Economic Interdependence and International Interactions: The Relationship Between Trade, Foreign Aid, and Tariff

By Yuan-Ching Chang*

The trade-conflict model claimed that trade reduces conflict. This paper extends the trade-conflict model to incorporate the foreign aid and tariff effects. The theoretical propositions supported by proofs are as follows: trade and foreign aid reduce conflict and tariff increases conflict. The empirical tests show that trade reduces conflict between states and the causality from trade to conflict remains. Foreign aid directly decreases conflict. The marginal effect of foreign aid in reducing conflict is greater than that of trade. However, the foreign aid is much smaller in magnitude than trade and trade is more important than aid in affecting international relationships. In addition, the foreign aid effect is greater for non-trading partners than trading partners. Foreign aid increases trade, and thereby indirectly decreases conflict since trade reduces conflict. However, the indirect effect of foreign aid decreasing conflict will be smaller than the direct effect. Tariffs, if over a critical level, will increase conflict.

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1. Introduction

The relationships between international conflict and other issues, such as international interdependence and political institutions, have received increasing attention. Over the past century, people have debated the virtues and vices of foreign trade. Does international trade provide a way to interstate peace? Are states with extensive economic linkages less likely than others to engage one another in conflict? How would international relationships be affected by other factors? This research will present the concept that free trade produces welfare gains, hence country will reduce conflict in order to protect her trade gains. There are various arguments for supporting free trade. Many economists believe that free trade will avoid the efficiency losses associated with protection. Such measured costs of deviating from free trade are large. The other kind of additional gain involves comparative advantage and economies of scale. Also by providing entrepreneurs with an incentive to seek new ways to export or compete with imports, free trade offers more opportunities for learning and innovation than are provided by a system of "managed" trade, where the government largely dictates the pattern of imports and exports. Another argument for free trade is that a political commitment to free trade is a good idea in practice even though there may be better policies in principle. In reality any government agency attempting to pursue a sophisticated program of intervention in trade would probably be captured by interest groups and converted into a device for redistributing income to politically influential sectors. As such, it is better to advocate free trade without exception. Free trade is so important that it would affect the international relations. A lot of factors affecting international

interactions are investigated, such as trade (i.e. interdependence), contiguity, foreign aid, tariff, democracy, country size, alliance, third party, market power, economic growth, military capability ratio, … etceteras. This paper will focus primarily on foreign aid and tariff that are very much related to trade in essence.

Aid is much more than just a carefully administered flow of resources. Donors have strategic, political and commercial motives for providing aid, besides their supposedly moral commitment to the development of the Third World. We can label aid as official development assistance, but aid reaches the developing countries through primary two kinds of channels: bilateral and multilateral. For bilateral aid, individual donor governments are both the resources and the channels of assistance. With parliamentary sanction, governments appropriate aid and determine its apportionment and use, in negotiation with recipients. The essence of the multilateral aid is the collective nature of both the governance and the administration of aid. Donors and recipients both have rights in how these resources are apportioned and utilized. By contrast, the two advantages of multilateral aid are its immunity to the political and commercial pressures that are brought to bear on bilateral aid, and its greater response to the development needs of recipients. This system encompasses the UN family of organizations, the International Development Association and the regional development banks.[1]

Tariffs are very natural for dyads. Most countries impose tariffs one another. A country applies customs duty (tariff) on an imported product at the time of import. But the reduction of tariff barriers is the recent world trend. The liberalization of trade was achieved through international negotiation (i.e., one kind of international interaction). That is, governments agreed to engage in mutual tariff reduction. Internationally coordinated tariff reduction as a trade policy can be

[1] For a detailed discussion on foreign aid, see Browne (1990).

dated back to the 1930s. The initial trade problems between countries were solved by bilateral tariff negotiations. After the World War II, the multilateral tariff reductions have taken place under the General Agreement on Tariffs and Trade (GATT), established in 1947. There is no doubt that the operations of the GATT had greatly contributed to the expansion of world trade and hence to the peace and prosperity. The GATT is a multilateral agreement among countries providing a framework for the product of international trade. It has been strengthened and supplemented from time to time (e.g. Kennedy Round, Tokyo Round, Uruguay Round). The latest such effort was made in the Uruguay Round of Multilateral Trade Negotiations on January 1995, which had resulted in the creation of the World Trade Organization. The worldwide tariff reductions on a nondiscriminatory basis implemented within GATT, and some groups of countries have negotiated preferential trading agreement under which they lower tariffs with respect to each other but not the rest of the world. These multilateral tariff plans include preferential tariff reductions on a discriminatory basis (e.g., within the system of Commonwealth Preferences or among a group of European countries) and preferential tariff elimination (e.g., a free trade area, a customs union). The members in a customs union (e.g., European Union) agree to set up common external tariffs. The members in a free trade area (e.g., North American Free Trade Agreement) do not charge tariffs on each others' products, but set their own tariff rates against the outside the world.[2] The effect of preferential tariff elimination on national welfare is unknown, it must depend on whether trade creation or trade diversion.[3] For example, in 1991 four South American nations,

[2] For a detail, see Brusse (1997), Rausser (1995), Didier (1999), Lloyd (1999), Howse (1998), and Bagwell and Staiger (1997a, 1997b).

[3] Either kind of agreement has ambiguous effects on economic welfare. The case of trade creation: if joining such an agreement leads to replacement of high-cost

Argentina, Brazil, Paraguay, and Uruguay, formed a free-trade area known as Mercosur where within four years the value of trade among the nations tripled. But the World Bank's report in 1996 claimed that the net effects on the economies involved were probably negative due to trade diversion.

This paper will focus on the neoliberalists views of that trade reduces conflict between countries. This argument can be traced to Emeric Cruce, Francois Qesnay, Adam Smith, David Hume, Cobden, John Bright, John Stuart Mill, and Baron de Montesquieu who discuss similar themes.[4] The research presents a mathematical trade-conflict model to incorporate foreign aid and tariff effects. In particular, we examine how the gains from trade are affected by these factors. Foreign aid increasing gains from trade reduces conflict, and tariff decreasing gains from trade increases conflict. The paper is structured as follows. This section serves as a simple introduction. A brief literature review is provided in Section 2. Section 3 presents the basic trade-conflict model extended to incorporate foreign aid and tariff effects. Section 4 discusses the various data sources. Section 5 provides methodology and empirical results and Section 6 concludes.

2. Literature Review

2.1 Trade-Conflict

Neoliberalists argue that trade reduces conflict between countries. The issue began to receive renewed attention when Polachek (1978, 1980) modeled how trade can enhance cooperation between

domestic production by imports from other members of the agreement, it will produce country gains. The case of trade diversion: if joining such an agreement leads to replacement of low-cost imports from outside the zone with higher-cost goods from members nations, it will produce country loses.

[4] For a detail, see Spiegel (1991) and de Wilde (1991).

countries.[5] These papers present a cogent theoretical model with rigorous empirical tests of the conflict-trade relationship. If conflict leads to a cessation or at least a diminution of trade (perhaps through tariffs or quotas), then countries with the greatest gains from trade face the highest costs of conflict and hence engage in the least conflict and the most cooperation. Since trade gains are difficult to measure, trade is often measured by trade levels instead of actual trade gains. A 30-country sample from 1958-1967 (Polachek 1978, 1980), a 115-country sample from 1948-1978 (Polachek 1992), and a time series analysis from 1967-1978 for Sino-Soviet ／ U.S. relations (Gasiorowski and Polachek 1982) reveal an inverse relationship between trade and conflict.[6]

Subsequent work looks at trade gains and finds an even stronger inverse relationship between trade gains and conflict (Polachek 1992 and Polachek and McDonald 1992). While these papers assume trade is the causal variable, the question of whether trade causes conflict or conflict causes trade is debatable. Pollins (1989a, 1989b) presents a model and empirical tests where trade is endogenous and conflict is an exogenous variable. He argues that trade is determined by politics and that friendly countries trade more than hostile countries. Both models are similar, yet it is important to determine the direction of causation. Several different approaches are used to look at causation. Oneal, Oneal, Maoz, and Russett (1996) and Barbieri (1996) use lagged trade data arguing that trade in the preceding year cannot be caused by

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[5] The following is a brief review of the trade-conflict literature. Detailed reviews are provided in Barbieri (1996), Reuveny and Kang (1998), Barbieri and Schneider (1999) and Mansfield and Pollins (2001).

[6] Studies that concentrate on the trade-conflict relationship and claim trade reduces conflict include Blainey (1988), Domke (1988), Neff (1990), Sayrs (1990), Mansfield (1994), Oneal et al. (1996), Reuveny and Kang (1996), Russet et al. (1998), Dorussen (1999), Oneal and Russett (1999), Polachek (1997), Polachek et al. (1999), Hegre (2000), Gartzke et al. (2001), Russett and Oneal (2001).

conflict in the current year. Polachek (1980) and Polachek and McDonald (1992) present simultaneous equations tests where both trade and conflict are considered to be endogenous variables. These studies provide support for trade causing conflict, but find little evidence that conflict reduces trade. Similar conclusions are drawn using Granger causality tests of Sino-Soviet/U.S. relations (Gasiorowski and Polachek 1982). Reuveny and Kang (1996) also use Granger causality tests, including a wider variety of dyads in their analysis. They find evidence of trade limiting conflict and conflict limiting trade.

The trade-conflict literature has been extended to examine other questions. For example, as is well known, democracies fight each other less than non-democracies.[7] Polachek (1997) and Oneal, Oneal, Maoz, and Russett (1996) apply the trade-conflict relationship to understanding why. Polachek (1997) documents that democracies trade more than non-democracies and once this is taken into account, democratic dyads exhibit less conflict and more cooperation. James, Solberg, and Wolfson (1999) extend this analysis by incorporating simultaneous equations approaches. McLaughlin-Mitchell and Prins (1999) ground interstate conflict between democracies in the post-World War II time period. Polachek et al. (1999) employed the trade-conflict model to analyze international interactions. Their brief results generally support the developed hypotheses. However, many empirical questions are still left unresolved. Dorussen (1999) and Morrow (1997) presented game-theoretic approaches which also constitute promising research avenues. Sherman (2001) found that democracies were more likely to participate in GATT disputes (i.e.,

[7] For example Rummel (1983), Chan (1984), Bremer (1993), Maoz and Abdelali (1989), Maoz and Russett (1993) are a few of the many studies. Recently, Russett and Oneal (2001) have found evidence that three legs - democracy, extensive economic interdependence, and shared membership in supranational institutions all reduce the probability of antagonism.

trade conflict) than nondemocratic states.

2.2 Foreign Aid

There are many substantial independent studies addressing the role of foreign aid on international relations, especially in bilateral aid relationship.[8] Many researches focus on the justifications for aid. These justifications are altruism, political ideology, commercial interests, and economic development. While lots of disagreements remain, people agree on the elements of successful development strategies. These include: development of market institutions; well-functioning government institutions; reliance on market mechanisms; investment to achieve critical levels of social and physical infrastructure; maintaining a stable macroeconomic environment; increased role of foreign trade; potential role of foreign private investment; and transfer of knowledge and technology from aid donor countries.[9] But in reality, many of the potential aid recipients can be characterized by terms such as patrimonial, rent-seeking, semi-sovereign, and corrupt. This kind of "state-failure" is the greatest threat to the success of foreign aid. Those countries that need aid the most are precisely those countries where aid may be the least effective, in this case for political rather than economic reasons.[10]

Some researches develop theoretical model using utility approach

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[8] For example Orr (1989), Gounder and Sen (1999), McKinlay and Little (1979).

[9] For an econometric time-series analysis of "what motivates foreign aid", see Gounder and Sen (1999) and for an econometric cross-section analysis, see McKinlay and Little (1979), Maizels and Nissanke (1984), Gounder (1994). For similar discussions, also see Schraeder et al. (1998). For a welfare analysis, see Djajic et al. (1999) and Gupta (1997). For the idea of capital flows see Lensink and White (1998). For policies and growth, see Burnside and Dollar (2000).

[10] For variable topics, see Mosley (1987), Riddell (1987, 1996), Krueger, Michalopoulos and Ruttan (1989), Browne (1990), White and Luttik (1994), Obstfeld (1995), and Tarp (2000).

to look at the impact of foreign aid. Dudley and Montmarquette (1976) treated foreign aid as a private good, and inspect how bilateral aids would then be supplied. Dudley (1979) treated foreign aid as a public good and looked the impact of aid among countries. He claimed that as a national public good, residents of the donor countries are aware of the effects of their aid in recipient countries and they may be concerned that increased spending by other countries will reduce the social returns from their own spending. Foreign aid spending seems to be a way for a country to gain political recognition and influence among other countries. Lundborg (1998) looked the foreign aid as a gift exchange for international support. The relative political support for a country is positively affected by the country aid and negatively affected by the rival country aid.[11]

2.3 Tariff

Much of the literature focuses on the relationship between tariffs and trade liberalization. For example, Bagwell and Staiger (1997a) presented a model of customs unions, which predicts that the early stages of the process of customs-union formation will lead to a temporary honeymoon for liberal multilateral trade policies which ultimately must be reversed as the customs union becomes fully implemented. Bagwell and Staiger (1997b) also focused on the consequences of the formation of regional trade agreements on the ability to maintain effective multilateral cooperation. However, the model does suggest that these heightened multilateral tensions should be temporary, and that greater multilateral cooperation can reemerge once the new trading patterns are more firmly established. Grossman and Helpman (1995), and Levy (1999) further introduced special-interest politics (i.e., lobbying) into the analysis of international trade relations. Their models studied policy formation in cooperative and

[11] For different discussions, also see Kemp (1995).

noncooperative international tariff settings. Pahre (1998) provided evidence that suggests trade treaties do play an important role in supporting a liberal trading order. Stahl and Turunen-Red (1995) even developed game-theoretic models to analyze consequences of diverse political parties in the context of international tariff policy. Bond, Syropoulos and Winters (2001) utilized the theory of repeated games, and the derived conditions will be incentive-compatible both for the union and outside countries.[12]

3. The Model

A world system encompasses numerous countries, many trading with each other because the virtues of trade make each country better off economically. What results is a system of inter-country interdependencies, which if based on free market principles including free trade and the full mobility of resources, would result in maximal global output. Any country breaking off such a trade relation would decrease its own long-run economic well-being, as well as perhaps the well-being of its trading partners and of other countries (Anderton and Carter, 2001). As such, reneging on a trade relationship is costly from a private as well as a global perspective.

3.1 The Trade-Conflict Analytics

To see how these potential welfare losses lead to greater cooperation and less conflict, more structure needs to be introduced. First, an actor country's social welfare function is defined as W(C, Z). The variable C is total domestic consumption, which is defined as:

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[12] For the theoretical literatures on the relationship between regional trade agreements and the multilateral trading system, see Kennan and Riezman (1990), Krugman (1991), Bond and Syropoulos (1996a and 1996b), and Bagwell and Staiger (1997a and 1997b).

$$C=Q - \sum_{i=1}^{n} x_i + \sum_{i=1}^{n} m_i \quad (1)$$

where Q is domestic production of a representative commodity, the x_i are the exports of a representative commodity to country i, and the m_i are the imports of a representative commodity from country i.[13] By including C, as defined, our approach is consistent with the economic theory paradigms that describs how countries maximize their collective well-being. The variable $Z=(z_1, z_2,.., z_n)$ represents a militarized and political interstate conflict vector where each z_i stands for conflict toward a particular country i. If z_i is greater than zero, this implies that there is more conflict than cooperation, while a z_i that is less than zero implies that there is more cooperation than conflict. Realist theories that emphasize the importance of national security motive include the political relations variable Z (Keohane and Nye, 1989). Typically:

$$\frac{\partial W}{\partial C} = W_c > 0 \quad (2)$$

denotes increased welfare achieved through increased domestic consumption. Similarly:

$$\frac{\partial W}{\partial Z} = W_z \quad (3)$$

defines welfare associated with conflict. W_z can be positive if an actor gains satisfaction when behaving in a conflictual manner toward another country.

In the beginning, countries face a trade pattern based on expected or existing international relations (i.e., relations based on conflict or cooperation). There are a variety of methods through which conflict

[13] We can have m commodities as in Polachek (1980) and even time t subscripts.

may influence trade, including tariffs, quotas, embargoes, or other trade prohibitions. For simplicity, we view conflict as making trade more costly by affecting import and export prices. That is, conflict is assumed to affect the terms of trade. If a target country responds to an actor's conflict by decreasing the price it will pay for the actor's exports, then conflict (on the part of an actor) raises the costs of trade. This implies decreased trade and a loss of the usual "gains from trade". Similarly gains from trade are lost if a conflictual actor has to pay higher prices for imports from a target recipient of its conflict. This means that the export price p_{x_i} and the import price p_{m_i} are a function of conflict such that $p'_{x_i}(z_i)<0$, $p''_{x_i}(z_i)<0$ and $p'_{m_i}(z_i)>0$, $p''_{m_i}(z_i)>0$.[14] Thus, the implicit price of being hostile is the diminution of welfare associated with potential trade losses.

Under this trade-conflict relationship, the actor country will choose an optimal level of conflict toward the ith target country (z_i) so as to maximize the social welfare function with positive but diminishing marginal utility of consumption and marginal utility of conflict; such that $W_c>0$, $W_{cc}<0$, $W_z>0$, $W_{zz}<0$, $W_{z_iz_j}=W_{z_jz_i}$.[15] For simplicity we assume the social welfare function is separable in C and Z (i.e., $W_{zc}=0$), implying that the consumption of conflict and the consumption of other commodities are independent. Given this

[14] These assumptions are from the original trade-conflict model which claimed that what is involved in such socio-economic applications is broadly redefining price so as to encompass implicit opportunity costs associated with consumption (Polachek, 1978, 1980).

[15] $W_z>0$ is the innate marginal benefit of additional conflict toward another country, the benefit (if it exists) of hatred. In international relations, it might be argued that if nations feel forced to choose conflict as the “least undesirable” course of action available to them, there should always be some positive marginal benefit attached to this choice. One could further simplify by assuming that there is no direct welfare gain from conflict, i.e., $W_z=0$. However, because we will define allies in terms of cross-effects (W_{zz}), we allow for W to be a function of Z (Polachek et al. 1999). For the possibility that $W_z<0$, see Polachek (1978, 1980).

structure, the actor's domestic welfare is as high as possible when it chooses international interaction Z to maximize W(C, Z) subject to the balance of payments constraint, $\sum_{i=1}^{n} p_{x_i} x_i - \sum_{i=1}^{n} p_{m_i} m_i = 0$. That is, if only considering the effect of pure trade gains on conflict, the actor faces the following maximization problem:

$$\text{Max } L = W(Q + \sum_{i=1}^{n} m_i - \sum_{i=1}^{n} x_i, Z) + \lambda(\sum_{i=1}^{n} p_{x_i} x_i - \sum_{i=1}^{n} p_{m_i} m_i) \qquad (4)$$

FOC:

$$W_{z_1} + \lambda(x_1 p'_{x_1} - m_1 p'_{m_1}) = 0 \qquad (4a)$$

$$W_{z_2} + \lambda(x_2 p'_{x_2} - m_2 p'_{m_2}) = 0 \qquad (4b)$$

$$\vdots \qquad \vdots$$

$$W_{z_n} + \lambda(x_n p'_{x_n} - m_n p'_{m_n}) = 0. \qquad (4n)$$

The FOCs simply state that at the margin an actor country chooses an amount of conflict with country #i so as to equate the conflict's marginal costs ($m_i p'_{m_i} - x_i p'_{x_i}$) and marginal benefits (W_{z_i} / λ).[16] In order to satisfy the second order conditions for maximization, the Hessian matrix must be negative definite. In other words, the principal minors $|H_1|$, $|H_2|$, $|H_3|$, … …, $|H_n|$ must alternate in sign:

[16] We assume λ is constant across time and countries. While questionable, this assumption is necessary to reach conclusions from the model.

$$|H_1| = \left|W_{z_i z_i} + \lambda(x_i p''_{x_i} - m_i p''_{m_i})\right| < 0 ,$$

$$|H_2| = \begin{vmatrix} W_{z_i z_i} + \lambda(x_i p''_{x_i} - m_i p''_{m_i}) & W_{z_i z_j} \\ W_{z_j z_i} & W_{z_j z_j} + \lambda(x_j p''_{x_j} - m_j p''_{m_j}) \end{vmatrix}$$

$$= [W_{z_i z_i} + \lambda(x_i p''_{x_i} - m_i p''_{m_i})][W_{z_j z_j} + \lambda(x_j p''_{x_j} - m_j p''_{m_j})]$$

$$- \mathrm{W}_{ij}^{2} > 0$$

$|H_3|$ = 3×3 determinant value < 0, … … et cetera.

For simplicity, we can assume that an actor interacts with only two possible targets. In this simple two-country case, differentiating the FOCs with respect to x_1 and m_1, applying the satisfied results of SOCs and using Cramer's rule, we get:

$$\begin{bmatrix} W_{z_1 z_z} + \lambda(x_1 p''_{x_1} - m_1 p''_{m_1}) & W_{z_1 z_2} \\ W_{z_1 z_2} & W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2}) \end{bmatrix} \begin{bmatrix} \dfrac{\partial z_1}{\partial x_1} \\ \dfrac{\partial z_2}{\partial x_1} \end{bmatrix}$$

$$= \begin{bmatrix} -\lambda p'_{x_1} \\ 0 \end{bmatrix},$$

$$\frac{\partial z_1}{\partial x_1} = \frac{-\lambda p'_{x_1}[W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})]}{[W_{z_1 z_1} + \lambda(x_1 p''_{x_1} - m_1 p''_{m_1})][W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})] - W^2_{z_1 z_2}} < 0$$

and similarly,

$$\frac{\partial z_1}{\partial m_1} = \frac{\lambda p'_{m_1}[W_{z_2z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})]}{[W_{z_1z_1} + \lambda(x_1 p''_{x_1} - m_1 p''_{m_1})][W_{z_2z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})] - W^2_{z_1z_2}} < 0.$$

Thus the actor's conflict toward the target falls as exports from the actor to the target and/or imports from the target to the actor increase. This is the neoliberalists' so-called result that trade reduces conflict. The next step, we will extend this trade-conflict model to incorporate foreign aid and tariff effects.

3.2 Foreign Aid and Conflict

Political scientists (e.g. Abegunrin (1990), Richardson (1978), Holsti (1982), and Orr (1989)) often look at the impact of foreign aid on international relations, such as how countries use foreign aid as an instrument to expand business empires, receive business benefits, and affect the target country's politics. The target country offering aid will be referred to as the donor, the actor country as the recipient.[17] We examine the effect of one target country offering aid to the actor, to the extent that such aid is to be used to purchase the target's exports.[18] We can model foreign aid as that the actor country gets v_1 units of imports from the target. The balance of payments constraint is revised by substituting $(\sum_{i=1}^{n} p_{m_i} m_i + v_1 p_{m_1})$ for $\sum_{i=1}^{n} p_{m_i} m_i$ to receive v_1 units of imports from the target #1 as a result of foreign aid from country #1.

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[17] As noted by a referee, the target country is usually a developed country and the actor country is a less developed country.

[18] This assumption is reasonable since the foreign aid as a grant, not a loan, usually needs feedback to the donor (target) from the recipient (actor). Also see Kemp (1995, pp.365) and 4.1: Foreign Aid Data.

Defining consumption to equal domestic production minus exports plus imports, one can specify welfare as:

$$W = W(Q + \sum_{i=1}^{n} m_i + v_1 - \sum_{i=1}^{n} x_i , Z) \quad (5)$$

subject to a balance of payments constraint

$$(\sum_{i=1}^{n} p_{x_i} x_i - \sum_{i=1}^{n} p_{m_i} m_i - v_1 p_{m_1} = 0).^{19} \quad (6)$$

The actor maximizes its welfare function which now incorporates the impact of foreign aid:

Max L=

$$W(Q + \sum_{i=1}^{n} m_i + v_1 - \sum_{i=1}^{n} x_i , Z) + \lambda (\sum_{i=1}^{n} p_{x_i} x_i - \sum_{i=1}^{n} p_{m_i} m_i - v_1 P_{m_1}) \quad (7)$$

FOC:

$$W_{z_1} + \lambda (x_1 p'_{x_1} - (m_1 + v_1) p'_{m_1}) = 0 \quad (7a)$$

$$W_{z_2} + \lambda (x_2 p'_{x_2} - m_2 p'_{m_2}) = 0 \quad (7b)$$

: :
: :

$$W_{z_n} + \lambda (x_n p'_{x_n} - m_n p'_{m_n}) = 0. \quad (7n)$$

For discussing the target #1 country offering foreign aid to actor, the

[19] Even if it is not a balance of payments (some constant k>0 or k<0) due to foreign aid effect, the derived results will not change (Polachek, 1978). Many thanks to a referee's comments.

actor country chooses an optimal amount of conflict with country #1 so as to equate the conflict's marginal costs ($(m_1 + v_1)p'_{m_1} - x_1 p'_{x_1}$) and marginal benefits (W_{z_1} / λ). For a simple two-country case, differentiating the FOCs with respect to v_1, applying the results of SOCs and using Cramer's rule, we get:[20]

$$\frac{\partial z_1}{\partial v_1} =$$

$$\frac{\lambda p'_{m_1}[W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})]}{[W_{z_1 z_1} + \lambda(x_1 p''_{x_1} - (m_1 + v_1)p''_{m_1})][W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})] - W^2_{z_1 z_2}} < 0.$$

Thus the increased imports brought about by the target's foreign aid to the actor reduce the actor's conflict toward the target.

3.3 Tariff and Conflict

Essentially, an increase (decrease) in import tariffs can be viewed as directly decreasing (increasing) trade. As such, increased (decreased) tariffs have the same impact as decreasing trade, and hence increase (decrease) conflict. Suppose that target country #1 imposes an import tariff on the actor's exports. Thus the actor will decrease its exports to the target country #1 where total exports to the target equal to ($x_1 - t_1 x_1$), and t_1 is an index denoting the tariff imposed by the target country #1. When t_1 equals zero, exports to the target are equal to x_1. When t_1 equals one, tariffs are sufficiently high to reduce exports to the target to zero. As in the case of foreign aid, the actor maximizes its welfare function, now incorporating the impact of tariffs[21]:

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[20] We assume $W_{zv_1} = 0$.

[21] One can expect that quotas imposed (removed) by the target have the same effect as an increase (decrease) in tariffs, and hence increase (decrease) conflict.

$$\text{Max } L = W(Q + \sum_{i=1}^{n} m_i - \sum_{i=1}^{n} x_i + t_1 x_1, Z)$$

$$+ \lambda (\sum_{i=1}^{n} p_{x_i} x_i - t_1 p_{x_1} x_1 - \sum_{i=1}^{n} p_{m_i} m_i) \quad (8)$$

FOC:

$$W_{z_1} + \lambda((1-t_1)x_1 p'_{x_1} - m_1 p'_{m_1}) = 0 \quad (8a)$$

$$W_{z_2} + \lambda(x_2 p'_{x_2} - m_2 p'_{m_2}) = 0 \quad (8b)$$

$$\vdots \qquad \vdots$$

$$W_{z_n} + \lambda(x_n p'_{x_n} - m_n p'_{m_n}) = 0. \quad (8n)$$

For discussing the target #1 country imposing a tariff on actor, the actor country chooses an optimal amount of conflict with country #1 so as to equate the conflict's

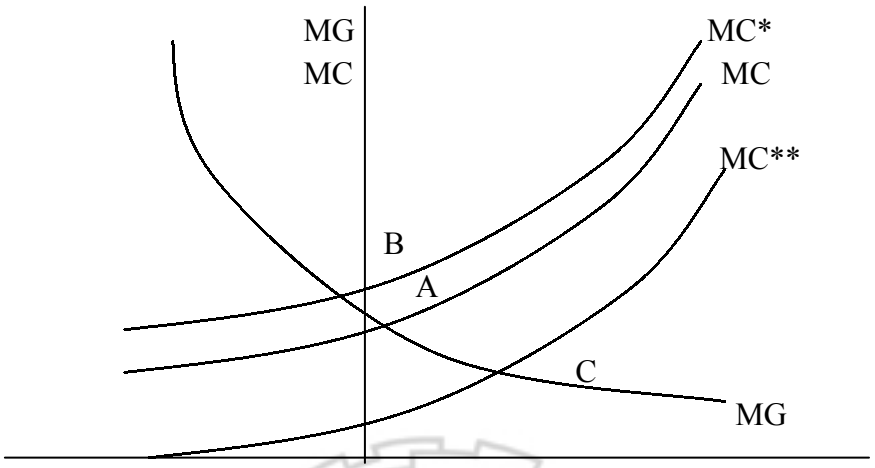

Figure 1: How Trade Gains Affect International Interactions.

marginal costs ($m_1 p'_{m_1}$ - $(1-t_1)x_1 p'_{x_1}$) and marginal benefits (W_{z_1} / λ). For a simple two-country case, differentiating the FOCs with respect to t_1, applying the results of SOCs and using Cramer's rule, we get:[22]

$$\frac{\partial z_1}{\partial t_1} =$$

$$\frac{-\lambda p'_{x_1}[W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})]}{[W_{z_1 z_1} + \lambda((1-t_1)x_1 p''_{x_1} - m_1 p''_{m_1})][W_{z_2 z_2} + \lambda(x_2 p''_{x_2} - m_2 p''_{m_2})] - W^2_{z_1 z_2}} > 0.$$

Thus the reduced exports brought about by the target-imposed tariffs to the actor increase the actor's conflict toward the target.

[22] As similar as before, we assume $W_{zt_1} = 0$.

3.4 A Diagrammatic Representation

The above optimality conditions are illustrated graphically for the typical ith target in Figure 1. Figure 1 depicts how optimal conflict is chosen and how trade gains (losses) decrease (increase) conflict. Looking at figure 1, curve MC depicts the marginal cost of conflict. It is upward sloping indicating that higher levels of conflict result in higher costs. (Mathematically this upward slope occurs because the second derivative of the balance of payments constraint is positive.) The MG curve depicts the marginal welfare gains from conflict. The optimal amount of conflict toward the ith target country is where the MG and MC curves intersect at point A. If there were no welfare gains from conflict, the MG curve would be synonymous with the horizontal axis, implying the optimal level of conflict would be determined by the point at which the MC curve intersects the horizontal axis. One can apply Figure 1 to illustrate how foreign aid, tariff and trade affect conflict. The foreign aid increases trade due to greater actor's imports. Import and export values are contained in the marginal cost function. Since p'_{m_1} is positive, greater import levels imply a larger m_1 (i.e. (m_1+v_1)) and a higher MC curve. In turn, this higher marginal cost curve implies less conflict since the MC^* curve now intersects the MG curve further to the left at point B. On the contrary, tariff decreases trade due to smaller actor's exports. Since p'_{x_1} is negative, smaller export levels imply a smaller x_1 (i.e. $(1-t_1)x_1$) and a lower MC curve. Therefore, this lower marginal cost curve MC^{**} now intersects the MG curve further to the right at point C, and hence higher levels of conflict.

4. The Data

Prior research typically uses war data such as the Militarized Interstate Dispute (MID) data set. MID defines a militarized dispute as an international interaction involving threats, displays, or actual uses

of military force; it must be explicit, overt, government sanctioned, and not accidental. Our primary source of data on conflict and cooperation is the Conflict and Peace Data Bank (COPDAB). COPDAB is an extensive, longitudinal collection of more than 350,000 daily and yearly events reported by dyad.[23] Events are obtained as reported from 72 newspaper and journal resources. These events are coded on the 15-point scale representing different kinds of cooperation and conflict. We concentrate on annual measures of conflict and cooperation for each dyad in a 30- country sample, with data pooled for the years 1958-1967.[24] COPDAB is distinct from the MID data set in at least two ways. First, it contains information on both cooperative and conflictual events. Second, it contains data on both severe and mild forms of conflict and cooperation.

One problem with this type of data is that certain countries are more newsworthy than other countries. If newspapers concentrate on certain countries, these countries will have more conflict and cooperation in our data. These types of selectivity issues are reduced by looking at relative conflict, i.e., the frequency of conflict *minus* the frequency of cooperation for a dyad. In this way, under or over reporting is reduced by concentrating not on the absolute frequency of reported events, but instead on the relative amount of conflict. We define net conflict (NETF) as the frequency of conflictual events (those in categories 9 to 15) minus the frequency of cooperative events (those in categories 1 to 7). A positive value implies a net conflict, while a negative value implies a net cooperation. Consistent with Azar (1978), on average, countries cooperate more than they conflict, with the average dyad having 1.62 conflictual events and 2.71 cooperative events each year. This measure is criticized since a dyad with a high degree of interaction (both high conflict and

[23] For a clear understanding of COPDAB, see Azar (1980) and Polachek (1980).

[24] For the 30-country sample, see Polachek (1997), pp. 303, Table 4.

cooperation) might have the same net conflict as a dyad with no interaction. In both cases net conflict is zero despite differences in dyadic interaction.[25] As such, some argue that war data are more appropriate for examining international interactions. However, war data have a similar problem as dyads with a high degree of interaction, and appear the same as dyads that only conflict and do not cooperate.

Import and export data on a country directional basis in U.S. dollars are compiled by Gillespie and Zinnes (n.d.). Sources for these data are found in the International Monetary Fund series of annual volumes under the heading "Direction of Trade". Standardizied variables are included to hold other factors that may affect both trade and conflict constant. Banks' (1973) Cross-National Times-Series Data Archive is used to select 13 country attributes over each of the years. These attributes are selected primarily because they have the least missing information. In addition, the data on defense expenditures (compiled mostly from the UN Statistical Yearbook by Gillespie and Zinnes) that are used to standardize for general levels of country militancy are included.

4.1 Foreign Aid Data

The foreign aid data are from the Statistical Abstract of the United States (1958-1967), the Statistical Yearbook / United Nations (1958-1960) and Geographical Distribution of Financial Flows to Less Developed Countries (1965-1967), Organization for Economic Co-operation and Development. We focus on aid in the form of grants, and exclude loans or credits since loans or credits are often repaid. Grants are not repaid and are more consistent with Foreign Aid Proposition. We have information on bilateral foreign aid for six

[25] A dyad with a high frequency of both conflict and cooperation, still shows a moderate relationship, but only in the case of a high frequency of interactions. For further discussion, see Mansfield and Pollins (2001) and Polachek (forthcoming).

countries: USA, United Kingdom, Canada, France, Germany and Italy, with total 402 observations.

4.2 Tariff Data

The tariff data are from the Statistical Abstract of the United States (1948-1962), Foreign Commerce and Navigation of the United States (1964-1965) and Highlights of US Export and Import Trade FT 990 (1967-1977), Bureau of the Census. The tariff rate represents total Calculated duty collected divided by the Dutiable value of imports for consumption, multiplied by 100. The "Dutiable value" represents, in general, the customs value of foreign merchandise imported into the United States subject to duty. The "Calculated duty" represents the estimated import duties collected. Estimated duties are calculated based on the applicable rates of duty as shown in the Harmonized Tariff Schedule of the United States Annotated for Statistical Reporting Purposes. All 29 countries are in the sample with a total of 541 observations.

5. Empirical Analyses

In order to keep the exposition as clear as possible, the theory section used a single subscript to denote targets. The remainder of the paper uses two subscripts to denote the actor and target. We apply ordinary least squares multivariate regressions to test the propositions. In addition, for explicit tests of the propositions, it is necessary that the estimations of net conflict and trade be simultaneously treated as endogenous variables in the system.

5.1 Trade Proposition:

The Trade proposition claims that there is an inverse relationship between trade and conflict. Countries that are trading partners have higher costs to conflict than non-trading partners, and are more likely to cooperate and less likely to fight. We test this proposition in two

different ways. First we assume trade is exogenous to the system and use ordinary least squares multivariate regressions to examine the relationship between trade and conflict where equation (9) is estimated.

$$\text{Net Conflict}_{ij} = \beta_0 + \beta_1 \text{Trade}_{ij} + \beta_2 A_i + \beta_3 A_j + \varepsilon \quad (9)$$

where Net Conflict_{ij} = the frequency of net conflict from the country i toward the target country j;

Trade_{ij} = exports from the actor country to the target country (X_{ij}), or imports of the actor country from the target country (M_{ij});

A_i = a vector of actor country attributes;

A_j = a vector of target country attributes;

ε = a random error term normally distributed with mean zero.

Second we assumed trade is endogenous and use three-stage least squares to look at the trade-conflict relationship.

The results are provided in Table 1 where the attributes of actor and target are controlled, and support the proposition as there is a negative and statistically significant trade-conflict relationship. As exports increase from country i to j, and/or imports increase from country j to i, net conflict targeted by country i to j decreases. The greater the level of trade engaged in by a pair of countries, the lower the conflict between them. The elasticity of conflict with respect to exports indicates that a one percent increases in exports is associated with a 0.23 decrease in net conflict. Thus doubling exports between two countries implies that on average there would be a 23 percent decline in the relative frequency of conflict. Similarly doubling imports between two countries implies that on average there would be a 21 percent decline in the relative frequency of conflict.

Second, we consider trade to be endogenous to the model. The results above indicate a negative relationship between conflict and trade. However, it is unclear whether trade is causing (reducing)

conflict as predicted by the trade proposition in the trade-conflict model, or whether an increase in conflict causes a decrease in trade. To test for causality one can view the trade-conflict relationship as a simultaneous set of equations. In one equation conflict affects trade, while in the other trade affects conflict. In effect both trade and conflict are treated endogenously while country attribute data are used as exogenous factors for identification. Three-stage least squares estimation is performed, since three-stage least squares method takes into account the covariances between error terms of different equations. The results in Table 2 show that the causality is as predicted. Even stronger, more negative coefficients (-0.0046 versus –0.0032 in exports and –0.0041 versus –0.0029 in imports) are obtained, while statistically insignificant coefficients are obtained for the impact of conflict on exports and imports. Thus, even when accounting for simultaneity, increases in trade diminish conflict.[26]

5.2 Foreign Aid Proposition:

The theory predicts an inverse relationship between a target's foreign aid to an actor and the actor's conflict toward the target. We examine this proposition in three different ways. First we include the foreign aid variable in equation (9) to determine if there is a direct effect of foreign aid on conflict:

$$\text{Net Conflict}_{ij} = \beta_0 + \beta_1 \text{Trade}_{ij} + \beta_2 \text{Aid}_{ji} + \beta_3 A_i + \beta_4 A_j + \varepsilon \qquad (10)$$

where Aid_{ji} = foreign aid from target country j to actor country i.

Second, we determine if foreign aid has different effects on conflict for trading and nontrading dyads. This is done by adding an interaction between aid and exports (imports) to the specification. The

[26] See Gasiorowski and Polachek (1982) for time series Granger causality tests indicating that trade causes cooperation, rather than the reverse.

third test considers the possible endogeneity of trade. We treat conflict and trade as endogenous variables and use three-stage least squares estimation to test the relationship between foreign aid, net conflict and trade.

The results testing the direct relationship between foreign aid and conflict are provided in Table 3. The negative coefficients on foreign aid indicate that foreign aid from the target to the actor reduces the actor's conflict toward the target. Elasticities of conflict with respect to foreign aid predict that a one percent increase in aid is associated with a decrease in conflict (increase in cooperation) range by 0.53 to 0.73. Thus doubling foreign aid from the target to the actor country implies that on average there would be a 53 to 73 percent decline in the frequency of net conflict from the actor toward target. The marginal effect of foreign aid in reducing conflict is even stronger than trade. However, on average, aid is much smaller in value than imports, and trade is more important than aid.

The second test determines whether the effect of foreign aid differs between trading and nontrading dyads and the results are provided in Table 4. By including an interaction between aid and imports (exports) in the specification, it can be determined whether the effect of aid varies with trade. Interestingly, the effect of aid on conflict is greater for non-trading partners than trading partners. The negative coefficients on aid and the positive coefficients on the interactions imply that aid decreases conflict more if the countries do not trade. One possibility is that foreign aid and trade are substitutes in determining the level of interdependence between countries. As long as there are diminishing marginal effects of interdependence on conflict, foreign aid to a nontrading partner will reduce conflict more than foreign aid to a trading partner.

The third test considers the possible endogeneity of trade. In the proof of this proposition we assume the recipient (actor) must use the aid to buy the donor's (target's) exports, thus aid to an actor should

increase the target's exports to the actor. In other words, foreign aid may have both a direct and indirect effect on conflict. Aid to the actor may directly lead to a decrease in actor to target conflict. In addition, aid to the actor may allow the actor to purchase goods from the target, leading to an indirect effect on conflict through an increase in trade between the countries. To explicitly test the propositions, net conflict and trade are treated as endogenous variables in three-stage least-squares estimation with country attribute data used as exogenous variables. In Table 5, the positive marginally significant foreign aid effect on the actor's imports shows that the greater the aid to the actor, the more the actor imports from the target country. After considering the endogeneity, foreign aid directly reduces net conflict (-0.0041), and also indirectly reduces net conflict through an increase in imports. The elasticity of net conflict with respect to foreign aid is now composed of two components: a direct and indirect effect. The direct effect from a one percent change in foreign aid is calculated as:

$$\frac{\partial NetConflict}{\partial Aid} * \frac{\overline{Aid}}{\overline{NetConflict}}$$

which equals .037 when controlling for imports. The indirect effect considers how foreign aid affects imports, and thus affects conflict through imports. The indirect effect from a one percent change in foreign aid is calculated as:

$$\left[\frac{\partial \mathrm{Im}\, ports}{\partial Aide} * \frac{\overline{Aid}}{\overline{\mathrm{Im}\, ports}}\right] * \left[\frac{\partial NetConflict}{\partial \mathrm{Im}\, ports} * \frac{\overline{\mathrm{Im}\, ports}}{\overline{NetConflict}}\right]$$

and equals .02. Thus the total effect from a one percent change in foreign aid is a 0.057 (.037+.02) reduction in net conflict after considering the endogeneity of trade. By allowing for foreign aid to affect trade, the influence on net conflict is greater than when holding trade constant. That the direct effect of foreign aid for improving

international relations is greater than indirect effect is conceivable. The role of foreign aid in determining trade has particularly important policy implications since foreign aid as a gift exchange is somewhat politically unpopular, but still positive. The potential increase in trade as a result of foreign aid is frequently overlooked in considering the benefits of granting foreign aid to a country. Since we find that aid increases imports to the actor from the target, we provide a benefit to granting aid to countries. Every $1 in foreign aid increases imports by $1.87. Presumably some of the aid is used to purchase goods, but additional trade also appears to be generated.

On the other hand, we don't have a significant foreign aid effect on exports. It is possible that a target will offer foreign aid to an actor in order to import goods from the actor. For example, this may occur if the target's markets are closed to the actor's exports. Another possibility is that the target offers aid to an actor to support a long term imports of a strategic commodity such as oil. For a long run political relationship with the actor and long lasting supply of a strategic commodity, such foreign aid is worthwhile. However, such a relationship is less clear than the possibility of aid to the actor leading to an increase in the actor's imports from the target.

5.3 Tariff Proposition:

The theory predicts a positive relationship between tariffs imposed by the target against the actor and actor to target conflict. To test this proposition, the equation (11) is estimated where tariff variable is added.[27]

$$\text{Net Conflict}_{ij} = \beta_0 + \beta_1 \text{Export}_{ij} + \beta_2 \text{Tariff}_{ji} + \beta_3 A_i + \beta_4 A_j + \varepsilon \quad (11)$$

where Tariff_{ji} = duties collected by j on imports from i divided by total

[27] Since the three-stage least squares estimations of tariff variable are not significant, we only estimate equation (11). Thanks for the referee's notification.

dutiable imports by j from i (in percent).

The results are provided in Table 6 where column (1) shows an insignificantly positive coefficient on the tariff rate. However, a quadratic form in column (3) is somewhat supportive of the proposition. In column (3) when controlling for actor's exports:

$$\frac{\partial Conflict_{ij}}{\partial Tariff_{ji}} = -1.10 + 0.068*\text{Tariff}_{ji} > 0 \text{ if Tariff}_{ji} > 16.17$$

$$< 0 \text{ if Tariff}_{ji} < 16.17.$$

That is if the target's tariff rate is greater than this critical level (i.e., 16.17), a further increase in tariffs leads the actor to increase conflict toward the target. Countries might accept a reasonable tariff for the protection of domestic production, but it cannot be over a tolerable level. As such there exists some evidence that tariffs still increase conflict under certain conditions. It is normal for tariff rates to differ from one product to the next. Tariff effects cannot evidently affect international relation is foreseen. This can be inferred from the reciprocal trade liberalization under the GATT since 1947. For these reasons, it is difficult to find significantly empirical results. However if one day, the world or/and any two countries get involve "trade protection", it will definitely create some kind of conflict. These trade friction conflicts will probably create other kinds of conflicts. As such, tariff increases conflict is believable. Because until now, the serious conflicts due to tariff did not happen in the world, people will ignore its importance on international interactions. In effect, once the tariff rate is over some critical level, it will create economic conflicts, and then more other conflicts.

6. Conclusion and Policy Implications

In 1978, Solomon Polachek developed trade-conflict model which claimed that increased trade between countries reduces conflict. The purpose of this paper is to look at the impact of foreign aid and tariff on the international relationships. To illustrate these effects, we extend trade-conflict model in which an actor maximizes a plausible social welfare function subject to a balance of payments, to examine how the gains from trade are affected by these factors, with foreign aid increasing the gains from trade and tariffs reducing gains from trade. The model predicts that foreign aid reduces conflict and tariff increases conflict.

The classical liberal thesis that trade promotes peace between states is based on two ideas: trade between two states increases the economic costs of waging war, and an inherent facet of increased trade is increased communication between states. The increased communication between states reduces the possibility of misunderstanding and fosters peaceful resolution of conflict (Hegre, 2000, pp.5). This research empirically examines the relationship between trade, foreign aid and tariff. The empirical tests using the Conflict and Peace Data Bank provide supports for the hypotheses that are derived from the model. Trade reduces conflict between states and the causality from trade to conflict remains. Tariff decreases trade and communication, and then increases conflict. Foreign aid increases trade and communication, and then promotes peace. This study shows that foreign aid and tariffs continuously play important roles in international relationships. The policy implication of this paper is straightforward. Encouraging free trade tends to decrease conflict and increase cooperation. Baron de Montesquieu (1900, pp. 316) stated: “Peace is the natural effect of trade. Two nations who traffic with each other become reciprocally dependent: for if one has the interest in buying, the other has the interest in selling; and thus their union is founded on the mutual necessities.” With democracy being a

worldwide trend, most contemporary leaders cling to this longstanding belief that expanding economic ties will increase the bonds of friendship and eliminate the thought of a resort to arms (Mansfield and Pollins, 2001, pp. 855). If the trade gains increase countries' welfare and serious conflict among countries disrupts trade, trade will promote peace and increased world trade will make the maxim "a friend of a friend is a friend" a reality.

Table 1

The Relationship between Conflict and Trade

Dependent Variable: Net Conflict (z_{ij})

	(1)	(2)	(3)	(4)
Intercept	- 1.71**	- 1.54**	- 1.04**	- 0.91**
	(- 8.85)	(- 8.01)	(- 8.0)	(- 7.06)
Export	- 0.0032**	- 0.0089**		
	(- 8.3)	(- 11.72)		
Export-squared		1.4×10^{-6} **		
		(8.71)		
Import			- 0.0025**	- 0.007**
			(- 10.5)	(- 15.0)
Import-squared				1.0×10^{-6} **
				(11.2)
Pop-actor	2.0×10^{-5} **	2.0×10^{-6} **	4.4×10^{-5} **	4.5×10^{-6} **
	(12.1)	(12.0)	(3.62)	(3.74)
Pop-target	-4.8×10^{-6} **	-4.1×10^{-6} **	-8.9×10^{-7}	-4.8×10^{-7}
	(- 2.74)	(- 2.7)	(- 0.81)	(1.04)
GNP-actor	-1.4×10^{-8} **	-1.2×10^{-8} **	-8.8×10^{-9} **	-2.7×10^{-9} **
	(- 11.2)	(- 9.89)	(- 10.8)	(- 9.53)
GNP-target	7.6×10^{-9} **	7.6×10^{-9} **	4.9×10^{-10} **	1.7×10^{-9} **
	(6.47)	(7.49)	(0.61)	(2.27)
R-squared	0.076	0.092	0.071	0.098

N	4223	4223	4241	4241
$\varepsilon_{z\exp ort}$	0.21			
$\varepsilon_{zimport}$			0.18	

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent level, elasticity computed as

$(\frac{\partial z}{\partial \exp ort}\frac{\overline{\exp ort}}{\bar{z}})$ or $(\frac{\partial z}{\partial import}\frac{\overline{import}}{\bar{z}})$.

Table 2

Three-Stage Least Squares Estimates of the Trade-Conflict Relationship

Dependent Variable:		Z_{ij} (1)	X_{ij}	Z_{ij} (2)	M_{ij}
Intercept		- 0.83**	- 90.7**	- 0.85	-108.5**
		(- 4.13)	(- 3.14)	(- 4.32)	(- 3.47)
Exports (X)		- 0.0046**			
		(- 5.58)			
Imports (M)				- 0.0041**	
				(- 5.45)	
Conflict			- 4.04		- 2.90
			(- 0.58)		(- 0.37)
Defense Expenditures	Actor	- 0.00018**		- 0.00019**	
		(- 5.66)		(- 5.66)	
	Target	- 0.00027**		- 0.00025**	
		(- 7.97)		(- 7.69)	
Population Density	Actor	- 0.0015**		- 0.0013**	
		(- 3.23)		(- 2.69)	
	Target	- 0.0018**		- 0.0019**	
		(- 3.77)		(- 4.22)	
GNP	Actor	9.8×10^{-9} **	2.9×10^{-7} **	9.8×10^{-9} **	1.2×10^{-7}
		(3.05)	(3.42)	(2.97)	(1.28)
	Target	2.4×10^{-8} **	1.1×10^{-7}	2.3×10^{-8}	3.8×10^{-7} *

	(7.39)	(1.54)	(7.19)	(5.13)
Highway Vehicles Actor		1078.6**		1092.6**
per capita		(7.01)		(6.36)
Target		945.3**		1054.6*
		(6.72)		(6.99)
Secondary School Actor		0.06*		0.089**
Enrollments		(1.65)		(2.26)
Target		0.081**		0.065
		(2.21)		(1.61)
Electrical Production Actor		- 5.59		2.05
per capita		(- 0.65)		(0.22)
Target		3.15		- 1.46
		(0.38)		(-0.16)
Annual Population Actor		- 0.09*		- 0.14**
Growth		(- 1.75)		(-2.61)
Target		- 0.14**		- 0.082
		(- 2.82)		(- 1.45)
System Weighted R-squared		0.2		0.194
N		3299		3345

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent levels.

Table 3

The Relationship between Conflict and Foreign Aid

Dependent Variable: Net Conflict (z_{ij})

	(1)	(2)	(3)	(4)
Intercept	- 0.95**	- 0.26	- 1.77**	
	(- 2.4)	(- 0.67)	(- 4.12)	
Aid	- 0.081**	- 0.061**	- 0.076**	- 0.059**
	(- 4.33)	(- 3.47)	(- 4.13)	(- 7.74)
Imports				- 0.01**
				(- 7.0)
Exports		- 0.012**		

		(- 6.03)		
Pop-actor			2×10^{-5} **	
			(4.62)	
R-squared	0.054	0.15	0.11	0.23
N	333	326	327	331
$\varepsilon_{z\,aid}$	0.73	0.55	0.68	0.53

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent level, elasticity computed as ($\frac{\partial z}{\partial aid}\frac{\overline{aid}}{\bar{z}}$). The variables with insignificant coefficients are dropped from the regressions.

Table 4
The Relationship between Conflict and Foreign Aid
Dependent Variable: Net Conflict (z_{ij})

	(1)	(2)	(3)	(4)
Intercept	- 0.83	- 0.26	- 1.13	- 0.63
	(- 0.95)	(- 0.27)	(- 1.33)	(- 0.71)
Aid	- 0.051**	- 0.053**	- 0.12**	- 0.101**
	(- 2.79)	(- 2.33)	(- 5.28)	(- 4.55)
Aid*Imports			0.00035**	
			(4.87)	
Imports	- 0.0098**		- 0.019**	
	(- 6.17)		(- 7.82)	
Aid*Exports				0.00028**
				(3.61)
Exports		- 0.12**		- 0.019**
		(- 5.96)		(- 6.90)
Pop-actor	1.1×10^{-5}	6.1×10^{-6}	1.5×10^{-5}	7.4×10^{-6}

	(1.09)	(0.60)	(1.47)	(0.74)
Pop-target	1.7×10^{-6}	-4.1×10^{-7}	1.4×10^{-5}	1.4×10^{-5}
	(- 0.10)	(- 0.03)	(0.84)	(0.78)
GNP-actor	-4.1×10^{-9}	-7.3×10^{-10}	-7.4×10^{-9}	-2.7×10^{-9}
	(- 0.31)	(- 0.03)	(- 0.57)	(0.20)
GNP-target	8.0×10^{-10}	-7.4×10^{-10}	-1.3×10^{-9}	-3.2×10^{-9}
	(0.19)	(- 0.17)	(- 0.31)	(- 0.74)
R-squared	0.016	0.016	0.22	0.19
N	323	317	323	317

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent level.

Table 5

Three-Stage Least Squares Estimates of the Trade-Conflict Relationship with Foreign Aid Effect

Dependent Variable:		Z_{ij} (1)	M_{ij}	Z_{ij} (2)	X_{ij}
Intercept		- 0.98	- 192.9**	- 0.2	- 81.1*
		(- 0.73)	(- 3.24)	(- 0.13)	(- 1.77)
Exports (X)				- 0.002**	
				(- 5.1)	
Imports (M)		- 0.0012**			
		(- 3.32)			
Conflict			0.8		- 13.1*
			(0.1)		(- 1.83)
Aid		- 0.0041*	1.87*	- 0.033	0.68
		(- 1.81)	(1.85)	(- 1.42)	(0.77)
Defense	Actor	- 0.0009**		- 0.0008**	
Expenditures		(- 2.10)		(- 2.1)	
	Target	- 0.0002 *		- 0.00014	
		(- 1.86)		(- 1.4)	
Population Actor		0.0016		0.0012	
Density		(- 0.56)		(0.6)	
	Target	- 0.0016		- 0.0014**	

		(- 0.69)		(- 0.7)	
GNP	Actor	7.6×10^{-8} **	1.3×10^{-6} *	8.8×10^{-8} **	1.9×10^{-6} **
		(4.18)	(1.85)	(4.9)	(3.26)
	Target	1.8×10^{-8} *	-3.0×10^{-7} **	1.1×10^{-8}	-1.9×10^{-7} *
		(1.86)	(- 2.29)	(1.2)	(- 1.79)
Highway Vehicles per capita	Actor		250		1333.1*
			(0.25)		(1.66)
	Target		1162**		482.7*
			(3.28)		(1.76)
Secondary School Enrollments	Actor		0.57**		0.23**
			(8.23)		(4.43)
	Target		0.08		0.07
			(1.0)		(1.21)
Electrical Production per capita	Actor		142.8**		32.8
			(3.53)		(1.13)
	Target		- 46.2**		- 25.3**
			(- 2.86)		(- 2.16)
Annual Population Growth	Actor		- 0.13*		- 0.07
			(- 1.89)		(- 1.42)
	Target		- 0.21		0.24
			(0.77)		(1.16)
System Weighted R-squared			0.39		0.38
N			291		285

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent level.

Table 6

The Relationship between Conflict and Tariffs

Dependent Variable: Net Conflict (z_{ij})

	(1)	(2)	(3)
Intercept	- 4.38**	- 68.3**	- 72.8**
	(- 4.30)	(- 5.31)	(- 2.00)
Tariff rate	0.063	- 0.104	- 0.110**
	(0.91)	(- 1.04)	(- 3.93)
Tariff-squared			0.034**

			(3.80)
Exports		- 0.0015**	- 0.016**
		(- 2.71)	(- 2.91)
Exports-squared		6.6×10^{-8} **	6.6×10^{-8} **
		(2.33)	(2.42)
Pop-actor		- 0.0035	- 0.0036
		(-0.58)	(-0.62)
Pop-target		0.38**	0.45**
		(5.00)	(5.82)
GNP-actor		$- 2.3 \times 10^{-5}$	$- 6.5 \times 10^{-6}$
		(- 0.72)	(-0.21)
GNP-target		- 0.0098**	- 0.013**
		(-2.93)	(-3.82)
R-squared	0.0017	0.15	0.16
N	497	355	355

T-statistics are in parentheses, * indicates significant at the 10 percent level, ** significant at the 5 percent level.

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