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29 November 2012

Online at <https://mpra.ub.uni-muenchen.de/42910/>
MPRA Paper No. 42910, posted 12 Dec 2012 16:49 UTC

Terrorism & Its Impact On Foreign Flows: Lessons **From Pakistan**

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Abstract

High terrorist attack frequency and intensity in Pakistan provides a unique data to study the impact of terrorism on foreign inflows and trade. After 9/11, Pakistan has suffered from rapidly decreasing foreign inflows and a contraction in trade. The paper estimates the *unit cost of a terrorist attack* in terms of foreign inflows and international trade lost to be \$51.92 million.

Working Paper, 2010

Keywords: Terrorism, trade, foreign inflows, unit cost

*Unabridged version of the paper with details is available on request.

Introduction

Speaking at a joint press conference with EU Foreign Policy Chief, Pakistan's Foreign Minister claimed that terrorism had a cost in excess of \$30 billion for Pakistan since 9/11 (Dawn, 2010). Ministry of Finance, on the other hand estimated terrorism induced loss to be about \$24.28 billion for period of 2004-2009 (SATP, 2010). Given the conflicting figures within the government, there is a pressing need for a scientific model that would assess the damage of terrorism to reasonable accuracy. Also, no model in international economics literature is developed, thus far to quantify the unit costs of terrorism in terms of trade and foreign inflows. In this paper an attempt is made to reasonably quantify this unit cost. This would allow authorities to better gauge the benefit of capturing terrorists and undertaking effective counterterrorism measures. This not only have benefits for Pakistan but also is a contribution in economics, as given the very high frequency and intensity (table 1 in the appendix) Pakistan provides a unique sample, a laboratory, to study impact of terrorism on trade and foreign inflows. Furthermore, calculation of these losses will provide policy makers and the public a metric of potential gain of stopping terrorist incidents (Enders and Sandler, 2005).

“Terrorism is the premeditated use, or threat of use, of extra-normal violence by individuals or sub-national groups to obtain political objectives through intimidation and fear directed at a large audience beyond that of immediate victims” (Enders, Sachida & Sandler, 2005. p3). Suicide attacks in Pakistan are a clear example of terrorism. Furthermore, suicide attacks have been the method of choice to cause terror by terrorists in Pakistan. The paper considers suicide attacks only, as a proxy for terrorist incidents. This makes intuitive sense due to their prevalence, impact and its falling unambiguously in standard terrorism definitions.

The paper is organized as follows: First, a theoretical backing is given to the main question of relationship between terrorism, foreign flows and international trade. Next there is a section on model specification. This follows a section on empirical analysis, addressing econometric concerns of the model. Finally, estimated results with concluding remarks are given.

Theoretical Framework

Economic theory suggests a negative relation between foreign flows (trade and foreign inflows) and terrorism. Foreign Flows would be used interchangeably for trade and foreign inflows during the course of the paper. The definition can be justified as earnings through trade are also a form of foreign exchange earnings. Terrorism greatly increases risk perceptions and hence risk premiums. This high risk premium stems to a large extent from greater expected losses in life, property, increased transaction costs and information asymmetries. An overly inflated risk premium causes the investment to be unprofitable and hence lead to lower net foreign flows. Furthermore, there would also be a strong substitution effect as investors and firms are expected to shift assets away from high terrorism countries to safer venues. This substitution effect is rooted in a variety of factors which would increase costs of doing business (See Enders et al., 2005).

It is also possible that Terrorism reduces foreign inflows because of its growth retarding effects through decreased consumer confidence¹ and increased defence spending² which decreases overall aggregate demand (Tavares, 2004). Terrorism is also expected to have an adverse affect on foreign exchange earnings through contraction of exports. Moser, Nestmann & Wedow (2006) studied German exports from a panel of 130 countries through period of 1991-2003 and established that political risk had a negative and statistically significant impact on exports. This makes sense as political risk acts as a hidden transaction cost and acts a friction for exporters. Furthermore, terrorism often results in tightening of border controls which further reduces international trade. Pakistan has a total land boundary of 6774 km, hence a huge potential for transit trade. Average shares of exports as a percentage of GDP has fallen by 18.2 % from 2000-2008 relative to period of 1994-2000. Hence a reduction of exports as a percentage of GDP post 9/11 is observed (CIA, 2010; IMF, 2010). This decrease of exports cannot be attributed completely to decrease in world demand due to the financial crisis as during the sample period we see exports of neighboring developing countries which have traditionally have had similar trading patterns in fact

¹ According to an index developed by Political Risk Services Group (PRSG) consumer confidence in Pakistan was all time low over the past decade sinking as low as 1.50.

² The dramatic increase in defence spending is observed in Pakistan, average defence expenditure increased by about 121% from 2002-2009 relative to about 43% from 1995-2002 (figure 6).

increased³. It is hypothesized that loss of foreign flows would inflict huge costs on Pakistan's economy.

Model Specification and Data

The study is based on monthly observations covering the period from 2002-2009. Our dependent variable is foreign flows (FF) which is a summation of Foreign Direct Investment, Net Exports and Foreign Portfolio Investment (SBP Databases, 2010). The choice of these variables as a proxy for foreign inflows and international trade is based on the need to get a broader measure of foreign flows which will include not only foreign investments but also foreign exchange earnings in the form of net exports. This will also have the affect of capturing the loss in international trade. Our main repressor (TI) is number of suicide attacks per month taken from Pakistan Conflict Monitor. In absence in any established weighting method, we use terrorist incident count, as used by Enders and Sandler (1996).

We seek to eliminate the various other factors which can account for changes in foreign flows coming into Pakistan. So, a multivariate model is developed which enriches the theoretical and statistical validity of the study. Due to international ramifications of the study and generalization reasons, some Pakistan specific factors that would affect FF variable are intentionally left out. Studenmund's (2006) specification criteria which specifies four criteria i.e. theory, t-test, adjusted R-squared value and Bias is adopted.

The models are specified as follows⁴:

Model 1

$$FF_t = \beta_0 + \beta_1 TI_t + \beta_2 PolRsk_t^5 + \beta_3 INF_t + \beta_4 FF_{t-1} + \xi_t$$

Model 2

$$FF_t = \beta_0 + \beta_1 Deaths + \beta_2 PolRsk_t^6 + \beta_3 INF_t + \beta_4 FF_{t-1} + \xi_t$$

³Comparison with India and Bangladesh is done (Figure 7).

⁴ Ramsey TSSET test was also performed to check for omitted variables and misspecification.

⁵ Larger rating signifies lesser risk. The data is taken from PRSG.

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Empirical Analysis

The pattern over time for foreign flows can be seen in figure 1. There is good reason to believe that sudden fluctuations and drop post 2006 in foreign flows is at least partially due to increased number of terrorist attacks. From 2002 to 2005, there were only 15 suicide attacks compared to 169 during 2006 to 2009 i.e. an increase of more than 1026%! Relatively lesser drop in FF pre-2005 can in part be explained by the fact that a full-fledged military operation was not yet launched against the militants what was taken as covert support for terrorists groups (The Washington Post, 2007).

We use time series dataset, which makes it important to check for stationarity. Chow tests were performed on all variables to check for the presence of structural breaks. Structural breaks cause standard unit root test statistics to be biased towards non rejection of unit roots (Enders, 2010). When structural breaks were present unit root tests which took into account structural breaks i.e. Clemente-Montañés-Reyes unit-root test (Clemente, Montañés and Reyes, 1998) were performed. Innovational outlier model i.e. gradual adjustment was used when appropriate. The absence of unit roots as observed by various tests suggests that data was generated by a stationary process.

Results of Breush-Godfrey and Breush Pagan test indicate that there is to be no serial correlation and heteroskedascity respectively. In line with satisfying the assumptions of classical linear regression model we test for linearity⁷, severe imperfect multicollinearity⁸, endogeneity and normality of residuals. Durbin-Wu-Hausman Test for Endogeneity was performed. The results show there is no violation of any of the assumptions of classical linear regression model and we can conclude that our estimate by OLS estimator is minimum variance, linear and unbiased (Gauss-Markov Theorem). In absence of any major problems resulting in use of level variables, we run a regression using level variables. This is preferred over other functional forms as it gives us richer interpretation and captures equilibrium relationships with greater accuracy (Studenmund, 2006).

⁷ Non rejection of no specification error hypothesis in Ramsey TSSET test provides a case for linearity of estimated coefficients.

⁸ Correlations and VIFs (Variance Inflationary Factors) are observed.

Results and Conclusive Remarks

Based on our estimation a single terrorist attack reduces foreign inflows in Pakistan by about US \$ 51.92 million significant to 1 percent (Table 2). Furthermore, long run (static) equilibrium settles to an even larger amount of \$ 67.76 million. As the incident count does not capture the intensity of the attack we also run an auxiliary regression by considering deaths by suicide attacks and estimate that loss of a single life would result in loss of about US \$ 3 million (Table 2).

Appendix

Table 1: Terrorist Violence in Pakistan, 2002- 2009

Years	Terrorist Incidents	Deaths
2002	2	19
2003	2	67
2004	7	86
2005	4	83
2006	7	157
2007	55	795
2008	59	900
2009 (August)	48	556

Table 2: Regressions Results for $FF = FDI + FPI + NX$

	Model 1	Model 2
Constant	-3.984 (1.162)	-3.867 (1.180)
Terrorist Incidents (TI)	-0.052*** (0.015)	
Deaths		-0.00316*** (0.970)
Inflation Rate (INF)	-0.164*** (0.051)	-0.156*** (0.513)
Political Risk (PolRsk)	0.081*** (0.024)	0.0782*** (0.024)
Lag of FF (LagFF)	0.234*** (0.09)	0.266*** (0.090)
R-squared	0.62	0.62
Adjusted R-squared	0.60	0.60
No. observations	91	91
GMM R-Squared	-3.52	
Mean VIFs	1.55	
Ramsey TSSET (p-value)	0.944	

Standard errors are reported in parentheses

, * indicate significance at the 95% and 99% level respectively.

Figure 1
FF = NX + FDI + FPI

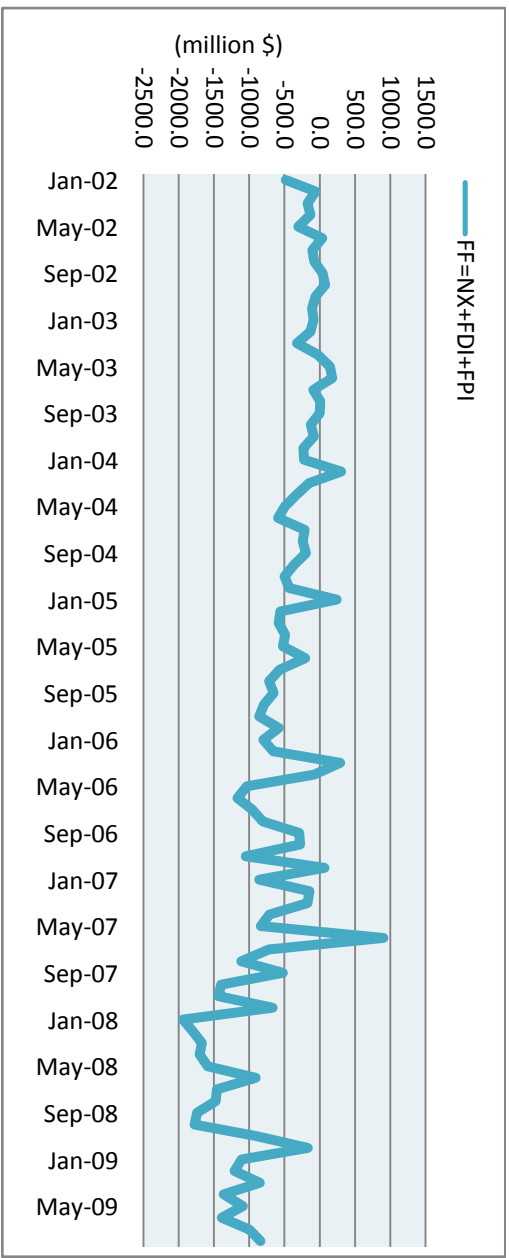


Figure 2
Number of Suicide Attacks

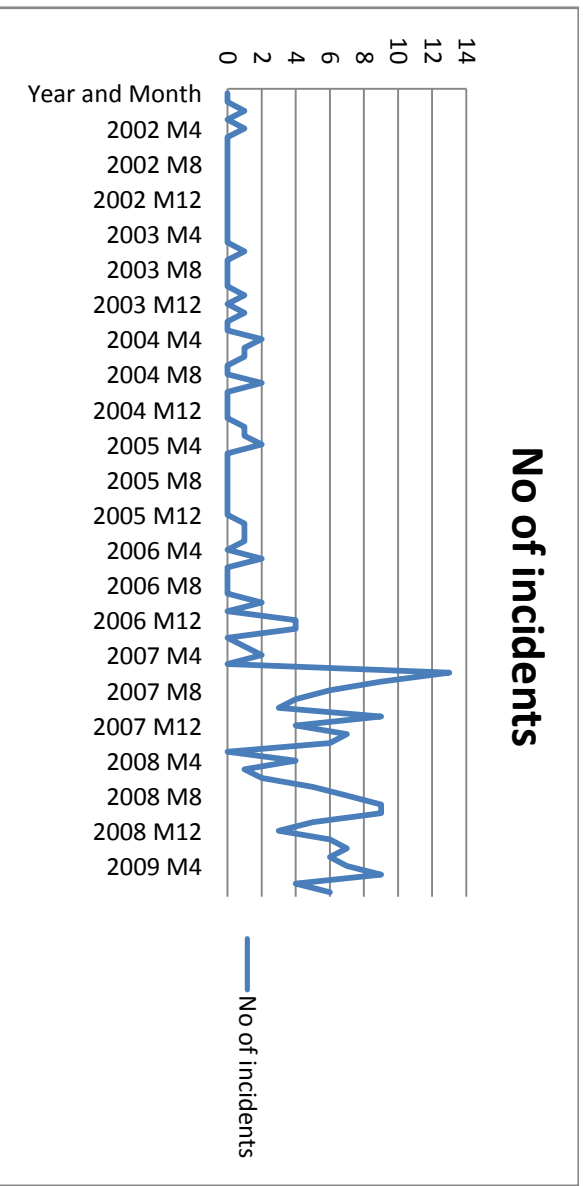


Figure 3
Defense Spending

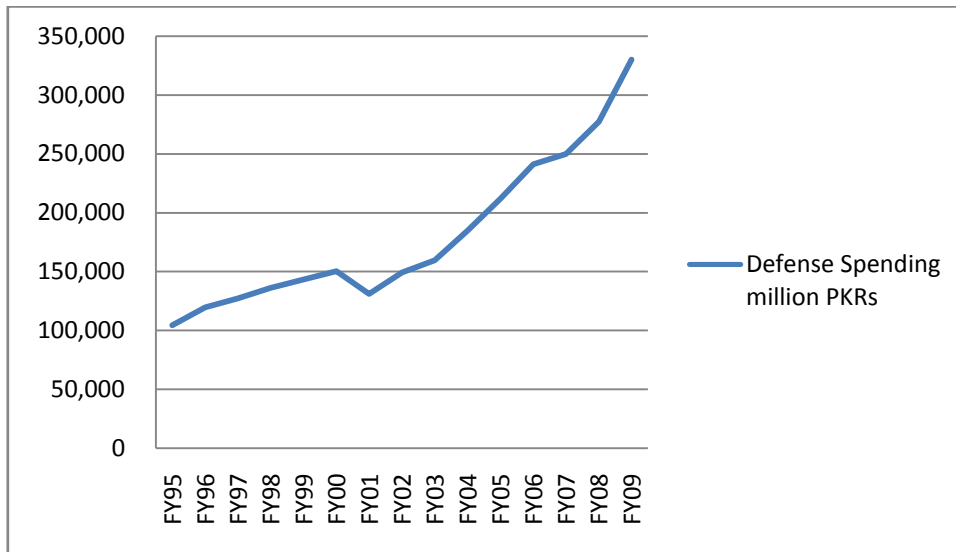


Figure 4

Exports as a percentage of GDP



Source: IMF Data Mapper

Acknowledgements

I am indebted to Saad Rehman, Dr. Ali Choudhary, and personnel at Central Bank of Pakistan for their support and insightful comments.

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