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Mamoon, Dawood and S. Mansoob, Murshed
Institute of social studies

25. April 2008

Online at <http://mpra.ub.uni-muenchen.de/10431/>
MPRA Paper No. 10431, posted 11. September 2008 / 14:41

ON THE CONFLICT MITIGATING EFFECTS OF TRADE: THE INDIA-PAKISTAN CASE

Dawood Mamoon
Institute of Social Studies (ISS)
PO Box 29776
2502 LT, The Hague, The Netherlands
Mamoon@iss.nl
&
S Mansoob Murshed*
The Birmingham Business School
University of Birmingham
Edgbaston, Birmingham B15 2TT, UK.
Institute of Social Studies (ISS)
PO Box 29776
2502 LT, The Hague, The Netherlands
Centre for the Study of Civil War (CSCW)
PRIO, Oslo, Norway
Murshed@iss.nl
www.iss.nl
This version: 24th April 2008

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, democracy scores and population are simultaneously considered. Our empirical investigation based on time series econometrics from 1950-2005 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. *Globalization*, or a greater openness to international trade with the rest of the world, is the most significant driver of a liberal peace, rather than a common democratic orientation suggested by the pure form of the democratic peace.

J.E.L Codes: F15, F51, F52.

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

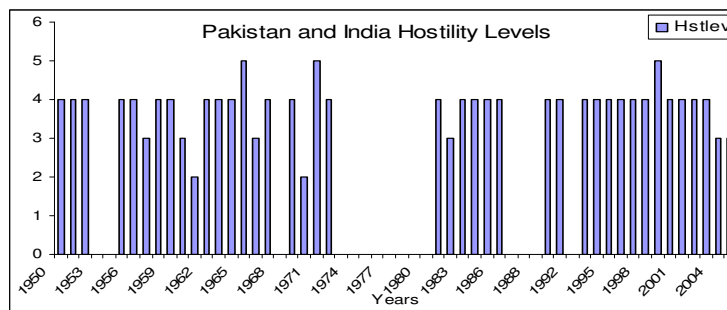
* Corresponding author. We would like to thank participants of the WZB workshop in Berlin, 28-29th March 2008 for helpful comments.

1 INTRODUCTION

This paper examines inter-state hostility between India and Pakistan, which is arguably one of the most prominent inter-state conflicts still extant, and whose saliency is magnified by the presence of nuclear weapons. Conflict reduction is also necessary in the region to release resources for poverty reduction. We analyse some of the factors that might lead to conflict abatement between these long standing rivals, especially the role of increased international trade as a conflict mitigating factor.

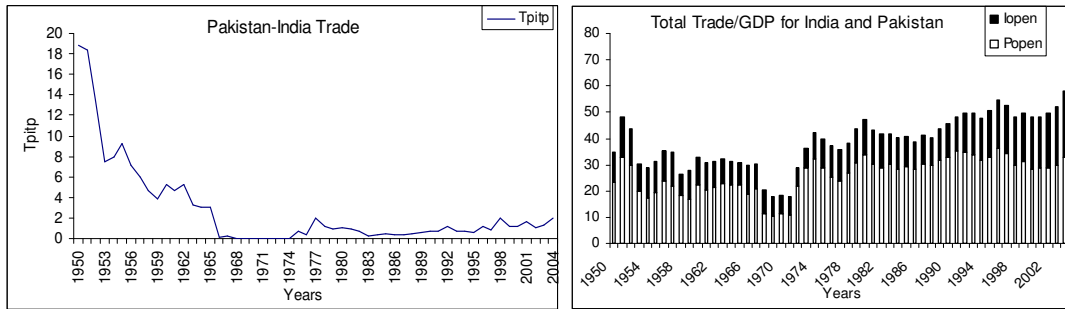
Outright war is just one manifestation of the rivalry between nations; the armed peace is equally consistent with aggressiveness. India and Pakistan have had four large scale military confrontations (1948, 1965, 1971 and 1999), but otherwise spend a great deal of time in uncompromising posturing vis-à-vis each other. Central to their hostility is the territorial dispute over Kashmir. India, in particular, frequently accuses Pakistan of sponsoring terrorism in her territory. Negotiations are infrequent, but occasionally both nations make goodwill gestures, such as sending out peace buses between cities, and agree to cricket tours. Figure 1 (based on the data in Faten, Palmer and Bremer, 2004) 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 indicates belligerency short of outright war.

Figure 1: Hostility Levels between India and Pakistan



International trade allows one country to peacefully benefit from the endowment of another nation through voluntary exchange. Conflict and rivalry are symptomatic of the absence of cooperation, including lesser bilateral trade. Equally, conflict may be said to be a consequence of the lack of trade. Polachek (1997) and Polachek and Seiglie (2006) argue that wars and disputes between geographically contiguous states involve substantial losses, as more efficient geographically proximate trade is displaced. 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 both India and Pakistan have fairly open economies at present.

Figure 2: Patterns in India-Pakistan Trade

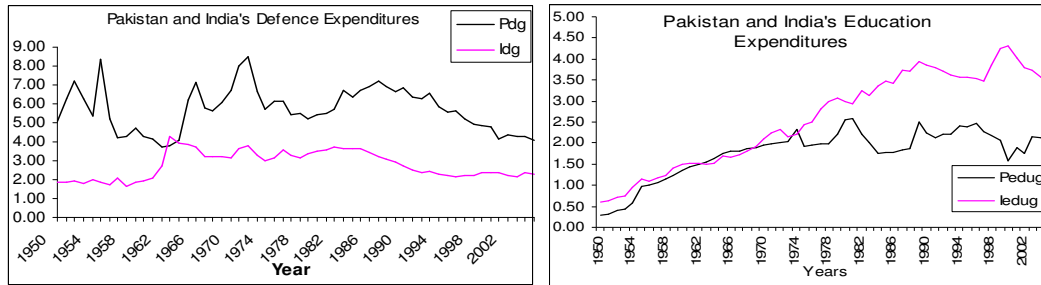


A related issue concerns the so-called *democratic peace*¹, see Polachek (1997) and Polachek and Seigle (2006) for a review of this substantial literature. The idea is that democracies will not fight each other because they share cultural norms that militate against forceful dispute resolution, or alternatively 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. Polachek (1997) makes a case for the alternative notion of the *liberal peace*², 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. Oneal and Russett (1999) also show that trade and peace are highly correlated. Barbieri (1996) demonstrates that the liberal peace based upon the pacific effects of economic interdependence may be a chimera. Hegre (2000), however, argues that economic interdependence reinforces peace, between more developed economies.

¹ 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 also as the liberal peace.

² 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.

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 always had one of the highest democracy scores in the developing world (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 fact, these two countries have among the highest military burdens in the world outside the Middle East (World Development Indicators, 2006).

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, too, has been growing at an average of 6% for the last 3 to 4 years. Despite a relatively high democracy score in Pakistan up to 1999, conflict between the countries escalated in the 1990s. By contrast, the recent regime in Pakistan which had a strong military orientation made 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. We examine whether greater inter-state trade, democracy and reduced military spending lowers belligerence between India and Pakistan 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 empirical 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.

B Costs of Peace

If peace is Pareto optimal, why don't countries favour it?³ 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. The probability of either state is in turn affected by a actions and efforts; (a) for India and (e) for 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 and the United States.

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.

³ 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).

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, $Z_{a1} < 0$.⁴ Also, $\pi_a > 0$, but $\pi_{aa} < 0$; there are diminishing returns to these actions. 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 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

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

⁴ Increased globalization is unlikely to directly affect the marginal productivity of actions or efforts (a , e) that raise the probability of peace (π).

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

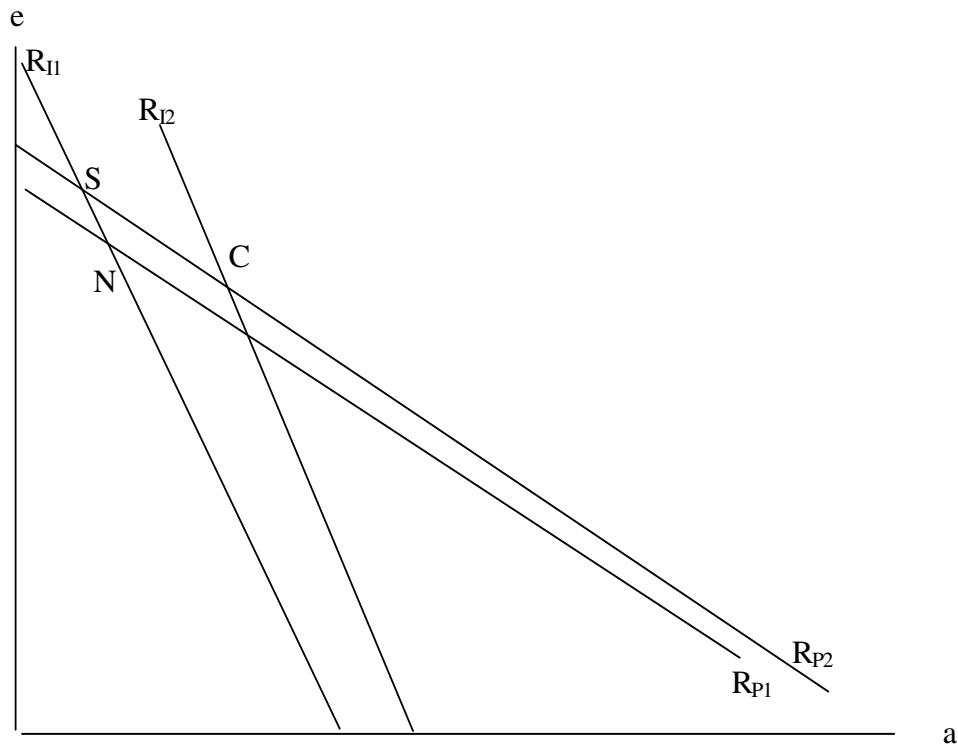
$$\frac{de}{da/R_I} = \frac{Z_{aa} + \pi_{aa} [U_I^H(\cdot) - U_I^D(\cdot)]}{\pi_{ae} [U_I^D(\cdot) - U_I^H(\cdot)]} \begin{matrix} \geq \\ \leq \end{matrix} \dots 0 \dots \text{if } \dots \pi_{ae} \begin{matrix} \geq \\ \leq \end{matrix} 0 \quad (10)$$

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.

Figure 4: Reaction Functions of India and Pakistan



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 conditions for both 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.

3 EMPIRICAL ANALYSIS

A Hypotheses

H₁: Greater bilateral inter-state commerce between the two countries, 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.

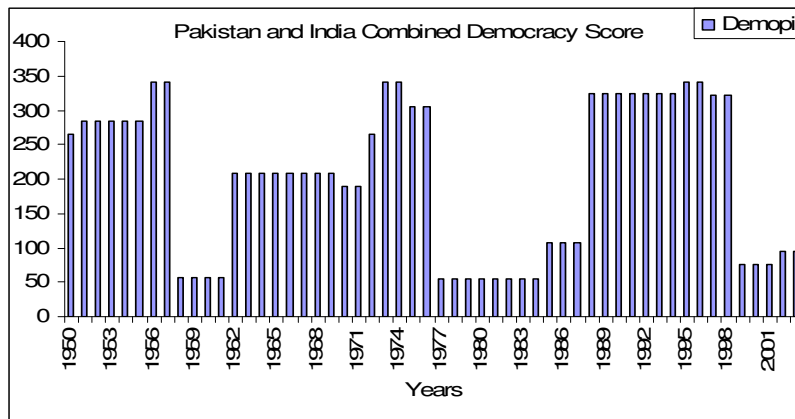
H₄: GDP growth will decrease inter-state conflict; there is more to lose from war. This raises the utility from consumption in (4), (6) through to (9).

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 Empirical Results

There are various data sources on inter-state conflict, see Murshed and Mamoon (2007). In this paper we report results using 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). 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. We also look at the proportion of military personnel to the overall population. This might reflect the extent of militarization in a society. 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). A full data description is presented in the appendix.

Figure 5: Dyadic democracy scores for Pakistan and India



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. In Murshed and Mamoon (2007), based on our time series data, we ran a Vector Autoregressive model (VAR) which is an extension of univariate autoregressive (AR) models to capture the evolution and the interdependencies between our multiple time series (Sims, 1980). These results were based on dyadic variables and we found that trade with the rest of the world was the most major factor in reducing India-Pakistan conflict. In other words, general globalization was most important in lowering India-Pakistan tensions, compared to bilateral trade. This is not surprising, as these two countries being quite poor are more likely to trade with the rest of the world compared to each other. Secondly, a common democratic orientation is secondary to globalization in mitigating conflict between the two nations (as indicated earlier, this applies mainly to Pakistan, as India is a steady democracy whereas Pakistan oscillates between military rule and elected governments). Thus, we found greater support for the liberal (economic) peace relative to the democratic peace. Interestingly when we ran Granger (1969) causality tests we found reverse causality between conflict and bilateral trade, as well as militarization and education expenditure. Thus, increased trade not only reduces conflict, but conflict also lowers bilateral trade. A similar argument can be applied to militarization and education expenditure, as increased threat perceptions also raise military expenditure and lower development spending.

In this paper we analyze country specific, rather than dyadic, effects in order to investigate in detail the potential of each country's trade levels, military burden, development expenditure and economic performance in enhancing peace and mitigating conflict. For Pakistan, we use Pakistan's trade share with rest of the world ($Popen$), Pakistan's total exports to GDP ratio ($Pexpg$) and Pakistan's imports to GDP ratio ($Pimpg$) as proxies for Pakistan's multilateral trade. Pakistan's exports to India (Pxi) are a proxy for bilateral trade. Pakistan's defence expenditure as a percentage of its GDP (Pdg) is a proxy for the military burden, and $Pedug$ is Pakistan's education expenditure as a percentage of its GDP. Similarly for India, we employ 3 proxies of multilateral trade namely $lopen$, $lexpg$ and $limpg$, 1 proxy for bilateral trade

(*lxp*), 1 proxy for military burden (*ldg*) and 1 proxy for education expenditure (*ledug*). We do not use separate Polity scores for India and Pakistan, as any changes in combined democracy scores are due to Pakistan. Before we carry out our econometric analysis, we undertook the stationary test. Note that our independent variables are time series in nature, and thus may have autocorrelation. Achieving stationarity in such series may be difficult.

We ran unit root tests on the above variables and find that the unit root is only solved at first differences, as shown by table 1. Since at levels, nearly all variables have unit roots, there should be at least one co-integrating relationship for our analysis to move forward. In other words, we cannot use unrestricted VAR analysis but need to undertake Vector Error Correction Methodology (VECM) which is only a restricted VAR, where we first find the presence of the number of co-integration equations in each VECM specification and then run the regression analysis. VECM also allows us to have a rich set of information among variables including their short and long-term adjustment dynamics and thus provides a more comprehensive insight into the relationship among variables compared to an unrestricted VAR.

Table 1
Augmented Dickey Fuller Test

Variables	Lag length	With intercept	With intercept and trend
Δ Fatal	1	-0.875*	-0.929*
Δ Popen	1	-0.977*	-0.984*
Δ Iopen	1	-1.192*	-1.495*
Δ Pexpg	1	-0.937*	-0.965*
Δ Iexpg	1	-0.940*	-1.257*
Δ Pimpq	1	-1.125*	-1.121*
Δ Iimpq	1	-1.321*	-1.449
Δ Pxi	1	-1.692*	-1.702*
Δ Ixp	1	-1.971*	-2.328*
Δ Pedu	1	-0.946	-1.025*
Δ Iedu	1	-0.841*	-0.879*
Δ Pgpc	1	-1.992*	-1.995*
Δ Igpc	1	-2.292*	-2.293*
Δ Pdg	1	-1.421*	-1.441*
Δ Idg	1	-0.899*	-0.877*
Δ Pmilpop	1	-1.289*	-1.292*
Δ Imilpop	1	-0.756*	-0.766*
Δ Demopi	1	-0.982*	-0.982*

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

The three reduced form VECM equations for Conflict are as follows:

$$Conf_{it} = \alpha_1(\beta_{1,t-1}Conf_{i,t-1} + \beta_{2,t-1}Ptr_{i,t-1} + \beta_{3,t-1}Itr_{i,t-1} + \beta_{4,t-1}Pdg_{i,t-1} + \beta_{5,t-1}Idg_{i,t-1} + \beta_{6,t-1}Dem\phi) + \sum_{y=1}^6 C_{y,t-i} + E_{1t}$$

.....(12)

$$Conf_t = \alpha_2 (\beta_{7,t-i} Conf_{t-i} + \beta_{8,t-i} Pedu_{t-i} + \beta_{9,t-i} Iedu_{t-i} + \beta_{10,t-i} Pdg_{t-i} + \beta_{11,t-i} Idg_{t-i} + \beta_{12,t-i} Dem\phi) + \sum_{y=1}^6 C_{y,t-i} + E_{2t}$$

.....(13)

$$Conf_t = \alpha_3 (\beta_{13,t-i} Conf_{t-i} + \beta_{14,t-i} Pgp_{t-i} + \beta_{15,t-i} Igpc_{t-i} + \beta_{16,t-i} Pdg_{t-i} + \beta_{17,t-i} Idg_{t-i} + \beta_{18,t-i} Dem\phi) + \sum_{y=1}^6 C_{y,t-i} + E_{3t}$$

.....(14)

Here, β 's show the co-integration relationship for each variable under investigation for each equation, and the α 's show the adjustment parameters. C 's are the constant terms for each six variables on the right hand side of each VECM equation, and the E 's are the respective error terms. As mentioned, the general openness indicator, total export shares, total import shares and exports to the other country of conflict for both India and Pakistan are utilized as 4 separate single country proxies of trade. Thus there are 4 separate specifications for equation (12). Equation (13) employs education and Equation (14) employs per capita growth rates to capture development expenditure and level of economic development for India and Pakistan respectively while defense and democracy proxies are common regressors for all specifications. *Fatal*, which is our dependent variable, captures severity of conflict. The total number of VECM specifications rise to 6.

The results for the VECM equations are presented in table 2. The lag length for each VEC equation is (1), 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). There is one co-integrating equation in each VECM, confirming the robustness of the model specification. Note, that optimal value of conflict is zero in the long run, meaning that our conflict measure, *Fatal* takes the value of 0.

The results for VECM 1 show that *Fatal* takes a negative value, and *Popen* and *Iopen* positive values. This means that in the short-term both Pakistan and Indian trade shares are negatively related with *Fatal*. However, only Indian trade is significant enough to exert a negative pressure on hostilities in the short-term adjustment period. In the long run both Pakistan's and Indian trade shares with rest of the world will adjust by moving in opposite directions. In the long run Pakistan would witness a rise in its trade with the outside world and Indian trade would decline to its steady-state level. The long-term net result on the trade share of both countries is expected to be positive as trade would be at higher levels with peace. The long-term rise in Pakistan's trade shares in order to adjust to a fall in hostility levels also mean that the negative effects of India-Pakistan conflict have thwarted Pakistan's capacity to trade in international markets more than in India's case. Results on VECM 2 suggest that in short-term both exports by India and Pakistan would rise to adjust to any fall in conflict. However, in the long run Pakistani exports would remain unchanged, whereas Indian exports will adjust downwards. Similar short-term adjustment dynamics for imports are observed for India in VECM 3. However in the long run Pakistan's imports would rise as conflict moves to its minimally optimal value of 0, whereas imports by India will adjust downwards. The

above discussion suggest that Pakistan's trading capability has been seriously hampered by the conflict between both nations despite the fact Pakistan has been historically the more open economy when compared to India. As far as Indian trade with the outside world is concerned, in the short-term it is destined to rise further especially if hostilities with Pakistan abate. However, the long run trade share would adjust downwards unless India follows a more open trade policy and further reduce its tariffs to levels similar to Pakistan.

Bilateral trade would also respond to increased peace as shown by the results of VECM 4. In the short-term there is a sign of increase in bilateral trade between India and Pakistan, but the increase is not significant meaning trade between India and Pakistan would remain low. However, in the long run Indian exports to Pakistan would decline to reach a steady-state level. Some in Pakistan fear that peace initiatives like reducing tariffs for Indian goods would mean greater dependency on Indian produce. Taking into account the historically high hostility levels between two countries, any peace initiative or confidence building measure which leads to greater market access for India is viewed with scepticism in Pakistan, as many fear that dependence on India may expose Pakistan to unnecessary pressures from India, leaving her vulnerable to one sided solutions to the Kashmir dispute. Our results show that in the long run the dependency on Indian cheap goods would actually decline, and both countries would end up being equal trading partners. Thus more bilateral trade, far from creating any power imbalance between India and Pakistan, would equally distribute the gains. Pakistan may fulfil its import needs more from other developing countries such as China. The results for VECM 5 suggest that education expenditure would increase in the short-term to reduce conflict, and as conflict falls to its optimal level, Pakistan would be able to simultaneously devote greater resources to its education sector. High growth rates also adjust positively to decrease hostility levels and in the long run as the hostilities fall, both countries also witness a strong positive effect on their growth rates. This means that peace would put India and especially Pakistan on higher growth paths on a sustainable basis.

In order to further check the conclusions drawn from our VECM results in table 2, we generated 6 different forecast schedules from 6 co-integrating VECMs as a simulation exercise to predict how conflict would be affected by changes in its determinants. Note that the data on *Fatal* are only up to 2002. Thus the one year forecasts are generated for *Fatal* for 2003 period. Figure 6 shows the forecast graphs. Graph 1a, 1b and 1c suggest that if military expenditures in both countries would remain at its current high levels, along with trade with the outside world at their 2002 levels, a slight deterioration in democracy scores will have a significant effect on the rise in hostility. However, if India is able to export or import more, this would at least put a check on any rise in the severity of conflict and hostilities would adjust to some average level. Any decline in Indian trade will enhance hostilities. The current low levels of bilateral trade between Pakistan and India is conflict enhancing, so more trade with increased exports by both sides to each other should be encouraged. More access to Pakistani markets on the Indian side may not lead to conflict mitigation if Pakistan is not able to also export more to

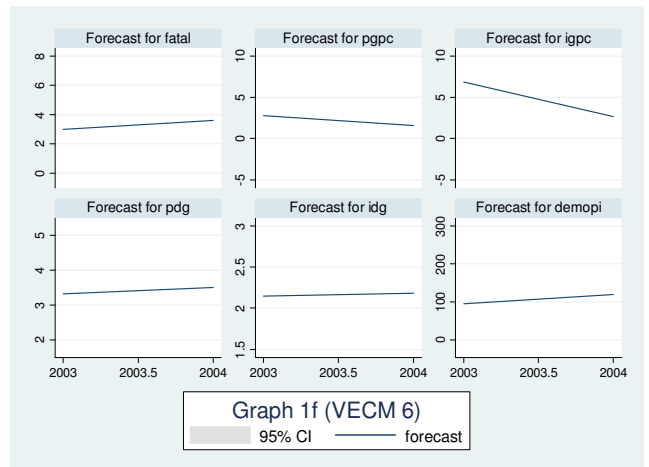
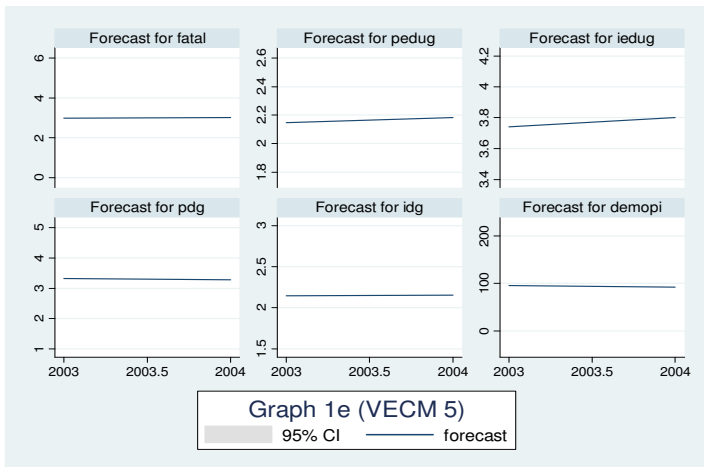
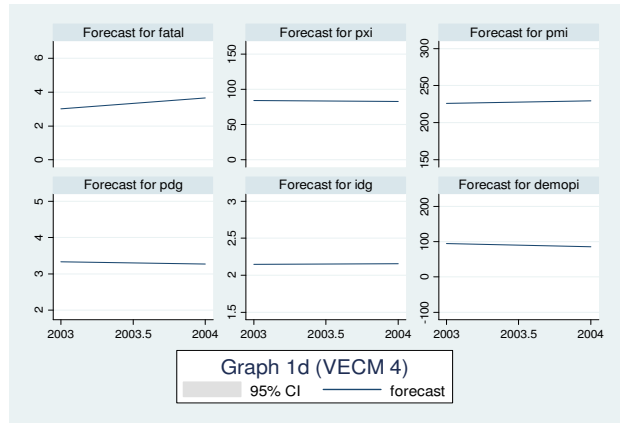
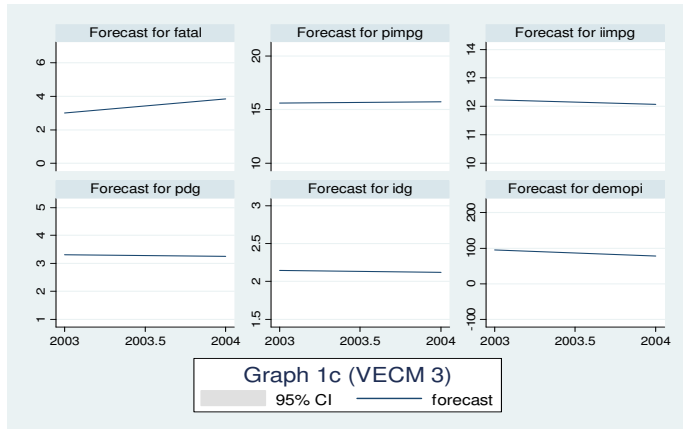
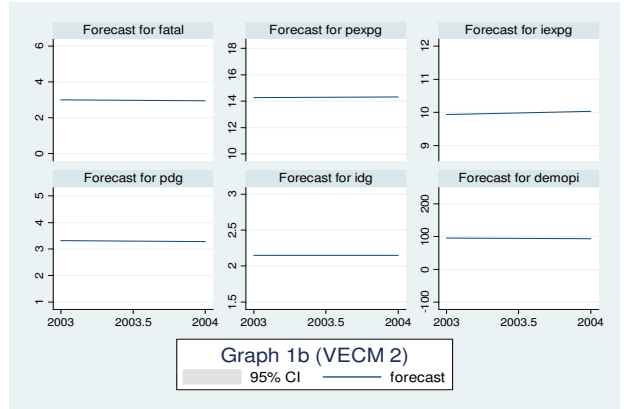
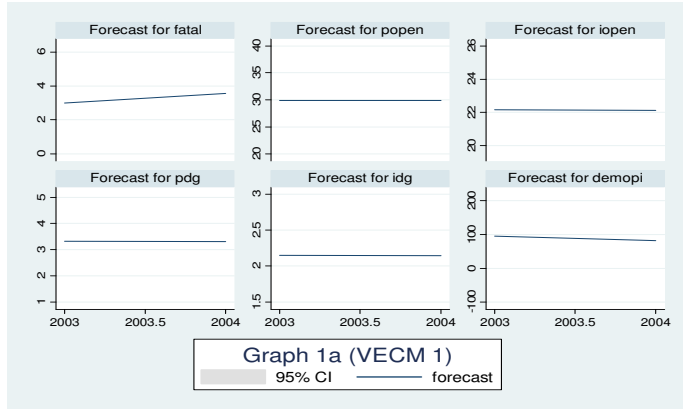
India. A rise in education expenditure puts a check on hostilities, as seen in Graph 1e. Graph 1f is the standard representation of India-Pakistan conflict, and not only best fits historical trends but also explain the rationale behind recent India-Pakistan peace initiatives with decreasing hostilities when not only India but Pakistan also has had economic growth rates as high as 7% per annum. The forecasts suggest that conflict will rise, even if there is a significant increase in combined democracy scores, if growth rates plummet. Both Pakistan and India have seen many such years, when hostilities between both countries rose significantly when at least one of the countries is performing poorly, but were channeling more resources on the military as a proportion of their GDPs. The forecasts favour the liberal peace over the democratic peace. Thus one may look at current peace talks between both countries with optimism as both are performing well on the economic front and channeling fewer resources on the military as a proportion of national income, while at the same time having a divergent set of political institutions, though recently Pakistan has edged towards greater democracy with elections in February 2008.

Table 2. VECM Regression Results for Fatal:

Variables	VECM Regression Equations for Fatal under multiple specifications of Trade, Education and Growth											
	VECM 1		VECM 2		VECM 3		VECM 4		VECM 5		VECM 6	
	α	β	α	β	α	β	α	β	α	β	α	β
Fatal	-0.92*	1	-0.80*	1	-0.87*	1	-0.96*	1	0.70*	1	0.05	1
Popen	0.27	0.15*										
Iopen	0.39*	-0.38*										
Pexpg			0.28***	0.15								
Iexpg			0.11**	-								
Pimpg					-0.02	0.30*						
Iimpg					0.29*	-0.85*						
Pxi							4.51	-0.007				
Ixp							2.20	-0.015*				
Pedu									-0.02	2.27*		
Iedu									-0.002	-1.53*		
Pgpc											-0.11**	2.18*
Igpc											-0.37*	2.57*
Pdg	-0.027	0.034	-0.081	0.52*	0.031	-0.25	0.048	-0.024	-0.082	0.84*	0.02	2.62*
I dg	0.009	-0.866*	-0.017	-0.32	0.030	-1.35*	0.002	-0.031	-0.006	-0.84**	0.002	-2.04
Demopi	17.83*	0.003**	17.8*	0.004**	14.73**	-0.002	14.76**	-0.0004	19.11	-0.008*	2.42*	0.017**
(Maximum VEC Rank) ^o	(1) ^o		(1) ^o		(1) ^o		(1) ^o		(1) ^o		(4) ^o	
N	53		53		53		45		53		52	
R2	0.53		0.57		0.48		0.52		0.42		0.04	
VEC(p)	VEC(1)		VEC(1)		VEC(1)		VEC(1)		VEC(1)		VEC(1)	

--*, **, *** shows significance at 1%, 5% and 10% level, Δ denotes values first difference, α captures adjustment coefficients for a co-integration equation and β are parameters for each variable in a co-integration equation. VEC Rank shows the maximum number of co-integration equations for each VECM model significant at 5%. - VEC(p) reports lag-order for each VECM 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),

Figure 6
Forecasting Simulations based on VECMs for Fatal



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. A regional trade agreement along the lines of a South Asian Free Trade Agreement (SAFTA) has a high potential for the improvement of relations between India and Pakistan on a long-term basis. Pakistan and India's general degree of openness to *world* (and not bilateral) trade is, however, the *dominant* economic factor in conflict resolution. It would be interesting to see whether India and Pakistan will be able sustain their recent impressive growth, and consequently continue with peace talks confirming the liberal peace arguments.

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 appreciate Angell-Lanes' (1910) arguments regarding the futility of inter-state conflict.

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APPENDIX: DATA and SOURCES

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 convert the variable in dyadic form), Years; 1950-2003

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)

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)

lmilopop: 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)

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

Ixp: 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

Pimp: 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