

**THE CONSEQUENCES OF NOT LOVING THY NEIGHBOUR AS THYSELF:
TRADE, DEMOCRACY AND MILITARY EXPENDITURE EXPLANATIONS
UNDERLYING INDIA-PAKISTAN RIVALRY***

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ABSTRACT

We examine whether greater inter-state trade, democracy and reduced military spending lower belligerence between India and Pakistan. We begin with theoretical models covering the opportunity costs of conflict in terms of trade losses and security spending, as well as the costs of making concessions to rivals. Conflict between the two nations can be best understood in a multivariate framework where variables such as economic performance, integration with rest of the world, bilateral trade, military expenditure, population are simultaneously taken into account. Our empirical investigation based on time series econometrics for the period 1950-2005 with causality tests suggests that reduced bilateral trade, greater military expenditure, less development expenditure, lower levels of democracy, lower growth rates and less general trade openness are all conflict enhancing, albeit with lags in some cases. Moreover, there is reverse causality between bilateral trade, militarization and conflict; low levels of bilateral trade and high militarization are conflict enhancing, equally conflict also reduces bilateral trade and raises militarization. *Globalization*, or a greater general openness to international trade with the rest of the world, is the most significant driver of a liberal peace, rather than a common democratic political orientation suggested by the pure form of the democratic peace.

Keywords: Inter-state conflict and trade, democracy and conflict, conflict and economic development.

J.E.L codes: D74, F13, F15, F51.

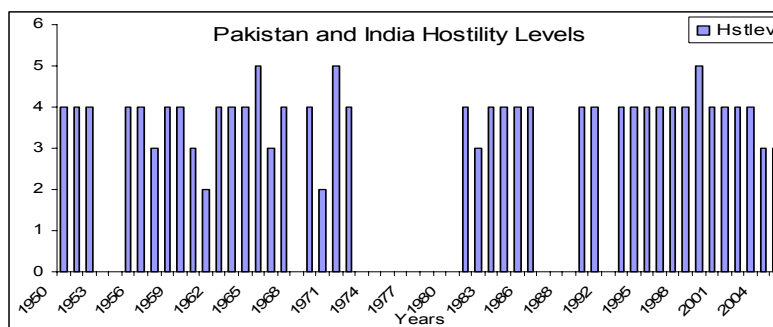
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1 INTRODUCTION

Conflict may be motivated by factors such as historical grievances, the clash of civilizations (Huntingdon, 1996), or pure avarice. Outright hostility between states implies the absence of peaceful cooperation, manifesting itself in diminished inter-state commerce, which in turn could further exacerbate the rivalry between the same countries. In this paper we are concerned with inter-state rivalry between India and Pakistan. Despite the fact that civil war is the most dominant form of war at present, inter-state rivalry has not withered away; these too can also divert substantial amounts of resources away from poverty reduction in developing countries.

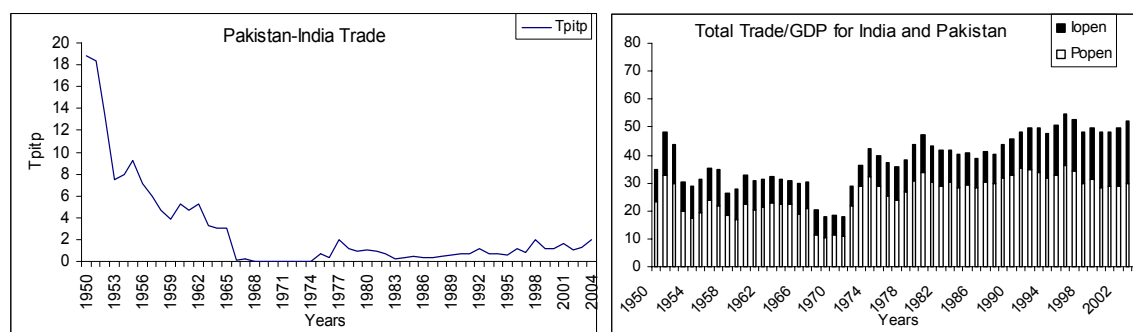
International trade allows one country to peacefully benefit from the endowments of another nation through voluntary exchange. War is another way of expropriating the endowments of another country, but it is costly as it destroys part of both countries pre-existing wealth. Predation is an alternative to production, but it is not usually the most efficient, as predation (war or other forms of larceny) unnecessarily wastes resources. Such, unenlightened behaviour may be rational or optimal from the standpoint of the individual person or a nation, but is inefficient in the global sense. International economic interactions between nations may involve peaceful trade, or it could be belligerent with reduced economic interaction. Outright war is just one manifestation of the rivalry between nations; the armed peace is equally consistent with aggressiveness. India and Pakistan are a case in point. They have had at least four large scale military confrontations (1948, 1965, 1971 and 1999), but otherwise spend a great deal of time in uncompromising posturing vis-à-vis each other. India, in particular, frequently accuses Pakistan of sponsoring terrorism in her territory. But occasionally they make goodwill gestures, such as sending out peace buses between cities like Delhi and Lahore, and agree to cricket tours. Less frequently, major concessions are made mainly by Pakistan, such as President Musharraf's willingness to put aside the long standing Pakistani demand and United Nations resolution for a plebiscite to settle the future of Kashmir.¹ Figure 1 charts the hostility levels of the two states on a scale of 0-6. It has never been below 2, but is usually at a high level of 4, which measures belligerency short of outright war.

Figure 1: Hostility Levels Between India and Pakistan



¹ See http://news.bbc.co.uk/2/hi/south_asia/3330031.stm.

Figure 2: Patterns in India-Pakistan Trade



Both countries spend a considerable amount in military expenditure, measured as a proportion of GDP. In fact, these two countries have among the highest military burdens in the world outside the Middle East (World Development Indicators, 2006). One can surmise, that such large scale military expenditure detracts from development and poverty reduction in South Asia which has the largest concentration of the world's poor, defined by below purchasing power parity \$1 a day per-person. Polachek (1997) and Polachek and Seiglie (2006) argue that wars and disputes between geographically contiguous states involve greater losses, as more efficient geographically proximate trade is displaced.² This effect, however, depends on the absence of alternative trading partners, who despite greater distance may be equally or more efficient. Figure 2 shows that India-Pakistan official trade (as a proportion of Pakistan's total international trade) steadily declined from nearly 20% in the early 1950s, plummeting to almost zero after their war in 1965, and has shown some signs of recovery in the 1990s. But it is still below the levels of the 1950s, which was shortly after the two nations were separated politically. This is despite the fact that India and Pakistan have fairly open economies at the present. Pakistan has traditionally been more open than India (Figure 2). Conflict and rivalry are symptomatic of the absence of cooperation including lower trade volumes. Equally, conflict may be said to be a consequence of the lack of trade.

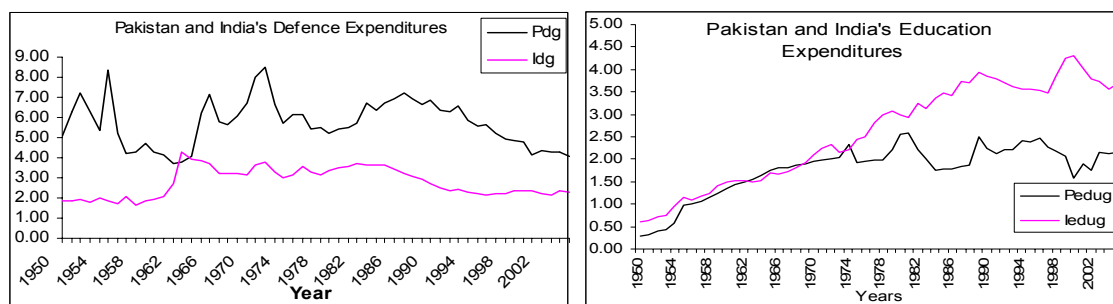
A related issue concerns the so-called *democratic peace*³, see Polachek (1997) and Polachek and Seiglie (2006) for a review of this substantial literature. The idea is that democracies will not fight each other because they share cultural norms that militate against forceful dispute resolution, or

² When we come to comparing trade and conflict with many nations, not just dyadic (pair-wise) interactions, Dorussen (1999) argues that although trade reduces conflict, in the presence of many countries, an increase in the number of countries or the world's endowment may induce more conflict, as there are more countries to grab from. Hegre (2002) shows that the benefits of trade rise as the number of countries increase. Thus, Dorussen (1999) establishes gains from conflict after globalization, whereas Hegre (2002) models benefits from cooperation (or trade) as globalization gathers pace.

³ Sometimes the literature refers to this concept also as the liberal peace, which is a source of some confusion as some authors refer to the peace emanating from economic interdependence as the liberal peace.

alternatively the checks and balances that characterise political processes in advanced democracies restrain violence. Put simply, the idea is that established democracies do not go to war with each other, but cooperate instead. The intellectual basis for this argument has been traced back to Immanuel Kant's (1795) work on the Perpetual Peace, where a like mindedness referred to as *cosmopolitanism* would prevent outright war between republics; a tendency that could be reinforced by commercial interdependence. Mirroring Kant's thoughts, is the contemporary philosopher, John Rawl's (1999) notion of peace between liberal societies or nations, arguing that liberal societies do not go to war with each other because their needs are satisfied, they are non-acquisitive in the sense of not wishing to grow beyond an achieved steady-state level of (presumably high) income, and they are tolerant of difference. They will only fight in self-defence, and invade to prevent gross human rights abuses such as genocide in other countries. They can, however, occasionally be duped into supporting foreign wars. Polachek (1997) makes a case for the alternative notion of the *liberal peace*⁴, presenting empirical evidence to suggest that advanced democracies cooperate, not because of their similar political systems, but due to their vast and multiply intersecting economic interdependence. Barbieri (1996) demonstrates that the liberal peace based upon the pacific effects of economic interdependence may be a chimera. Oneal and Russett (1999) and Hegre (2000), however, argue that economic interdependence reinforces peace, particularly between democracies. Perhaps, we need a theory that embeds democracy with economic interdependence. Democracies may, however, go to war with other democracies that are distantly located, culturally disparate and considerably poorer, something that is also echoed in Kant (1795). Indeed, Robst, Polachek and Chang (2006) present some evidence to suggest that more democratic nations could exhibit some degree of belligerence to less democratic countries, such as in the case of India's actions vis-à-vis Pakistan. Nevertheless, increased democratic levels can mandate concessions and re-negotiation with neighbours.

Figure 3: Conflict, Development and Democracy Trends in India-Pakistan



The Polity score gives us an average score of democracy and autocracy ranging from 10 to -10, acting as an indicator of the overall political system. India has one of the highest democracy scores in the developing world for

⁴ Theories of the liberal peace may be traced back to the Baron de Montesquieu's, Spirit of the Laws (1748), where he states that commerce tends to promote peace between nations, mutual self-interest precludes war; trade also softens attitudes of peoples towards each other.

the entire 50 year period (scoring 7-9), whereas Pakistan's experience with democracy fluctuates, with high autocracy scores associated with military coups in 1958, 1969, 1977 and 1999. Figure 3 indicates that military expenditures tend to move inversely with development (education) expenditure, providing *prima facie* evidence that large military expenditure crowds out development in the social sector. Pakistan's military expenditure is consistently above India's except in the mid-1960s when India had wars with both China and Pakistan. In Pakistan's case, military expenditure as a proportion of GDP has historically been at 5%, but rising during and after its 1965 and 1971 wars with India to as high as 8%. The average defence expenditure of Pakistan is 5.5% of GDP in the 1950-2005 period, whereas for India it is about half at 2.8% of GDP. Since the 1990s Pakistan's military expenditure has been falling, and is now at a little above 4% of GDP, which represents a historical low. As Indian education expenditure rose to 4 % of GDP in the 1990s, its defence expenditure fell from nearly 4% of GDP in the mid-1960s to less than 3% of GDP (it has rarely been below 2% of GDP). Pakistan's education public expenditure is stagnating at around 2% of GDP.

The opportunity costs of conflict could rise when countries move to higher stages of economic development as they have more to lose from conflict, and have more resources to negotiate peaceful settlements. The 1990s is considered to be a golden decade for India as GDP growth rates on average the Indian economy grew at 5-6% annually. Pakistan has been growing at an average of 6% for the last 3 to 4 years. Traditionally, from the early 1960s up to the early 1990s, Pakistan's was the faster growing economy of the two. Both countries are in the second most rapidly growing region (South Asia) in the world (World Development Indicators, 2006).

Despite a relatively high democracy score in Pakistan up to 1999, conflict between the countries escalated in the 1990s. By contrast, the current regime in Pakistan with a strong military orientation (the military is highly influential and the President continues to be the army chief), and therefore less democratic, is making major unilateral concessions to India vis-à-vis their long standing disputes over Kashmir. Could that be related to the very recent impressive growth record in Pakistan? If anything, conflict between the two nations can be best understood in a multivariate framework where the relevant variables and processes (economic performance, integration with rest of the world, bilateral trade, military expenditure, democracy and population) are simultaneously taken into account. The purpose of this paper is to examine whether greater inter-state trade, democracy and reduced military spending lower belligerence between India and Pakistan. We also investigate the causal links between bilateral conflict and these variables in a time series framework, between 1950 and 2005 in most cases. The rest of the paper is organised as follows: section 2 contains the theoretical model, the econometric analysis is presented in section 3, and section 4 concludes.

2 THEORETICAL MODEL

This section consists of two parts: the first deals with the costs of belligerent behaviour in a single country context where the losses are displaced trade

and the crowding out effects of defence expenditure; the second looks at the costs of peaceful behaviour where the disutility of making concessions to an adversary is modelled in a two country setting. The situations we model either pertain to limited warfare, with negligible effects on national endowments, or alternatively we could be said to model the costs of an armed peace associated with large security and military establishments. In many ways, conflict has similar effects as other forms of trade wars.

A Costs of War

We begin with a single country's decision making with regard to belligerence, based on Polachek (1997). The welfare of either country (U) depends upon consumption (E), and security (S), entering the utility function in a separable fashion:

$$U = u(E, S) \quad (1)$$

Where:

$$E = cQ - X + M - T \quad (2)$$

Q is the total endowment of the country where a proportion c is devoted to private and public non-military consumption and investment; a fraction $1-c$ to a public good covering security or military expenditure. X and M denote exports and imports to the rival country, and T represents trade (exports minus imports) with the rest of the world. θ is the price of the exportable and the price of the importable is the numeraire good, normalised at unity. There is also a balance of trade constraint, the value of exports must equal imports:

$$\theta X(S) - M + T = 0, \dots X_s < 0 \quad (3)$$

Following Polachek (1997) let us postulate that conflict disrupts trade. Specifically, it lowers exports, but unlike in Polachek's model both countries are hostile towards each other, and not just one country (described as the actor) against a passive target. So, in our model, both countries exports to each other will decline, along with ambiguous effects on the terms of trade. The country whose goods are demanded more elastically will experience the negative terms of trade effect. Nevertheless, exports displaced by conflict are a loss, as they represent foregone trade, especially in the context of neighbours who might be expected to trade substantially in peaceful circumstances. Substituting (3) as a constraint and (2) into (1) allows us to write a Lagrangian function (L), where λ indicates the Lagrange multiplier:

$$L = u(cQ - X + M - T; S) + \lambda[\theta X(S) - M + T] - C(S) \quad (4)$$

The function C represents the distortionary (taxation and crowding out) costs of security expenditure, which rises with S , so that the partial derivative is positive. This is an additional cost associated with security spending, absent in Polachek's (1997) model. The first order condition with respect to S is:

$$u_s = -\lambda X_s + C_s \dots u_s, C_s > 0, X_s < 0 \quad (5)$$

In equation (5) the marginal utility of security (u_s) is equated to its marginal costs. The latter (on the right-hand side of (5)) is comprised of the trade disruption due to conflict, and the cost of diverting resources to military and security expenditure. This, last effect, is absent from the Polachek models. The cost of conflict is not just confined to displaced trade, but it also has a distortionary resource cost because of security expenditure, either because of distortionary taxation or due to the crowding out effect on other forms of investment, including government spending on health and education; see Deger and Sen (1990). Note, that security expenditure and benefits derived from confronting one's enemy does yield positive utility, but comes at a price. There is, therefore, an additional cost of belligerent behaviour over and above losses from trade displacement, and is likely to be substantial because it detracts from poverty reduction directly. It is worth noting that trade costs and losses from resource misallocation are *a priori* likely to be greater for the smaller economy, Pakistan. The same will be true of the terms of trade which are likely to deteriorate for Pakistan. This is because a smaller economy's exports to its larger neighbour are usually a greater proportion of its total exports, its goods may be demanded more elastically, and the costs of an arms race are larger for the smaller nation.

B Costs of Peace

If peace is Pareto optimal, why don't countries engage in it?⁵ In this section we model the costs of peace, which include psychic non-pecuniary costs of making concessions to one's adversaries. Additionally, we try to demonstrate how increased globalization and democratisation can help to reduce conflict by lowering the cost of making concessions to one's neighbours. To analyse these factors we require a two country expected utility model of non-cooperative strategic interaction.

The two countries: India and Pakistan are indexed by subscripts I for India and P for Pakistan. There are two states of nature, denoted by superscripts: one more peaceful or dovish (D), and the other associated with greater hawkishness (H). Their probabilities are defined as π and $1 - \pi$, respectively. An important feature of our model is that states of conflict, or peace, are relative. The probability of either state is in turn affected by an action (a) by India and effort (e) by Pakistan. These are also the strategic variables employed by the two sides to the conflict. We postulate that the probability of the peaceful state π rises with the input of action and effort by the two sides, but at diminishing rates. One can imagine a range of activities by one or both sides if they wish to promote peace, including a greater willingness to compromise, reduce military expenditure, devoting more resources to peaceful economic development, or a greater willingness to respond to calls for peace by third-parties such as the UN or under the influence of pressure from the United States.

⁵ Sir Normal Angell, winner of the 1933 Nobel peace price and former editor of *Foreign Affairs*, in his great book *The Great Illusion*, asserted that nations could never enrich themselves through war, and even a victorious nation would come off economically worse from a war; see Angell-Lane (1910).

Actions and efforts to seek peace entail costs for each party. The costs of actions to promote peace could take a variety of forms, but, above all, there is the loss of face to either party's hawkish domestic political constituencies, including the military establishment. Increased globalization may, however, augment the stock of rhetoric available to politicians who wish to push their 'peace' agenda through the political process. Secondly, and in a more palpable sense, increased international trade and the growth it brings may provide the additional resources to buy off domestic 'war' lobbies. A more democratic government, following military rule, may similarly use its mandate from the people to justify greater peace and reduced military expenditure.

The expected utility of India is given by

$$U_I = \pi(a, e)U_I^D(E_I^D + S_I^D) + (1 - \pi)(a, e)U_I^H(E_I^H + S_I^H) - Z(a(T)) \quad (6)$$

Where U_I^D and U_I^H denote utilities or pay-offs in dovish and hawkish states respectively, weighted by the probabilities of the two states. $E_I^D + S_I^D$, $E_I^H + S_I^H$ indicate the exogenous pair of payoffs from consumption and security expenditure respectively in the less belligerent and more belligerent states respectively. The difference is that in dovish state security spending is lower and private consumption higher than in the hawkish state. There will also be more trade between the two countries. Most importantly, the dovish state of nature will imply greater poverty reduction. Z is the cost function of undertaking the action, a . Action, a , increases the probability of peace, π , however, undertaking it entails a cost, as described above. T indicates greater globalization (more trade with the rest of the world), and this is postulated to reduce the cost of making peace via the cost function (Z) as discussed above, $Z_{a1} < 0$.⁶ Also, $\pi_a > 0$, but $\pi_{aa} < 0$; there are diminishing returns to these actions. Note, however, both $Z_a > 0$ and $Z_{aa} > 0$.

Turning to Pakistan, we symmetrically have

$$U_P = \pi(a, e)U_P^D(E_P^D + S_P^D) + (1 - \pi)(a, e)U_P^H(E_P^H + S_P^H) - L(e(T, P)) \quad (7)$$

L is the cost of effort, e , which increases the probability of peace, π . As with India, greater globalization lowers the marginal cost of making peaceful concessions, but so does a hybrid concept called increased democratisation (P) for Pakistan only given the nature of swings there between democratically elected governments and military rule; L_{e1} and $L_{e2} < 0$. Also, $\pi_e > 0$, but $\pi_{ee} < 0$, $L_e > 0$, and $L_{ee} > 0$.

In the non-cooperative or Cournot-Nash game played by the two sides both sides move simultaneously. Each side, therefore, maximises its own utility

⁶ Increased globalization is unlikely to *directly* affect the marginal productivity of actions or efforts (a , e) that raise the probability of peace (π).

function with respect to its own choice variable. For India, it implies maximising utility, Equation (6), with respect to a as shown by

$$\pi_a [U_I^D(\cdot) - U_I^H(\cdot)] = Z_a \quad (8)$$

Pakistan maximises Equation (7) with respect to e

$$\pi_e [U_P^D(\cdot) - U_P^H(\cdot)] = L_e \quad (9)$$

Note that in Equations (8) and (9) each side will equate its marginal benefit from exercising their own strategic choice to the corresponding marginal cost. Each side's strategic choices will depend on the first order conditions given in Equations (8) and (9), along with a fixed conjecture about the opposition's strategic choice. These lead to the (linear) reaction functions for both sides, obtained by totally differentiating Equations (8) and (9) with respect to a and e . For India this is indicated by

$$\frac{de}{da / R_I} = \frac{Z_{aa} + \pi_{aa} [U_I^H(\cdot) - U_I^D(\cdot)]}{\pi_{ae} [U_I^D(\cdot) - U_I^H(\cdot)]} \begin{matrix} \geq \\ \leq \end{matrix} \dots 0 \dots \text{if} \dots \pi_{ae} \begin{matrix} \geq \\ \leq \end{matrix} 0 \quad (10)$$

and for Pakistan by

$$\frac{de}{da / R_P} = \frac{\pi_{ae} [U_P^D(\cdot) - U_P^H(\cdot)]}{L_{ee} + \pi_{ee} [U_P^H(\cdot) - U_P^D(\cdot)]} \begin{matrix} \geq \\ \leq \end{matrix} \dots 0 \dots \text{if} \dots \pi_{ae} \begin{matrix} \geq \\ \leq \end{matrix} 0 \quad (11)$$

Note that $\pi_{ae} = \pi_{ea}$ by symmetry.

The reaction functions are positively sloped if $\pi_{ae} > 0$, implying that the two strategies are complements. This is the standard assumption in the literature on conflict. In our model, however, we postulate that $\pi_{ae} < 0$, the choice variables are strategic substitutes, and the reaction functions slope downwards (Figure 4). This can occur because the strategy space is defined in terms of peace. Thus, if one side behaves more peacefully it increases the utility of both parties and the other side may free ride on this action by not bringing about a corresponding increase in their action.

In Figure 4, two non-cooperative equilibria are illustrated by points N and C respectively. Point C is more cooperative and peaceful with greater inter-country trade and poverty reduction. A shift from N to C can occur because of greater globalisation (rise in T) because of, say, the establishment of a free trade area, and increased international (not necessarily just bilateral) trade lowers the marginal cost of peaceful behaviour ($Z_{a1}, L_{e1} < 0$). Analytically this means a change in the first-order condition for India:

$$\pi_a [U_I^D(\cdot) - U_I^H(\cdot)] = Z_{a1} dT \quad (8')$$

and for Pakistan

$$\pi_e [U_P^D(\cdot) - U_P^H(\cdot)] = L_{e1} dT \quad (9')$$

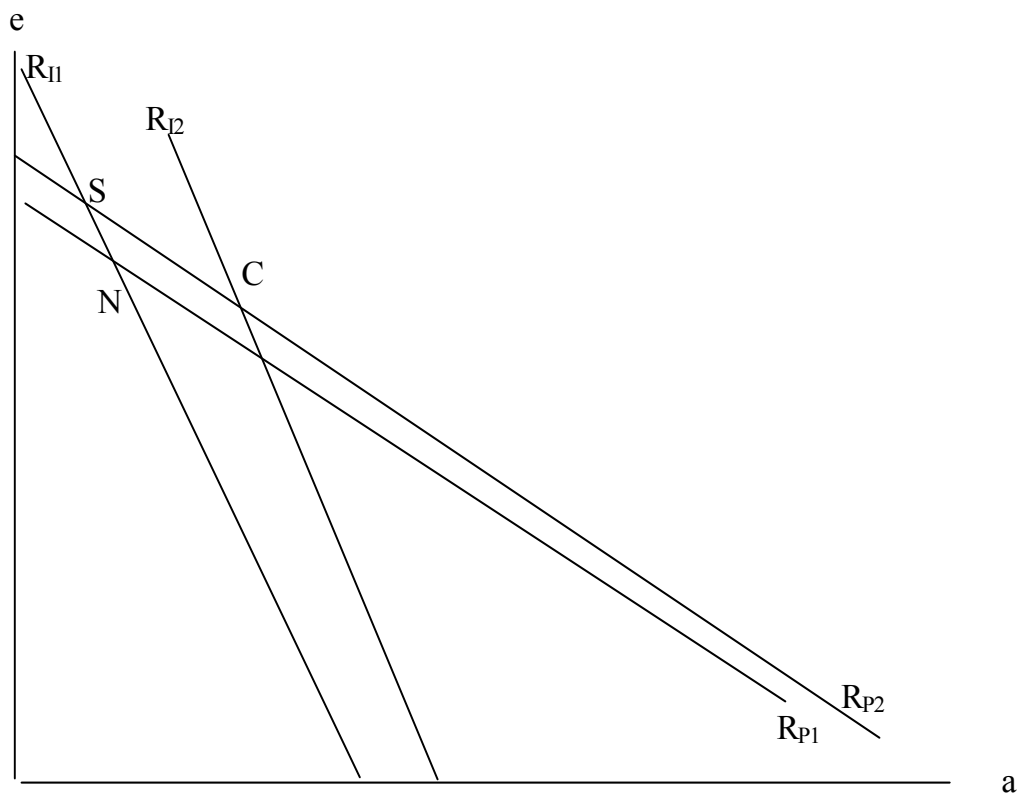
This pertains to the liberal peace. Alternatively, there could be a rise in the exogenous pay-offs in terms of consumption expenditure (E) in (8) and (9) above, leading to the same outcome in figure 4.

The costs of peaceful actions may be easier to bear when countries (in this case only Pakistan) are more democratic, as there may be a mandate from the people to engage in more poverty reduction, greater social sector spending and lower military expenditure. This corresponds to the democratic peace and will cause the first order condition for Pakistan to become:

$$\pi_e [U_P^D(\cdot) - U_P^H(\cdot)] = L_{e2} dP \quad (9'')$$

This causes Pakistan's reaction function to shift outwards along India's, with a new equilibrium at point S. Note, however, in the new equilibrium (point S) India has effectively passed on some of the burden of adjustment to Pakistan. In fact, the level of effort exercised by Pakistan is greater than even in the more cooperative solution (C), but not India's. This could be argued to be the case at present. As India moves closer to the United States, and with the latter's global war on terror more pressure is exerted on Pakistan to make unilateral concessions towards India since 2001. We could even argue that India is free riding on Pakistan.

Figure 4: Reaction Functions of India and Pakistan



3 EMPIRICAL ANALYSIS

A Hypotheses

H₁: Greater bilateral inter-state commerce, as well as greater multilateral trade with third countries lowers various forms of bilateral inter-state conflict. This corresponds to the liberal peace. This hypothesis follows from our theoretical discussion, specifically the first order conditions in (8') and (9'), and in inversely from the right-hand side of (5).

H₂: More military spending as a result of increased insecurity raises conflict. The hegemonic power, however, may have internal conflict (India has many civil wars) and other neighbours to militarily confront. The marginal utility of security spending rises in (5), as well as in (8) and (9).

H₃: Development expenditure (such as public spending on education) should lower conflict, because of economic growth which enables more consumption in equations (4) to (9). This is also related to the increased democratisation hypothesis, below.

H₄: GDP growth will decrease inter-state conflict; there is more to lose from war. This raises the utility from consumption in (4), (6) through to (9).

H₅: Increases in dyadic democracy scores will lead to less conflict, related to the notion of the democratic peace. Increased democracy may lower the cost of concessions and compromise with former enemies, as in (9'') above.

B Data and Methodology

B.1. Data

Since inter-state conflict involves at least two parties, it is a dyadic concept. We construct dyadic proxies for India-Pakistan inter-state trade, military burden, development expenditure, economic development and democracy to test the five hypotheses we have presented above. Data definitions are given in the appendix.

B.1.1. Measuring Conflict:

The literature on inter-state conflict classifies conflict data sets into two categories: 1) war data and 2) events data. War data sets focus on more hostile aspects of inter-state interactions such as crises, wars or militarized inter-state disputes (Jones, Bremer and Singer, 1996). The most comprehensive wars data set is available under the Correlates of War Project (COW). The other major data set on inter-state armed conflict is hosted by the Uppsala Conflict Data Project (UCDP) with the collaboration of the International Peace Research Institute, Oslo (PRIO) and is collected on an annual basis and covers the full post-World War II period, 1946–2003, see Harbom et al (2006). Events data focuses on all inter-state events and bilateral interactions reported in newspapers. Since we are interested in the evolution of India-Pakistan conflict over a period of the last 55 years, we will use Uppsala/PRIO and COW inter-state war data set instead of events based data sets because the former data sets provide conflict data which covers most of the period of 55 years (1950-2005) which we have selected for our analysis. Events data set is not available for the entire period. Though the

events data set captures daily observations, our macroeconomic and democracy data varies annually which limits the use of daily information on conflict. Secondly, as shown in figure 1, hostility between India and Pakistan has usually been high in most of last 55 years, enabling the COW data set to capture the severity of conflict in most years of the dispute.

B.1.2. Measuring International Trade:

Generally dyadic trade is captured by sum of imports and exports between actor and target countries (Polachek and Seglie, 2006). We construct two composite measures of India-Pakistan trade. They are Pakistan's total trade with India as percentage of Pakistan's total trade (Tpitp), and also India's trade with Pakistan as a percentage of India's total trade (Tpiti). We expect both trade proxies to be negatively related with conflict. It would be interesting to investigate whether trade between both countries as share of each countries total trade also affects conflict mitigation. If trade reduces conflict, trade with more countries should reduce conflict even more (Dorussen, 1999). Thus, it is important to investigate how more trade with the rest of the world affects India-Pakistan hostilities. We construct 8 dyadic proxies to capture the combined international integration levels for both countries, and these are described in the data appendix.

B.1.3. Measuring Military Expenditure:

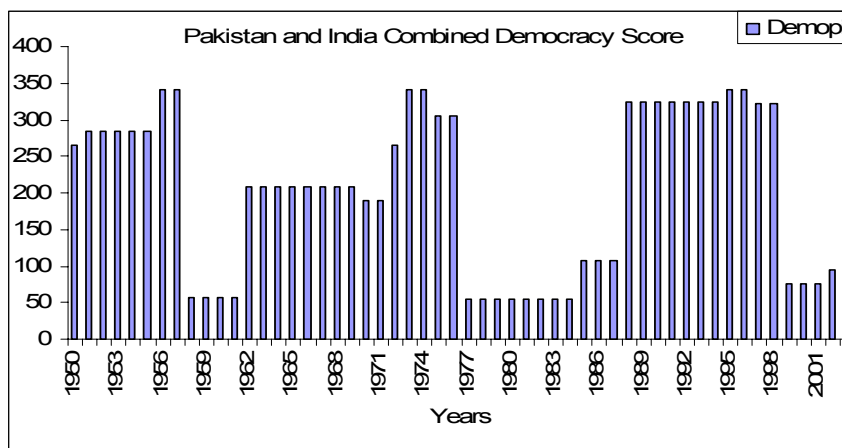
Military expenditures can reflect hostility, as well as deterrence (Polachek and Seglie, 2006). In the India-Pakistan case, we would like to examine how each country's military expenditure/ military burden affects the dispute. Pakistan's spending on military expenditure as a proportion of GDP is higher than India's. Additionally, since military expenditures may also capture the capability of a country to deal with civil unrest or intra-state conflict, Indian military expenditure can also be explained in terms of the high prevalence of continuing intra-state conflicts in various regions of India. Pakistan has had fewer civil wars. This may mean that Pakistan's military burden captures its security concerns vis-à-vis India solely. If so, dyadic variables which take the military burden of Pakistan as a ratio of the Indian military burden, should affect conflict positively and vice versa. We construct 8 different dyadic proxies of military burden utilizing data on military expenditures as well as military personnel from the COW dataset, described in the appendix. This is because the proportion of military personnel in the total population represents the extent of militarization in a society.

B.1.4. Measuring Democracy, Growth and Other Variables:

To capture democracy levels for India and Pakistan, we turn to the Polity IV project hosted by Center of International Development and Conflict Management (CIDCM). Polity IV computes a combined polity score by subtracting autocracy scores from the democracy scores for the corresponding year. The value of this Polity score ranges from -10 to 10, where -10 denotes the highest autocracy level, and 10 the maximum

democracy score. Although India always takes a high positive value of 7 or above, Pakistan frequently takes on negative values. We construct a dyadic variable of democracy for both countries by combining (multiplying) their Polity scores, following Polachek and Seiglie (1969). We add 10 to each countries polity series to make the negative Polity values positive so that our combined democracy score may capture the variations in the democratization process only on a positive scale. The dyadic democracy variable shows values as low as 50 on the scale of 0 to 400 when there are high levels of political dissimilarities between Pakistan (dictatorship) and India (democracy), and as high as 350 when both countries are governed by democracies (see figure 5).

Figure 5: Dyadic democracy scores for Pakistan and India



We take the weighted average of India and Pakistan’s real GDP per capita growth rates (G_{pi}) as the dyadic proxy of economic progress for both countries. We constructed the series for both countries by dividing GDP at constant prices taken from economic surveys, and dividing it by population levels. The data was later tallied with GDP per capita series available at the World Development Indicators (2006) data set. We also constructed 4 different proxies of social development based on India and Pakistan’s education data⁷ India and Pakistan are one of the most densely populated countries in the world. Pakistan has 160 million inhabitants, and India has over a billion citizens. In line with the earlier literature, we also take the average of both countries populations as a standardising variable in our analysis (see Polachek, 1997).

B.2. Methodology:

Any simple least square regression analysis may lead to spurious results due to the endogeneity problems among our variables (from trade, military expenditure and growth to conflict and vice-versa). We need to utilize a simultaneous equation model where potential endogenities between various variables are addressed. Since our data is time series, we will use Vector Autoregressive model (VAR) which is an extension of univariate autoregressive (AR) models to capture the evolution and the

⁷ There is an insufficiently long time series for public health spending data for India.

interdependencies between our multiple time series (Sims, 1980). All variables in a VAR are treated symmetrically by including for each variable an equation explaining its evolution based on its own lags, and the lags of other variables in the model. The number of equations in a VAR model depends upon the number of endogenous variables; each endogenous variable is regressed on its lagged value, and the lagged values of all other endogenous variables as well as any number of exogenous variables. This solves the problem of endogeneity among variables. In this sense VAR model is just a seemingly unrelated regression (SUR) model with lagged variables and/or deterministic terms as common regressors, so that the regression results for each equation can be interpreted in the same manner as we do for ordinary least square estimators. After fitting a VAR we may want to know which way causalities run. One way to do that is by running Granger (1969) causality tests after the VAR analysis.

Before we carry out the regression analysis, a test for stationarity is in order for all dyadic variables employed in our analysis. Stationarity tests are carried out by running the modified Dicky-Fuller t-test also known as the DF-GLS test proposed by Elliot, Rothenberg and Stock (1996). Table 1 provides unit root test results based on this criterion.

Table 1 DF-GLS Unit Root Tests

Variables	Lag length	With intercept	With intercept and trend
Fatal	1	-3.528* (Ng-Perron)	-3.774* (Ng-Perron)
Volfatal	1	-4.789* (Ng-Perron)	-4.844* (Ng-Perron)
Dur	1	-4.058* (Ng-Perron)	-4.233* (Ng-Perron)
Hiact	1	-2.382** (Ng-Perron)	-2.590 (Ng-Perron)
Hstlev	1	-2.371** (Ng-Perron)	-2.512 (Ng-Perron)
Cnf	1	-3.025* (Ng-Perron)	-4.082* (Ng-Perron)
Tpitp	15	-1.112*** (Ng-Perron)	-1.861 (Ng-Perron)
Tpiti	15	-3.856* (MAIC)	-3.319** (Ng-Perron)
Xmpi	2	-2.710* (Ng-Perron)	-2.860*** (Ng-Perron)
Xmip	8	-4.951* (MAIC)	-4.923* (MAIC)
Lxpi1	0	2.951** (D-Fuller)	2.951** (D-Fuller)
Lxpi2	0	-4.769* (SIC)	-4.929* (SIC)
Lmpi1	1	-4.049* (SIC)	-3.961* (SIC)
Lmpi2	1	-4.511* (SIC)	-4.382* (SIC)
Lmilbrd1	5	-2.209** (Ng-Perron)	-2.795*** (Ng-Perron)
Lmilbrd2	5	-2.209** (Ng-Perron)	-2.795*** (Ng-Perron)
Lmilbrd3	5	-1.911*** (Ng-Perron)	-2.686*** (Ng-Perron)
Lmilbrd4	5	-2.128*** (Ng-Perron)	-2.831*** (Ng-Perron)
Lmilbrd5	1	-4.735* (SIC)	-4.748* (SIC)
Lmilbrd6	0	-	-4.308* (SIC)
Lmilppi	1	-4.082* (SIC)	-4.098* (SIC)
Lmilpip	1	-4.082* (SIC)	-4.098* (SIC)
Ledupi1	1	-	-5.374* (SIC)
Ledupi2	1	-	-5.478* (SIC)
Ledupi3	1	-5.918* (SIC)	-5.907* (SIC)
Ledupi4	1	-	-5.642* (SIC)
Gpi	0	-4.256* (Ng-Perron)	-4.276* (Ng-Perron)
Demopi	7	-2.790* (Ng-Perron)	-2.997* (Ng-Perron)
Poppi	10	-	-7.392* (MAIC)

*, ** and *** shows significance at 1%, 5% and 10% level

- The Lag structure is selected through (1) Ng - Perron sequential t (Ng-Perron), (2) the minimum Schwarz information criterion (SIC), (3) the Ng-Perron modified information criterion (MAIC) and (4) Dickey-Fuller test (D-Fuller).

Table 1 shows that nearly all variables have unit roots. Since our time series variables are stationary at levels, though with some time lags, we can use unrestricted VAR analysis instead of the restricted VECM (vector error correction) methodology. We can now proceed to VAR analysis.

Our reduced form general VAR model for conflict is as follows:

$$Conf_t = \alpha_1 + \alpha_{2,t-i} Conf_{t-i} + \alpha_{3,t-i} Tr_{t-i} + \alpha_{4,t-i} Mil_{t-i} + \alpha_{5,t-i} E_{t-i} + \alpha_{6,t-i} G_{t-i} + \alpha_7 Dem_t + \alpha_8 P_t + E_t \quad (12)$$

Where $Conf_t$, Tr_{t-i} , Mil_{t-i} , E_{t-i} , G_{t-i} , $Demo_t$ and P_t depict inter-state conflict, bilateral or multilateral trade, military burden, education expenditure, real growth rate of GDP per capita, dyadic democracy score and population respectively, t ranges from 1950-2005 and $i = 1, \dots, p$. Here p is the optimal lag structure for the VAR model. $\alpha_{2,t-i}$, $\alpha_{3,t-i}$, $\alpha_{4,t-i}$, $\alpha_{5,t-i}$ and $\alpha_{6,t-i}$ are (6×6) metrics (for every $i = 1, \dots, p$). Proxies for conflict, bilateral and multilateral trade, economic progress, military burden and social development will be treated as potentially endogenous, whereas dyadic democracy and population will be viewed as purely exogenous concepts.

B.3. Results:

The model above is first run for the number of fatalities, *Fatal*, because it best captures the severity of the militarized conflict between the two nations. Later, we also employ other conflict proxies. Table 2a shows the results for bilateral trade with 8 proxies of military burden. The evidence suggests that trade between Pakistan and India significantly decrease hostilities between both nations. However, the low values of $\alpha_{3,t-i}$ coefficients suggest that bilateral trade has a limited role to play in conflict mitigation. This is not surprising because we know from figure 2, that trade between Pakistan and India has remained very low, and comprises only a very small fraction of each country's total international trade. Though low trade levels between both countries may very well be the cause of the ongoing conflict, here we do not need to worry about reverse causality because our VAR model takes care of potential endogeneity problems between *Fatal* and *Tpitp* or *Tpiti*. On the other hand, *Lmilbrd1*, *Lmilbrd2*, *Lmilbrd3*, *Lmilbrd4*, *Lmilbrd5* and *Lmilbrd6* all are significantly related with conflict especially in case of *Tpitp*. *Lmilbrd1* and *Lmilbrd3* are negatively related with conflict and *Lmilbrd2* and *Lmilbrd4* are positively related with conflict. This confirms our hypothesis that Pakistan's high military expenditure is a close determinant of the India-Pakistan conflict. The high values of the $\alpha_{4,t-i}$ coefficients in this case indicate that any increase in military expenditure by Pakistan when compared to India will be correlated with higher conflict. However negative signs of *Lmilbrd2* and *Lmilbrd4* also suggest that India's military expenditure is weakly related with conflict. We have argued that Indian military expenditure is also directed to its domestic civil wars and security concerns with other states, and thus in case of *Lmilbrd1*, *Lmilbrd2*, *Lmilbrd3* and *Lmilbrd4* the explanatory power comes from Pakistan's military expenditure. Furthermore, combined military scores

Table 2a

Variables	VAR Regression Equations for Fatal under multiple specifications of BiLateral Trade and Military Burden													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<u>Bilateral Trade</u>														
Tpitp (16)	-0.30*	-0.30*	-0.32*	-0.28*	-0.24**	-0.23**	-0.22**							
Tpiti (16)								-0.76***	-0.76***	-0.83**	-0.70***	-0.61***	-0.64***	0.55***
<u>Military Burden</u>														
Imilbrd1 (6)	2.33***							2.02						
Imilbrd2 (6)		-2.33***							-2.02					
Imilbrd3 (6)			6.53***							6.03				
Imilbrd4 (6)				-3.45							-2.84			
Imilbrd5 (2)					6.84**							6.54**		
Imilbrd6 (1)						3.26***							3.52***	
Lmilppi(2)							-1.80							
Lmilpip(2)														1.79
<u>Social Development</u>														
Ledupi1(2)	-4.98	-4.98	-4.83	-5.09***	-6.35**	-8.34*	-6.08**	-6.07***	-6.07***	-6.19***	-6.02***	-5.97**	-8.35*	-6.10**
<u>Economic Growth</u>														
Gpi (1)	-0.40*	-0.40*	-0.41*	-0.40*	-0.28*	-0.35*	-0.34*	-0.39*	-0.39*	-0.39*	-0.39*	-0.31*	-0.38*	-0.37*
<u>Exogenous Variables</u>														
Demopi (7)	-0.003	-0.003	-0.003	-0.003	-0.003	-0.004***	-0.004***	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003***	-0.004***
Poppi (10)	0.064*	0.064*	0.063*	0.066*	0.112*	0.094*	0.076*	0.063*	0.063*	0.062*	0.064*	0.101*	0.088*	0.072*
N	38	38	38	38	38	38	38	38	38	38	38	38	38	38
R2	0.61	0.61	0.62	0.61	0.63	0.61	0.59	0.57	0.57	0.58	0.57	0.61	0.59	0.57
VAR(p)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)	VAR(2)

*, **, *** shows significance at 1%, 5% and 10% level

- VAR(p) reports lag-order for each VAR model based on final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan and Quinn information criterion (HQIC),

Table 2b

Variables	VAR Regression Equations for Fatal under multiple specifications of Exports, Imports and Military Burden											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Multilateral Trade</i>												
Lxpi1(1)	-4.24*	-4.03*	-3.96*									
Lxpi2(1)				-7.89*	-7.15*	-4.78*						
Lmpi1(2)							-0.36	-0.17	0.03			
Lmpi2(2)										-0.71	-0.59	-0.33
<i>Military Burden^a</i>												
Lmilbrd3 (6)	2.19			5.84**			0.39			0.30		
Lmilbrd4(6)		-0.66			-2.34***			0.44			0.37	
Imilbrd6 (1)			3.51*			2.42***			3.19**			3.09**
<i>Social Development</i>												
Ledupi1(2)	-1.96	-2.08***	-7.13*	-2.87*	-2.89*	-7.02*	-3.97*	-4.19*	-8.66*	-4.01*	-4.13*	-8.43*
<i>Economic Growth</i>												
Gpi (1)	-0.36*	-0.36*	-0.35*	-0.39*	-0.39*	-0.39*	-0.34*	-0.36*	-0.33*	-0.34*	-0.35*	-0.33*
<i>Exogenous Variables</i>												
Demopi (7)	-0.004***	-0.004***	-0.003***	-0.002	-0.002	-0.002	-0.006*	-0.006*	-0.006*	-0.006*	-0.005*	-0.005*
Poppi (10)	0.122*	0.120*	0.154*	0.077*	0.075*	0.103*	0.077*	0.078*	0.104*	0.074*	0.075*	0.103*
N	45	45	45	45	45	45	45	45	45	45	45	45
R2	0.50	0.49	0.55	0.58	0.55	0.55	0.40	0.40	0.45	0.40	0.40	0.44
VAR(p)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)

*, **, *** shows significance at 1%, 5% and 10% level

- VAR(p) reports lag-order for each VAR model based on final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan and Quinn information criterion (HQIC),

- ^a Results for *Lmilbrd1*, *Lmilbrd2*, *Lmilbrd5*, *Lmilppi* and *Lmilpip* are also utilised and the results do not change. (See tables 3a and 3b for details)

Table 3: VAR Regression results for Various Measures of Conflict

Variables	VAR Regression Equations under multiple Specifications for Conflict and Military Burden														
	Volfatal			Cnfpj			Dur			Hstlvi			Hiact		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
<i>Multilateral Trade</i>															
Lxpi2 (1)	-10996*	-9971*	-6662*	-2.60*	-2.48*	-1.22***	-451.46**	-413.04**	-182.81	-6.81*	-6.60*	-4.07**	-25.75**	-25.32*	-16.08***
<i>Military Burden^a</i>															
Lmilbrd3 (6)	8276*			2.91*			604.72*			5.33***			19.09		
Lmilbrd4(6)		-3352**			-1.46*			-283.85**			-2.68***			-9.98	
Lmilbrd6 (10)			3255***			0.31			-55.94			0.97			4.47
<i>Social Development</i>															
Ledupi (2)	-397.02	-435.58	-6011.6**	-0.74***	-0.69	-1.48	-146.53	-130.7	-180.69	-1.56	-1.47	-3.34	-9.09***	-8.75***	-17.08
Gpi (1)	-517.07*	-524.78*	-554.46*	-0.86**	-0.084***	-0.09**	4.89	4.97	3.63	-0.25***	-0.25***	-0.26***	-1.28**	-1.26**	-1.38***
<i>Exogenous Variables</i>															
Demopi (8)	1.36	1.06	0.06	-0.001***	-0.001***	-0.002***	-0.336***	-0.342***	-0.372***	-0.001	-0.001	-0.001	-0.011	-0.012	-0.012
Poppi (11)	36.38***	34.66***	71.54*	0.023*	0.021*	0.027*	3.531***	3.209***	4.248***	0.051**	0.048**	0.058**	0.253*	0.247*	0.295*
N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
R2	0.45	0.44	0.42	0.53	0.51	0.42	0.40	0.37	0.31	0.42	0.42	0.38	0.39	0.40	0.37
VAR(p)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)	VAR(1)

*, **, *** shows significance at 1%, 5% and 10% level

- VAR(p) reports lag-order for each VAR model based on final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan and Quinn information criterion (HQIC),

- ^a Results for *Lmilbrd1*, *Lmilbrd2*, *Lmilbrd5*, *Lmilppi* and *Lmilpip* are also utilised and the results do not change. (See tables 3a and 3b for details)

in *Lmilbrd5* and *Lmilbrd6* are positively related with conflict and the relationship is significant for both proxies of bilateral trade. This result suggests that irrespective of Indian security concerns (national or international), or Pakistan's anxieties about Indian hegemony, military expenditures on average do not have deterrent effect (in terms of fewer fatalities), but high military expenditures by both sides could reflect an arms race between both countries. The insignificance of *Lmilppi* and *Lmilpip* may also indicate the transformation of contemporary conventional war tactics, in which military size *per se* has a limited role in providing strategic depth. However, the negative sign of *Lmilppi* and the positive sign of *Lmilpip* indicate that increased Pakistani military personnel has a deterrent effect, and the converse is true for India. Education expenditures *Ledupi1* and growth rates *Gpi* are significantly related to conflict mitigation, and the size of coefficients suggests that the potential of spending on education in decreasing hostilities is quite substantial. Democracy also decreases the severity of conflict, but the low values of coefficients, and their insignificance in certain cases, show a weak relationship.

Table 2b shows the results for multilateral trade with various proxies of military burden. In combination with various proxies of multilateral trade the explanatory power of *Lmilbrd1*, *Lmilbrd2*, *Lmilbrd3* and *Lmilbrd4* have reduced as they are generally insignificant but the coefficients have also been reduced especially for *Xmpi* and *Xmip*. The only military burden proxy which is consistently significant and also comes out with the right sign is *Lmilbrd6*. This means that our conclusion about the average conflict enhancing role of military expenditures has not been altered. Table 2b shows results for average trade scores for both countries differentiated by exports and imports. Combined exports by both countries to rest of the world are negatively related with conflict and the relationship is significant at the 1% level. The coefficients can be shown to be greater than when individual multilateral trade is included⁸, indicating that the more these two countries are able to export to rest of the world, the lower are the levels of bilateral conflict. In contrast to exports, results on *Lmpi1* and *Lmpi2* show that rising imports do not abate conflict significantly. The results for education expenditure, economic performance and democracy remain unchanged.

Further robustness checks, under additional specifications of the conflict dependent variable, are carried out on (12) with different proxies of conflict (i.e., *Volfatal*, *Cnfpj*, *Dur*, *Hstlvi* and *Hiact*). The results are reported in Table 3. They confirm the validity of all the 5 hypotheses proposed at start of our empirical section, and the preceding theoretical analysis. More trade, increased education expenditure, higher GDP per capita growth rates, a greater democratic orientation, all exert downward pressure on conflict, as all of these variables are

⁸ Available from the authors upon request. We also ran vector error correction methods (VECM) regressions which are more appropriate for country-specific data. The results are not reported here and can be provided on request, but the overall tone of the outcomes remain unchanged.

significant in most cases, and always carry the right signs. A comparison of coefficients suggests that integration (or multilateral trade) with the world has by far the most dominant effect on conflict mitigation than any other variable. Note that in Table 3 we only consider multilateral trade, and not bilateral India-Pakistan trade.⁹ Education spending comes second in its effectiveness in enhancing peace. The results in Table 3 also show that annual battle deaths, severity of conflict, duration of escalation, hostility levels and highest hostility level decrease when both countries score high on democracy. Again, persistently low values taken by democracy means that political orientation plays a less prominent role in explaining the severity of dispute or levels of escalation. There is some evidence that these countries have entered into outright war even when both were democracies. The 'Kargil' war of 1999 is a case in point.

We ran Granger causality tests for each VAR specification for which we present results in tables 3 and 4. A summary of Granger causality tests are provided in Table 4 for all endogenous regressors of conflict, and where there is an instance of reverse causality it is noted. The results in Table 4 show that all regressors except *Lmilppi*, *Lmilpip*, *Lmpi1* and *Lmpi2* Granger cause conflict. We also witness some instances of reverse causality, and these require some elaboration.

The reverse causality in the India-Pakistan bilateral trade measures show that low levels of trade are also an outcome of India-Pakistan conflict which has spanned more than 50 years. Thus any decrease in hostility levels would also exert a positive effect on bilateral trade which would create fertile grounds for dispute resolution. The presence of reverse causality in average military spending is also not a surprise. This means that India-Pakistan conflict is also a significant cause of historically high military expenditures between both countries. In the light of all the results, one interpretation may be that a military build up by Pakistan increases as a response to conflict. Reduction of hostilities would thus favourably affect the military burden in both countries, and both India and Pakistan would have more resources to channel towards its development and poverty reduction strategies. The greater allocation of funds for defense due to ongoing conflict, may also strangle development spending. The reverse causality from conflict to education expenditure could explain this process. Reverse causality between conflict measures and proxies of education expenditure highlight the resource constraints faced by both sides due to their rivalry where funds allocated to defense seems to crowd out public investment in development sector. We also find that there is reverse causality between *Lxpi2* and *Hsts/vl* and *Hiact*. This result highlights the economic implications of conflict. If hostility levels rise and conflict moves closer to outright war, it will strangle export capability with rest of the world for both countries. This will have negative effects on growth potentials also. Economic growth Granger causes conflict, and the relationship is

⁹ Space constraints prevent us from reporting all our findings, but coefficients on bilateral trade are consistently smaller than comparable coefficients on multilateral trade when regressed along with common independent variables.

negative. The growth patterns of both countries are independent of conflict as far as reverse causality is concerned. The relationship is highly significant at a 1% level in all the observed instances of Table 4. These results substantiate our graphical analysis, where hostilities between both countries seem to go down when both countries are performing well on the macro-economic front.

Table 4. Granger Causality Wald Tests

Direction of Causality	Causes	RC	Direction of Causality	Causes	RC
<i>Tpiti</i> → <i>Fatal</i>	(√)*	(√)***	<i>Gpi</i> → <i>Volfatal</i>	(√)*	×
<i>Tpiti</i> → <i>Fatal</i>	(√)***	(√)**	<i>Lxpi2</i> → <i>Cnfpfi</i>	(√)*	×
<i>Xmpi</i> → <i>Fatal</i>	(√)**	×	<i>Lmilbrd3</i> → <i>Cnfpfi</i>	(√)*	×
<i>Xmip</i> → <i>Fatal</i>	(√)*	×	<i>Lmilbrd4</i> → <i>Cnfpfi</i>	(√)*	×
<i>Lxpi1</i> → <i>Fatal</i>	(√)*	×	<i>Lmilbrd6</i> → <i>Cnfpfi</i>	×	(√)***
<i>Lxpi2</i> → <i>Fatal</i>	(√)*	×	<i>Ledupi1</i> → <i>Cnfpfi</i>	(√)***	(√)***
<i>Lmpi1</i> → <i>Fatal</i>	×	×	<i>Gpi</i> → <i>Cnfpfi</i>	(√)*	×
<i>Lmpi2</i> → <i>Fatal</i>	×	×	<i>Lxpi2</i> → <i>Dur</i>	(√)*	×
<i>Lmilbrd1</i> → <i>Fatal</i>	(√)**	×	<i>Lmilbrd3</i> → <i>Dur</i>	(√)*	×
<i>Lmilbrd2</i> → <i>Fatal</i>	(√)**	×	<i>Lmilbrd4</i> → <i>Dur</i>	(√)**	×
<i>Lmilbrd3</i> → <i>Fatal</i>	(√)*	×	<i>Lmilbrd6</i> → <i>Dur</i>	×	(√)***
<i>Lmilbrd4</i> → <i>Fatal</i>	(√)*	×	<i>Ledupi1</i> → <i>Dur</i>	(√)*	(√)*
<i>Lmilbrd5</i> → <i>Fatal</i>	(√)*	(√)**	<i>Gpi</i> → <i>Dur</i>	(√)*	×
<i>Lmilbrd6</i> → <i>Fatal</i>	(√)*	(√)*	<i>Lxpi2</i> → <i>Hstlvl</i>	(√)*	(√)*
<i>Lmilpip</i> → <i>Fatal</i>	×	×	<i>Lmilbrd3</i> → <i>Hstlvl</i>	(√)***	×
<i>Lmilppi</i> → <i>Fatal</i>	×	×	<i>Lmilbrd4</i> → <i>Hstlvl</i>	(√)***	×
<i>Ledupi1</i> → <i>Fatal</i>	(√)*	(√)*	<i>Lmilbrd6</i> → <i>Hstlvl</i>	×	(√)*
<i>Ledupi2</i> → <i>Fatal</i>	(√)*	(√)*	<i>Ledupi1</i> → <i>Hstlvl</i>	×	(√)*
<i>Ledupi3</i> → <i>Fatal</i>	(√)*	×	<i>Gpi</i> → <i>Hstlvl</i>	(√)***	×
<i>Ledupi4</i> → <i>Fatal</i>	(√)*	(√)***	<i>Lxpi2</i> → <i>Hiact</i>	(√)**	(√)***
<i>Gpi</i> → <i>Fatal</i>	(√)*	×	<i>Lmilbrd3</i> → <i>Hiact</i>	×	×
<i>Lxpi2</i> → <i>Volfatal</i>	(√)*	×	<i>Lmilbrd4</i> → <i>Hiact</i>	×	×
<i>Lmilbrd3</i> → <i>Volfatal</i>	(√)*	×	<i>Lmilbrd6</i> → <i>Hiact</i>	×	(√)*
<i>Lmilbrd4</i> → <i>Volfatal</i>	(√)*	×	<i>Ledupi1</i> → <i>Hiact</i>	(√)***	(√)**
<i>Lmilbrd6</i> → <i>Volfatal</i>	(√)*	(√)***	<i>Gpi</i> → <i>Hiact</i>	(√)***	×
<i>Ledupi1</i> → <i>Volfatal</i>	(√)*	×			

*, **, *** shows significance at 1%, 5% and 10% level, RC stands for reverse causation, √ means causes and × means not causes

4. Conclusions

Conflict between India and Pakistan, which spans over most of last 60 years since their independence from British rule, has significantly hampered bilateral trade between the two nations. However, we also find that the converse is also

true; more trade between India and Pakistan decreases conflict and any measures to improve the bilateral trade share is a considerable confidence building measure. In the short term, greater Indian access to Pakistani markets will help decrease hostilities between the two countries; whereas in the long run as the peace is achieved, both countries could be exporting more to each other. Lately, there has been a high demand of cheaper Indian raw materials in Pakistani industries. A regional trade agreement along the lines of a South Asian Free Trade Agreement (SAFTA) could enable freer access to the markets of member countries, and has a high potential for the improvement of relations between India and Pakistan on a long term basis. Pakistan and India's degree of openness to world trade is the *dominant* economic factor in conflict resolution. One would imagine that in the counterfactual case of significant mutual inward investment, that too would also decrease mutual belligerent tendencies.

Some of our results may appear to suggest that Pakistan's relative military expenditure is conflict enhancing, whereas Indian relative military expenditure has a deterrent effect on conflict. This result, however, needs to be interpreted with caution. It does not necessarily mean that Pakistan is the principal actor initiating inter-state conflict with India. Rather it means that India, the regional hegemon, has other domestic and international concerns to which its defence spending is targeted, besides its disputes with Pakistan. India, for example, has unilaterally massed troops on Pakistan's borders in 1951 and 2002. Indeed, there is some reverse causality between some of the military proxies and conflict suggesting that Pakistan's military build ups may be more reactive. Overall military expenditures are still at high levels in both countries and are diverting scarce resources away from social development spending, such as on education, and poverty reduction. Education spending has been shown to be good for both peace and economic progress.

In an ideal world increased dyadic democracy between pairs of nation should reduce inter-state hostility according to the democratic peace hypothesis; this relationship in our case is present but weak. Peace initiatives, it should be remembered, are not the sole prerogative of democracies; they can also be made by countries which are less than perfectly democratic out of economic self-interest. Pakistan, at present, is making unilateral concessions on many disputed issues with India. Our findings, however, veer towards the liberal peace hypothesis. Economic progress and poverty reduction combined with greater openness to international trade in general are more significant drivers of peace between nations like India and Pakistan, rather than the *independent* contribution of a common democratic polity. So it is more economic interdependence rather than politics which is likely to contribute towards peaceful relations between India and Pakistan in the near future. In many ways, our results for an individual dyad echo Polcahek's (1997) work across several dyads, where it is argued that democracies cooperate not because they have common political systems, but because their economies are intricately and intensively interdependent. As pointed by Hegre (2000), it is at these higher stages of economic development

that the contribution of common democratic values to peace becomes more salient. Meaningful democracy cannot truly function where poverty is acute and endemic, even in ostensible democracies such as India. In the final analysis, it may be that democracy itself is an endogenous by-product of increased general prosperity, as suggested nearly half a century ago by Lipset (1960). Then and only then, will nations be able to fully comprehend Angell-Lanes' (1910) arguments regarding the futility of inter-state conflict.

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APPENDIX: DATA and SOURCES

Single Country Variables:

ldg: India's Defence Expenditure as a percentage India's GDP at current market prices, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book 2006 (IMF) and Economic Survey of Pakistan

ledug: India's education expenditure as a %age of India's GDP at current market prices, Years: 1950-2005, Sources: Indian Economic Survey, Education Statistics (Department of Education, India) and Education Statistics 2006 (World Bank)

lexpg: India's total exports as a percentage of India's GDP, Years: 1950-2005, Source: Indian Economic Survey, International Financial Statistics 2006 (IMF)

lg: Annual growth rate of India's per capita gross domestic product (GDP) at constant prices, Years: 1950-2005, Source: Indian Economic Survey

lgpc: India's real per capita growth rate: Years: 1950-2005, Source: Indian Economic Survey, International Financial Statistics 2006 (IMF), World Development Indicators 2006 (World Bank)

limpg: India's total imports as a percentage of India's GDP, Years: 1950-2005, Source: Indian Economic Survey, International Financial Statistics 2006 (IMF)

lmiipop: India's number of military personnel as a percentage of Indi's total population. Years: 1950-2003, Source: COW Inter-State War Data, Version 3.02, Faten et al (2004), International Financial Statistics 2006 (IMF)

lopen: India's exports plus imports as a %age India's GDP at current market prices, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF)

lxp: Indian exports to Pakistan, Years: 1960-2005, Source: as above.

P2i: Polity 2 Score for India, numeric range from -10 (high autocracy) to 10 (high democracy), Years: 1950-2003, Source: Polity IV Project (Center for International Development and Conflict Management)

P2p: Polity 2 Score for Pakistan, numeric range from -10 (high autocracy) to 10 (high democracy), Years: 1950-2003, Source: as above.

Pedug: Pakistan's education expenditure as a percentage of Pakistan's GDP at current market prices, Years: 1950-2005, Sources: Pakistan Economic Survey and Education Statistics 2006 (World Bank)

Pexpg: Pakistan's exports as a percentage of Pakistan's GDP, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF)

Pdg: Pakistan's Defence Expenditure as a percentage Pakistan's GDP at current market prices, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators (2006), Government Finance Statistics Year Book 2006 (IMF) and Economic Survey of Pakistan

Pg: Annual growth rate of Pakistan's GDP per capita at constant prices, Years: 1950-2005, Source: Pakistan Economic Survey

Pgpc: Pakistan's real GDP per capita Growth rates, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF), Pakistan Economic Survey

Pimpg: Pakistan's imports as a percentage of Pakistan's GDP, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF)

Pmilpop: Pakistan's number of military personnel as a percentage of Pakistan's total population. Years: 1950-2003, Source: COW Inter-State War Data, Version 3.02, Faten et al (2004), International Financial Statistics 2006 (IMF)

Popen: Pakistan's exports plus imports as a percentage Pakistan's gross domestic product at current prices, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF)

Pxi: Pakistan's exports to India, Years: 1960-2005, Source: Direction of Trade Statistics yearbook, IMF

Dyadic Variables:

Cnfp: Intensity of Conflict between Pakistan and India, Scores 1 (Minor) when 25 to 999 battle-related deaths and 2 (War) when at least 1000 battle-related deaths in a given year, Years: 1950-2003, UCDP/PRIO Armed Conflict Data set Version IV, Harbom et al (2006)

Demopi: Pakistan and India's combine democracy score (by adding 10 to India and Pakistan's Polity2 values for each year and then taking the product of these values in order to covert the variable in dyadic form), Years; 1950-2003

Dur: Number of days a conflict lasts in a year between Pakistan and India, Years: 1950-2003, Source: COW Inter-State War Data, Version 3.02, Faten et al (2004).

Fatal: Annual fatality level of conflict between Pakistan and India, scores from 0 to 6

- 0 None
- 1 1-25 Deaths
- 2 26-100 Deaths
- 3 101-250 Deaths
- 4 251-500 Deaths
- 5 501-999 Deaths
- 6 >999 Deaths

Years: 1950-2003, Source: COW Inter-State War Data, Version 3.02, Faten et al (2004)

Gpi: Weighted average of real GDP per capita growth rates for Pakistan and India, Years: 1950 to 2005. Sources: Pakistan Economic Survey, Indian Economic Survey, International Financial Statistics 2006 (IMF)

Hiact: Highest action by Pakistan and India in annual corresponding dispute [bracketed numbers refer to corresponding hostility level]

- 0 No militarised action [1]
- 1 Threat to use force [2]
- 2 Threat to blockade
- 3 Threat to occupy territory [2]
- 4 Threat to declare war [2]
- 5 Threat to use CBR weapons [2]
- 6 Threat to join war
- 7 Show of force [3]
- 8 Alert [3]
- 9 Nuclear alert [3]
- 10 Mobilisation [3]
- 11 Fortify border [3]
- 12 Border violation [3]
- 13 Blockade [4]
- 14 Occupation of territory [4]
- 15 Seizure [4]
- 16 Attack [4]
- 17 Clash [4]
- 18 Declaration of war [4]
- 19 Use of CBR weapons [5]
- 20 Begin inter-state war [5]
- 21 Join inter-state war [5]

Years: 1950-2003, Source: COW Inter-State War Data, Version 3.02, Faten et al (2004)

Hstlev: Annual hostility levels reached by India and Pakistan in each annual corresponding dispute

- 1 No militarised action
- 2 Threat to use force
- 3 Display of force
- 4 Use of force
- 5 War

Years: 1950-2003, Source: Faten et al (2004)

Ledupi1: Log GDP weighted average of India and Pakistan's per capita education expenditures, Years: 1950 to 2005 Sources: Pakistan Economic Survey, Indian Economic Survey, Education Statistics 2006 (World Bank), International Financial Statistics 2006 (IMF)

Ledupi2: Log mean of India and Pakistan's per capita education expenditures, Years: 1950 to 2005 Sources: as above

Ledupi3: Log of Pakistan plus India's education expenditures as a ration of Pakistan plus India's GDPs, Sources: as above

Ledupi4: Log of average of Pakistan's education expenditure over GDP plus India's education expenditure over GDP, Years: 1950 to 2005, Sources: as above

Lmilbrd1: Log of Pakistan's defence expenditure over Pakistan's GDP as a ratio of India's defence expenditure over India's GDP, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF) and Economic Survey of Pakistan

Lmilbrd2: Log of India's defence expenditure over India's GDP as a ratio of Pakistan's defence expenditure over Pakistan's GDP, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF) and Economic Survey of Pakistan

Lmilbrd 3: Log of Pakistan's defence expenditure over Pakistan's GDP as a ratio of Pakistan's defence expenditure over Pakistan's GDP plus India's defence expenditure over India's GDP, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF) and Economic Survey of Pakistan

Lmilbrd 4: Log of India's defence expenditure over India's GDP as a ratio of Pakistan's defence expenditure over Pakistan's GDP plus India's defence expenditure over India's GDP, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF) and Economic Survey of Pakistan

Lmilbrd5: Log of Mean of India's defence expenditure over GDP and Pakistan's defence expenditure over GDP, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF) and Economic Survey of Pakistan

Lmilbrd6: Log GDP weighted average of Pakistan and India's defence expenditures, Years: 1950-2005, Sources: Correlates of war data set version 3.02, World Development Indicators 2006 (World Bank), Government Finance Statistics Year Book (IMF), Economic Survey of Pakistan, Economic Survey of India

Lmilppi: Log of Pakistan's military personnel over Pakistan's total population as a ratio of India's military personnel over India's total population, Years: 1950-2001, Sources: Correlates of war data set version 3.02 and International Financial Statistics 2006 (IMF)

Lmilpip: Log of India's military personnel over India's total population as a ratio of Pakistan's military personnel over Pakistan's total population. Years: 1950-2001, Sources: Correlates of war data set version 3.02 and International Financial Statistics 2006 (IMF)

Lmpi1: Log GDP weighted average of Pakistan and India's total imports, Years: 1950-2005, Source: International Financial Statistics 2006 (IMF)

Lmpi2: Log mean of Pakistan's total imports as a proportion of Pakistan's GDP and India's total imports as a ratio of India's GDP, Years: 1950-2005, Source: as above

Lxpi1: Log GDP weighted average of Pakistan and India's total exports, Years: 1950-2001, Source: as above.

Lxpi2: Log mean of Pakistan's total exports over Pakistan's GDP and India's total exports over India's GDP. Years: 1950-2001, Source: as above

Poppi: Average of Pakistan's total population and India's total population, Years: 1950-2001, Source: as above

Tpitp: Bilateral trade between Pakistan and India as a ratio of Pakistan's total trade, Years: 1950-2001, Source: Direction of Trade Statistics yearbook, IMF International Financial Statistics 2006 (IMF)

Tpiti: Bilateral trade between Pakistan and India as a ratio of India's total trade, Years: 1950-2001, Source: as above

Xmpi: Pakistan's total trade (exports + imports) as a ratio of India's Total trade (exports + imports), Years: 1950-2001, Source: as above

Xmip: India's total trade (exports + imports) as a ratio of Pakistan's total trade (exports + imports). Years: 1950-2001, Source: as above

VolFatal: Precise volume of fatality in each annual corresponding dispute, Years: 1950-2003, Sources: COW Inter-State War Data, Version 3.02 (Faten et al, 2004), CSCW/PRIO Battle Deaths data (Lacina, 2005), CSP Data set on Major Episodes of Political Violence 1946-2006
<http://members.aol.com/cspm/mgm/warlist.htm>