Globalization and International Conflict: Can FDI Increase Cooperation Among Nations?

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Abstract

Currently there is a small, but growing, literature extending analysis of the conflict-trade relationship by introducing foreign direct investment (FDI). We present a formal model that illustrates how FDI can improve international relations, as does trade. We then proceed to test the model empirically adopting three innovations: First, we employ unique bilateral FDI data instead of systemic FDI used in most past studies. Second, we utilize a simultaneous two-equation estimation approach to account for the fact that multinational corporations typically invest only in politically stable countries. One equation defines FDI as determined by political stability, and the other defines international interactions as a function of FDI. Third, we employ new 1990-2000 Virtual Resource Associates (VRA) events data to measure cooperation and conflict between countries. Our empirical results show that foreign direct investment plays a similar role to trade in affecting international interactions. The policy implication of our findings is that further international cooperation in reducing barriers to both trade and capital flows can promote a more peaceful world.

1. Introduction

There is an extensive literature that addresses the question of whether trade between nations leads to peaceful relations. The economic basis upon which the argument rests is a model of exchange whereby trading countries promote peace with each other in order to avoid the "opportunity costs" associated with disrupted trade arising from war. With roots at least as far back as Montesquieu (1750) and perhaps even Emeric Crucé (1623), the hypothesis was first derived in a Ricardian framework by Polachek (1980), formalized using a game theory by Polachek and Xiang (2010) and generalized by Martin et al. (2008) using a mechanism design framework leading to implications regarding trade in a multilateral setting. Others that examine the trade-conflict relationship in a multilateral context include Polachek et al. (1999), Dorussen (1999, 2006, 2010), Hegre (2002) and Polachek (2003).

In contrast to this approach, some political theorists reach a different conclusion. For example, Morrow (1999) argues that trade and conflict are unrelated: if disputes are based on contested resources (e.g., territory) then conflict arises independent of trade. Others (e.g., Gartzke, Li and Boehmer (2001) argue that trade signals resolve. In this case, trade decreases high order conflict such as wars but has no effect on low order conflict, such as militarized interstate disputes (MIDS). Finally Marxist based theorists (e.g., Barbieri, 2002) argue that trade emanates from an oppressor nation exploiting a weaker oppressed nation. In this circumstance, the colonial country achieves all the trade gains, while the other actually suffers an economic loss. In this case, negative trade gains could lead to conflict because there are no potential trade gains to protect. Although these

notions that trade and conflict might be related 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 for a review of the literature). Even though there is still some debate, the preponderance of the evidence shows that trade reduces interstate conflict.[1]

Of late, trade interdependence has grown exponentially. Not only has trade expanded, but capital flows increased many fold (Navaretti and Venables, 2004). For example, Figure 1 plots foreign direct investment (FDI) showing its rapid growth in the 1980s and 1990s, and implying the possibility that it too might have become a major force fostering pacific relations. 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 theorists, such as Frank (1967). 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 MNCs 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 empirically we should expect that there exists some correlation between the direct investments of multinationals and the foreign policy of their home countries because, as will be explained, home countries often benefit from these investments. Conversely, if multinationals are independent actors in the international system and their

increasing importance has 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, in particular international conflict.

Empirical research exploring the pacifying effects of capital flows is limited. However, a number of recent articles utilize a rigorous statistical framework to analyze how FDI relates to conflict between countries. Perhaps the first to systematically study foreign direct investment and conflict was Gasiorowski (1986). He embedded monadic measures of 1960-1964 long-term and short-term capital flows relative to GNP into a conflict-trade regression framework. He found a weak positive relationship between FDI and conflict. But the analysis utilized FDI values for the 1960-1964 period, whereas the conflict variable encompassed 1960-1977. In contrast to Gasiorowski who uses COPDAB data to measure conflict, Gartzke et al. (2001) used MIDS data. They found that nations with larger FDI flows engage in fewer MIDS. They argued this result supports a game-theoretic model in which nations signal their resolve through interdependence. More recently Lee (2005) applied the opportunity cost model by essentially replicating Gartzke et al.'s empirical work using newer data through 2000.

One problem with each of these studies is they used monadic FDI data. Using such data is problematic because with monadic data one cannot differentiate how FDI can cause a given country to have both cooperative and hostile relations at the same time. For example, the US invests $30 billion in England and virtually zero dollars in Cuba. But one cannot discern any effect of FDI on US conflict initiation if the same US FDI value is reported for both the US-England and the US-Cuba dyads. If this is the case,

then it is hard to see how the coefficient of this variable can detect differences in US initiation across countries. Rosecrance and Thompson (2003) have the same criticism, stating "all previous studies have looked at systematic factors, not particular FDI relationships and their effect on conflict between the countries doing and receiving the investing" (Rosecrance and Thompson, 2003, p. 389). However, unlike this study which utilizes data covering dyadic FDI flows of between 70 OECD and non-OECD countries, they utilize dyadic FDI flows only for the US.

Another problem is simultaneity. The considerable growth in FDI over the last thirty years has led to a now vast economics and political science literature on the determinants of FDI. One of the most significant determinants of FDI is the host country's political stability. If regimes are unstable and countries war torn, why invest? (Rosecrance and Thompson 2003:383). In fact, there are a series of private firms that provide international country risk guides for businesses such as the PRS Group and BERI, SA. As such, causality is especially important. Lee (2005:7) notes "countries are frequently asked to provide the environments for multinational corporations to make profits by direct investment." This is supported by Tarzi (1991) who claims~~states~~ "that states need to provide MNCs with political stability." Gartzke, et. al claim "since capital markets dwarf the exchange of goods and services, firms should weigh the risks of investment much more heavily than trade" because "foreign production facilities are vulnerable to nationalization in a way that trade is not" (p. 395). This means that foreign investment more so than trade is dependent on political stability. Perhaps Gartzke et al. summarize this best (page 402) by stating "to the degree that states rely on capital markets for prosperity, they also rely on political stability."

Because conflict and cooperation potentially affect a multinational's investment behavior and hence foreign direct investment, it makes sense to explore whether FDI is dependent on political interactions. As such, one should treat FDI as an endogenous variable within a simultaneous equations system. This means that FDI is dependent on political relations, or in short, FDI is endogenous, not exogenous. Failing to model how FDI is dependent on political relations means that past models suffer from simultaneous equations bias.

The aim of this paper is to address these two issues as well as utilize updated conflict and cooperation measures, and in the process extend our previous paper (Polachek, Seiglie, and Xiang, 2007) using updated data. First, we employ unique *bilateral* FDI data. The dyadic FDI flows were obtained by collecting all direct investment inflows and outflows where at least one of the countries in the dyad was a member of the OECD. Second, we devise a simultaneous equations system, one defining FDI as determined by political stability and other variables; and the other defining conflict as a function of FDI and other variables. Third, to estimate these equations, we merge our bilateral FDI data with new (1990-2000) dyadic events data on conflict and cooperation produced by Virtual Research Associates (VRA). To these, we add Correlates of War (COW) data, as well as data on other country attributes. With these we use three-stage least-squares to statistically test whether *dyadic* FDI flows affect conflict and cooperation between nations, holding other variables constant. In addition, by replicating the econometric specification using trade instead of FDI data we compare the importance of each (i.e. FDI and trade) in affecting international conflict and cooperation during more recent times. With regard to FDI, we find a 10% increase in FDI is

associated with an increase in net cooperation of 3.3%. Given the rapid rise of FDI over the last few decades this result is especially important.

The paper is organized as follows. The next section provides additional motivation for analyzing the effects of capital flows on international conflict. The formal model of FDI and international relations is presented in Section 3. Section 4 discusses the data used and Section 5 contains the empirical estimates for the FDI-conflict relationship. In Section 6 we compare these estimates to similar estimates of the trade-conflict relationship. Finally, in Section 7 we conclude.

2. Capital Flows, Trade and Peace: Why Should They be Related?

If FDI and trade are correlated, then it is a natural extension of the trade-conflict research to examine if FDI and conflict are also related. Cursory evidence shows that intra-firm trade, i.e., trade between subsidiaries of a multinational, accounts for a fairly large share of world trade. For the US, intra-multinational corporation (MNC) trade accounts for approximately 23 percent of US merchandise exports and 17 percent of US merchandise imports (Mataloni, 1995). This implies that FDI may increase trade and therefore, may have only a marginal impact once we account for trade. Yet theoretically, FDI can be either trade creating or trade replacing and therefore, the direction of correlation between the two is unclear.

Trade creation will occur if FDI opens up new markets by generating distribution channels and marketing opportunities in the host country thereby serving to increase trade between the home and host country. In this case, sometimes referred to as the *beachhead effect*, FDI and trade are complementary strategies for penetrating a market. On the other hand, trade diversion takes place if the increase in local production from the

establishment of production facility by a MNC in another country displaces previous exports from the host countries or allows for increases in exports from the new recipient country to a third country. The empirical evidence on whether FDI increases or decreases trade is mixed (see e.g., -Blonigen, 2001).

In one of the earliest works, Mundell (1957) showed that trade and capital flows can be negatively interrelated. In his analysis, a country can increase the flow of capital into her economy by imposing a tariff on a capital-intensive good that is being imported. The resulting domestic increase in the capital-intensive good's price leads to an increase in the return to capital relative to labor in the country (the Stolper-Samuelson theorem). As a result, a relatively larger amount of foreign capital will flow into the host country because it is attracted by the higher return than those being offered in the home country. Even though, due to the tariff, imports of the capital-intensive good decline leading to an improved balance of trade, there is now an inflow of capital that shows up as a surplus in the capital account (increase in foreign direct investment). This situation has been observed in the US when the government proposed voluntary export restraints (VER) by the Japanese automobile industry to reduce imports into the US. Yet, as a consequence it became profitable for Japanese auto firms to establish assembly plants in the US (an increase of Japanese FDI). Therefore, the impact that a 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.

Capital flows between countries can be of two types: portfolio investments and direct investment. Direct investment is generally defined by the IMF and most countries to constitute a situation when at least 10 percent ownership of a foreign business

enterprise is acquired by a resident of the host country. Ownership of 10 percent or more is considered evidence of a lasting interest in or a degree of influence over management of the foreign enterprise. Therefore, whether a US corporation sets up a new manufacturing facility in a host country or whether it acquires a foreign firm's manufacturing facility, both are recorded as FDI. Any foreign investment that is not direct investment is regarded as portfolio investment. At this juncture a point should be made regarding intra-firm trade and FDI. If a US corporation establishes a subsidiary in Mexico at time T, then it is recorded as direct investment in that year. It is a flow of capital between the two countries at time T. If the US corporation does not invest any more capital afterwards, then direct investment between the two countries becomes zero in subsequent years, i.e., the stock of FDI remains unchanged from what it was at time T. Yet, the effects of trade flows persist beyond period T. For example, suppose the Mexican subsidiary begins to import parts from the US parent to assemble in Mexico. Then trade between Mexico and the US in subsequent years will be recorded at higher levels even though FDI is zero during this same period.

Consequently, a complementary study to the trade-conflict relationship should analyze the relationship between capital flows in the balance of payments and conflict (Fieleke, 1996). Since only data for foreign direct investment are available at the dyadic level, and since direct ownership of a foreign enterprise implies a transfer of sovereignty, and finally since we wish to empirically explore the arguments presented in the MNC-State literature, we concentrate only on the impact of FDI on conflict, but also consider trade in the empirical work.

3. The Model

In this paper, 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 MNC's home or host country's governments initiate conflict and if as a result direct investment decreases and associated returns confiscated, then many of the gains from FDI are lost. We argue that in order to protect these gains, both home and host 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. It can also lead to multinationals potentially having a high degree of influence on the policies adopted by the government of the home country in order to protect their investments.

Host countries also obtain benefits from FDI. 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 training to their workers resulting in increased worker productivity that could be beneficial to local firms if these workers switch employers later on. In addition to these spillovers, multinationals make purchases from local companies and provide intermediate inputs at a

lower cost to host country manufacturing plants. They also contribute to host countries' fiscal revenues through corporate taxes. In contrast to short term portfolio inflows which through its effects on currency value could destabilize the host country economy, the long-term nature of FDI makes the economy more stable and more productive.[2] 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 the opportunity cost argument describing why the governments of trading partners try to maintain a peaceful relationship with each other.

Some game theoretic models reach a similar conclusion that interdependence reduces conflict. Instead of motivating cooperation by the opportunity costs of conflict, they argue that nations threaten to cut interdependence as a way to signal their resolve to fight (Morrow, 1999). These models are consistent with the Ricardian-based opportunity cost approach because they require gains from trade to signal resolve. Otherwise a nation's threats are empty "cheap talk". Further, unlike what Gartzke et al. (2001) claim, they do not disprove, but instead complement, the opportunity cost approach (Polachek and Xiang, 2010).

A careful examination of FDI may yield stronger reasons why FDI may reduce interstate conflict compared to trade. Foreign direct investment has certain attributes that trade does not possess. In particular, 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. So, 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.

Underlying the formal model is our assumption depicting governments as seeking to maximize citizen well-being within the country. Whereas we believe corporate lobbyists (including MNCs) or other pressure groups may influence policy makers, ultimately according to median voter models, the majority's wellbeing keeps democratic politicians in power (Downs, 1957), and similarly, citizen-wellbeing decreases revolutionary tendencies in autocratic regimes (Geddes, 1999). Furthermore, citizens are the shareholders of MNCs and therefore, policies which adversely affect the bottom line of these companies will be reflected in either lower dividend payments or a reduction in the company's stock price. Therefore, the citizens of a country will oppose such policies if there are no offsetting benefits.

We take a country's aggregate production (i.e., its GDP) to represent a measure (albeit a materialistic measure) of citizen wellbeing. A country's welfare depends on

factor endowments, as well as on concessions a country can obtain through threats or conquest on the one hand, and international commerce on the other. For the sake of the formal theory we concentrate on FDI, although trade can be broadly defined to include exchange of produced goods, short run financial transactions, as well as FDI. A country's production depends on its resources, basically labor and capital, and the benefits it achieves from its share of foreign direct investment. Holding constant financial and other considerations, FDI is dependent on political stability. This implies for example, that military threats might not pay off because such threats decrease international political stability which in turn deters FDI by reducing its economic returns through confiscation. Thus conflict, in that it leads to concessions from the target is beneficial because it brings in new resources, but it is also costly because it leads to less overall FDI (and trade). The model developed assumes that a country's leadership maximizes citizen wellbeing by choosing an "optimal" conflict/cooperation level to balance perceived costs and benefits. The results indicate that on balance, countries with greater FDI choose less conflict, while countries with smaller FDI choose greater amounts of conflict.

We derive a formal two-stage optimization~~game~~ to illustrate these propositions regarding FDI and conflict. First, we assume that the host country has an established foreign capital "confiscation" policy in response to aggression based on its past foreign relations experiences, and that the home country knows the host's confiscation policy with complete certainty. Second, the home country simultaneously decides both how to allocate its investment portfolio between home k_1 and the foreign host country k_2 and how much conflict/cooperation Z it engages in, given its knowledge of the host country's

response. For simplicity, we assume a country operating in a one-period context, which we denote as the "home" country with social welfare function

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

where C denotes consumption and Z denotes the intensity of conflict or cooperation that the home country generates~~d~~ towards a foreign country, which we later will define as the "host" country. We define Z such that a greater positive-valued Z represents more intense conflict and a lower ~~negative~~ valued Z greater cooperation with the other country. It should be pointed out that although we assume that welfare is increasing in Z, the level of conflict can be viewed as a derived demand where the underlying motive for it is to be able to redistribute wealth either voluntarily or involuntarily through the threat or actual use of force. Therefore, greater conflict can achieve to acquiescence of other countries to the demands of the aggressor.

The home country has a given labor force, l, that we normalize to one. We assume a representative multinational firm which at the beginning of the period, the firm has an amount of capital *k* that can be allocated to production at home, k_1, or in a foreign(host) country which we denote by k_2. Therefore,

$$k_1 = k - k_2 \tag{2}$$

The investments generate returns of R_1 and R_2 respectively, which due to diminishing returns, depend inversely on the amount invested. 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 Ω in the home country and Ω^* in the host country. More specifically,

$$R_1 = R_1\left(k_1, \Omega\right) = R_1\left(k - k_2, \Omega\right) \tag{3}$$

$$R_2 = R_2\left(k_2, \Omega^*\right) \tag{4}$$

with

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

Denoting the wage rate by w, implies an income, *y*, such that

$$y = w + R_1 k_1 + \left(1 - \tau\right) R_2 k_2, \tag{5}$$

where τ is the "confiscation rate" on the multinational's income (profits) imposed by the host country. This is meant to capture such events as when foreign governments only allow a partial repatriation of profits (1-τ), or the case where there is expropriation without compensation (τ=1) or other types of policies that reduce the profitability of the MNC such as corporate taxes. In other words, poor international relations makes for greater regulatory restrictions and other such policies aimed at foreign investors. Therefore, $\tau = \tau\left(Z\right)$ with $\partial\tau/\partial Z > 0$, so that conflict initiated by the home country reduces the net- return on capital generated in the host country. Note, also, we allow for the home country wage rate to increase with 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:

$$C + Z = w + R_1 k_1 + (1-\tau) R_2 k_2 . \quad (6)$$

The timing of the problem~~game~~ is as follows. First, we assume that the host country has an established foreign capital "confiscation" policy in response to aggression based on its past foreign relations experiences. We assume the home country knows the host's confiscation policy (τ(Z)) with complete certainty. Second, the home country simultaneously decides both how to allocate its investment portfolio between home (k_1) and the foreign host country (k_2), and how much conflict/cooperation (Z) it engages in. In order to solve the model~~game~~, we use backward induction. This means the home country chooses values of (k_1, k_2), and Z, given τ(Z), and its already established knowledge of returns $R_1(k_1, \Omega)$ *and* $R_2(k_2, \Omega^*)$. Substituting (3) and (4) into (6), and solving out for C and substituting it into the home country's utility function, the problem for the home country is to maximize equation (1) namely,

$$\underset{k_2, Z}{Max}\ U = U\left(w + R_1(k - k_2) + (1-\tau) R_2 k_2 - Z, Z\right) \quad (7)$$

The first-order conditions for this problem are:

$$\frac{\partial U}{\partial C}\left(-\frac{\partial \tau}{\partial Z} R_2 k_2 - 1\right) + \frac{\partial U}{\partial Z} = 0 \quad (8)$$

$$\frac{\partial U}{\partial C}\left\{(1-\tau)\frac{\partial R_2}{\partial k_2}k_2-\frac{\partial w}{\partial k_1}-\frac{\partial R_1}{\partial k_1}(k-k_2)-R_1+(1-\tau)R_2\right\}=0 \qquad (9)$$

implying

$$\frac{\partial U}{\partial Z}=\frac{\partial U}{\partial C}+\frac{\partial U}{\partial C}\frac{\partial \tau}{\partial Z}R_2k_2 \qquad (10)$$

$$\frac{\partial w}{\partial k_1}+R_1-(1-\tau)\frac{\partial R_2}{\partial k_2}k_2=(1-\tau)R_2-\frac{\partial R_1}{\partial k_1}(k-k_2) \qquad (11)$$

the home country's optimality condition for optimal aggression towards the host (10) and the home country's optimality condition for optimal foreign direct investment (11).

Condition (10) states that the 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. The cost on the right-hand side is composed of two term: the first is the direct resource cost that an additional unit of Z has for the country as it must forgo a unit of the consumption good, $\partial U/\partial C$, in order to free up the resources to engage in conflict. The second term is the indirect cost that is imposed on the home country's citizens who are shareholders of the MNC which has investments in the host country. This latter term captures the reduction in the

shareholders' net of tax return on each unit of investment of $\frac{\partial \tau}{\partial Z} R_2 k_2$ resulting from the deterioration of relations that yields a total loss in utility from the decline in consumption of $\frac{\partial U}{\partial C}\frac{\partial \tau}{\partial Z} R_2 k_2$. Note that as compared to the situation of no FDI $(k_2 = 0)$, the marginal cost for the home country 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) must be smaller when FDI exists $(k_2 > 0)$.

Condition (11) states that foreign direct investment is determined by equating the marginal gains (right hand side of the equation) with the marginal cost (left hand side). Here the marginal gain is composed of two parts. First, the extra net of tax revenue per unit of FDI $\left((1-\tau)R_2\right)$; and second, the gain in home country revenue per unit investment from investing less at home, which simply reflect small changes in investment returns at home caused by diminishing returns $\left(\frac{\partial R_1}{\partial k_1}(k - k_2)\right)$. FDI's marginal cost is composed of three parts. First, the direct costs of each FDI unit (R_1); second, the foregone increase in domestic wages due to less home investment $\left(\frac{\partial w}{\partial k_1}\right)$; and third, the lower returns per unit FDI in the host country reflecting diminishing returns due to increased investment there $((1-\tau)\frac{\partial R_2}{\partial k_2} k_2)$.

Totally differentiating equation (10) illustrates that increases in capital flows reduces conflict.

$$\left(\frac{\partial^2 U}{\partial Z \partial C}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial Z^2}-\left(\frac{\partial \tau}{\partial Z}R_2 k_2+1\right)\left(\frac{\partial^2 U}{\partial C^2}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial C \partial Z}\right)-\frac{\partial U}{\partial C}\frac{\partial^2 \tau}{\partial Z^2}R_2 k_2\right)dZ+$$
$$\left(\frac{\partial^2 U}{\partial Z \partial C}\frac{\partial C}{\partial k_2}-\frac{\partial^2 U}{\partial C^2}\frac{\partial C}{\partial k_2}\left(\frac{\partial \tau}{\partial Z}R_2 k_2+1\right)-\frac{\partial U}{\partial C}\frac{\partial \tau}{\partial Z}R_2\right)dk_2=0$$

or

$$\frac{dZ}{dk_2}=\frac{\left(\frac{\partial^2 U}{\partial C^2}\frac{\partial C}{\partial k_2}\left(\frac{\partial \tau}{\partial Z}R_2 k_2+1\right)+\frac{\partial U}{\partial C}\frac{\partial \tau}{\partial Z}R_2-\frac{\partial^2 U}{\partial Z \partial C}\frac{\partial C}{\partial k_2}\right)}{\left(\frac{\partial^2 U}{\partial Z \partial C}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial Z^2}-\left(\frac{\partial \tau}{\partial Z}R_2 k_2+1\right)\left(\frac{\partial^2 U}{\partial C^2}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial C \partial Z}\right)-\frac{\partial U}{\partial C}\frac{\partial^2 \tau}{\partial Z^2}R_2 k_2\right)} \quad (12)$$

Note that the denominator of (12) is negative by the second-order condition for a maximum. As for the numerator, $\frac{\partial C}{\partial k_2}=0$ because $\frac{\partial U}{\partial C}\neq 0$ from (9), so that (12) reduces to

$$\frac{dZ}{dk_2}=\frac{\frac{\partial U}{\partial C}\frac{\partial \tau}{\partial Z}R_2}{\left(\frac{\partial^2 U}{\partial Z \partial C}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial Z^2}-\left(\frac{\partial \tau}{\partial Z}R_2 k_2+1\right)\left(\frac{\partial^2 U}{\partial C^2}\frac{\partial C}{\partial Z}+\frac{\partial^2 U}{\partial C \partial Z}\right)-\frac{\partial U}{\partial C}\frac{\partial^2 \tau}{\partial Z^2}R_2 k_2\right)}<0 \quad (12')$$

implying lower conflict as FDI increases.

Totally differentiating (11) illustrates that higher conflict (Z) for the most part decreases FDI. Here,

$$\left[-\frac{\partial \tau}{\partial Z}\left(\frac{\partial R_2}{\partial k_2}k_2+R_2\right)\right]dZ+\left[\frac{\partial^2 w}{\partial k_1^2}+\frac{\partial^2 R_1}{\partial k_1^2}(k-k_2)+2\frac{\partial R_1}{\partial k_1}+(1-\tau)\left(\frac{\partial^2 R_2}{\partial k_1^2}k_2+2\frac{\partial R_2}{\partial k_2}\right)\right]dk_2=0$$

$$\frac{dk_2}{dZ} = \frac{\left[\frac{\partial \tau}{\partial Z}\left(\frac{\partial R_2}{\partial k_2}k_2 + R_2\right)\right]}{\left[\frac{\partial^2 w}{\partial k_1^2} + \frac{\partial^2 R_1}{\partial k_1^2}(k - k_2) + 2\frac{\partial R_1}{\partial k_1} + (1-\tau)\left(\frac{\partial^2 R_2}{\partial k_1^2}k_2 + 2\frac{\partial R_2}{\partial k_2}\right)\right]} \tag{13}$$

the denominator is negative by 2nd order condition. So $\frac{dk_2}{dZ} < 0$ as long as

$\left(\frac{\partial R_2}{\partial k_2}k_2 + R_2\right) > 0$. Thus, a higher Z decreases the marginal gain from investing in a foreign country and thus decreases k_2, unless the decrease in k_2 dramatically increases the returns to investment in the foreign country, which is highly unlikely.

Finally, solving equations (10) and (11) yields

$$Z = Z\left(k_2, H, k, \Omega, \Omega^*\right) \tag{14}$$

$$k_2 = k_2\left(Z, H, k, \Omega, \Omega^*\right) \tag{15}$$

These represent a two-equation system in which the levels of actor conflict is a function of FDI, and other factors reflecting public infrastructure, Ω and the countries' population, including human capital H in (14) and the level of FDI is a function of conflict and the other exogenous factors already mentioned in (15).

We estimate (14) and (15) simultaneously by three-stage least-squares.

In summary, the citizen shareholders of firms allocate their capital between purchasing shares of firms that invest domestically and those that invest abroad in order to achieve maximum returns on their investments. These individuals are assumed to have

perfect information. As a result, there is no scope for signaling on the part of actors~~the players~~, nor is signaling necessary to achieve our results. The government can affect these decisions imposing capital restrictions including confiscation, thereby reducing the attractiveness of the returns from investing abroad. The state is responsive to the well-being of their citizens. Therefore, reductions in the returns to shareholders are met with dissatisfaction on the part of the citizens and they in turn oppose politicians which enact such positions.

Yet citizens also care about issues that do not impact on their pocketbook directly. They may support the condemnation of human rights abuse, a reduction in immigration visa allotments, the rupturing of diplomatic relations because of voting irregularities and a myriad of other issues that are not contested since they are non-rivalrous. Similarly they may support cultural exchanges, the easing of travel restrictions and other such cooperative measures. We assume the state must balance these interests with those that are interdependence related.

The formal theory leads to a two-equation estimation model. One equation specifies conflict as a function of FDI, holding other factors reflecting public infrastructure constant. The infrastructure variables include source and target country attributes, GDP to get at the size of each economy, as well as the power ratio, joint democracy and contiguity variables which now are used in typical specifications (Russett and Oneal, 2001). The other equation specifies FDI as a function of conflict holding financial variables (the source and target country's gross capital formation) and other economic attributes such as level of development (population and telephones lines) and workforce human capital (primary and secondary school enrollments) constant.[3]

The specification is as follows:

$$Z_{stj} = \alpha_0 + \alpha_1 k_{stj} + \alpha_2 A_{stj} + \alpha_3 A^*_{sjt} + \varepsilon_{1_{sjt}} \quad (16)$$

$$k_{stj} = \beta_0 + \beta_1 Z_{stj} + \beta_2 B_{stj} + \beta_3 B^*_{sjt} + \varepsilon_{2_{sjt}} \quad (17)$$

where Z_{stj} represents conflict from source (s) to target (t) in year (j), k_{stj} represents FDI flow from source to target in year j, and A_{stj} , A^*_{stj} , B_{stj} , and B^*_{stj} are vectors of the exogenous source and target country political and developmental attributes just mentioned above (GDP, power ratio, joint democracy, contiguity, population, telephone lines, school enrollments and capital formation) in each year.[4] Finally, ε_1 and ε_2 are random errors assumed to be normally distributed.

It implies that the above specification omits the control of dyad-specific effects on conflict and FDI flow. Although it is possible to include the fixed effects in the regression, there are a number of obvious limitations. First, the time period employed in this study is relatively short (i.e., 1990-2000). As a result, the data do not allow sufficient within dyad variations in FDI inflow and conflict. On the other hand, our substantive variables are able to capture a great deal of variations across dyads. In addition, there are a great amount of missing values in the dataset. This problem leaves many dyads in the regression with only a few observations. That being said, future research can explore the use of fixed effects models to test the interplay of FDI and conflict when a longer time period is available.

In the next section we discuss in more detail the specific variables used in the estimation. Following this discussion we present the econometric issues of simultaneous estimation (i.e. 3SLS) including the variables used to identify each equation.

4. The Data

Typical conflict and trade studies adopt one of two types of measures of conflict. One measure constitutes war and/or militarized interstate dispute (MID) data. The other measure constitutes events data. The underlying assumption for using war data is the absence of peace implies war. In this framework interdependence induces peace by decreasing violent militarized dispute. However, wars represent rare events because they denote a very extreme form of conflict (at least 1000 battle deaths per year in the COW data). For this reason, one must go far back in history to get enough wars for meaningful statistical analysis. But a simple comparison of wars across the various compilations of war data does not yield a uniform listing (Singer and Small, 1972: 78-79). This type of discrepancy is especially true the farther back in history one considers. Another problem is that by concentrating on wars one neglects less severe forms of hostility. For this reason, a number of studies now utilize data on less extreme events, namely militarized interstate dispute (MID) data collected by the COW project which contain almost 4000 disputes in which one or more states threaten, display or use force during the period 1816-2001.

But even these militarized dispute data comprise only a small fraction of all interstate interactions. For this reason, a second type measure constitutes *events* data. Events data correspond to bilateral interactions reported in the media. While clearly not all interactions are reported in the press, these type data have the advantage of being able to incorporate both conflictive interactions short of war as well as cooperative type political exchanges. McClelland (1999) was the first to compile events data in the 1960s.

His World Events Interaction Survey (WEIS) uses information solely from the *New York Times*. McClelland originally distinguished 22 classes and seven types of bilateral actions (Azar and Ben-Dak, 1975). Shortly thereafter, Azar (1980) classified information from almost 50 newspapers from all over the world to report on bilateral interactions of 115 countries from 1948 to 1978 in his Cooperation and Peace Data Bank (COPDAB). Finally, more recent events data have become computer driven. They use computer software to read and machine-code wire service reports, particularly Reuters. Originally developed at the University of Kansas, these data are known as the Kansas Events Data Study (KEDS). Beginning in 1992 a group of researchers headed by Doug Bond at Harvard University's Center for International Affairs joined with scholars at the University of Kansas. The Harvard team developed a protocol to classify events, which they called PANDA (Protocol for the Assessment of Nonviolent Direct Action). Subsequently, Virtual Research Associates, Inc. (VRA) was established in 1996. They later partnered with several University-based research teams to expand their original protocol. This second-generation protocol is called IDEA (Integrated Data for Events Analysis). Currently, the Harvard-MIT Virtual Data Center distributes historical events data developed by VRA for use by academic scholars. The VRA data 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).

While advantageous in many ways, events data are not devoid of problems (Kegley, 1975 and Burgess and Lawton, 1975). In this regard, a number of salient

aspects of events data are relevant. First, by their very nature, events data constitute discrete acts and hence do not measure "national goals, national interests, or the content of national policy orientations" (Kegley: 97). Second, events must be newsworthy, especially given they must be reported in the media; but as a result they don't cover "routine intersocial behavior" (Kegley: 98). Third, events are often reported multiple times. How one weights these and how one interprets the duration of these events is important. Finally, events can be misreported.

Our study uses the VRA data. Independent of the pros and cons of events data, we are forced to choose VRA data because bilateral FDI data are only available throughout the 1990s, thereby precluding utilizing war or MIDS data which in this short time period contain too few militarized disputes for meaningful results. We begin 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. For a detailed description of IDEA see Bond, et. al., (2001) and King and Lowe (2003) who compare several different coding methods. Joshua Goldstein (1992) proposed a scale to convert the IDEA code to one that matches closer to the scaling used in previous events data sets. Table 1 contains examples of events and the associated conversion scale as given by King and Lowe (2003). As can be seen from the table, negative scale values represent conflict and the positive scale values represent 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 actual scale includes 55 categories, it makes the use of a count model inappropriate. We compute the weighted sum of all events annually for each dyad (weighted by the Goldstein scale for each type of event form). Because we model conflict, we multiply the weighted sum by minus one so that a positive value implies a greater amount of conflict than cooperation within a dyad. Conversely a negative weighted sum means cooperation exceeds conflict within the dyad. Thus, for each dyad year, a positive value implies conflict outweighs cooperation, whereas a negative value implies conflict outweighs cooperation. This measure has certain advantages. First, it includes both conflict *and* cooperation so that it comprises the whole panorama of international interactions. Second, because conflict enters as a positive weight (because we multiplied the weighted sum by minus one) and cooperation as a negative weight, we are essentially defining our conflict measure to be *net* conflict, that is the degree to which severity weighted conflict exceeds cooperation. This amounts to using a "first-difference" estimation technique which eliminates selectivity biases in how events are reported (Greene, 2003) and has precedence in the literature (Polachek, 1980). Nonetheless, the first-difference technique eliminates dimensionality. For example, zero net conflict could mean no interactions at all, or many offsetting conflictive and cooperative interactions.

With the VRA data, it is possible to concentrate on broad categories of events (such as major conflict comprising the military activities in categories -8 through -10 or more minor conflict as in categories -5 and -6) much like a number of current interdependence-conflict studies that simply use war or MIDs data (Oneal and Russett, 1999). But limiting the analysis to these type broad categories omits valuable

information on the whole array of international interactions which can lead to a number of possible empirical misspecifications. For one, the number of events in each category depends on country prominence. Less prominent countries might not attract a sufficient cadre of reporters so that some events go unreported in the media. Second, using counts of particular types of conflict leads to a dependent variable bounded by zero. This would necessitate a Tobit-type regression framework to correct for the one-sided dependent variable. Third, as will be explained below, conflict and cooperation are often positively correlated, meaning that positive peace initiatives often accompany conflict, and vice versa. Not examining the difference between the two might overstate one or the other. For these reasons we feel a more useful method is to compute the severity weighted *difference* between conflict and cooperation. The weighted sum of all events for each dyad by year (weighted by the Goldstein scale for each type of event form), as described above, constitutes such a measure.

For our purposes, there are two major benefits to using the VRA data. 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. It is not confined solely to high order conflicts such as wars. Second, using the difference between conflict and cooperation (just described above) enables us to correct for a potential bias in many recent trade-conflict studies. Notably, Waltz (1979) posits that trade (and FDI) will increase *all* interactions between trading partners. These interactions include *both* cooperation as well as conflict. Omitting cooperation could underestimate the role of interdependence because it neglects interdependence's impact on cooperative activities.

The following example shows why one could obtain an erroneous result by confining oneself solely to conflict data between trading partners. Trading partners are often likely to end up with unbalanced annual trade. In the worst case, if trade imbalances last a long time, the country experiencing the trade deficit could become dissatisfied with the policies of the trade surplus country. As a result, trade related conflict might arise. The United States and China illustrate such a circumstance because China often runs a trade surplus. The long lasting US trade deficit forces it to pressure China to revaluate its currency vis-à-vis the dollar. But despite this, the US and China cooperate widely in many economic, political and social aspects. In the end, what we observe between the US and China is that trade induced cooperation dominates trade induced conflict, so the net effect of trade is to reduce conflict. For the above reason, using events data containing both conflict and cooperation is more appropriate for an analysis of how trade and FDI affect conflict. Of course, there are some disadvantages with events data. But as was mentioned above, these disadvantages have been addressed by many studies (see Kegley, 1975) and will not affect the consistency of the estimation (see Polachek, 1980).

The second major data set used for the study is FDI data comprised of 29 countries that are members of the Organization for Economic Cooperation and Development (OECD)[5] as well as their partner countries (which need not be OECD),[6] amounting to a total of 53 countries. This is the only data set that we know of that specifies *bilateral* capital flows. The time period for which these data are 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. One limitation of these data is they are

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 FDI transfers between pairs of non-OECD countries which in any case are relatively minimal.

Other data sets are used to account for differences in other characteristics of countries as implied by equations (16) and (17). There are different sources for these data. For information on GDP, we use IMF data and adjust it into US dollars as was done with the FDI data. Measurements of country military capabilities are taken from the National Material Capabilities in COW. In addition, variables on a country's infrastructure development 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. Joint democracy is defined by multiplying the dyad's two regime scores. Finally, we use the Kristian Gleditsch dyadic trade data because it contains dyadic trade for the years matching our FDI data.

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

Since one country's investment in another country may be influenced by how peaceful their relationship is, and simultaneously because peace between the two countries might be influenced by how much one country invests in the other, the formal model described earlier yielded a two-equation system depicted by equations (16) and (17). One equation examined how FDI (k_{stj}) affects conflict (Z_{stj}), and the other how conflict (Z_{stj}) affected FDI (k_{stj}). Further, we use 3-stage least squares (3SLS) to estimate equations (16) and (17). Three-stage least squares involves utilizing the

exogenous variables A_{stj}, A^*_{stj}, B_{stj}, and B^*_{stj} to estimate the endogenous variables Z_{stj} and k_{stj}, and then using generalized least squares to estimate the equation system employing the instrumented variables computed in the previous stage instead of the actual endogenous variables (Zellner and Theil, 1962).

One aspect of 3SLS is how to choose A_{stj}, A^*_{stj}, B_{stj}, and B^*_{stj} to appropriately identify each equation. To do this, variables A_{stj} and A^*_{stj} should influence Z_{stj}, but not k_{stj}; and variables B_{stj}, and B^*_{stj} should influence k_{stj}, but not Z_{stj}. We rely on current empirical studies of dyadic conflict (Russett and Oneal, 2001) as well as the current literature on FDI determinants (Froot, 1993; and Bora, 2002) to achieve this objective. Based on these analyses, we choose what are currently the most common explanatory factors used in modeling dyadic conflict. We define A_{stj} and A^*_{stj} to incorporate these variables respectively for each actor and target. As already indicated, they comprise the COW data power ratio, joint democracy, contiguity, and actor and target GDP. Because existing research shows mixed results whether conflict affects GDP, we assume GDP is exogenous in our estimation. Similarly based on the FDI literature, we choose measures of economic development, namely education, GDP per capita and gross capital formation to be exogenous variables influencing FDI. We define B_{stj}, and B^*_{stj} to depict these latter variables respectively for the actor and target countries.

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 'Conflict.' Conflict represents the ~~*net*~~ amount of conflict (i.e., the degree to which conflict exceeds cooperation) between an actor and a target country.

When positive it implies that conflict outweighs cooperation, when negative the reverse. Although we can rescale our data to make this variable non-negative (e.g., add the same positive number to each observation such that the new minimum is zero), we use the current measure because its interpretation is more straightforward. The variable FDI measures the net inflow between two countries in a specific year. Inflow is the investment a target host country receives from a source, denoted the country.

The estimated coefficients (α and β) are interpreted as measuring the marginal effects of each variable on conflict or on FDI. Because we are interested in the effect of FDI on conflict, we concentrate on α_1. Here a positive coefficient implies FDI increases conflict more than cooperation, whereas a negative coefficient implies FDI increases cooperation more than conflict, thus decreasing net conflict. Based on the formal model, we hypothesize a negative coefficient. A negative coefficient is also consistent with empirical work emanating from the conflict-trade literature.

We begin with descriptive statistics. Table 2 presents summary statistics for each of the variables we employ. A few observations are noteworthy. First, average FDI flows amount to about $400 million per dyad year. Second, the economic development variables reflect composition differences between actor and target countries. GDP per capita, telephone lines, and school enrollments are slightly smaller for targets than actors. The same is not true for imports and exports because accounting principles require imports to about equal exports for the economy globally. As in COPDAB (Polachek, 1980), net conflict is negative. This means on average more cooperation occurs than conflict. As is often done in the literature, we define power ratio as the stronger over the weaker country. Thus this ratio varies between 1.0 and almost 600. The joint democracy

is defined by multiplying the dyad's two regime scores based on Polity IV. The contiguity variable measures whether two countries within a dyad share a land border, or share a water border separated by 400 miles or less.

Table 3 presents estimates for the simultaneous equations model (16) and (17) outlined above. As we can clearly see, FDI has a significant negative effect on conflict (-.015).[7] For a one million US dollar increase in FDI within a dyad, on average conflict (i.e., the excess conflict over cooperation) will be reduced by 0.015 units. However, from the information above it is difficult to visualize FDI's significant. So, in order to get a meaningful measure, we compute an elasticity indicating the percent change in conflict given a one percent change in FDI. We use the following elasticity measure:

$$\text{Elasticity} = \frac{\partial Z}{\partial k}\frac{\bar{k}}{\bar{Z}} = -.015 * \frac{370.369}{-16.685} = .333^{8}$$

The interpretation of this elasticity is as follows: As FDI increases by 10%, net conflict will decrease by 3.3%, on average.

Our result on the net conflict variable (-21.8 in column 2) indicates that dyadic conflict decreases FDI investments. This result is consistent with our propositions that FDI occurs when two-countries have a good dyadic relationship. In this case, a one-unit change in net conflict decreases FDI by about $21.8 million between the two countries. The elasticity for this relationship is:

$$\text{Elasticity} = \frac{\partial k}{\partial Z}\frac{\bar{Z}}{\bar{k}} = -21.8 * \frac{-16.685}{370.369} = .982$$

Therefore, a 10% decrease in conflict between dyad will increase FDI by 9.8%.

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 country's GDP and the target country's GDP are associated with less conflict. Thus it appears countries reduce conflict, or put differently promote cooperation to protect their economic well-being just as they reduce conflict to protect FDI. Second, a number of country capability attributes tend to increase conflict. For example, the power ratio of the dyads has a positive sign and is statistically significant. The smaller the power ratio, the less intense is conflict. This finding is consistent with the balance of power argument. Third, unlike analyses using MIDS (e.g., Russett and Oneal, 2001), joint democracy is associated with more conflict. Whereas, it is reasonable to argue that on balance democratic countries will have less conflict because they have similar cultural and social backgrounds and because checks and balances within this type of government decrease a democracy's proclivity toward wars, our results indicate that polity does not 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. It is also consistent with Gowa (1999) who finds that joint democracy in the post Cold War period does not decrease conflict as it did in the Cold War Period. Finally fourth, the estimates indicate that the contiguity of countries results in less intense conflict once capital flows are taken into account. This result is in contrast to most other findings using MIDS or COW data that find contiguity leads to greater conflict, but is consistent with events-based studies such as Robst et al. (2007).

As for the other estimates of FDI inflows, given by equation (17), 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. On the other hand, a country's development level as indicated by GDP per capita is negatively related to FDI inflow. This result suggests that less developed countries are more likely to attract FDI partly because of their lower local worker wages. However, the size of the market as represented by the gross capital formation for the dyad has no significant effects in inducing FDI.

6. FDI and Trade: Are They Comparable In Predicting Conflict?

The above results indicate FDI and dyadic conflict are inversely related. But whether FDI has a similar role in decreasing conflict as trade is not obvious because we know of no other published studies that examine the trade-conflict relationship with 1990s VRA data. To test this, we estimate equations (16) and (17) using trade instead of FDI. We then compare the coefficients (and elasticities) of the trade-conflict relationship to the FDI-conflict relationship just obtained in Section 5. The results are presented in Table 4.[9]

Of particular interest is how trade affects conflict. This relationship is given by the coefficient for imports, -.003 in column (1).[10] On average net conflict within a dyad will be reduced by 0.003 units for every one million US dollar increase in trade (within the dyad). Denoting the trade variable as T, we compute the elasticity of conflict with respect to trade as:

$$\text{Elasticity} = \frac{\partial Z}{\partial T} \cdot \frac{\overline{T}}{\overline{Z}} = -.003 * \frac{3979.952}{-15.540} = .768$$

The results indicate that a 10% increase in trade will on average lead to a 7.68% decrease in conflict

Given the simultaneous equation system, we can also examine how conflict affects trade. The relationship is given by the conflict coefficient in column (2). Here the -214.1 coefficient indicates trade will decrease by 214.1 million US dollars for a unit increase in net conflict within the dyad. Translating this to an elasticity, a 10% increase in conflict will result in a 8.36% decrease in trade:

$$\text{Elasticity} = \frac{\partial T}{\partial Z} \cdot \frac{\overline{Z}}{\overline{T}} = -214.122 * \frac{-15.540}{3979.952} = .836.$$

Our empirical results indicate that trade and FDI each independently have a very similar role in promoting peace and reducing conflict, though the effect of FDI appears to be marginally larger than trade.

7. **Conclusion**

This paper extends the analysis of the conflict-trade relationship by introducing foreign direct investment. In doing so, it makes three innovations: First, it uses dyadic rather than monadic FDI. Only by using dyadic FDI flows can one discern how FDI causes a given country to have cooperative relations with some countries and hostile relations with others. Second, because FDI is related to host country stability and because dyadic interactions are based on FDI, we adopt a simultaneous equations model. Adopting a two-equation system allows one to account for both the effect of FDI on

conflict as well as the effect of conflict on FDI. Third, whereas most current analyses of conflict utilize historical data such as COW, MIDS, or COPDAB, we employ the new VRA data with information for the 1990s instead of earlier periods. We justify using events data because events data contain information on conflict as well as cooperation.

Our empirical results show that foreign direct investment works parallel with trade in influencing international relations. More specifically, we find that the flow of FDI reduced the degree of international conflict and encouraged cooperation between dyads during the decade of the 1990s. This is an especially important result since one of the main characteristics of globalization has been the large increase in international capital flows. From a policy perspective, our findings underscore how reducing barriers to both trade and capital flows can promote a more peaceful world. Finally, future research should explore the effects of short-term capital flows, such as portfolio investment on international conflict. This is an especially important topic since many countries have adopted capital controls and taxes to stem the flow of "hot money." Therefore, while the promotion of trade and long-term capital flows such as FDI have been encouraged by many of these same countries, presumably because of gains resulting from them, short-term flows are discouraged. Therefore, one may conjecture that their perceived benefits are limited and attempts by countries to reduce international conflict that could result in their reductions would not be pursued to the extent that we find in our research for FDI and trade.

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Figure 1. Inflows of FDI to Developed and Developing Countries, in Millions of Current Dollars, 1970-2000 (Source: UNCTC, *Transnational Corporations in World Development* 2003)

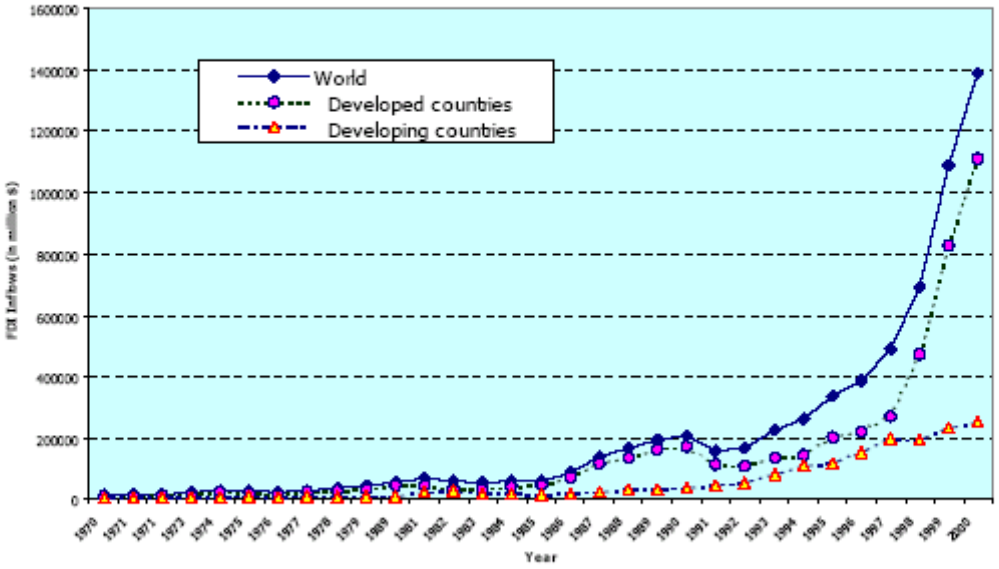

Table 1: Examples of Conflict and Cooperation Using the Goldstein Scale

Gold	IDEA	Definition	Gold	IDEA	Definition
8.3	072	Extend military aid	-3	16	warn
7.6	073	extend humanitarian aid	-4	1122	censor media
6.5	081	make substantial agreement	-5	201	expel
5.2	0522	promise military support	-6.4	175	non-military force threats
4.5	051	promise policy or non-material support	-7	1734	threaten military war
3.4	092	solicit support	-7.6	1826	military border fortification
2.2	0654	demobilize armed forces	-8.7	221	bombings
1.6	0932	ask for military aid	-9.2	211	seize possession
0.1	024	optimistic comment	-10	2234	military occupation
-0.9	141	deny responsibility			
-1.1	0631	grant asylum			
-2.2	121	criticize or blame			

Source: Gary King and Will Lowe (2003).

Table 2: Summary Statistics

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

Net Conflict: weighted conflict minus weighted cooperation using Goldstein Scale (Table 1);Power ratio: the relative capability of the stronger country over the weaker, measured in terms of their CINC scores; Joint Democracy: the product of two transformed regime scores (transformed regime score=democracy-autocracy+11); Contiguity: dummy variable, equal to 1 when countries within a dyad share a land border or are contiguous across up to 400 miles by water, and 0 otherwise; WTO: dummy variable, equal to 1 if both countries are members of WTO (or GATT) and 0 otherwise

Data sources:

Net Conflict data are from VRA dataset; FDI data are from the International Direct Investment Statistics Yearbook (various years) OECD; Trade data are from Gleditsch's expanded trade dataset; GDP data are from IMF dataset; Other economics variables are from World Bank dataset; CINC scores and Contiguity data are from COW dataset; Regime scores data are from Polity IV; WTO data are from WTO web.

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

(Standard errors in parentheses)

	Dependent Variables	
Independent Variables	Conflict	FDI Inflow
Constant	-.368	-1712.936***
	(1.555)	(329.869)
FDI Inflow	-.015***	
	(.002)	
GDP Actor	-8.62e-06***	
	(5.59e-07)	
GDP Target	-6.26e-06***	
	(4.83e-07)	
Power Ratio	.146***	
	(.012)	
Joint Democracy	.015***	
	(.004)	
Contiguity	-7.642***	
	(1.357)	
(Net) Conflict		-21.763***
		(1.103)
WTO		160.675**
		(62.028)
GDP Per Capita Actor		-20.596***
		(3.648)
GDP Per Capita Target		-9.078**
		(3.030)
Population Actor		.0004***
		(.0001)
Population Target		.0006***
		(.0001)
Telephone Mainlines Actor		1.300***
		(.241)
Telephone Mainlines Target		.837***
		(.207)
School Enrollment, Primary Actor		1.155
		(1.949)
School Enrollment, Primary Target		1.028
		(2.005)
School Enrollment, Secondary Actor		4.181***
		(.989)
School Enrollment, Secondary Target		5.602***
		(1.118)
Gross Capital Formation Actor		1.625
		(3.184)
Gross Capital Formation Target		-3.014
		(3.276)
R-Squared	.2482	.1807
Number of Observations	5449	5449

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

Table 4: Three-Stage Least Square Estimation of Trade-Conflict Relationship-Import

(Standard errors in parentheses)

	Dependent Variables	
Independent Variables	Conflict	Trade
Constant	2.116	-7799.311***
	(1.176)	(1696.013)
Trade (Imports)	-.003***	
	(.0003)	
GDP Actor	-4.73e-06***	
	(8.00e-07)	
GDP Target	-3.77e-06***	
	(7.33e-07)	
Power Ratio	.088***	
	(.018)	
Joint Democracy	.008***	
	(.002)	
Contiguity	-10.391**	
	(3.809)	
(Net) Conflict		-214.122***
		(4.414)
WTO		-18.878
		(215.524)
GDP Per Capita Actor		-37.189**
		(12.426)
GDP Per Capita Target		14.564
		(10.406)
Telephone Mainlines Actor		3.697***
		(.985)
Telephone Mainlines Target		2.257**
		(.768)
School Enrollment, Primary Actor		15.637*
		(7.413)
School Enrollment, Primary Target		29.056***
		(8.190)
School Enrollment, Secondary Actor		5.075
		(3.378)
School Enrollment, Secondary Target		-.414
		(3.456)
Gross Capital Formation Actor		25.509*
		(12.300)
Gross Capital Formation Target		39.682**
		(13.743)
R-Squared	.4458	.3561
Number of Observations	6284	6284

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

Notes

[1] For example see the articles in Mansfield and Pollins (2001), Mansfield and Pollins (2003), Schneider, Barbieri and Gleditsch (2003), and Polachek and Seiglie (2007).

[2] For example, the outflow of capital resulting from the 1997 Asian crisis primarily consisted of bank lending and portfolio flows, while FDI remained essentially unchanged. Chuhan, Perez-Quiros and Popper (1996) find that FDI is insensitive to changes in short term capital flows, yet short-term flows are sensitive to changes in long-term flows such as FDI.

[3] One can include other economic variables such as direct and indirect taxes (Desai, Foley and Hines, 2004), corruption indices (Wei (1997), as well as labor costs and market sizes (Fung, Iizaka and Parker, 2002).

[4] W~~In the appendix we~~e denote these A, A*, B and B* variables as H, Ω, and Ω*. Here we change the notation slightly to make more apparent how each equation is statistically identified.

[5] These are Australia, Austria, the Belgium-Luxembourg Economic Union, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

[6] These include Algeria, Argentina, Brazil, Bulgaria, Chile, China, Columbia, Egypt,

India, Iran, Israel, Korea, Kuwait, Libya, Morocco, Panama, Philippines, Rumania, Russia, South Africa, Saudi Arabia, Taiwan, Thailand, and the United Arab Emirates.

[7] We present the results for FDI inflows. The results for outflows are similar, but to conserve space they are not presented here.

[8] The 16.685 conflict measure differs from Table 2 because Table 2 reports the mean conflict level for the total sample, whereas the coefficient from Table 3 refers to the sample for observations containing inflow FDI data.

[9] To be consistent with past empirical work examining the trade-conflict relationship we limit trade to an actors imports from the target. However, to check robustness, we re-estimated the model using exports as well as total trade. The coefficients for the model using exports are virtually identical. Because total trade is roughly twice as large as either imports or exports, the coefficients for the model using total trade are roughly half the magnitude as the coefficients for the model using imports. In addition, we use GDP per capita instead of population in equation (2).

[10] We do not discuss the other variables' coefficients because they are comparable to those estimated in Table 3.

[11] In what follows, we can think of the utility function as representing the preferences of the policymakers. In government 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 benefits from conflict, and therefore supports such policy since they are made better off.