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Terrorism - A Case Study of Pakistan**

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# Foreign Financial Flows and Terrorism – A Case Study of Pakistan

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## **Abstract**

This study examines the differential response of various international financial flows to the post 9/11 episode of terrorism in the context of a South Asian country. Using monthly data for the period from January 2003 to December 2014, we analyze the impact of terrorism in Pakistan on the inflows of foreign direct investment (FDI), portfolio investments, and migrant remittances. We find that FDI decreases substantially as a result of terrorist activity, whereas portfolio investments show little change. In contrast, migrant remittances show a significant increase. These differences are also evident in financial flows from major source regions and top sending countries. The results are robust to the use of alternative definitions and indicators of terrorism as well as the inclusion of various macroeconomic variables. These findings indicate that foreign private capital flees an economy suffering from terrorism whereas migrant remittances are the only financial flows that increase during difficult times.

**Keywords:** *Terrorism; 9/11; FDI; Portfolio investment; Remittances; Developing countries; Pakistan.*

## 1. Introduction

In the aftermath of the 9/11 attacks, literature has increasingly focused on the economic cost of terrorism. Terrorist activity is reported to have hit economic growth in both developing and developed countries and regions around the world (Abadie and Gardeazabal 2003; Eckstein and Tsiddon 2004; Crain and Crain 2006; Gaibullov and Sandler 2008). This fall in growth of output occurs through multiple channels: Domestic consumption is increasingly diverted to security and defence spending leading to a larger government presence and greater budget deficits (Blomberg et al. 2004; Eckstein and Tsiddon 2004; Gupta et al. 2004) Investment in the economy drops due to higher production costs and growing interest rates; non defence-related production suffers, and the financial sector is crippled by rising transaction costs and scrutiny as well as documentation requirements (Eldor and Melnick 2004; Johnston and Nedelescu 2006).

Another channel through which terrorism can hurt an open economy is decrease in international financial flows to the terrorism-afflicted country. Financial flows, whether foreign direct investments (FDI), portfolio capital, or migrant remittances can all alter in the face of terrorism (Abadie and Gardeazabal 2008; Enders and Sandler 1996; Enders, Parise and Sandler 1992).

The direction and magnitude of the reaction of different foreign financial flows to terrorism may vary depending on the nature of those flows as well as the motives behind them. The degree to which financial flows respond to terrorism-induced economic shocks may determine the macroeconomic stability of a developing economy. This is of particular significance to capital-deficient developing countries that are heavily reliant on foreign financial flows, both for promoting growth and covering chronic current account deficits. During the early 2000s, international financial flows to developing countries grew substantially. At the same time, a new form of terrorist activity came to the fore, targeting mainly the United States and its allies. Given this background, this study examines the differential response of

various foreign financial inflows to post 9/11 terrorist activity. The analysis helps to distinguish between the risk profile of foreign investors and remitters in the face of terrorism.

The study uses monthly data on the three financial inflows (FDI, portfolio investments, and migrant remittances) as well as the terrorist activity which occurred in Pakistan between January 2003 and December 2014. The added value of this paper is three-fold:

Firstly, terrorism is a complex phenomenon resulting from the interaction of numerous social, economic and demographic factors which are area specific and thus cannot be adequately addressed in a cross-country setting. This study selects a developing country that is significant both for the amount of financial flows it receives, as well as the level of terrorist violence that has recently occurred in the country. In addition, comprehensive monthly data are employed for foreign financial flows and terrorism allowing a meaningful empirical investigation.

Secondly, the media coverage, and resulting risk perception of terrorist events, may vary from country to country; the impact of terrorism on the financial flows a country receives may consequently differ according to the countries and regions from which they originate. Therefore, the differential effects of the three flows are examined with respect to their provenance.

Thirdly, unlike most empirical studies on effects of terrorism on the economy which focus on a particular form of terrorism (e.g. transnational, domestic, business-related), this study considers the global effect of the terrorist activity. Along with the casualty count of civilian and security forces (which is taken as the principal terrorism indicator), the study evaluates the role of a number of significant terrorism incidents, such as bomb blasts and total fatalities, in shaping the volume of financial inflows.

## **2. Terrorism and Financial Flows: Theoretical Background and Literature Overview**

According to Abadie and Gardeazabal (2008), capital mobility determines the equilibrium output level of an open economy. This occurs in two ways: directly through the destruction of physical assets, and more importantly, indirectly through a decrease in the marginal productivity of capital as a result of the terrorism shock. The latter leads potential foreign investors away to safer locations and thus hurts the economy's future output which results in low future growth even though the short term impact may not be substantial. This clear theoretical derivation has found mixed support in the empirical literature. For instance, Li (2006) finds no evidence that either anticipated or unanticipated terrorism has any direct effect on the location or volume of FDI. In their panel study on US FDI flows to a sample of 69 countries, Enders, Sachida and Sandler (2006) find that, although transnational terrorist incidents have a statistically significant impact on US FDI in OECD countries, the relationship is not visible in non-OECD countries. Similarly, Blomberg and Mody (2005) report a qualified support for a negative impact of transnational terrorism on host country investments, finding that the relationship disappears if country fixed dummy variables are not employed. Power and Choi (2012) find that transnational terrorism that targets multinational investments in developing countries negatively affects FDI to those countries while non-business-related terrorism does not show a statistically significant impact.

Other empirical studies have found evidence for an unequivocally negative relationship between terrorism and FDI to the developing countries. Alomar and El-sakka (2011), for example report a negative impact of terrorism on FDI inflows to a sample of 136 developing countries. Likewise, Abadie and Gardeazabal (2008) examine the impact of terrorist violence on a cross-section of 186 countries and find a negative correlation between direct investments and terrorist violence. A one standard deviation increase in terrorist risk is reported to cause a five percent decrease in the affected country's FDI to GDP ratio. Similarly, Lutz and Lutz (2006) suggest a substantial fall in the ability of Latin American economies to attract inward FDI due to terrorism.

The negative impact of terrorism on FDI flows may be due to several factors: Firstly, FDI is typically a long time investment and cannot easily be withdrawn without incurring losses. In other words, the investment itself becomes an exit-barrier for foreign investors (Rivoli & Salorio, 1996). Therefore, MNCs prefer to invest in larger and growing economies (Bandera & White, 1968; Lunn, 1980; Schneider & Frey, 1985), avoiding economies suffering from slow growth as a consequence of terrorism (Abadie and Gardeazabal 2003; Blomberg et al. 2004; Tavares 2004).

Secondly, terrorist incidents create an atmosphere of uncertainty (Abadie and Gardeazabal, 2008), and multinational corporations (MNCs) avoid investing in such countries. According to Abadie and Gardeazabal, FDI flows to the US fell from 15.8% of the Gross Fixed Capital Formation in 2000 to a mere 1.5% in 2003 in the aftermath of the 9/11 terrorist attacks. In contrast, US FDI outflows slightly increased in the same period.

Thirdly, terrorism can hurt productivity by raising transaction costs through increased security measures (Johnston and Nedelescu, 2005; Abadie and Gardeazabal,2008), leading the firm to lose its price competitiveness in the international markets (Moshirian,2006). Terrorist incidents trigger a generalized drop in asset prices, flight of capital and increase in operational costs for the firms (IMF, 2001; Johnston and Nedelescu, 2005).

Fourthly, governments of terror -stricken countries strengthen security measures which leads to higher budgetary allocations. Taxes need to be raised to finance these anti terrorism measures. Moreover, financial transactions face increased scrutiny as security agencies track potential terrorism financing. The monetary and business costs of these steps may deter foreign investors.

A possible reason for lack of consensus in empirical literature with regards to the significance and sign of terrorism's impact on FDI may be the differences in the business environment and socioeconomic conditions of the investing countries.

Host countries with strong trade, cultural and historic ties with the home country may be well known to the investor who can therefore better evaluate the short and long-term risks involved in investments. However, home country media may give prominent coverage to terrorist activities in such countries which may lead to a heightened perception of threats in the investment destinations. The effect of terrorism in a country on its FDI inflows may therefore also depend on the extent its economic and security situation is known and understood in investing countries, and may subsequently vary from country to country.

The impact of terrorism on portfolio investments is likewise found to be negative in the empirical literature. Foreign portfolio investments (FPI) are more flexible than FDI and can be readily withdrawn from countries facing terrorist activity. Financial markets in developed country are more resilient to terrorism activity than those in their counterparts in developing countries (Arin et al. 2008; Chen and Siems, 2004).

Unlike the effects on FDI and FPI flows, the impact of terrorism on migrant remittances is ambiguous. Motives for remitting range from purely altruistic to purely self-interested. If the migrant maintains strong kinship ties with the country of origin and feels emotionally involved in the well being of relatives back home, he/she will tend to increase their financial assistance to help cover economic losses incurred due to terrorism. These altruistic remittances should therefore rise with terrorist violence. Carling, Erdal and Horst (2012), for instance, assert that ongoing conflict in the country of origin exerts an upward pressure on the migrants' willingness to remit.

The positive remittance behaviour may also correspond to a co-insurance motive (Amuedo-Dorantes and Pozo 2006) as the migrant remitter helps the stay-behind members of the household in turn for their support in times of financial distress.

On the other hand, a negative association between terrorism and remittance flows points to asset-accumulation and investment-related motives behind remitting



(Lukas and Stark 1985), as the migrant makes use of his/her knowledge of opportunities back home to invest in profitable ventures. This may particularly be the case if the migrant is permanently settled in the host country and considers the home country mainly as an investment destination.

These differences in motives may be evident in differential reactions to terrorism of the inflows from different countries.

Terrorism can also affect migration and subsequently have a positive impact on remittances through the size effect. Episodes of terrorist violence lead to outflows of migrants and refugees and create migrant communities abroad (Berdal 2005; Kaldor 2007; Omeje 2007). Dreher, Krieger and Meierrieks (2011) assessed the influence of terrorism on skilled migration for 152 countries over the 1976–2000 period and find robust evidence that terrorism increases skilled emigration, suggesting that terrorism affects the cost-benefit considerations of highly educated individuals in ways that make emigration more attractive. The resulting larger overseas migrant communities eventually lead to higher remittance inflows to the terrorism-afflicted country.

Following testable hypotheses can be identified from this discussion of the literature:

**H1. FDI inflows fall as a result of terrorism.**

This expectation is in line with Abadie and Gardeazabal (2008) capital flow theory as well as empirical evidence on the long-run impact of terrorism on FDI to developing countries (Alomar and El-sakka 2011; Lutz and Lutz 2006).

**H2. The impact of terrorism on portfolio investments is negative.**

During the first decade of this century stock markets of various developing countries including Pakistan rose sharply and subsequently attracted fresh capital from mature economies. High yield from stock markets in emerging countries

compensated for high terrorism-related variance. Nonetheless, sustained terrorist campaigns such as the one Pakistan is currently facing, harms the business environment and investments are prevented due to heightened risk perception. This can happen particularly if terrorist activity hits the country's major production centers.

### **H3. Migrant remittances rise in response to terrorism.**

Following Anwar and Mughal (2012) and Mughal and Anwar (2014), migrant remittances to Pakistan are expected to be predominantly altruistic in nature, and as a result may rise when the stay behind households face financial difficulty due to increased terrorist activity.

### **H4. The financial flows' reaction to terrorism may vary with respect to their source regions and countries.**

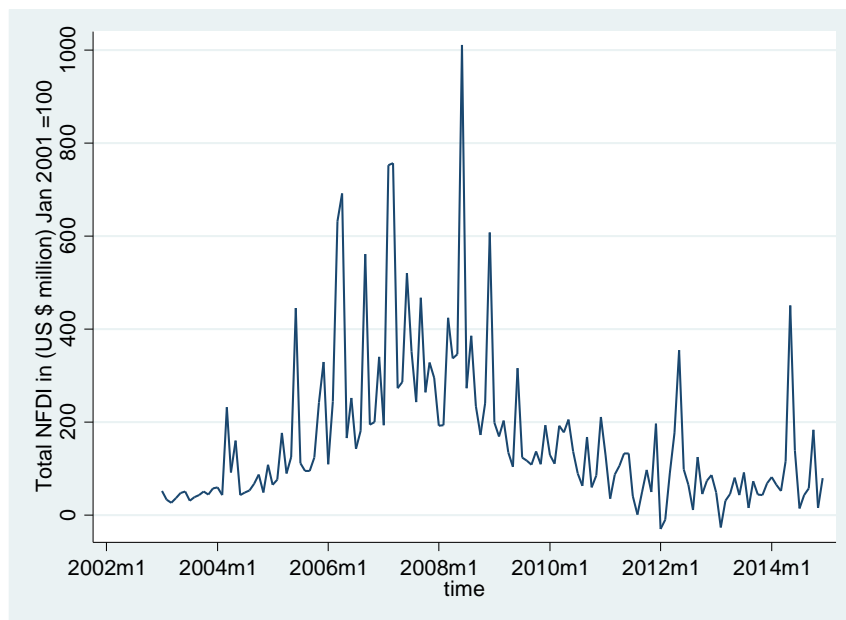
As described in the next section, Pakistan's investment and remittance profile is diversified with substantial financial inflows received from three distinct regions. The list of source countries is likewise varied with source countries differing in historic and economic ties and geographical, demographic and economic profile. Financial flows may therefore behave differently based on their provenance.

## **3. Terrorism and Foreign Financial Flows to Pakistan: An overview**

The inflows of FDI and portfolio investments received by Pakistan have fluctuated significantly. For instance, FDI flows to Pakistan jumped nine-fold between 2003 and 2007 to exceed US \$5 billion only to fall again below \$2 billion in 2011 (Fig. 1). FDI inflows often coincide with the country's business cycle, rising during the boom periods and falling during low-growth phases. A substantial share of FDI has been in the form of privatization receipts for previously state-owned corporations in the telecommunication and banking sectors. The United States, Europe and United Arab Emirates have historically been the major sources of FDI. The country's FDI

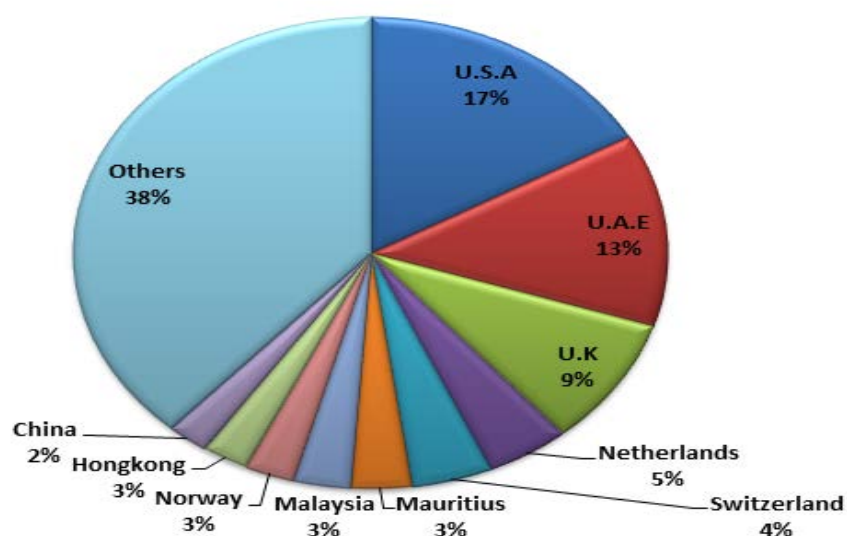
portfolio is quite diverse with significant investments from countries in the EU, North America and Asia (Fig. 2).

**Fig. 1. Net FDI to Pakistan (US \$ million): 2003 – 2014**



Source: Authors' calculations based on SBP data (2015)

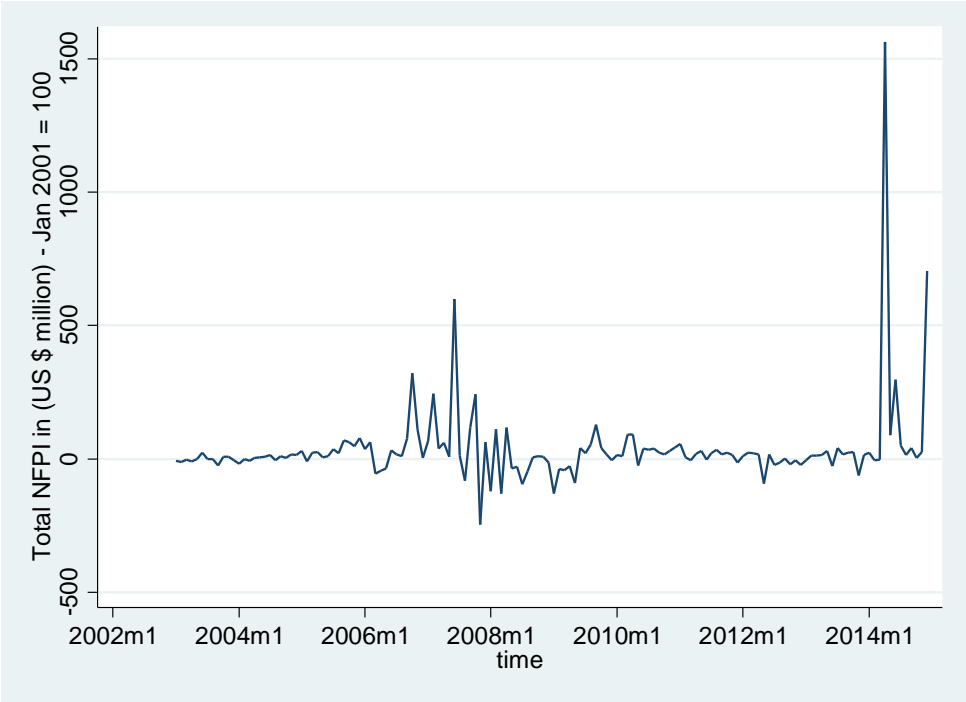
**Fig. 2. Top FDI sources in Pakistan: 2003 - 2014**



Source: Authors' calculations based on SBP data (2015).

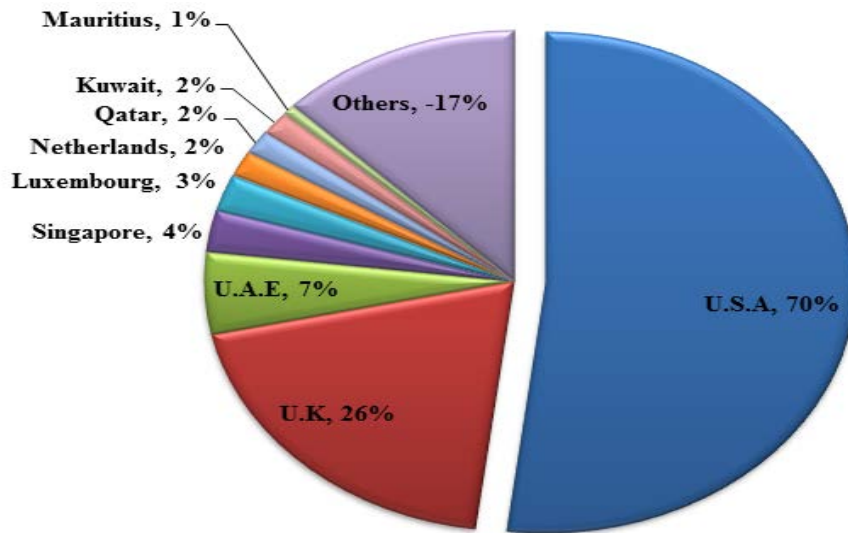
Foreign portfolio investments (FPI) to Pakistan have generally stayed low compared with other developing countries, and net inflows have surpassed \$1 billion only once (in 2007). Net FPI inflows have been remarkably unstable. For instance the flows were negative for five of the thirteen years since 2001 (Fig. 3). The United States, UAE and UK account for much of the FPI investments the country receives (Fig. 4).

**Fig. 3. Net foreign portfolio investment in Pakistan (US \$ million): 2003 – 2014**



*Source: Authors' calculations based on SBP data (2015).*

**Fig. 4: Top sources of net foreign portfolio investment in Pakistan: 2003 - 2014**

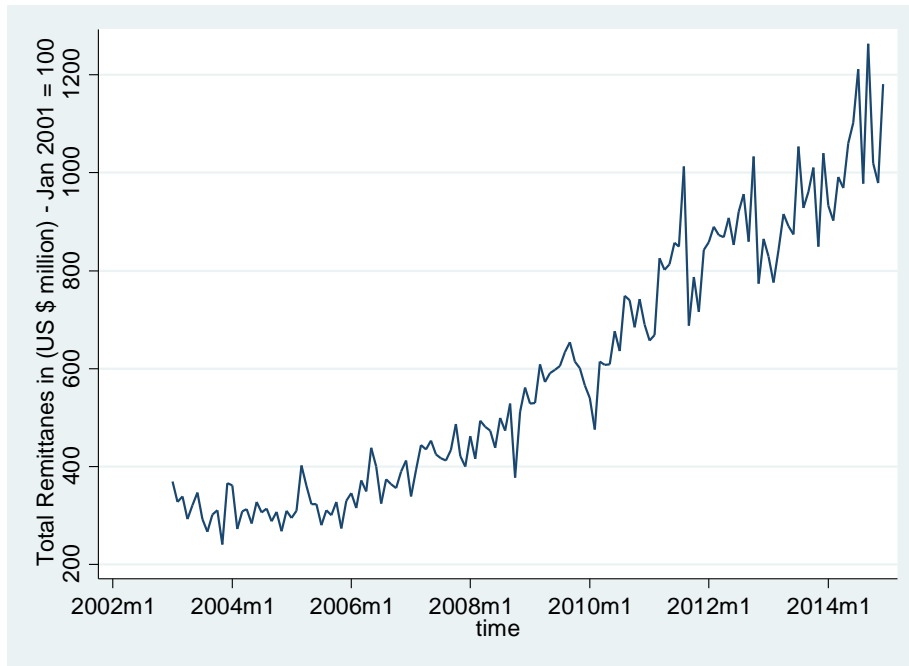


*Source: Authors' calculations based on SBP data (2015).*

In comparison, Pakistan received over US \$12 billion migrant remittances in 2014 (Fig. 5), making it one of the top ten recipients of formal remittances in the world (State Bank of Pakistan 2013; World Bank 2011). Remittances comprise six percent of the country's GDP, surpassing the combined share of international capital inflows to Pakistan. The volume of formal remittances has risen sharply in the last decade, growing ten-fold between 2001 and 2014<sup>1</sup>. The energy-rich states of the Persian Gulf are the main source of remittance flows to Pakistan along with North America and Europe (Fig. 6). Remittances to the country are considered a relatively stable source of foreign exchange (Mughal and Makhoul, 2011), and are shown to be contra cyclical (Ahmed 2012).

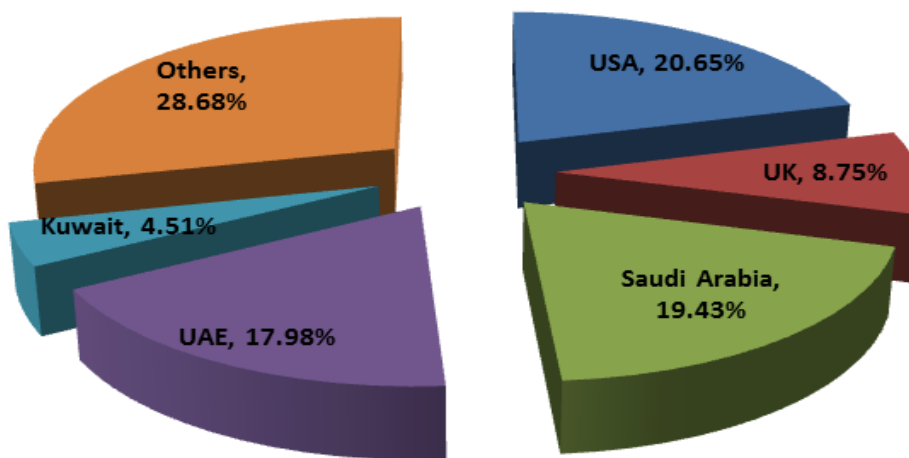
<sup>1</sup> For a recent account of the evolution and development impact of remittances to Pakistan, see for example Mughal (2013).

**Fig. 5. Foreign remittances to Pakistan (US \$ million): 2003 – 2014**



*Source: Authors' calculations based on SBP data (2015).*

**Fig. 6. Top 5 remittance source countries: 2003-2014**



*Source: Authors' calculations based on SBP data (2015).*

Pakistan's economy remains vulnerable to macroeconomic shocks arising within or outside the country's frontiers. Terrorism is one such shock that has hit the economy in the last decade. Although Pakistan has faced bouts of ethnic, separatist and sectarian violence in the past, anti-state militant activity surged spectacularly in the aftermath of 9/11 as the country joined the US-led campaign against Al-Qaida and the Taliban<sup>2</sup>. The number of deaths in terrorist attacks rose from 164 in 2003 to 3739 in 2012, before falling to 2314 in 2014 (Table 1). Most of the attacks have been carried out by the militant group Tehrik-e-Taliban Pakistan (TTP) followed by Baloch separatist groups and sectarian militants (Pakistan Security Report 2012). Target killings, bomb blasts, improvised explosive devices and rocket attacks have been the terrorists' main tactics.

**Table 1: Terrorism in Pakistan (2003 -2014)**

<b>Year</b>	<b>Number of Deaths</b>	<b>Civilian Deaths</b>	<b>Security Forces Deaths</b>	<b>Terrorist' Deaths</b>	<b>Number of Major Incidents</b>	<b>Number of Bomb Blasts</b>
2003	164	140	24	25	12	42
2004	619	435	184	244	23	137
2005	511	430	81	137	18	245
2006	933	608	325	538	42	300
2007	2119	1522	597	1479	157	677
2008	2809	2155	654	3906	243	598
2009	3315	2324	991	8389	364	499
2010	2265	1796	469	5170	348	463
2011	3503	2738	765	2800	269	635
2012	3739	3007	732	2472	255	648
2013	3677	3001	676	1702	345	375
2014	2314	1781	533	3182	401	375
<b>Grand Total</b>	<b>25968</b>	<b>19937</b>	<b>6031</b>	<b>30044</b>	<b>2477</b>	<b>4994</b>

*Source: Authors' calculations based on SATP data (2015).*

<sup>2</sup> For a brief background on the origins of terrorism in Pakistan, see Mehmood (2013).

Terrorism has exacted a heavy cost on the country, both in terms of lives and limbs as well as in material losses. According to Mehmood (2013), terrorism has cumulatively cost Pakistan 33.02 percent of its real national income during the 1973-2010 period, implying around one percent of lost real GDP per capita growth every year.

## **4. Data and Methodology**

### **4.1. Data Description**

Monthly time series for FDI, portfolio investments and migrant remittances are taken from Pakistan's central bank, the State Bank of Pakistan (SBP). All the series are in current US Dollars and are converted into constant US Dollars. FDI comprise investments by foreign corporations acquiring at least ten percent ownership of the local business. Investments involving less than ten percent foreign investor share are deemed portfolio investments. In addition to aggregate flows, both FDI and FPI are analyzed with respect to their source regions and countries. The regions considered are Asia, North America, and Western Europe. The list of countries for the constituent regions is given in Table A-5 in the appendix. United States, United Arab Emirates, United Kingdom, Netherlands and Switzerland were Pakistan's top five FDI sources during the examined period, while the top five FPI senders were USA, UAE, UK, Singapore and Luxembourg. Remittances comprise the sum of workers' remittances, compensation of employees, and migrants' transfers. In addition to aggregate inflows, remittances from three major remitting regions and top five remitting countries are also considered. The regions included are Persian Gulf, North America and Europe<sup>3 4</sup>.

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<sup>3</sup> Unlike FDI and FPI, migrant remittances from Asia overwhelmingly originate in the Persian Gulf. Therefore, the latter can be taken as representing Asia. Similarly, FDI and FPI to Pakistan arriving from Europe originate almost exclusively in Western Europe. Therefore, the region is comparable to the Europe region taken as the source of remittance inflows.

<sup>4</sup> The variable for Persian Gulf comprises observations for the six states of Gulf Cooperation Council (GCC), namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, while those for North America and Europe



Pakistan's top five sending countries during the period analyzed includes Saudi Arabia, United Arab Emirates, United States, United Kingdom and Kuwait. Together, these five account for the bulk of Pakistan's remittance inflows.

Following Mughal and Anwar (2014), data on terrorism are taken from the South Asia Terrorism Portal (SATP). Studies on other countries and regions have often been based on data from Global Terrorism Database (GTD) maintained by the University of Maryland National Consortium for the Study of Terrorism and Response to Terrorism Center.

For South Asian countries however, including Pakistan, SATP provides more comprehensive data from 2003 onwards<sup>5</sup>.

Terrorism in this study pertains to both domestic and transnational attacks, although given the country context; attacks are overwhelmingly against domestic targets. Terrorism is defined as “an act or acts of criminal violence, or the sequence of actions leading to such an act or acts, which is/are intended to intimidate the public, coerce or unduly compel a government or public authority to perform or abstain from performing any act; or to destabilize or destroy the fundamental political, constitutional, economic or social structures of a country; or to overawe any public functionary or government agency” (SATP 2013).

We take the number of civilian and security -force fatalities in terrorist attacks as our main terrorism indicator. The reason for this choice is the following: during the period examined, the number of terrorism incidents in the country has been very high (as many as 47 terrorism incidents took place in a month involving three or more deaths). In such a situation, it is the intensity of attacks reflected in the number of deaths that is more significant than the incident count itself. As a

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*respectively consist of Canada and USA, and Belgium, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom.*

<sup>5</sup> *Estimations are also carried out using the GTD database as a robustness measure. The results are similar to the study's main findings, and are not shown.*

robustness check, the analysis is carried out using an alternative definition of the variable, including insurgent deaths in the death count. We also carry out the analysis using the number of incidents involving three or more deaths as well as the number of bomb blasts carried out during a month.

Monthly data for Pakistan's Consumer Price Index (CPI), interest rate and nominal exchange rate used in addition to the robustness checks are taken from the SBP. The terrorism series began from January 2003. As a result, the dataset contains a maximum of 144 observations for the January 2003 – December 2014 period. Summary statistics of the dataset are given in Table 2. An average of 180 people lost their lives every month during the examined period (excluding terrorists), while there was an average of 17 incidents involving three or more deaths per month.

**Table 2: Summary Statistics**

**Number of Observations: 144**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Aggregate Net Foreign Direct Investment	165.84	168.06	-30.28	1010.68
Net Foreign Direct Investment from United States	33.29	33.97	-2.04	291.64
Net Foreign Direct Investment from UAE	23.53	70.55	-87.09	548.15
Net Foreign Direct Investment from UK	20.92	36.63	-32.78	318.80
Net Foreign Direct Investment from Netherlands	10.65	20.79	-30.15	186.38
Net Foreign Direct Investment from Switzerland	7.41	37.44	-105.68	363.05
Aggregate Net Foreign Portfolio Investment	36.41	162.10	-245.97	1562.22
Net Foreign Portfolio Investment from USA	13.88	44.50	-106.10	221.40
Net Foreign Portfolio Investment from UK	1.40	5.06	-15.01	32.42
Net Foreign Portfolio Investment from UAE	4.89	48.14	-98.99	505.52
Net Foreign Portfolio Investment from Luxembourg	2.47	7.56	-13.90	58.71
Net Foreign Portfolio Investment from Singapore	0.54	10.41	-50.40	75.50
Aggregate Foreign Remittances	590.80	261.87	240.19	1263.13
Remittances from USA	121.00	26.49	74.63	203.73
Remittances from UK	63.93	42.49	19.21	182.19

Remittances from Saudi Arabia	140.84	94.90	31.71	372.17
Remittances from UAE	117.79	63.08	34.81	289.99
Remittances from Kuwait	28.22	10.34	10.84	56.57
Exchange Rate	76.36	16.65	57.33	107.51
Pakistan CPI (2010=100)	87.57	32.35	46.41	144.99
Death Count including terrorists	388.94	351.04	1.00	2024.00
Death Count	180.33	130.30	0.00	507.00
Civilian Death Count	138.45	107.26	0.00	432.00
Security Forces Death Count	41.88	34.43	0.00	157.00
Insurgents Death Count	208.64	264.00	0.00	1590.00
Number of Bomb Blasts	34.68	20.65	0.00	104.00
Major Incidents	17.20	13.02	0.00	47.00

*Source: Authors' calculations based on SATP and SBP data (2015).*

## 4.2. Methodology

The time series included in the study are found to have a moving average component<sup>6</sup>. Moreover, terrorism is found to be exogenous with respect to the financial flows<sup>7</sup>. Given these characteristics of the dataset, the Autoregressive Integrated Moving Average (ARIMA) group of econometric techniques is considered pertinent for the analysis. The ARMAX model is chosen as the mainstay of the study. The general ARMAX (p, q) model in the context of our study can be expressed as:

$$FF_{i,t} = \alpha + \beta_1 FF_{i,t-1} + \dots + \beta_p FF_{i,t-p} + \gamma_0 T_t + \gamma_1 T_{t-1} + \varepsilon_t - \theta_1 \varepsilon_{t-1} - \dots - \theta_q \varepsilon_{t-q}$$

Where 'FF' represents the financial flow for the month t, 'T' is the terrorism indicator for the corresponding month and  $\varepsilon$  is the disturbance term. To apply ARMAX, the variables must be stationary, i.e. with constant mean and variance as well as constant auto-covariance over time.

We begin our empirical analysis by determining the level of stationarity of the aggregate, regional and country-wise financial flow series. Graphic evidence

<sup>6</sup> The moving-average nature was tested using the Auto-Correlation (AC) and Partial Auto-Correlation (PAC) graphs

<sup>7</sup> Endogeneity was determined using the Wu-Hausman specification test

suggests that all the series are non-stationary at levels, but turn stationary at first difference. The graphical evidence is confirmed by unit root tests (Table A-1 in the Appendix). Appropriate lag structure is determined for the tests using the Akaike's Information Criterion (AIC) and the Schwarz Bayesian Information Criterion (SBIC) (Table A-1). The next step is to obtain the autocorrelation and partial-autocorrelation functions in order to determine the adequate lags for the aggregate, regional and top five country ARMAX models. The corresponding lags for the autocorrelation (AR) and moving average (MA) specifications obtained for the baseline models are given in Tables A-2. AIC and SBIC criteria are used to select the appropriate ARMAX models among suggested competing lag specifications. Most of the specifications thus selected are ARMAX (1,1,1). All the estimations are carried out using robust standard errors in order to control for potential heteroskedasticity in the models. Post-estimation tests are performed to check for autocorrelation in residuals (shown in Table A-3).

Granger causality test (Table A-4) shows that all the financial flows have one directional association with terrorism, running from terrorism to the financial inflow<sup>8</sup>.

## 5. Findings

Tables 3 to 5 present results for aggregate and country wise financial inflows. As shown in Tables 3 and 5, FDI and migrant remittances appear to react to the terrorism indicator (number of civilian and security-force fatalities) in a statistically significant manner, portfolio flows being insignificant (Table 4). The signs of association for FDI and remittances are opposite, though, and suggest the fact that the motives facing foreign investors and overseas Pakistani remitters are not the same. The coefficient of FDI's negative association with terrorism is a strong 0.05, implying a marginal effect of -0.38; one additional terrorism-related death is associated with a \$0.38 million drop in FDI inflows. In comparison, remittances show a marginal rise of \$0.09 million per additional death.

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<sup>8</sup> *Li and Schaub (2004) also find no significant impact of FDI, FPI or migrant remittances on terrorism*

**Table 3. Aggregate and top 5 countries Net FDI inflows and terrorism  
(ARMAX)**

VARIABLES	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)
	1	2	3	4	5	6
	FDI_aggregate	FDI_USA	FDI_UAE	FDI_UK	FDI_Netherlands	FDI_Switzerland
Terrorism	-0.0489*** (0.0143)	-0.0092*** (0.0029)	-0.0072 (0.0054)	-0.0047*** (0.0015)	-0.0009 (0.0007)	-0.0038 (0.0034)
AR (1)	0.1171 (0.1322)	0.1030 (0.1315)	0.3831 (0.2753)	0.0574 (0.0411)	-0.0634*** (0.0228)	0.3604** (0.1585)
MA(1)	-0.8969*** (0.0277)	-0.8491*** (0.0907)	-1.0000*** (0.0000)	-1.0000*** (0.0000)	-1.0000*** (0.0000)	-1.0000*** (0.0000)
sigma	131.5268*** (15.3618)	25.6720*** (6.9932)	62.9387*** (14.0652)	35.2791*** (10.3336)	20.6321*** (5.7386)	34.0676*** (12.3909)
Constant	9.5166*** (3.6245)	1.7223** (0.8140)	1.1598 (1.1695)	0.9249*** (0.3242)	0.1528 (0.1502)	0.6674 (0.7307)
Observations	143	143	143	143	143	143

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

These differential impacts are also evident in region-wise results<sup>9</sup>. FDI inflows from all the major source regions show strong negative association with terrorism. Similar to aggregate estimation, region-wise results for migrant remittances are all positive and significant. However, terrorism seems to have a small and marginally significant association with remittances from North America, which possibly points to a different socioeconomic profile of the North American Pakistani diaspora compared with the migrant communities located in the Persian Gulf and Europe.

<sup>9</sup> The results explaining relationship between terrorism and region wise financial flows are not provided here and available upon request.

**Table 4. Aggregate and top 5 countries Net FPI inflows and terrorism  
(ARMAX models)**

VARIABLES	ARIMA (1,1,1)	AR(4) I(1) MA (1)	ARIMA (1,1,1)	ARIMA (1,1,1)	AR(2) I(1) MA (1)	ARIMA (1,1,1)
	1	2	3	4	5	6
	PFI_aggregate	PFI_USA	PFI_UAE	PFI_UK	PFI_Singapore	PFI_Luxemburg
Terrorism	-0.0005 (0.0123)	-0.0040 (0.0029)	-0.0001 (0.0002)	-0.0025 (0.0030)	-0.0004 (0.0006)	0.0006 (0.0004)
AR(1)	-0.0561 (0.0655)		-0.1471 (0.1348)	-0.1080 (0.1009)		0.4401** (0.2061)
AR(2)					-0.1769 (0.2173)	
AR(4)		0.3194*** (0.1227)				
MA(1)	-0.8503*** -0.1626	-1.0000*** 0	-1.0000*** 0	-1.0000*** 0	-1.0000*** 0	-1.0000*** 0
sigma	160.9802*** (52.4135)	41.4343*** (4.1890)	4.9637*** (0.8146)	47.4907*** (17.6100)	10.1919*** (2.2168)	6.2302*** (1.0298)
Constant	1.3542 (2.4956)	0.7682 (0.6405)	0.0163 (0.0461)	0.4798 (0.6396)	0.0675 (0.1212)	-0.0548 (0.0661)
Observations	143	143	143	143	143	143

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Among the three major overseas communities, the North American Pakistani community is the wealthiest and the most educationally qualified (Mughal 2013; Oda 2009), and mostly comprises permanent migrants who may have a more investment-oriented perspective with respect to the home-country. The altruism-driven response to terrorism back home may thus be partially compensated by the community's investment-motivated reaction to organized violence.

The association between foreign portfolio investments and terrorism is negative for both the aggregate and country-wise estimations as expected (Table 4). However, most of the estimations are statistically insignificant. The predominantly weak significance of FPI's association also suggests the presence of a factor which pulls portfolio investments in the opposite direction. Being more footloose than FDI, portfolio investments seek high yields in spite of high security risks as it is always possible to withdraw if the host economy is confronted with a shock. This has

become increasingly possible thanks to financial globalization and advances in information and telecommunications technology.

**Table 5. Aggregate and top 5 countries remittance inflows and terrorism  
(ARMAX models)**

VARIABLES	ARIMA (1,1,1)	ARIMA (1,1,1)	AR(6) I(1) MA (1)	ARIMA (1,1,1)	ARIMA (1,1,1)	AR(8) I(1) MA (1)
	1	2	3	4	5	6
	Remit_aggregate	Remit_USA	Remit_Saudi Arabia	Remit_UAE	Remit_UK	Remit_Kuwait
Terrorism	0.0219* (0.0116)	0.0005 (0.0008)	0.0083*** (0.0029)	0.0065 (0.0062)	0.0062*** (0.0015)	0.0007 (0.0006)
AR(1)	-0.0752 (0.4135)	0.2899*** (0.0936)		-0.2289 (0.6017)	0.2906 (0.2234)	
AR(6)			-0.1997 (0.1272)			
AR(8)						-0.2448*** (0.0938)
MA(1)	-0.7548* (0.4367)	-1.0000*** (0.0000)	-0.6901*** (0.0783)	-0.3772 (0.6242)	-0.9402*** (0.1556)	-0.7365*** (0.1158)
sigma	63.3339*** (4.7655)	15.0906*** (1.1291)	16.9522*** (1.5028)	17.9507*** (1.5343)	11.0626*** (1.0390)	3.3363*** (0.2625)
Constant	1.4535 (1.8518)	0.4019*** (0.1471)	0.5468 (0.4590)	0.0708 (0.9715)	-0.3148 (0.2814)	0.0633 (0.1130)
Observations	143	143	143	143	143	143

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

These findings corroborate the conclusions of a growing body of business literature that highlights the security risk-averse nature of foreign private capital. FDI usually denotes a long-term engagement with the host country and therefore requires trust in the prospects of the local economy. The higher security, insurance, transportation and production costs that result from terrorism-related uncertainty erode this trust and make the investors look for less risky avenues (Blomberg, Hess and Tan 2011; Frey, Luechinger and Stutzer 2007; Gaibullov and Sandler 2011). Our findings are in contrast with those of Mehmood (2013) who fails to ascertain adverse effects of terrorism on FDI to Pakistan over the 1973-2010 period. In addition to different analytical tools employed, the two

studies differ in the time scale and the period examined, suggesting that the long-term impact of terrorism on FDI may vary from its short-run effects.

In contrast to international private capital flows, migrant remittances to Pakistan chiefly correspond to altruistic motives. Migrants tend to remit more back home to help their family members or compatriots in general cope with terrorism-induced economic losses. This rise in remittances can also be due to increased migration of the more mobile sections of the population (especially that of skilled workers and professionals).

## **6. Robustness checks**

### **A. Post estimation tests**

The estimated sets of ARMAX models need to be tested for the presence of white noise in the residuals. No autocorrelation of the estimated residuals is a prerequisite for good model fit. The models appear to be normally distributed. Augmented Dickey Fuller (ADF) and Phillip-Peron (PP) tests indicate no evidence of autocorrelation in residuals (Table A-3).

### **B. Estimations using alternate definitions of terrorism**

We estimate the baseline aggregate models using several alternative definitions of terrorism. Table 6 shows the reaction of financial inflows to an incident count of the terrorist activity. A somewhat similar picture emerges. FDI from all source regions are significant and negative (country and regional level results are not shown). FDI from the developing countries (particularly those from Asia) show a strong drop in response to terrorism. Here too, portfolio investments retain their lack of significance on aggregate, region and country level. However, the behaviour of migrant remittance inflows changes. Even though the positive sign remains, many of the aggregate, regional and top five country estimations are no longer significant at the 10% significance level.



**Table 6. Aggregate flows and major terrorism incidents (ARMAX models)**

VARIABLES	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)
	1	2	3
	Aggregate Net FDI	Aggregate Net FPI	Aggregate Remittances
Major Incidents	-0.4421*** (0.1214)	0.0621 (0.1175)	0.2413*** (0.0227)
AR(1)	0.1324 (0.1334)	-0.0546 (0.0634)	0.0954 (0.1141)
MA(1)	-0.9139*** (0.0311)	-0.9119*** (0.0542)	-1.0000*** (0.0000)
Sigma	131.4714*** (15.1425)	160.8052*** (51.9947)	60.9281*** (4.6464)
Constant	7.8688*** (2.9939)	0.1675 (1.7584)	1.5585*** (0.3459)
Observations	143	143	143

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 7. Aggregate flows and bomb blasts count (ARMAX models)**

VARIABLES	AR(2) I(1) MA (1)	AR(7) I(1) MA (1)	ARIMA(1,1,1)
	1	2	3
	Aggregate Net FDI	Aggregate Net PFI	Aggregate Remittances
Bomb_Blasts	-0.3075*** (0.1097)	-0.1160** (0.0523)	0.1124 (0.0760)
AR(1)			-0.1176 (0.5430)
AR(2)	-0.1515* (0.0904)		
AR(7)		-0.0642 (0.0473)	
MA(1)	-0.8262*** (0.0701)	-0.9181*** (0.0365)	-0.7025 (0.5865)
sigma	131.8475*** (16.8526)	159.9187*** (52.8470)	63.6083*** (4.6920)
Constant	11.5315*** (4.3577)	5.6050** (2.6576)	1.4587 (2.8392)
Observations	143	143	143

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We check the relationship between foreign financial flows and terrorism using another terrorism indicator: Bomb blasts are a major terrorism tactic in Pakistan. Results shown in Table 7 corroborate the findings of the incident count models. Although portfolio investments show significantly negative reaction to the number of bomb blasts carried out during a month, remittance receipts remain insignificant.

Finally, we estimate the terrorism – financial flows relationship employing another definition of terrorism by including the reported number of terrorists in the death count. Results given in Table 8 confirm the findings of our baseline models with all results maintaining their respective significance.

**Table 8. Aggregate flows and terrorism – death count including terrorists  
(ARMAX models)**

VARIABLES	ARIMA (1,1,1)	ARIMA (1,1,1)	ARIMA (1,1,1)
	1	1	1
	Aggregate Net FDI	Aggregate Net PFI	Aggregate Remittances
Terrorism [death count including terrorists]	-0.0209*** (0.0032)	-0.0014 (0.0026)	0.0083** (0.0035)
AR(1)	0.1176 (0.1277)	-0.0553 (0.0633)	-0.0724 (0.4086)
MA(1)	-1.0000*** (0.0000)	-0.9115*** (0.0514)	-0.7574* (0.4362)
sigma	124.9648*** (14.8709)	160.9316*** (52.4230)	63.3309*** (4.7735)
Constant	8.8198*** (1.5998)	1.8233 (2.0604)	2.2083 (1.4076)
Observations	143	143	143

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### **C. Estimations using other macroeconomic drivers of foreign financial flows**

Financial inflows interact with various macroeconomic factors. Investors can modify their investment plans in view of exchange-rate variations. Similarly, if remittances are sent for investment in the local economy, depreciation may cause the remitter to delay or reconsider his/her investment decisions. A depreciating currency often signals deteriorating economic conditions. This may dissuade an investment-motivated migrant from remitting. However, if the migrant sends money to help the household maintain a certain standard of living; he/she will now need a lower amount of foreign currency to consume the same goods basket given the higher purchasing power of the foreign currency. Likewise, local market interest and inflation rates can affect the flow of foreign capital (Agarwal 1997; Tangjitprom 2012). The relationship between foreign financial flows and terrorism can be affected as a result. To account for this possibility, we estimate the aggregate models adding three macroeconomic variables, nominal exchange rate, Consumer Price Index (CPI) and interest rate. The results shown in Table 9 confirm our baseline results with all the models maintaining their signs, significance and respective coefficients. It should be noted here that, given that the data is monthly, other potentially important drivers of foreign flows such as growth in national output and domestic investment cannot be included in the aforementioned models.

**Table 9. Aggregate flows and terrorism (ARMAX models including macroeconomic indicators)**

VARIABLES	1 Aggregate Net FDI	2 Aggregate Net FPI	3 Aggregate Remittances
Terrorism	-0.0296*** (0.0065)	-0.0188** (0.0080)	0.0051** (0.0026)
Exchange Rate	0.2219 (0.7637)	1.6523** (0.6682)	-0.2858 (0.2316)
CPI	-0.0448 (0.3716)	-0.7134** (0.2898)	0.1979* (0.1151)
Money Market Rate	6.2079 (3.9303)	4.6057 (4.2013)	4.8033** (1.8743)
AR(1)	0.0922 (0.1273)	-0.0983 (0.0788)	0.0721 (0.1158)
MA(1)	-1.0000*** (0.0001)	-1.0000*** (0.0000)	-1.0000*** (0.0000)
sigma	123.3920*** (14.7520)	150.6814*** (43.8705)	60.1232*** (4.8976)
Constant	0.2405 (23.8904)	-54.0693** (22.0050)	8.5797 (7.1437)
Observations	143	143	143

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 7. Concluding Remarks

In the aftermath of the Sep 11 2001 terrorist attacks on the Twin Towers in New York, terrorism has become an everyday issue for many developing countries. At the same time, foreign financial flows have boomed as increasing amounts of private capital and migrant remittances have found home in many developing countries. In this study, we sought to analyze the response of foreign financial flows to terrorism. Using monthly data for the January 2003 - December 2014 period, we examined the relationship between terrorism and FDI, portfolio investments and migrant remittances to Pakistan. We found a substantial difference between the behaviour of these inflows in the face of terrorism. Private capital flows, particularly FDI, demonstrate a sizeable drop due to terrorist activity,

whereas migrant remittances show an increase. Region- and country-wise flows indicate no specificities suggesting that investors and remitters from all the major source areas react in a similar fashion to bouts of terrorism.

In December 2014, a horrific terrorist attack on a school in North West Pakistan left 150 dead, most of them children. This widely mediatized attack has led to a strong response by the country's security forces. Terrorist networks are being actively targeted, sleeper cells in urban areas are being destroyed, and the anti-terrorism judicial proceedings have been streamlined and accelerated. Part of the response to this challenge will ultimately have to be to offer economic incentives to the marginalized sections of the society. The findings of this study lead to certain economic policy implications in this regard: Foreign investments abstain from countries facing sustained terrorism activity. Governments of such countries should therefore not expect major FDI inflows while the security situation is not well under control. Instead of courting illusive foreign investors, a more productive strategy could be to provide a better business environment at home, allowing local businesses to create new jobs and expand production. Even though the terrorists may not target the businesses directly, it is the business companies that ultimately face the cost of insecurity. Better performance of existing businesses which in turn improve the local economic situation creates a disincentive for terrorists by raising the opportunity cost of terrorism. Another means of boosting the local economy can be to encourage migrant remittances by lowering remitting costs and facilitating more productive use of remittances. Given their relatively stable and countercyclical nature, remittances can be relied upon, in the short-term, to keep afloat a developing economy suffering from terrorism. Measures to tax these remittances may prove counterproductive.

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**Table A-1. Unit root tests for FDI , FPI and Remittances**

Time Series	Number of lags As per AIC/SBIC criteria	ADF test statistics ( $\tau$ )	PP test statistics ( $\tau$ )	Critical Value (at 5 %)
Aggregate Net Foreign Direct Investment (D1)	3	-9.43	-20.02	-2.89
Net Foreign Direct Investment from United	2	-8.663	-20.686	-2.89
Net Foreign Direct Investment from UAE (D1)	4	-8.12	-16.002	-2.89
Net Foreign Direct Investment from UK (D1)	3	-8.882	-24.39	-2.89
Net Foreign Direct Investment from Netherlands	4	-7.823	-16.247	-2.89
Net Foreign Direct Investment from	4	-8.216	-28.081	-2.89
Aggregate Net Foreign Portfolio Investment	3	-7.966	-32.74	-2.89
Net Foreign Portfolio Investment from United	4	-6.989	-35.483	-2.89
Net Foreign Portfolio Investment from UAE (D1)	3	-9.002	-30.918	-2.89
Net Foreign Portfolio Investment from UK (D1)	3	-8.412	-26.068	-2.89
Net Foreign Portfolio Investment from	3	-8.52	-26.399	-2.89
Net Foreign Portfolio Investment from	2	-8.814	-17.912	-2.89
Aggregate Remittances (D1)	2	-8.306	-21.373	-2.89
Remittances from USA (D1)	2	-8.146	-17.979	-2.89
Remittances from Saudi Arabia (D1)	1	-8.551	-16.712	-2.89
Remittances from UAE (D1)	1	-9.68	-15.851	-2.89
Remittances from UK (D1)	3	-7.217	-17.151	-2.89
Remittances from Kuwait (D1)	1	-9.645	-17.104	-2.89

**Note: D1 = stationary at first difference**

**Table A-2. Lags Selection for FDI and FPI ARMAX Models**

<b>Time Series</b>	<b>Number of lags for autoregressive term ' <math>p</math>'</b>	<b>Number of lags for moving average term ' <math>q</math>'</b>
Aggregate Net Foreign Direct Investment (D1)	1, 2, 4, 5, 8	1, 6
Net Foreign Direct Investment from United States (D1)	1, 2	1, 2, 3, 6
Net Foreign Direct Investment from UAE (D1)	1, 2, 4, 8	1, 2
Net Foreign Direct Investment from UK (D1)	1, 2, 3, 5	1
Net Foreign Direct Investment from Netherlands (D1)	1, 2, 4	1, 2
Net Foreign Direct Investment from Switzerland (D1)	1, 2, 3, 4, 10, 11	1
Aggregate Net Foreign Portfolio Investment (D1)	1, 2, 3, 7	1, 4, 5
Net Foreign Portfolio Investment from United States (D1)	1, 3, 4	1, 2, 3, 4
Net Foreign Portfolio Investment from UAE (D1)	1, 2, 3, 6, 8	1
Net Foreign Portfolio Investment from UK (D1)	1, 2, 3, 5, 7	1
Net Foreign Portfolio Investment from Singapore (D1)	1, 2, 3	1, 2, 4, 5
Net Foreign Portfolio Investment from Luxembourg (D1)	1, 2, 6, 7	1
Aggregate Remittances (D1)	1	1
Remittances from USA (D1)	1, 8, 12	1
Remittances from Saudi Arabia (D1)	1, 6, 8	1, 6, 8
Remittances from UAE (D1)	1, 5	1
Remittances from UK (D1)	1, 3	1
Remittances from Kuwait (D1)	1, 7	1

*Note: D1 = stationary at first difference*

**Table A-3. ADF and PP tests for Residuals**

<b>Time Series</b>	<b>ADF test statistics (<math>\tau</math>) on</b>	<b>PP test statistics (<math>\tau</math>) on Residuals</b>	<b>Critical Value (at 5 %)</b>
Aggregate Net Foreign Direct Investment	-11.018	-11.017	-2.89
Net Foreign Direct Investment from United States	-11.026	-11.045	-2.89
Net Foreign Direct Investment from UAE	-10.473	-10.464	-2.89
Net Foreign Direct Investment from UK	-10.521	-10.523	-2.89
Net Foreign Direct Investment from Netherlands	-10.448	-10.435	-2.89
Net Foreign Direct Investment from Switzerland	-11.21	-11.257	-2.89
Aggregate Net Foreign Portfolio Investment (D1)	-11.251	-11.253	-2.89
Net Foreign Portfolio Investment from United States	-10.743	-10.738	-2.89
Net Foreign Portfolio Investment from UAE (D1)	-11.078	-11.099	-2.89
Net Foreign Portfolio Investment from UK (D1)	-11.127	-11.129	-2.89
Net Foreign Portfolio Investment from Singapore (D1)	-11.113	-11.113	-2.89
Net Foreign Portfolio Investment from Luxembourg	-11.244	-11.249	-2.89
Aggregate Remittances (D1)	-11.190	-11.211	-2.89
Remittances from USA (D1)	-11.311	-11.306	-2.89
Remittances from Saudi Arabia (D1)	-10.488	-10.505	-2.89
Remittances from UAE (D1)	-11.369	-11.348	-2.89
Remittances from UK (D1)	-10.316	-10.338	-2.89
Remittances from Kuwait (D1)	-11.007	-11.090	-2.89

**Table A-4. Test for Granger causality (Aggregate models)**

<b>Model</b>	<b>F-Statistics</b>	<b>Prob &gt; F</b>
Aggregate Net Foreign Direct Investment	F( 4, 113) = 1.49	Prob > F = 0.2097
Aggregate Net Foreign Portfolio Investment	F( 4, 113) = 2.35	Prob > F = 0.0887
Aggregate Remittances	F( 4, 112) = 1.52	Prob > F = 0.2004

**Table A-5. List of source countries and regions for FDI and FPI**

**Developed countries:** Luxembourg, Denmark, France, Germany, Netherlands, Sweden, U.K, Norway, Switzerland, Canada, U.S.A, Australia, Japan

**Developing countries :** Libya, Egypt, Mauritius, South Africa, Oman, Iran, Kuwait, Bahrain, Qatar, Saudi Arabia, Turkey, U.A.E, Bangladesh, China, Hong Kong, Malaysia, Singapore, India, Korea (South), Caribbean Islands, Cayman Island, Bahamas

**Asia:** Oman, Iran, Kuwait, Bahrain, Qatar, Saudi Arabia, Turkey, U.A.E, Bangladesh, China, Hong Kong, Malaysia, Singapore, India, Korea (South)

**Western Europe:** Luxembourg, Denmark, France, Germany, Netherlands, Sweden, U.K, Norway, Switzerland

**North America:** Canada, U.S.A

**Africa:** Libya, Egypt, Mauritius, South Africa

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