haiti (HTI)
Hungary (HUN)
Indonesia (IDN)
India (IND)
Ireland (IRL)
Iran (IRN)
Iraq (IRQ)
Israel (ISR)
Italy (ITA)
Jamaica (JAM)
Jordan (JOR)
Japan (JPN)
Kazakhstan (KAZ)
Kenya (KEN)
Kyrgyzstan (KGZ)
Cambodia (KHM)
South Korea (KOR)
Kuwait (KWT)
Laos (LAO)
Lebanon (LBN)
Liberia (LBR)
Libya (LBY)
Sri Lanka (LKA)
Lithuania (LTU)
Latvia (LVA)
Morocco (MAR)
Moldova (MDA)
Madagascar (MDG)
Mexico (MEX)
Macedonia (MKD)
Mali (MLI)
Myanmar (MMR)
Mongolia (MNG)
Mozambique (MOZ)
Mauritania (MRT)
Mauritius (MUS)
Malawi (MWI)
Malaysia (MYS)
Niger (NER)
Nigeria (NGA)
Nicaragua (NIC)
Netherlands (NLD)
Norway (NOR)
Nepal (NPL)
New Zealand (NZL)
Oman (OMN)
Pakistan (PAK)
Panama (PAN)
Peru (PER)
Philippines (PHL)
Papua New Guinea (PNG)
Poland (POL)
North Korea (PRK)
Portugal (PRT)
Paraguay (PRY)
Qatar (QAT)
Romania (ROM)
Russia (RUS)
Rwanda (RWA)
Saudi Arabia (SAU)
Senegal (SEN)
Singapore (SGP)
Solomon Islands (SLB)
Sierra Leone (SLE)
El Salvador (SLV)
Suriname (SUR)
Slovakia (SVK)
Slovenia (SVN)
Sweden (SWE)
Syria (SYR)
Chad (TCD)
Togo (TGO)
Thailand (THA)
Tajikistan (TJK)
Turkmenistan (TKM)
Trinidad and Tobago (TTO)
Tunisia (TUN)
Turkey (TUR)
Tanzania (TZA)
Uganda (UGA)
Ukraine (UKR)
Uruguay (URY)
United States of America (USA)
Uzbekistan (UZB)
Venezuela (VEN)
Yemen (YEM)
South Africa (ZAF)
Dem Rep Congo (ZAR)
Zambia (ZMB)
Zimbabwe (ZWE)