

# Globalization and International Conflict: Can FDI Increase Peace?

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# Globalization and International Conflict: Can FDI Increase Peace as Trade Does?

## Abstract

This paper extends the analysis of the conflict-trade relationship by introducing foreign direct investment (FDI). We present a formal model that shows why FDI can improve international relations. We then proceed to test the model empirically. Our empirical results in fact show that foreign direct investment plays a similar role to trade in affecting international interactions. More specifically, we find that the flow of FDI has reduced the degree of international conflict and encouraged cooperation between dyads during the period of the late 1980 and the decade of the 90s. This is an especially important finding since one of the main characteristics of globalization has been the reduction of barriers to international capital flows. As a consequence, these have expanded enormously relative to trade flows. Finally, we also find that trade and FDI complement each other in reducing conflict. The policy implication of our finding is that further international cooperation in reducing barriers to both trade and capital flows can promote a more peaceful world.

## 1. Introduction

There is a large body of literature that deals with the question of whether trade promotes peace. Despite different methodologies, the preponderance of the evidence shows that trade reduces interstate conflict, though there is still some debate.<sup>1</sup> The economic basis upon which these results rest is comparative advantage, an approach developed by David Ricardo almost two hundred years ago. Comparative advantage induces nations to trade with each other and as a consequence enhances each trading partner's national wealth. Trading countries seek not to disrupt these "gains from trade," and thus aim at cooperative relations to foster peace. Although these notions date back to Crucé (1623), empirical testing has begun only in the last twenty-five years (see Russett and Oneal, 2001 and Mansfield and Pollins, 2001).

Recently, countries have moved into a more complicated interdependent network as global integration has expanded. Not only is trade increasing, but the amount of capital flows has as well. For example, foreign direct investment (FDI) has experienced the fastest growth in the 1980s and 1990s and now has become a major economic force that might foster global pacific relations. Some numbers give us a first impression of this alternate economic force. FDI's annual growth rate exceeded the growth of international trade over the past decade and broke through the trillion U.S. dollar level in 2000. This contrasts with the period of the 1960s and 1970s when countries were concerned with the possibility that their sovereignty would be reduced by foreign direct investment by multinationals. The focus now is on the positive effects of FDI and other types of capital flows on the home and host countries' economies. This change in attitude was

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<sup>1</sup> For example see the articles in Mansfield and Pollins (2001), Barbieri (2002), Mansfield and Pollins (2003), and Schneider, Barbieri and Gleditsch (2003).

complemented by the adoption of favorable policies by many countries to attract FDI. Partial reductions or the complete elimination of corporate taxes and the exemptions on import duties are the most common policies, as well as case by case negotiations of direct subsidies to multinationals by host countries. More salient action was taken by the World Trade Organization when it decided to orient discussions on incorporating rules on investment. All these actions have encouraged the expansion of capital flows in general, and FDI in particular over the last decade. These developments raise the possibility that the role of direct investment in determining interstate relationships has increased in importance.

Research on the impact of foreign investments by multinational corporations (MNC) on the international system predates the recent increase in globalization. Some such as Hymer (1960, 1976) and Cox (1987) explored the nexus from a Marxist or radical perspective. Closely linked to this type of analysis are those of the dependency theorist such as Gunder-Frank (1969). Other influential works from a more conventional perspective include that of Vernon (1971), Gilpin (1975) and Nye (1974). Generally, these latter studies take the view that MNC are tied to their home countries and that nation states are still the principal actors in the international system. As Gilpin (2001) points out, this state-centric position assumes that multinational firms are essentially national firms competing with one another around the globe. If this is the case, then from this perspective one would expect that there exists some correlation between the direct investments of multinationals and the foreign policy of their home countries. Conversely, if multinationals are independent actors in the international system and their increasing importance have diluted the role of the nation state as some have argued (e.g., Ohmae,

1990) then we should observe little or no correlation between FDI and the foreign policies of the home and host country towards each other.

The aim of this paper is to address this issue using a different methodology and data set. While earlier work tended to be case studies, we utilize data on FDI, merged with dyadic events data produced by Virtual Research Associates (VRA) and Correlates of War 2 (COW2) data, as well as other country attributes to statistically test whether dyadic FDI flows affect conflict and cooperation between nations. In addition, by introducing trade data we can compare and contrast the importance of each (i.e. FDI and trade) in affecting international conflict during more recent times. The next section provides additional motivation for analyzing the effects of capital flows on international conflict. The model of FDI and international relations is presented in Section 3, while Section 4 discusses the data used. In section 5, we present the empirical estimates for the effects of FDI on conflict and cooperation while accounting for the issue of simultaneity and we compare these estimates with those of trade. Finally, in section 6 we explore whether trade and FDI are substitutes or complements in promoting peace and provide some final conclusions.

## **2. Capital Flows and Peace: Why Should They be Related?**

Independent of the reason found in the *multinational and the state* literature for studying the FDI-conflict relationship, there are some arguments that come directly out of the trade-conflict research. In order to understand these, let us begin by reviewing a country's balance of payments. The balance-of-payments records all transaction between domestic residents and foreigners in accordance with the principles of double-entry bookkeeping. As a consequence, the sums of the two sides of the balance-of-payments

accounts should always be the same (see Fieleke, 1996 for an in-depth discussion). However, there is no bookkeeping requirement that the sum of the two sides of a selected group of transactions recorded in the accounts should be the same, and it is these balances that are often referred to as “surpluses” or “deficits” in the balance of payments. The balance-of-payments accounts are grouped into three major categories: (1) accounts dealing with trade in goods, services, and income; (2) accounts recording gifts, or unilateral transfers; and (3) accounts dealing basically with financial claims (such as bank deposits and stocks and bonds).

In order to illustrate the general principles, suppose that a firm in the United States ships merchandise to an overseas buyer with the understanding that the price of \$200 million is to be paid within 90 days. In return for giving up these goods, U.S. residents are acquiring a financial asset, namely, a promise from the foreign customer to make payment within 90 days. The bookkeeping entries required to record these transactions are as follows: first, a debit of \$200 million to the account “U.S. private short-term claims,” to show the increase in this kind of asset held by U.S. residents; and second, a credit of \$200 million to “Goods.” To illustrate the case of a direct investment abroad, suppose that the purchase of Mexican securities by a United States firm leads to the U.S. party owning at least 10 percent of the voting securities of this entity. This entails the transfer of money by the U.S. resident in exchange for a promise to share in the returns of the Mexican firm. Then if this purchase is for \$500 million dollars and it is made by transferring U.S. dollar demand deposits to the Mexican firm, then a debit entry records the increase in U.S. holdings of long-term investments and a credit entry records the increase in demand deposits of \$500 million dollars held by foreigners in U.S. banks.

Since by definition of double entry bookkeeping, the current account plus the capital and official reserves transactions accounts must equal zero, then in a two country world (exploring dyadic relations) the effects would be the same whether we used trade or capital flows to explore their impact on international relations. If a country has a trade surplus with another country, then it has an equal capital account surplus with that country assuming no central bank intervention. Then it is inconsequential whether we regress the degree of conflict on the trade balance or on the capital account balance since one is just the negative of the other. A similar relationship would exist if we instead used the sum of imports and exports or the credits and debits in the capital account. Yet in a multi-country world, the link is severed at the dyadic level since trade between countries can be financed by capital flows from third countries.

Another economic reason why capital flows will generally be correlated with trade flows is given by Mundell (1957). In his analysis, if a country imposes a tariff on a capital-intensive good that is being imported, the increase in its price domestically leads to an increase in the return to capital relative to labor in the country. As a result, foreign capital flows into the domestic country attracted by the higher return than those being offered in the home country. Even though imports of the capital-intensive good decline as a result of the tariff, and the country's balance of trade improves, there is now an inflow of capital that shows up as a surplus in the capital account (increase in foreign direct investment). Therefore, the impact that the reduction in trade between countries has on bilateral relationships could be offset by those generated by the additional capital transactions between residents of the two countries. As these examples make clear, exploring the capital flows-conflict relationship is complementary to the trade-conflict

one. Therefore, a complementary study to the trade-conflict relationship should analyze the relationship between all capital flows in the balance of payments and conflict.

Unfortunately, only data for long-term flows are available at the dyadic level. Yet, since short-term capital flows are more liquid than long-term flows their potential impact on international relations should be substantially weaker. For these reasons, as well as to empirically explore the arguments presented in the MNC-State literature our study will focus on long term flows in the capital account, namely FDI.

### **3. The Model**

The main mechanism through which FDI influences international relations is similar to the way trade influences international relations. FDI benefits both home and host countries. If the home country of the MNC or the host country's government initiate conflict and as a result direct investment decreases, then many of the gains are lost. We argue that in order to protect these gains, both governments will reduce conflict and promote cooperation, much like why the governments of trading partners try to maintain a peaceful relationship with each other. The advantage of FDI for the home country comes from multinationals, the FDI agents. In most economies, the scale of production of multinationals leads to their using the most advanced technology and management techniques, along with large R&D investments. This can result in high payoffs for the national economy and as a result it can lead to multinationals potentially having a high degree of influence on the policies adopted by the government of the home country.

The advantages of FDI to the host country are more obvious. Direct investment in the host country brings new technologies, management techniques and human capital. Some of these may be non-rival goods and therefore can be shared by local firms.

Specifically, FDI can generate productivity spillovers which might be captured by local firms. Through these spillovers, the host country can achieve what it could not through domestic investments or trade in goods and services. Furthermore, multinationals provide trainings to their workers and the increase in worker productivity could be beneficial to local firms if these workers switch employers later on. In addition to these spillovers, multinationals may provide intermediate inputs at a lower cost to the host country and demand inputs from local firms. They also contribute to host countries' fiscal revenues through corporate taxes. In contrast to short term capital inflows which could destabilize the host country economy, the long-term nature of FDI makes it more stable and therefore is less disruptive to the national economy. In fact, empirical evidence suggests that FDI has a positive and significant effect on the growth of real per capita income of the host country (see for example, Borensztein, et.al 1998, Khawar, 2005). If the home country of the MNC or the host country's government initiate conflict and as a result direct investment decreases, then many of the gains are lost. We argue that in order to protect these gains, both governments will reduce conflict and promote cooperation, much like why the governments of trading partners try to maintain a peaceful relationship with each other.

However, a careful examination of the comparative advantage of FDI may yield stronger reasons why it may reduce interstate conflict more than trade. Direct investment has certain attributes that trade does not possess. For example, its long term nature differentiates it from trade. In the case of trade, one country can change its partners more frequently and easily when an adverse situation is encountered. For example, if war breaks out between two countries, the traded goods can be held or delayed, or even

transferred to another destination. The loss resulting from the termination of trade between these two countries can be minimized. Yet this is not the case for FDI. Once investments are made, multinationals cannot withdraw investments arbitrarily. The loss resulting from interstate conflict can continue for a long time with the cost not being recovered. Based on this, multinationals may use their power to push both governments, or at the very least the home government to adopt cooperative policies rather than conflictual ones. In addition, the host government may be induced to adopt cooperative policies in order to demonstrate a friendly image towards FDI in order to attract further investments from other countries. Therefore, the resulting consequence is likely to be cooperative relationships between countries and less conflict.

The following presents a one-period model that aims to capture these stylistic facts. For simplicity, we assume a 2-country world where these can be associated with the home and host country. The home and host countries' preferences are represented by the following utility functions:

$$U = U(C, Z) \tag{1}$$

$$U^* = U^*(C^*, Z^*) \tag{2}$$

where  $C$  denotes consumption in the home country and  $C^*$  that in the host country and  $Z$  denotes the intensity of conflict or cooperation that the home country generates towards the host country and  $Z^*$  that of the host towards the home country (see Polachek 1980). We assume that  $Z$  is defined over the non-negative real numbers with the property that a greater  $Z$  represents more intense conflict and a lower  $Z$  greater cooperation with the other country. Greater conflict requires resources whether it is military weapons or

diplomatic pressure that must be taken from other uses. Preferences for the level of conflict generate a derived demand for it, although the primitive for conflict may be to redistribute wealth from neighbors either voluntarily or involuntarily by threat or use of force<sup>2</sup>.

Each country has a given labor force,  $l$  and  $l^*$ , respectively, that we normalize to one. For simplicity, we assume that the representative multinational firm is based in the home country and that none exists in the host country. At the beginning of the period, the multinational firm has an amount of capital  $k$  that can be allocated to production in the home country,  $k_1$  or in the foreign country which we denote by  $k_2$ . Therefore,

$$k_1 + k_2 = k. \quad (3)$$

The investments generate returns of  $R_1$  and  $R_2$  respectively, with the rate of returns depending inversely upon the amount invested due to diminishing returns and on the level of conflict, as poor international relations makes for greater regulatory restrictions and other such policies aimed at foreign investors. In addition, the returns to foreign investment will depend positively on such variables as public infrastructure, the level of education of the labor force and other types of social capital which we denote by  $\Omega$ .

More specifically,

$$R_1 = R_1(k_1, \Omega) \quad (4)$$

$$R_2 = R_2(k_2, Z, Z^*, \Omega^*) \quad (5)$$

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<sup>2</sup> In what follows, we can think of the utility function as representing the preferences of the policymakers. In the economics of regulation literature these are generally referred to as political support functions. Under this interpretation, greater consumption yields support for the politician from the segment of the constituency whose level of welfare is increased as their consumption rises. Similarly, there exists a subset of the constituency who benefit from conflict and therefore, support such policy since they are made better off.

$$\text{with } \frac{\partial R_1}{\partial k_1} < 0, \frac{\partial R_2}{\partial k_2} < 0, \frac{\partial R_2}{\partial Z} < 0, \frac{\partial R_2}{\partial Z^*} < 0, \frac{\partial R_2}{\partial \Omega} > 0, \frac{\partial R_2}{\partial \Omega^*} > 0.$$

Denoting the wage rate in the home and host countries by  $w$  and  $w^*$ , respectively, the home country's income,  $y$ , is

$$y = w + R_1 k_1 + (1 - \tau) R_2 k_2, \quad (6)$$

where  $\tau$  is the tax rate on the multinational's income imposed by the host country. Note that the wage rate in the home country is increasing in the amount of capital invested in the home country,  $k_1$  and on the amount of human capital,  $H$ , namely  $w(k_1, H)$  with  $\partial w / \partial k_1 > 0$  and  $\partial w / \partial H > 0$ .

Finally, the budget constraint for the home country is:

$$C + Z = w + R_1 k_1 + (1 - \tau) R_2 k_2. \quad (7)$$

The host country's income,  $y^*$  is

$$y^* = w^* + R^* k^* + \tau R_2 k_2, \quad (6')$$

where  $k^*$  and  $R^*$  are the capital stock owned by the host country's firms and the return to this indigenous capital, respectively, the latter which can differ from that earned by the MNC. The wage rate in the host country is also increasing in the amount of capital since they are complementary factors of production, as well as on the level of human capital,  $H^*$ . These assumptions conform to the empirical evidence on FDI that was discussed above. Therefore,

$$w^* = w^*(k_2, k^*, H^*), \quad (8)$$

$$\text{with } \frac{\partial w^*}{\partial k_2} > 0, \frac{\partial w^*}{\partial k^*} > 0, \frac{\partial w^*}{\partial H^*} > 0.$$

Finally, the budget constraint for the home country is:

$$C^* + Z^* = w^* + R^*k^* + \tau R_2 k_2. \quad (7')$$

The timing of the game is as follows. First, we assume that the MNC decides how to allocate its investment portfolio between the home and foreign countries, while the host country government decides the tax rate on foreign capital. In the second stage, the governments of each country determine the type of international relations to have with the other country, i.e., it chooses the level of  $Z$ . To solve the game, we use backward induction. Therefore, given  $(k_1, k_2, \tau)$  chosen in the first stage, each country chooses  $Z$ . Substituting equation (3) into (7), the problem for the home country in the second-stage is to maximize equation (1) namely,

$$\text{Max}_Z U = U\left(w + R_1(k - k_2') + (1 - \tau)R_2 k_2' - Z, Z\right) \quad (9)$$

where  $k_2'$  denotes the amount chosen in the first-stage.

The first-order condition is:

$$\frac{\partial U}{\partial Z} = \frac{\partial U}{\partial C} - (1 - \tau) \frac{\partial U}{\partial C} \frac{\partial R_2}{\partial Z} k_2'. \quad (10)$$

This condition states that the optimum level of conflict is determined at the point where the marginal benefits from engaging in conflictual relations with the host country measured by the left-hand side is equal to the marginal cost. This cost is composed of two term: the first is the direct resource cost that an additional unit of  $Z$  has for society as

they forgo a unit of the consumption good,  $\partial U/\partial C$ , and the second, the indirect cost imposed on domestic residents who have opted to invest in the host country. This latter term captures the reduction in their net of tax returns on each unit of investment of  $(1-\tau)\frac{\partial R_2}{\partial Z}$  resulting from the deterioration of relations that yields a total loss in utility from the decline in consumption of  $\frac{\partial U_1}{\partial C} \frac{\partial R_2}{\partial Z} k_2'$ . For the host country, they maximize equation (2) subject to (7') yielding the first-order condition

$$\frac{\partial U^*}{\partial Z^*} = \frac{\partial U^*}{\partial C^*} - \tau \frac{\partial U^*}{\partial C^*} \frac{\partial R_2}{\partial Z^*} k_2'. \quad (11)$$

Note that as compared to the situation of no FDI ( $k_2' = 0$ ), the marginal cost in both these cases is higher by the amount of the second-term on the right hand side. Therefore, if the marginal utility from conflict is decreasing then the optimal level of  $Z$  determined by equations (10) and (11) must be smaller when FDI exists. Finally, solving equations (10) and (11) we get

$$Z = Z(Z^*, k_2', H, k, \tau, \Omega, \Omega^*) \quad (12)$$

$$Z^* = Z^*(Z, k_2', H^*, k^*, \tau, \Omega^*, \Omega) \quad (13)$$

By substituting these equations into (1) and (2) we can solve for the first-stage solutions for  $k_2'$  and  $\tau$ . Our objective is to estimate equations (12) and (13) taking into account the simultaneity generated by the first-stage solution. Therefore, we next proceed to explore the empirical evidence of this relationship.

#### **4. The Data**

The two major data sets used in this study are the Virtual Research Associates data (VRA) and bilateral Foreign Direct Investment by OECD countries. The VRA data are unique. They are derived from events reported in the wire services. Rather than being read and transcribed from newspapers, they are based on computer driven formulas that analyze the first sentence of each news report. From these first sentences, the computer determines an actor, a target, as well as an action (see King and Lowe, 2002 for examples and more details). The data used for our study begins with 3.7 million international dyadic events during the period 1990-2000 downloaded from Gary King's web site. After deleting the intrastate events, there remain about 450,000 observations. This event data set is coded by IDEA (Integrated Data for Events Analysis). For a detailed description of IDEA see Bond, et. al., (2001) and King and Lowe (2002) who compare several different coding methods. Joshua Goldstein has proposed a scale to convert the IDEA code to one that matches closer to the scaling used in previous events data sets (see Goldstein, 1992). Table 1 contains the conversion scale as given by King and Lowe. As can be seen from the table, the negative scale values represent conflict and the positive ones cooperation, while zeros are basically natural disasters and neutral social activities. The maximum negative value is -10 which corresponds to extreme conflict cases. Note that conflict decreases with the absolute value of these negative values. The same holds for the positive values except that its maximum positive value is only 8.3. Since the scale includes 55 categories, it makes the use of a count model inappropriate. It is possible to divide these into smaller sub-categories, but the problem is how to capture the total event effect for each dyad by year. A more useful method, is to

compute the weighted sum of all events for each dyad by year (weighted by the Goldstein scale for each type of event form). Given that conflict and cooperation are differentiated by different signs, if the weighted sum is positive, it means net cooperation exists between these dyads and conversely, negative values imply net conflict. In other words, for net cooperation the total weighted events in cooperation must dominate the total weighted event in conflict.

Our use of the VRA data was chosen for two reasons. First, country interactions are composed of both cooperation as well as conflict. Thus the data set is rich in the sense it contains all types of interactions. As such, it is not confined solely to high order conflicts such as wars. On the other hand, one is able to limit the analysis to wars (or other high order conflicts) if desired by concentrating on those values that correspond to such events. Second, utilizing data that contain both conflict and cooperation enables us to correct for a potential bias that exists in many of the recent work on the trade-conflict relationship. Confining the data solely to conflict could lead to erroneous results. Interaction theory (see Waltz, 1979) posits that trade will increase all interactions between trading partners. These interactions include both cooperation as well as conflict.

Consider the following example which shows how cooperation and conflict both exist between trading partners and why an erroneous result is expected if confined solely to conflict data. Taking any two big trading partners, they are more likely to end up with unbalanced trade annually. In the worst case, if the imbalance lasts for a long period of time, the country experiencing the trade deficit will be dissatisfied with the policies of the trade surplus country. Trade related conflict thus arises. In reality, the case of the U.S and China offers a good example. China is often the trade surplus country and the long

lasting trade deficit for the U.S forces it to pressure China to reevaluate its currency vis-à-vis the dollar. However, U.S and China cooperate widely in many economic, political and social fields probably much more than those with their smaller trading partners. What we observe in the end between the U.S and China is that trade induced cooperation dominates trade induced conflict and the net effect of trade is to reduce conflict. For the above reason, the use of events data containing both conflict and cooperation is more appropriate for our analysis of how FDI and conflict are related. Of course, there are some disadvantages with events data. These disadvantages have been addressed by many studies (see Kegley, 1975 and Polachek, 1980 and 1997), yet these will not affect the consistency of the estimation (see Polachek, 1997).

The second major data set used for the study is an FDI data set comprised of 70 countries that are members of the OECD, as well as their partner countries. This is the only data set that we know of that details bilateral capital flows. The time period for which this data is available is from 1989 which makes it useful for capturing any new trend in FDI and the role that FDI is playing in the post-Cold War period. A limitation of this data is that it is weighted towards OECD countries more than other countries, although FDI in these others tend to be relatively small in magnitude. Thus, this data set has FDI between each pair of OECD countries and FDI between OECD countries and non-OECD countries but not between pairs of non-OECD countries. We can interpret this as either there is no FDI from non-OECD countries to OECD or it is unavailable. It seems that the former is the case although the unavailability of data does not allow us to conclude definitively that this is the case.

Other data sets are used to account for differences in other characteristics of countries as implied by equations (12) and (13). There are different sources for these data. For the data on GDP, we use IMF data and adjust it into US dollars as was done with the FDI data. Some measurements of countries' military capabilities, and variables such as population, military expenditure and military personnel are taken from the National Material Capabilities in COW2. In addition, variables on a country's infrastructure level and the educational level of its population are from the World Bank. The extent of democracy for each country is obtained from the "Polity IV" data set. Finally, one data set worth mentioning is the dyadic trade data set developed by Kristian Gleditsch. It contains dyadic trade for the years which matches our data for FDI.

## **5. FDI and Conflict: Can One Predict The Other?**

### *The Empirical Model of FDI and Conflict*

The model addressing the FDI and interdependence relationship is a simultaneous two-equation model. Based on the theory, FDI and interdependence are expected to influence each other and we expect both to have a positive impact. Therefore, FDI and interdependence are both regarded as endogenous variables. Only by looking at both in a simultaneous equations context do we get unbiased results.

As previously mentioned, the variable measuring interdependence is the weighted sum of all conflict and cooperation events for each dyad year from the VRA data. We denote this variable as '*Total*.' It represents the net amount of cooperation between an actor and a target country. When positive it implies that cooperation outweighs conflict. Therefore, by defining net cooperation to be the dependent variable (*Total*), we can then explore whether conflict and cooperation increases or decreases at the same time as our

independent variables change. The observed coefficients will be interpreted as measuring the marginal effects on net conflict or cooperation. In the VRA data, every event has a source country and a target country thus all interactions are directed from an actor country to a target. Yet it is possible that between dyadic actors, country A directs events toward country B in a specific year, but that dyad country B does not direct events toward country A. In our study, *Total* measures the weighted sum of the directed events of both dyad countries in that year. The reason for this is that we want to see the total net effect between two dyad countries.

The variable FDI measures either the inflow or outflow between a pair of dyad countries in a specific year. Inflow is the investment a target country receives from a source country. Outflow is the amount of investment leaving the source country to the target country. Theoretically, these two should be equivalent. Yet in practice, they may differ from each other because countries differ on how they define direct investment and on other measurement issues. We report the results for inflows in the text and present those for outflows (which are almost identical) in the Appendix. As previously mentioned, since one country's investment in another may be expected to be influenced by how peaceful their relationship is and since peace might be influenced by how much one country invests in the other, we adopt a simultaneous equation system to examine how FDI affects dyadic relations and how dyadic relations affect FDI. These are specified below by equations (14) and (15).

$$\text{Total} = \alpha_0 + \alpha_1 \text{FDI} + \alpha_2 A_s + \alpha_3 A_t + \varepsilon_1 \quad (14)$$

$$\text{FDI} = \beta_0 + \beta_1 \text{Total} + \beta_2 B_s + \beta_3 B_t + \varepsilon_2 \quad (15)$$

where both  $A_s$  and  $B_s$  are a vector of country attributes of the source country while both  $A_t$  and  $B_t$  are a vector of country attributes of target country. Table 2 presents the descriptive statistics for the variables employed including the attributes. Finally,  $\varepsilon_1$  and  $\varepsilon_2$  are random errors assumed to be normally distributed. The results for the estimation of the simultaneous system given by equations (14) and (15) are reported in Table 3, with the first coefficients reported being those that correspond to the attributes of the source country and the second coefficients to those of the target country.

As we can clearly see from the above table, FDI has a significant positive effect on the net cooperation variable which is 0.014. So for every one million US dollar increase in FDI for a dyadic pair, on average net conflict will be reduced by 0.014 units or net cooperation will increase by 0.014 units between the dyad. However, from the information above it is difficult to see how big this effect could be. In order to do so, more information will be needed such as the mean value of FDI and of total net cooperation to assess the possible effects of FDI in decreasing net conflict. Following Polachek (1980) we can use the following measurement of elasticity that provides more intuitive results:

$$\text{Elasticity} = \frac{\partial \text{Total}}{\partial \text{Inflow}} * \frac{\text{meanInflow}}{\text{meanTotal}} = .014 * \frac{370.369}{16.685} = .311.$$

The interpretation of this elasticity is as follows: As FDI increases by 1%, net cooperation will increase by 0.31% or net conflict will decrease by 0.31%, on average. Our result on the net conflict variable also confirms that it has a significant positive impact on FDI. The coefficient of this is 23.0. This is consistent with our propositions

that FDI relies on good dyadic relationships. In this case, a one unit change in net cooperation will increase FDI by about \$23.0 million between the two countries. Once again, the elasticity for this relationship is:

$$\text{Elasticity} = \frac{\partial \text{Inflow}}{\partial \text{Total}} * \frac{\text{meanTotal}}{\text{meanInflow}} = 23.000 * \frac{16.685}{370.369} = 1.036.$$

Therefore, a 1% increase in net cooperation or 1% decrease in net conflict between dyad will increase FDI by 1.04%.

These regressions also yield a number of other interesting findings. First, GDP seems to play a positive role in decreasing net conflict. Both the source and the target countries' GDP ( $k$  and  $k^*$ ) are positively associated with FDI inflows and are statistically significant. On average, large GDP countries are more likely to have more inflows of FDI. As FDI can reduce net conflict, so might higher GDP. Second, a number of country capability attributes tend to negatively impact on the degree of net cooperation. For example, the power ratio of the dyads has a negative sign and is very significant. The greater the power ratio, the less the net cooperation. Also, we find the variable joint democracy has a significant negative coefficient. We expect that the level of democracy plays a very important role in global interdependence. It is reasonable to argue that democratic countries will have less net conflict because they have similar cultural and social backgrounds and that checks and balances within this type of government decreases democracies' proclivity toward wars. However, our results indicate that polity does not increase net cooperation or decrease net conflict once GDP and the levels of FDI inflows are taken into account. This result reinforces that found by Polachek (1997) where more salient determinants for the democratic peace are found to be economic issues rather than only political considerations. Finally, the estimates indicate that the

contiguity of countries results in more net cooperation once capital flows are taken into account. This result is in contrast to most other findings that find contiguity leads to greater conflict.

As for the other estimates of FDI inflows given by equation (15) we find that membership in the World Trade Organization, the population of both members of the dyad, higher quality of labor as measured by the percentage of school enrollment and better infrastructure measured by telephone mainlines per 1,000 people will lead to more FDI. However, the size of the market as represented by GDP and the gross capital formation for the dyad has no significant effects in inducing FDI.

### **FDI and Trade: Are They Comparable In Predicting Conflict?**

The above results confirm that FDI and dyadic political relations are mutually related. But whether FDI can have the similar role as trade is not obvious. The best way to answer this question is to compare the coefficients or elasticity of FDI and trade with respect to the political relationship variable (*Total*) in a similar context. Past literature may provide us with a quick comparison. A closely estimated comparison is the 0.005 coefficient for trade and up to 0.36 for trade-net conflict elasticity from Polachek's 1980 article where he accounts for causality.<sup>3</sup> The results in Table 3 indicate that FDI has a comparable effect to trade on influencing political interdependence. Actually, it has a greater coefficient of 0.14 and an elasticity of 0.311.

Of course, comparison between measurements based on two different time periods may miss time effects which the estimated coefficients may capture. In

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<sup>3</sup> He estimated the coefficients for trade and conflict using late 1950s to late 1960s' data using COBDAB, an event data set comparable to the VRA to measure net conflict. However, he separated imports and exports with the 0.005 coefficient being the average of the two. If total trade is used, we should expect a slightly smaller coefficient.

considering this, the estimates from the same time period and sample will be much more convincing. In Table 4 such an estimate is provided. For convenience and comparison purposes as well, we set up the model almost the same to that used for the FDI and interdependence relationship. The differences are in the trade equation where we account for population by estimating GDP on a per capita basis instead of separating it into the GDP and population of the countries. Again, we report the results for imports in the text and leave those for exports to the Appendix.

Of particular interest is the coefficient for imports, 0.003, which is similar as the 0.005 coefficient obtained in Polachek's 1980 paper, although it is smaller. The same explanation will apply here: For every one million US dollar increase in trade for a dyad pair, on average net conflict will be reduced by 0.003 units or net cooperation will increase 0.003 units between the dyad. We also estimate the elasticity for trade with respect to total as:

$$\text{Elasticity} = \frac{\partial \text{Total}}{\partial \text{Im port}} * \frac{\text{mean Im port}}{\text{mean Total}} = .003 * \frac{3979.952}{15.540} = 0.768$$

The results indicate that a 1% increase in imports will on average lead to a 0.768% increase in net cooperation or net conflict will decrease by 0.768%.

In this simultaneous equation system, *Total* also has a strong positive impact both on imports and exports which is not found in Polachek's 1997 paper.<sup>4</sup> For every unit increase in net cooperation between the dyad, on average trade between them will increase by 214.1 million U.S dollars. As for the elasticity, a 1% increase in net cooperation will result in a 0.836% increase in trade between the dyad:

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<sup>4</sup> In his 1997 paper, the sign for 'Total' with respect to trade is indeterminate.

$$\text{Elasticity} = \frac{\partial \text{Im port}}{\partial \text{Total}} * \frac{\text{meanTotal}}{\text{mean Im port}} = 214.122 * \frac{15.540}{3979.952} = 0.836.$$

Our empirical results indicate that trade and FDI have a very similar role in promoting peace and reducing conflict especially when the elasticity is considered. The effects of their attributes are very close as well. Overall, we find that FDI can actually perform the role that trade did over a different time period.

## **6. FDI and Trade: Are They Complementary?**

In the previous section, we showed empirically that FDI can increase net cooperation and therefore promote peace in a similar manner as trade. But a natural question might arise: Do FDI and trade augment each other in bringing about more net cooperation, or do they work against each other? This question is important because if they work against each other, the total economic influence on world interdependence or globalization, as well as world peace is constrained. If both FDI and trade complement each other, then their joint effect will promote interdependence and consequently, conflict is expected to be reduced at a faster pace.

In order to test this relationship, we perform a single OLS taking FDI and trade as the independent variables at the same time. The reason we do not set up a simultaneous system taking FDI and trade both as the endogenous variables is because they are closely related and the variables in the equations will be hard to identify. The results are reported in Table 5. From this table, we can see that FDI and trade indeed complement each other. They both increase net cooperation at the same time. To see the combined effect, we compute the elasticity of both:

$$\text{Elasticity} = \frac{\partial \text{Total}}{\partial \text{Trade}} * \frac{\text{meanTrade}}{\text{meanTotal}} = .001 * \frac{8335.687}{15.786} = 0.528$$

$$\text{Elasticity} = \frac{\partial \text{Total}}{\partial \text{Inflow}} * \frac{\text{meanInflow}}{\text{meanTotal}} = .004 * \frac{357.238}{15.786} = 0.091$$

and the sum of them is  $0.528 + 0.091 = 0.62$ . We interpret this sum to be that a 1% increase in both trade and FDI increases net cooperation by 0.62%. This elasticity is expected to increase if we adjusted for causality.

## 7. Conclusion

This paper extends the analysis of the conflict-trade relationship by introducing foreign direct investment. Furthermore, whereas most current analysis of the conflict-trade relationship examines historical data either using COW, MIDS, or COPDAB, we employ the VRA data with information for the 1990s. We justify using events data because events data contain both information on conflict as well as cooperation. Our empirical results show that foreign direct investment plays a similar role in affecting international interactions. More specifically, we find that the flow of FDI has reduced the degree of international conflict and encouraged cooperation between dyads during the period of the late 1980 and the decade of the 90s. This is an especially important result since one of the main characteristics of globalization has been the reduction of barriers that has led to large increases in international capital flows. We also find that trade and FDI complement each other in reducing conflict. The policy implication of our finding is that further international cooperation in reducing barriers to both trade and capital flows can promote a more peaceful world.

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Table1: Goldstein Scale

Gold	IDEA	Definition	Gold	IDEA	Definition
8.3	072	extend military aid	-2.8	12	Accuse
7.6	074	rally support	-3	161	warn
7.6	073	extend humanitarian aid	-3	16	warn
7.4	071	extend economic aid	-3.4	122	denounce or denigrate
6.5	081	make substantial agreement	-3.8	194	halt negotiations
5.4	064	improve relations	-4	1134	break law
5.2	0523	promise humanitarian support	-4	1132	disclose information
5.2	0522	promise military support	-4	1131	political flight
5.2	0521	promise economic support	-4	113	defy norms
5.2	052	promise material support	-4	1123	veto
4.8	083	collaborate	-4	1122	cancel media
4.8	08	agree	-4	1121	impose curfew
4.7	05	promise	-4	112	refuse to allow
4.5	051	promise policy or non-material support	-4	111	reject proposal
3.5	0432	forgive	-4	11	reject
3.5	04	endorse or approve	-4.4	2122	political arrest and detention
3.4	093	ask for material aid	-4.4	2121	criminal arrest and detention
3.4	092	solicit support	-4.4	212	arrest and detention
3.4	043	empathize	-4.4	171	non-specific threats
3.4	041	praise	-4.5	1963	administrative sanctions
3	082	agree or accept	-4.5	1961	strike
2.9	065	ease sanctions	-4.5	196	strikes and boycotts
2.8	054	assure	-4.5	19	sanction
2.8	033	host meeting	-4.9	151	demand
2.5	062	extend invitation	-4.9	15	demand
2.2	0655	relax curfew	-5	201	expel
2.2	0654	demobilize armed forces	-5	20	expel
2.2	0653	relax administrative sanction	-5.2	1813	protest defacement and art
2.2	0652	relax censorship	-5.2	1812	protest procession
2.2	0651	observe truce	-5.2	1811	protest obstruction
2.2	0632	evacuate victims	-5.2	181	protest demonstrations
2.2	063	provide shelter	-5.6	193	reduce or stop aid
2.2	06	grant	-5.8	172	sanctions threat
2.2	0431	apologize	-6.4	175	non-military force threats
2	013	acknowledge responsibility	-6.4	17	threaten
1.9	066	release or return	-6.8	2112	guerrilla seizure
1.9	032	travel to meet	-6.8	2111	police seizure
1.6	0933	ask for humanitarian aid	-6.8	21	seize
1.6	0932	ask for military aid	-6.9	183	control crowds
1.6	0931	ask for economic aid	-6.9	1814	protest altruism
1.6	09	request	-6.9	18	protest
1.5	1011	offer peace proposal	-6.9	174	give ultimatum
1.5	101	peace proposal	-7	2231	military clash
1.5	03	consult	-7	195	break relations
1.2	102	call for action	-7	1734	threaten military war
1.1	01	yield	-7	1733	threaten military occupation
1	031	discussions	-7	1732	threaten military blockade
0.8	10	propose	-7	1731	threaten military attack
0.6	012	yield position	-7	173	military force threat
0.6	011	yield to order	-7.6	1827	military border violation
0.1	091	ask for information	-7.6	1826	military border fortification
0.1	024	optimistic comment	-7.6	1825	military mobilization
0	99	sports contest	-7.6	1824	military troops display
0	98	A and E performance	-7.6	1823	military naval display
0	97	accident	-7.6	1821	military alert
0	96	natural disaster	-7.6	182	military demonstration
0	95	human death	-8.3	224	riot or political turmoil
0	94	human illness	-8.7	221	bombings
0	72	animal death	-9.2	2236	military seizure
0	27	economic status	-9.2	2123	abduction
0	26	adjust	-9.2	211	seize possession
0	25	vote	-9.6	2228	assassination
0	24	adjudicate	-9.6	2227	guerrilla assault
0	2321	government default on payments	-9.6	2226	paramilitary assault
0	2312	private transactions	-9.6	2225	torture
0	2311	government transactions	-9.6	2224	sexual assault
0	231	transactions	-9.6	2223	bodily punishment
0	23	economic activity	-9.6	2222	shooting
-0.1	094	ask for protection	-9.6	2221	beatings
-0.1	022	pessimistic comment	-9.6	222	physical assault
-0.1	021	decline comment	-9.6	22	force
-0.1	02	comment	-10	2237	biological weapons use
-0.9	141	deny responsibility	-10	2235	assault
-1	14	deny	-10	2234	military occupation
-1.1	0631	grant asylum	-10	2233	coups and mutinies
-2.2	192	reduce routine activity	-10	2232	military raid
-2.2	121	criticize or blame	-10	223	military engagements
-2.4	132	formally complain			
-2.4	131	informally complain			
-2.4	13	complain			

Table 2: Summary Statistics

<b>Variable</b>	<b>Number of Observations</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
<b>FDI Inflow (In Millions)</b>	5449	370.3692	2198.749	-4439.439	99362.37
<b>FDI Outflow (In Millions)</b>	5365	435.9184	2456.108	-2514.127	105651
<b>FDI (In Millions)</b>	4530	915.3345	4449.512	-3259.342	136056.5
<b>Import (In Millions)</b>	6284	3979.952	11156.46	0	181711.6
<b>Export (In Millions)</b>	6284	3915.989	11353.07	0	190296.4
<b>Trade (In Millions)</b>	6284	7895.941	22048.06	0	330788.6
<b>Total (Net Cooperation)</b>	6284	15.54036	47.00418	-179.6	861.1
<b>GDP Actor (In Millions)</b>	6284	1129349	1936794	503.6674	8484402
<b>GDP Target (In Millions)</b>	6284	1093643	1913315	503.6674	8694336
<b>Total Population Actor (In Thousands)</b>	6284	94716.93	211500.9	1422	1266838
<b>Total Population Target (In Thousands)</b>	6284	97576.14	216948.8	1422	1266838
<b>GDP Per Capita Actor (In Thousands)</b>	6284	18.17114	11.56651	.0513841	43.63908
<b>GDP Per Capita Target (In Thousands)</b>	6284	17.10487	11.68497	.0513841	43.63908
<b>Telephone mainlines Actor (Per 1,000 People)</b>	6284	398.2965	202.1086	5.9	745.5634
<b>Telephone mainlines Target (Per 1,000 People)</b>	6284	384.5038	206.1911	5.9	745.5634
<b>School Enrollment, Primary Actor</b>	6284	104.175	8.740926	54.7984	165.9567
<b>School Enrollment, Primary Target</b>	6284	103.9344	8.8735	54.7984	165.9567
<b>School Enrollment, Secondary Actor</b>	6284	98.88845	27.08365	30.09889	160.11
<b>School Enrollment, Secondary Target</b>	6284	96.73133	26.77884	30.09889	160.763
<b>Gross Capital Formation Actor (% of GDP)</b>	6284	22.06183	5.599327	8.119479	43.6401
<b>Gross Capital Formation Target (% of GDP)</b>	6284	22.211	5.656464	8.119479	43.6401
<b>Power Ratio</b>	6284	14.77485	42.88632	1.000221	591.798
<b>Joint Democracy</b>	6284	356.8811	123.9196	15	441
<b>Contiguity</b>	6284	.1306493	.3370432	0	1
<b>WTO</b>	6284	.888606	.3146445	0	1

Table 3: Three-Stage Least Square Estimation of FDI-Conflict Relationship-FDI Inflow

(Z-Score in parentheses)

Independent Variables	Dependent Variables	
	Total (Net cooperation)	FDI Inflow
Constant	-.260 (-0.16)	-1827.978 *** (-4.61)
FDI Inflow	.014*** (7.72)	
GDP Actor	9.03e-06*** (14.77)	-4.36e-05 (-1.35)
GDP Target	6.18e-06*** (11.05)	-3.57e-07 (-0.01)
Power Ratio	-.142*** (-8.59)	
Joint Democracy	-.014*** (-3.68)	
Contiguity	7.103*** (4.67)	
Total (Net Cooperation)		23.000*** (8.59)
WTO		128.576* (1.97)
Population Actor		3.91e-04*** (3.36)
Population Target		.001*** (4.03)
Telephone Mainlines Actor		.442** (2.75)
Telephone Mainlines Target		.357* (2.35)
School Enrollment, Primary Actor		4.169* (2.02)
School Enrollment, Primary Target		1.772 (0.83)
School Enrollment, Secondary Actor		3.231** (2.87)
School Enrollment, Secondary Target		5.873*** (4.68)
Gross Capital Formation Actor		-2.761 (-0.83)
Gross Capital Formation Target		-5.200 (-1.53)
<i>R Squared</i>	.2730	.1756
<i>N</i>	5449	5449

Note: \*\*\* p<.001; \*\* p<.01; \* p<.05.

Table 4: Three-Stage Least Square Estimation of Trade-Conflict Relationship-Import  
(Z-Score in parentheses)

Independent Variables	Dependent Variables	
	Total (Net Cooperation)	Trade Import
Constant	-2.116 (-1.80)	-7799.311 *** (-4.60)
Trade Import	.003*** (8.15)	
GDP Actor	4.73e-06*** (5.91)	
GDP Target	3.77e-06*** (5.14)	
Power Ratio	-.088*** (-5.02)	
Joint Democracy	-.008*** (-3.40)	
Contiguity	10.391** (2.73)	
Total (Net Cooperation)		214.122*** (48.51)
WTO		-18.878 (-0.09)
GDP Per Capita Actor		-37.189** (-2.99)
GDP Per Capita Target		14.564 (1.40)
Telephone Mainlines Actor		3.697*** (3.75)
Telephone Mainlines Target		2.257** (2.94)
School Enrollment, Primary Actor		15.637* (2.11)
School Enrollment, Primary Target		29.056*** (3.55)
School Enrollment, Secondary Actor		5.075 (1.50)
School Enrollment, Secondary Target		-.414 (-0.12)
Gross Capital Formation Actor		25.509* (2.07)
Gross Capital Formation Target		39.682** (2.89)
“R Squared”	0.4458	0.3561
N	6284	6284

Note: \*\*\* p<.001; \*\* p<.01; \* p<.05

Table 5: Trade, FDI Inflow and Conflict  
(T-values in parentheses)

Independent Variable	Dependent Variable
	Total (Net Cooperation)
Constant	1.226 (0.89)
Trade	.001*** (42.72)
FDI Inflow	.004*** (17.28)
GDP Actor	6.73e-06*** (26.28)
GDP Target	3.61e-06*** (14.63)
Power Ratio	-.098*** (-9.32)
Joint Democracy	-.010** (-2.78)
Contiguity	-16.367*** (-11.80)
R-squared	.5084
N	6161

Note: \*\*\* p<.001; \*\* p<.01; \* p<.05.

Appendix

Table 3A: Three-Stage Least Square Estimation of FDI-Conflict Relationship-FDI Outflow  
(Z-Score in parentheses)

Independent Variables	Dependent Variables	
	Total (Net cooperation)	FDI Outflow
Constant	-.118 (-0.07)	-2000.455*** (-4.95)
FDI Outflow	.014*** (7.35)	
GDP Actor	8.02e-06*** (12.87)	-4.93e-05 (-1.54)
GDP Target	6.24e-06*** (9.23)	9.65e-06 (0.34)
Power Ratio	-.133*** (-7.47)	
Joint Democracy	-.013*** (-3.64)	
Contiguity	7.169*** (4.77)	
Total (Net Cooperation)		27.636*** (9.70)
WTO		128.818* (2.09)
Population Actor		3.55e-04** (2.99)
Population Target		.001*** (4.07)
Telephone Mainlines Actor		.423** (2.83)
Telephone Mainlines Target		.394** (2.68)
School Enrollment, Primary Actor		-.499 (-0.25)
School Enrollment, Primary Target		6.502** (3.16)
School Enrollment, Secondary Actor		5.878*** (4.66)
School Enrollment, Secondary Target		3.795*** (3.48)
Gross Capital Formation Actor		-.356 (-0.11)
Gross Capital Formation Target		-4.027 (-1.31)
“R Squared”	0.3152	0.2282
N	5365	5365

Note: \*\*\* p<.001; \*\* p<.01; \* p<.05.

Table 4A: Three-Stage Least Square Estimation of Trade-Conflict Relationship-Export  
(Z-Score in parentheses)

Independent Variables	Dependent Variables	
	Total (Net Cooperation)	Trade Export
Constant	-1.486 (-1.10)	-8091.89 *** (-4.51)
Trade Export	.003*** (7.31)	
GDP Actor	5.04e-06*** (6.57)	
GDP Target	4.23e-06*** (4.87)	
Power Ratio	-.094*** (-5.05)	
Joint Democracy	-.011*** (-4.23)	
Contiguity	10.132* (2.24)	
Total (Net Cooperation)		202.241*** (42.74)
WTO		175.770 (0.73)
GDP Per Capita Actor		-15.435 (-1.23)
GDP Per Capita Target		-17.845 (-1.33)
Telephone Mainlines Actor		2.685** (2.79)
Telephone Mainlines Target		4.326*** (4.18)
School Enrollment, Primary Actor		16.608 (1.92)
School Enrollment, Primary Target		27.676*** (3.25)
School Enrollment, Secondary Actor		9.548* (2.47)
School Enrollment, Secondary Target		-.965 (-0.24)
Gross Capital Formation Actor		37.745* (2.47)
Gross Capital Formation Target		12.238 (0.95)
“R Squared”	0.3827	0.2968
N	6284	6284

Note: \*\*\* p<.001; \*\* p<.01; \* p<.05.