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Doctoral Thesis

Religion and Ethnicity in Developing Labour Markets

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Declaration of Authorship

I, Sarah KHAN, declare that this thesis titled, 'Religion and Ethnicity in Developing Labour Markets' and the work presented in it are my own. I confirm that:

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Abstract

Department of Economics

Doctor of Philosophy

Religion and Ethnicity in Developing Labour Markets

by Sarah KHAN

This Ph.D. thesis looks at the effects of religion and ethnicity in developing labour markets. The first and second chapter take a step towards understanding the impact of terrorist activities in north-western Pakistan since 2007. The increased insurgency in the north-western regions of Pakistan threatened the educational attainment of young girls and boys, with the Taliban specifically targeting the education of girls. The empirical strategy uses a *difference-in-difference-in-difference* approach, comparing the differences in education and labour market outcomes across three dimensions, gender, years, and district. I first estimate the gender differential for total school enrolment in the affected districts. Second, estimate the impact on enrolment in religious schools. Last, I look at the gender differential in labour market by age and marital status. The results suggest that the impact of these terrorist attacks was relatively modest and short-lived for both education and labour market outcomes. The third chapter uses the Ghana Living Standards Survey 2005 to empirically analyse the employment outcomes of ethnic minorities in Ghanaian labour market. In the to less-developed regions, the absence of paid work opportunities has resulted in ethnic groups entering self employment. Non-dominant groups residing in *ethnic enclaves* are pulled into non-farm self-employment where access to credit and family workers are important determinants of entry into entrepreneurship.

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Dedicated to my family, for their immense support throughout the years.

Chapter 1

Introduction

There exists a growing economic literature that examines the effects of ethnicity and religion on conflict and economic development (Montalvo and Reynal-Querol, 2005) (Bosker and de Ree, 2014) (J Esteban and Ray, 2012). An important catalyst for this literature has been the global rise of Islamic terrorism and internal ethnic conflicts in recent decades. Along with low investment, high population, and low level of education, religious and ethnic strife could also be a major cause of poor economic performance and political instability. Ethnic and religious divisions can challenge the cohesion within of a state as well as between states. Therefore, it is important to empirically examine the economic consequences of religious and ethnic violence on the targeted groups, and understand household and individual behaviour; as such insights could be used in targeting affected populations with social and economic policies.

Religious and ethnic divisions have been linked to conflicts by forming social cleavages that can develop into violence. Horowitz and Lijphart claim that religious differences are more important than other differences (language, ethnicity, or race) as a social cleavage, as religion is exclusive and is a stronger sign of identity (Horowitz, 1985) (Lijphart, 1984). High religious and ethnic tensions can be found in Lebanon, Israel, Nigeria, Sudan, and Ethiopia where there are conflicts among ethnic groups, in Malaysia between Christians and Muslims, in South Asia between different sects of Islam (Shia vs. Sunni), Myanmar where Rohingya Muslims have faced a genocide, and recent violence in Iraq and Levant with the rise of Wahabi Islam. Moreover, radical groups like the Taliban in Afghanistan and Pakistan as well as Al-Shabab in Somalia, Boko Haram in Nigeria, the Benghazi rebels in Libya, and the ISIS in Iraq have occupied important territories in these countries, where these groups have been known to practice ethnic

cleansing[1], abduction of women[2], killing foreign workers[3], and large-scale intimidation of the public. The US and Allied forces have been at war with extremist elements within these countries for over a decade now.

Terrorism and violence displaces people, destroys capital and infrastructure, disrupts schooling, and limits mobility of the affected population. Volatile regions of a country under conflict can experience gender differentials in educational and labour market outcomes. Due to destruction of industry and infrastructure, there may be limited opportunities for skilled work, in which case it makes more economic sense to educated boys rather than girls, as men are more likely to take better paying jobs in developing countries (Shemyakina, 2010). Existing literature shows that conflict effects females disproportionately; women and girls are made worse off relative to men in terms of education, labour market and marriage outcomes (Valente, 2001) (Alderman and Kinsey, 2004) (T. Brück and Verwimp, 2010) (Shemyakina, 2010). In countries experiencing religious violence, women's mobility and freedom have been specifically targeted[4]. Moreover, violence also increases mortality risks and income shocks, decreases the quality of education, and a subsequent increase in child labour (Chamarbagwala and Morán, 2008) (Prieto-Rodriguez and Rodriguez-Gutierrez, 2003) (Shemyakina, 2010). Households can change labour allocations, where child labour can be used as an economic security to compensate for income losses during war time. These children can be removed from school which reduces the stock of human capital resulting in loss of long-term welfare of the family.

Also, as religious/ethnic schism increases, this can lead to antagonism, hostility, and discrimination towards the minorities. For instance, in the absence of government regulations and management practices in the labour market, majority group members may discriminate against the minority groups, leading to wage differentials where the minority groups are rewarded less for the same jobs and the same level of worker endowments. As a result, the economic divide between minority and majority members widens. That is, as the population of a minority group within the labour market increases, so does the likelihood of discriminatory practices in the labour market (Semyonov, 1988) (Bonacich, 1976) (Black, 1995) (Arrow, 1973) (Becker, 1971) (Barr and Oduro, 2000).

This PhD thesis contributes to several strands of studies in education and labour economics, and the economics of terrorism. First, it adds to the literature studying the effect of terrorism on educational attainment and the labour market in developing countries. Second, it adds to the literature on Islamic schooling in Pakistan. Last, it contributes

[1] Yazidis have been known to be killed by ISIS in recent months.
[2] Boko Haram is currently holding hundreds of girls as hostages
[3] US ambassador, J. Christopher Stevens, was killed in Benghazi in 2012.
[4] The Taliban have a history of banning women in public in Pakistan and Afghanistan

to the literature of ethnic enclaves in developing labour market of Ghana. The chapters are summarized below.

The Taliban insurgency in the north-western regions of Pakistan specifically threatened the participation of women in the labour market and education, as one of the main goals of their terror campaign was to keep women at home. Women's socio-economic outcomes in Pakistan had seen a steady improvement in the decade prior to the start of the insurgency in 2007. The actions of the Taliban were therefore seen as a threat to the improvement in Pakistani women's future socio-economic status. The first two chapters after the introduction take a step towards understanding the impact of terrorist activities in north-western Pakistan on women's human capital development and accumulation, with the Taliban specifically targeting working women and girls over age 10 in education. The spatial and time-based variation in intensity of violence is used to identify the effects of terrorism on the educational attainment and labour market outcomes of young girls and women. The empirical strategy uses a *difference-in-difference-in-difference* approach, comparing the differences in enrolment and employment across three dimensions, gender, district, and years. I estimate the impact of these attacks by using five consecutive rounds of the Pakistan Social and Living Standards survey (PSLM) from the years 2004 to 2009. This data is merged with data on the total number of terrorist attacks and the number of attacks on educational institutions compiled from the Global Terrorism Database (GTD) and the South Asian Terrorism Portal (SATP).

The main results of this analysis are as follows. First, there is a relatively small effect on the estimated enrolment probabilities for girls aged 10-14 during 2007-08, the years of highest-intensity terrorist attacks. In the following year of 2008-09, when the Pakistani military retook control over some of the affected areas, this effect fades away, suggesting that students returned to schools as soon control was regained in the most-affected areas. Moreover, there is no evidence of dramatic increases in religious school enrolment rates, pointing at failed intimidation attempts of the Taliban. Second, there is no evidence for a substantial drop in the labour force participation rates in the worst affected districts. There is a relatively small effect estimated for women in paid employment in the years of highest-intensity terrorist attacks, followed by a rapid return to normality in overall employment after the Pakistan Army counterinsurgency measures in 2009.

The third chapter looks at the influence of ethnicity on the decision to enter self employment in Ghana and the push/pull factors which affect the rewards in the different sectors of employment. First, I look into factors that drive ethnic minorities out of formal sector employment. I test whether Non-Akans living in Akan-majority regions suffer from detrimental consequences of socio-economic discrimination more than those living in Non-Akan majority regions. Next, I estimate the influence of ethnicity on the decision

to enter non-farm self-employment and earnings in the non-farm informal sector. Lastly, I test for the impact of *ethnic enclaves*, defined following Portes and Wilson as a cluster of individuals from an ethnic group who reside within the same geographical location, on labour market outcomes - How does living in an enclave affect labour market outcomes for the non-dominant groups (Wilson, 1980)? If enclaves are important for self employment, the likelihood of being self-employed would be higher if an individual from a non-dominant group lives in an enclave.

Chapter 2

The Taliban and Girls' Schooling

The Impact of School Bombings on Access to Education: Evidence from North-western Pakistan

2.1 Introduction

Since Pakistan became a United States ally in the War on Terror after the 9/11 attacks on New York and Washington, terrorist incidents in the country have resulted in around 50,000 deaths of civilian and army personnel. In addition, over 2 million Pakistanis have been displaced due to military operations in troubled areas (SAT, 2014). The National Counterterrorism Centre's Report on Terrorism shows that, in 2011, Pakistan experienced 1,436 terrorist incidents, 68 percent of the total in South Asia and 17 percent of the world's total, a figure only surpassed by Afghanistan and Iraq (NCTC, 2012). These incidents include numerous forms of violence against civilians, from suicide/bomb attacks on private citizens to destructions of schools. The terrorist attacks on girls' schools in north-western Pakistan have caught the attention of the world in recent years. Although the enrolment rate of girls has always been below that of boys, it has seen a considerable increase between 1999 and 2007 where girls' literacy rates have increased from 32 percent to 42 percent (SDPI, 2008). The targeting of female education by the Taliban was therefore seen as a threat to the improvement in female schooling and future economic and social status.

The microeconomic impact of terrorism on civilian populations can be substantial and persistent. Not only do people living in troubled areas suffer injuries and have their

property destroyed, they may also be displaced from their towns, lose their means of livelihood, or be unable to attend school, all of which may result in a permanent decline in their stock of human capital and earnings. Furthermore, since war costs tend to be disproportionately borne by the underprivileged and most vulnerable populations, conflict may intensify poverty and inequality (Chamarbagwala and Morán, 2008). Understanding the short-term and longer-term economic consequences of terrorism is thus important for implementing post-conflict reconstruction/rehabilitation efficiently and helping identify those populations that reconstruction policy should target.

Although men are typically more affected by direct conflict-related death, in Pakistan's case women face more challenges as the terrorists have specifically targeted women and their mobility. Since the rise of the Taliban in the areas adjacent to Afghanistan, they have aimed at barring girls and young women from attending schools and colleges by sending threatening letters to schools, blowing up school buildings, and attacking women who defied the ban. There was a sharp increase in attacks on educational institutions from 2007, most of which were girls' schools (GTD data). Mainstream news reports and international articles claim that these attacks led to the closure of 900 schools, denying access to over 120,000 female students (IRIN, 2004). By the spring of 2009, the military operation in Swat districts led to the end of the Taliban's anti-female education campaign. However, there were some reports of continued bombings in rural areas of Peshawar and surrounding districts of Mardan and Charsadda towards 2010.

This paper looks gender specific effects of terrorism on educational attainment in northwestern Pakistan. The variation in intensity of violence, measured in number of schools attacked in each district of Khyber Pukhtoonkhwa over time, is used to identify the effect of terrorism on the educational attainment of girls and young women. I estimate the impact of targeted attacks of the Pakistani Taliban on the educational attainment and labour market outcomes of Pakistani women using five consecutive rounds of the Pakistan Social and Living Standards survey (PSLM) from the years 2004 to 2009. This data is merged with data on attacks on educational institutions compiled from the Global Terrorism Database (GTD) and the South Asian Terrorism Portal (SATP). My first estimation looks at the effects of attacks on schools on the enrolment rates of both boys and girls in the age groups of 3-9, 10-14, and 15-18 years. Special consideration is given to the districts of Swat and Peshawar, which experienced the most incidents and which have dominated media accounts of the conflict. The second estimation looks at the effects of these attacks on enrolment rates of madrassas (Islamic schools). The Taliban's letters demanded that children should be removed from secular schools and enrolled in madrassas. If parents perceived that these threats were credible, I would expect to see a drop in overall enrolment after the bombings, but an increase in enrolment rates of religious schools.

This paper is structured as follows. Section 2.2 describes the history of the Pakistan conflict and the Taliban's campaign against female education. Section 2.3 presents previous research on the impact of civil war and terrorism on educational attainment. Section 2.4 describes the data while the empirical strategy and results of the estimation are presented in section 2.5. Section 2.6 concludes the paper.

2.2 Pakistan and Terrorism: Background

Pakistan is administratively divided into the semi-autonomous Federally Administered Tribal Areas (FATA) in the northwest and four provinces - Punjab, Sindh, Balochistan, and Khyber Pukhtoonkhwa – which contain a total of administrative 102 districts (PSLM). Towards the northwest, Pakistan shares a 2,430 km (1,509.9 mile) border with Afghanistan in the provinces of Khyber Pukhtoonkhwa and Balochistan, known as the Durand line (Figure 2.1). Due to its proximity with the Afghan border, the province of KPK has suffered the most attacks from the militant insurgency (Hassan, 2008).

Even before the rise of the Taliban in the north-west, Pakistan's women were comparatively disadvantaged in terms of human development. The female participation rate in 2003-04 was 15.9 percent out of the total Labour Force Participation Rate of 43.7 percent with the rural rate at 19.5 percent and urban at 9.4 percent[1]. According to Pakistan Social and Living Standards Measurement Survey (PSLMS) 2004-05 the total literacy rate for Pakistan (age 10 years and above) was 53 percent. Of this literate males were 65 percent and females 40 percent, revealing a gender gap of 25 percent. In rural areas only 29 percent females were literate. As for more recent figures, only 18.3 percent of adult women have reached a secondary or higher level of education compared to 43.1 percent of their male counterparts. The female labour market participation rate is 22.7 percent compared to 83.3 percent for men. Pakistan has a Gender Inequality Index value of 0.567, ranking it 123 out of 148 countries in the 2012 index (UNDP, 2012).

Pakistani Taliban: Formally known as Tehrik-i-Taliban Pakistan (TTP), the group is very closely linked with the Afghani Taliban and al Qaeda through similar religious extremist ideology and shared heritage. During the Soviet occupation of Afghanistan, fighters from Pakistan crossed over the border to fight alongside the Afghani Taliban (Hassan, 2008).

After joining the War on Terror in 2001, Pakistan's army began hunting various militant groups that had their hideouts in the semi-autonomous regions along Pakistan's border with Afghanistan. In reaction, militant supporters of the Afghan Taliban in

[1]Pakistan Labour Force Survey, 2003-04

the tribal areas transitioned into a mainstream Taliban force of their own. In 2007, like-minded militias in Pakistan's tribal region came together under the command of Baitullah Mehsud from the Mehsud tribe of South Waziristan. The TTP may have started in the tribal regions, but have since expanded their network into settled areas of Khyber Pukhtoonkhwa and Punjab provinces. Whereas the TTP are predominantly a Pashtoon group, they are not solely composed of Pashtoon fighters. They draw membership from all of FATA's seven agencies as well as several settled districts of Khyber Pakhtunkhwa and Punjab. Punjabi Taliban, an alliance of militant groups that were active in Kashmir that fought in the insurgency in Kashmir, have also joined forces with the TTP. With close to 2,000 men, the Punjabi Taliban mostly carry out attacks inside settled areas of Pakistan. The Pakistani Taliban also receive support from Arab, Chechen, Uzbek, and other foreign fighters, many of whom settled inside FATA after the Soviet-Afghan War because they could not return to their own countries or came to FATA after the NATO invasion in Afghanistan. They have also been joined by criminal gangs to raise money through kidnappings and extortion (Hassan, 2008).

Their primary targets of the Taliban are the Pakistani state and it's military. The ultimate goal of their insurgency is to overthrow the government via a terrorist campaign and impose Sharia law (strict Islamic law) in Pakistan. Because of Pakistan's alliances with the United States and NATO, the Pakistani Taliban has also attacked foreign interests inside and outside of Pakistan. Within Pakistan, Tehrik-i-Taliban often target members of Pakistan's armed forces but also target politicians and civilians. Two-time Prime Minister, Benazir Bhutto and teen blogger Malala Yousafzai perhaps their most prominent targets. A Tehrik-i-Taliban militia led by Maulana Fazlullah controlled the Swat region until they were overthrown by a military operation in summer of 2009. In early 2009, Malala Yousafzai wrote a blog entry exposing how a decree in forbidding girls from attending school was enforced by Tehrik-i-Taliban and the targeting of schools in her region. On October 9 2012, Taliban gunmen halted a van transporting her and other children home from school, found Malala and shot her in the head and neck. When she survived her injuries, a TTP spokesman promised that they would "finish the job the next time"[2]. Malala was recently the Nobel Peace Prize for her fight against extremism.

Spillover into Pakistan - What determines where the Taliban are active: After the NATO forces toppled the Taliban regime in Kabul in the aftermath of September 11 2001, the Taliban regrouped a sizable contingent of forces along the Pak-Afghan border, 2500 k.m. of rugged mountainous territory with numerous mountain passes and difficult routes linking Afghanistan and Pakistan, which are in most cases known only to the locals. The Taliban reappearance in Pakistan has taken place in areas that adjoin the Taliban's traditional strongholds in Afghanistan. Helmand, a remote southern province

[2]CNN 2012,''Who are the Pakistani Taliban?" Ben Brumfield

of Afghanistan, is one such area, where the Taliban have a heavy influence. This area is adjacent to the Pakistani territory of the Noshki-Chaghai region in Balochistan province, where the Taliban have found refuge among local tribes. Also, North and South Waziristan are adjacent to Khost and Paktika provinces in Afghanistan, where in the latter, NATO forces have several checkposts and a compound. Reportedly, there are 243 illegal passages in North Waziristan by which it is possible to enter Afghanistan, while there are only five check posts on the border in this area. Similarly, Quetta city in Balochistan, Pakistan is near Kandahar, Afghanistan, where the Taliban have a presence in the neighbouring Afghan countryside. The outskirts of Quetta have become a safe haven for such groups. Whenever the Pakistani army starts operations within its borders, terrorists move from one side of the Pakistani border to the other (Zaidi, 2010).

The insurgency, which was initially limited to North and South Waziristan, spread during the next few years throughout FATA, including the agencies of Khyber, Orakzai, Kurram, Bajaur, and Mohmand. Moreover, several rebel militias emerged between 2002 and 2006 in the settled areas of Swat and Darra Adam Khel in KPK. By 2007, the Swat district had also fallen under rebel control, and within two years the Pakistani Taliban controlled towns located a mere sixty miles away from Islamabad.

The main determinent of the terrorist activities in an area depends on the proximity from the tribal areas. In figure 2.3, it can be observed that the number of terrorist attacks are more frequent in the areas adjacent to the tribal areas. As the distance of the tribal areas increases, the number of terrorist incidents reported in the GTD data goes down. In addition to its presence in these areas, reports indicate that the TTP has also made their presence felt settled metropolitan areas by reaching targets in all provinces (Peshawar, Islamabad, Rawalpindi, Faisalabad, Lahore, Multan, Karachi, and Quetta). They have also attacked security forces inside the Pakistani controlled region of Kashmir (Qazi, 2011).

Taliban activities in Khyber Pukhtoonkhwa province: Since Pakistan joined the War on Terror in 2001, Khyber Pukhtoonkhwa has experienced the greatest amount of extremist violence out of all the regions in Pakistan. In comparison to the unsettled tribal belt, where Pakistan's security forces face the brunt of attacks from Taliban, the types and nature of attacks in Khyber Pukhtoonkhwa have a different focus: to set up micro-emirates in the province where they enforce an extremist version of religious ideals (O'Malley, 2010). For instance, recent targets included a population welfare office in Swabi, bomb attacks on girls' schools and sending threatening letters to boys' schools asking them to join madrassas instead of public schools, destruction of historical sites containing rocks engraved with Buddha images, attacks on video and music shops, and

attacks on barber shops due to their practice of shaving beards [3] [4] [5]. To drive the Taliban out of Swat Valley, Operation Rah-e-Rast II began in January 2009 and involved the Pakistani Army and Taliban militants in a fight for control of the Swat district of Pakistan. The operation ended in July 2009 with Pakistan army taking control of the district.

This paper is primarily concerned with attacks on girls' schools. UNESCO's *Education under Attack* has documented hundreds of fire bombings and suicide attacks on schools, particularly in the Swat district of Khyber Pukhtoonkhwa province. The Taliban started bombing girls' schools in parts of Khyber Pukhtoonkhwa province in early 2007. From 2007 to March 2009, hundreds schools were either damaged or completely destroyed by attacks. The targets of attacks included different types of schools, although girls' schools were often singled out. Initially, public threats by the Taliban warning of attacks on all girls' schools were sent out demanding a ban of girls' education beyond age 9. The only cohort that would have been negatively impacted would be girls in secondary schooling in the ages of 10 and beyond as older girls in the Pushtoon culture observe *purdah*[6] and are restricted from higher education even in the presence of high schools/colleges. Even in the absence of terrorism, enrolment rates for girls in older cohorts are expected to be lower due to restrictions of *purdah* in the strict Pushtoon culture.

Letters were sent out to girls' school demanding that students wear burqas, which then progressed to demands for closure of girls' schools. These threats were then followed by bombing school buildings, usually in the middle of the night. In Swat district alone, from 2007 to March 2009, 116 girls' schools and 56 boys' schools were destroyed or damaged[7]. Throughout 2008, the attacks on girls' schools spread to districts adjacent to Swat, including Dir, Peshawar, Mardan, Charsadda, Bannu, and the tribal regions of FATA and North Waziristan (tribal areas are not included in my dataset). Popular press articles and media reports claim that the incidents of terrorist attacks lead to the closure of 900 government and private schools and a fall in enrolment rates for girls from 120,000 in 2007 to just 50,000 in 2009[8]. The "fall" is generally attributed to fear amongst parents and teachers that their girls might be attacked. Yet while these reports claim the success of the Taliban campaign, none of the reports base their analysis on

[3] Reza Sayah, "Pakistan: Bomb Destroys Girls' School," CNN, July 25, 2008.

[4] "Tailor's Shop Blown Up in Bajaur," Daily Times, September 7, 2007

[5] This was inspired by the destruction of the Bamiyan statues. The Buddhas of Bamiyan were two 6th century monumental statues of Buddha carved into the side of a cliff in Bamiyan, central Afghanistan. In March 2001, these statues were destroyed by the Taliban (USA Today, 2001).

[6] Purdah is a religious and social practice of female seclusion prevalent among some Muslim communities in Afghanistan, Pakistan, and Northern India. More simply, it is the practice of preventing men from seeing women. This takes two forms: physical segregation of the sexes and the requirement that women cover their bodies so as to cover their skin and conceal their form.

[7] Akhtar Amin, "Militants Destroyed 125 Girls' Schools in 10 Months," Daily Times, August 21, 2008.

[8] IRIN News, "Pakistan: Swat Militants Driving Girls Out of School," January 20, 2009

publically available data sources or established statistical methodologies. They have only provided anecdotal evidence for their claims[9] (O'Malley, 2010).

2.3 Literature - Previous Work on Gender-Specific Effects of Armed Conflicts

The micro level consequences of conflict are relatively under-researched area with most focus on macro-economic effects of conflicts. This is due to a lack of large-scale, high quality data for countries under conflict and because it is difficult to collect data from a country that just emerged from conflict (Justino, 2011). Very few micro-level socio-economic surveys in conflict-affected countries explicitly acknowledge the prior existence of violent conflict in those countries when designing sampling frames and formal questionnaires. Questionnaires used in standard household surveys implemented in countries affected by violence and conflict (e.g. Nigeria, Indonesia, Colombia, Rwanda, South Africa, and Liberia) rarely feature questions capturing the causes and consequences of violence in the lives of those affected by violent conflict. For instance, these surveys rarely include questions specifically about conflict-related migration or evacuation. Even when they do, these questions are not implemented in a way which allows consistent comparisons across different settings or over time (T. Brück and Verwimp, 2010). When reliable data is available, it is difficult to identify whether household behaviour was a reaction to conflict directly or other economic conditions that took place simultaneously. A related issue is that most existing surveys are cross-sectional, and thus cannot be used for difference-in-difference estimation.

Justino outlines three consistent patterns that emerge as a result of violence interrupting education. First, minor shocks to schooling can lead to long term consequences on the educational attainment, health outcomes, and labour market outcomes of the affected cohort. Second, when conflict leads to destruction of education infrastructure, there is a negative effect for secondary education but not primary education. Third, conflict can produce gender differentials in educational and labour market outcomes (Justino, 2011).

Regarding long term consequences of violence, Akbuluut-Yuksel uses a difference-in-difference to examine the effects of allied bombings during World War II on the schooling and health of German children. He finds that those who resided in heavily targeted cities had significantly fewer years of schooling and were one centimetre shorter than children of same age in non-targeted areas (Akbulut-Yuksel, 2009). Next, the pattern of

[9]There are only news reports about closing down of schools. Most are anonymous interview with education department officials. All reports give different figures for number of schools bombed or number of girls affected. The only official data which I can use here is the GTD data on incidents of attack

destruction of education infrastructure was observed for Bosnia by Swee, who finds that the civil war of 1992-1995 led to a decrease in the likelihood that students completed secondary schooling, but had no significant effects on primary education. He argues that child soldier recruitment was the main determinant of these results (Swee, 2009). Chen, Loayza, and Reynal-Querol find that the average recovery rate in post-conflict countries during the period 1960-2003 was smaller for secondary-school enrolment than for primary enrolment (Loayza and Reynal-Querol., 2008). Similar studies by Miguel and Roland, and Stewart et. al. suggest that countries with strong institutions can recover pre-conflict enrolment rates once war dies down. Stewart et. al. used a sample of eighteen African economies under civil war and find that primary school enrolments decreased in only three out of eighteen countries in their sample but improved in five countries during civil war (Stewart and Wang, 2001). A similar effect is found by Miguel and Roland who study the long-term impact of US bombing on the economic development in Vietnam (Miguel and Roland, 2006). Akresh and de Walque find that school age children exposed to the genocide experienced a drop in educational achievement of almost half a year of completed schooling, and were 15 percent less likely to complete 3rd or 4th grade (Akresh and de Walque, 2008). Lastly, regarding gender differentials in educational outcomes, Shemyakina finds that during the Tajikistan armed conflict of 1992-1998, girls who were exposed to conflict experienced a significant reduction in enrolment rates while there was little or no effect on the enrolment of boys. School aged girls residing in conflict-ridden regions were 12.3 percent less likely to complete mandatory schooling as compared to girls who completed their schooling before the conflict started. Furthermore, Shemyakina finds that the probability of completing the compulsory ninth grade is 4 percent lower for boys and 7 percent lower for girls. These results suggest that households affected by conflict invested more in the schooling of boys, for whom there is less perceived risk of violence, harassment or abduction. Due to the destruction of industries and infrastructure, job opportunities for skilled labour may become scarce, in which case it may make more economic sense to educate boys as they may be more likely than girls to take up higher paid jobs (Shemyakina, 2006). Similarly, Chamarbagwal and Moran examine the effects of the Guatemala civil war of 1979 using an empirical strategy which exploits variation in conflict intensity across regions. They find that during the peak conflict years (1979-1984), girls had 0.55 years less education while boys had 0.13 year less education in areas worst hit by conflict. The authors argue that internal displacement and destruction of property led families to reallocate scarce resources towards the primary education of boys. While both boys and girls received less secondary education due to civil war, the effects were more pronounced for girls (Chamarbagwala and Morán, 2008).

Causal mechanisms that link violence and educational outcome during conflicts:

The literature discussed in this section show a clear negative consequences of violence and conflict on the human capital accumulation of households in affected regions. However, there is little consensus on the causal mechanisms that explain the negative link between conflict/terrorism and schooling outcomes. Identifying the mechanisms that uphold this negative relationship between conflict and educational outcomes are crucial towards designing and executing policies to ensure these negative effects can be diminished. The types of mechanisms that explain the negative effects of conflict on schooling are discussed as under.

First, households in affected regions can reallocate labour; using child labour to compensate for income losses during war time. The affected households replace their dead, injured or physically and mentally disabled adult workers with children, in order to compensate for the unexpected reduction in the household income. As a result, children are removed from schools, reducing the stock of human capital, and resulting in loss of long-term welfare for the family (Justino, 2011). Akresh and de Walque, Merrouche, Shemyakina and Swee observed a reduction in educational attainment and enrolment in countries undergoing civil war, as well as higher rates of child labour (Akresh and de Walque, 2008) (Merrouche, 2007) (Swee, 2009) (Shemyakina, 2006). Furthermore, household can redistribute their investments by gender. Due to destruction of industries and infrastructure during war periods, job opportunities for skilled labour generally become scarce. Households may respond to this job scarcity by redistributing their resources away from investments with lower returns. Shemyakina, and Chamarbagwala and Morán have found that, during conflict periods, households may invest more in the education of boys rather than girls, as boys may have a higher probability of finding better paid jobs (Chamarbagwala and Morán, 2008) (Shemyakina, 2006).

Evans and Miguel find that young children in rural Kenya are more likely to drop out of school after the parent's death, especially the mother's death. Rodriguez and Sanchez examine the impact of war on child labour in Colombian municipalities between 1990 and 2003, and find significant rise in school drop-out and labour force participation rates of children due to violence by armed groups. They show that increased mortality risks, income shocks and decrease in quality of education due to violence are the main culprits for reduction in educational investments and increases child labour at the household level. Mooney and French estimate that about 27 million children are without education due to emergencies in their regions. These out-of-school children are then used as labour to contribute to household income. They find that the boys are used for field work while the girls are used as household help (Evans and Miguel, 2004) (Rodriguez and Sanchez, 2009) (Mooney, 2005).

Second, *fear* plays an important part in explaining the removal of children from schools during violent events. Conflict-ridden countries often experience direct attacks on teachers and students or the destruction of school buildings. These attacks lead to severe psychological trauma for the affected; leaving children afraid to go to school, parents afraid of sending them to school, and teachers are afraid to go to work. For example, in Afghanistan, school children and staff have been directly targeted by the Taliban. More than 100 children were killed in this way between 2006 and 2008, which has resulted in the closure of around 670 schools in early 2009, depriving around 170,000 children of access to education (IRIN, 2004). Fear of physical attacks and sexual violence is can act as an obstacle for school enrolment abilities of affected children, especially girls. In such environments, households may try to protect their children by keeping them at home.

Third, access to quality education is imperilled as educational infrastructure is often targeted. Schools, teachers, students and staff in affected areas can be directly targeted by terrorist attacks. The types of attack include the burning, shelling and bombing of schools, the occupation of schools by armed forces, the murder, torture, abduction and rape of teachers, students, education aid workers and school staff by armed groups or military forces, and the forced recruitment of child soldiers (O'Malley, 2010). Schools facing such threats often closed down to prevent untoward incidents and governments may be reluctant to reopen schools because threats of attack may still be present. Moreover, it will also find it difficult to replace teachers in the attacked areas (Mulkeen, 2007). Such incidents can have long-term impact on the quality and quantity of education institutions for those living in volatile areas.

In order to increase the number of members, militant groups recruit *child-soldiers* to improve logistical support, spread fear and reduce resistance amongst local populations. This can have considerable impact on their educational attainment, with consequences on their level of human capital. In particular, participation in armed groups affects negatively the long-term economic performance of child soldiers in terms of skills, productivity and earnings because military activities are not good substitutes for the benefits that individuals will acquire through education and work experience (Blattman and Annan, 2010). These children are exposed to extreme violence and can develop severe psychological issues such as post-traumatic stress syndrome, which in turn, affects their educational outcomes (Justino, 2011).

According to the World Bank , there are about 300,000 child-soldiers involved violent conflicts around the world, both boys and girls, under the age of 18 (Blattman and Annan, 2010) (Bank, 2005). Most research focuses on male child soldiers, although there is wide recognition of the involvement of girls in armed forces, as combatants and as non-combatants (used as cooks, cleaners, nurses and so forth), and as victims

of sexual slavery, forced 'marriages', rape and other forms of sexual violence (Annan et al., 2009) (UNHCR/OSCE, 2002). In Pakistan's case, after taking over in Swat, the Taliban forced the locals to show their support by either paying a security fee or sending a family member to join them. They also kidnapped local children and trained them as suicide bombers. In early 2007, they began forcing schoolchildren to sign up for suicide bombing missions in one part of Tank District and abducted 30 children for this purpose. In Swat, as many as 1,500 children were abducted. While some of the boys were used for labour in the camps, others were trained to fight in the field, become informants, or undertake suicide-bombing missions. After the Swat military operation of 2009, the Pakistan Army recovered and rehabilitated some of these children (Qazi, 2011).

Lastly, violent conflict can often result in displacement of the affected population, which can last decades leaving whole generations without access to education. The education resources in IDP camps are substandard , where the schools are overcrowded and limited to primary education. Moreover, it is difficult to access schooling outside of camps. The loss or confiscation of personal documents also makes enrolment difficult for displaced populations (Aguilar and Retamal, 1998). School fees, the cost of school supplies and travel costs may also pose constraints to the access of education by displaced children (UNHCR/OSCE, 2002). Mooney and French find that in Colombia, only an estimated 15 perent of IDP children in 1999 received some form of education. Their school performance was found to be significantly constrained by high rates of malnutrition, trauma and cognitive disorders (Mooney and French, 2005).

2.4 Data Description

The main source of data for this study is the five rounds of the Pakistan Social and Living Standards Measurement survey collected from 2004 to 2009. The PSLM is an annual nationally-representative survey conducted since 2004-05. The survey is carried out annually in all four provinces, although the tribal region is not present in all rounds. The survey is organised at the level of the household and covers education, health, social capital, fertility and marriage, employment, and economic status. This study relies on data from only Khyber Pukhtoonkhwa province, which was the primary area for Taliban attacks. The fieldwork for the fourth round of the PSLM was conducted in Khyber Pukhtoonkhwa between July, 2007 and June, 2008, immediately after the first reported school attack in the GTD data in June, 2007. The fieldwork for the fifth round was conducted in Khyber Pukhtoonkhwa between August, 2008 and June, 2009 and in Swat between January, 2009 and June, 2009. This coincides roughly with the

last attacks in Swat in March of 2009 following the military operation which began in January of the same year and ended in July.

Table 2.1 shows variable definitions and their coding; the dependant variable for my estimation is the enrolment status dummy. To measure the intensity of attacks, I have created dummy variables for residence in high and low intensity districts. High intensity districts (High Intensity) are defined by ten or more reported school attacks in the GTD data (Dir, Swat, Bannu, Hangu, and rural Peshawar). Similarly, low intensity districts (Low Intensty) are defined by $1-9$ reported school attacks in the GTD data (Malakand, Mardan, Charsadda, urban Peshawar, Noshehra, Swabi, and Mansehra). No attacks districts (No attacks) are the remaining twelve districts of Khyber Pukhtoonkhwa with no reported incidents in the GTD data (Chitral, Shangla, Buner, Kohat, Karak, D.I. Khan, Tank, Abbotabad, Batagram, Kohistan, Haripur, and Lakki Marwat). The remaining variables are the standard determinants of school enrolment in developing countries. Parental income (Father logincome and Mother logincome) and education (Father edu and Mother edu) are included as controls for family background and intergenerational transmission of human capital where family attitudes encourage schooling as an educated parent acts as a role model for the children. Following Currie and Moretti, I expect that school enrolment will be positively related to both parental education and household income (Currie and Moretti, 2002). The variable indicating the labour force participation of a child (Child work) is included to control for alternative possible uses of children's time. I expect a negative coefficient on child work as children in employment will have fewer hours available for other activities, including schooling. Similarly, I expect the variable indicating birth order (First born) to have a negative effect of enrolment rates. Older children are often used as helping hands in contributing to household income as well as care-taking activities for the elderly and young children in the household leaving fewer hours available for other activities, including schooling.

The descriptive statistics for the main variables of interest are presented in Table 2.2. The top panel shows the sample statistics for the years 2004 to 2006 (before attacks) while the bottom panel shows the sample for the years 2007 to 2009 (during and after attacks). The first reported attacks were from June, 2007 while the survey for the year 2007-08 was conducted from July, 2007 to June 2008. This would cover the time period when the school attacks were ongoing. The fieldwork for the last round of the survey was carried out in KPK till 2009, which was just after the spring army offensive in Swat and the district had been cleared from the Taliban. This allows me to examine the short term impact of exposure to terrorist activities in the worst affected districts.

The data for terrorist incidents comes from South Asia Terrorism Portal (SATP) and

Global Terrorism Database (GTB), which have detailed information on terrorist incidents between 1970 and 2011. This data is disaggregated at district level by intensity of attacks on educational institutions. Figure 2.2 shows a sudden increase in attacks on schools after 2006 and a decline after 2010. It can be seen that in 2007 and 2008 the majority of the attacks occurred in Swat district. From 2009 onwards, there is a sharp decrease in the number of school attacks in Swat, coinciding with the Operation Rah-e-Rast in 2009 where the military regained control of the area. Bombing incidents beyond 2009 were predominantly carried out in Peshawar district [10] [11].

Figure 2.3 shows the division of districts of Khyber Pukhtoonkhwa by intensity level of violence. Table 2.3 shows the distribution in education level for the baseline years of 2004-2006 by gender, region, and intensity levels for individuals in the whole of Khyber Pukhtoonkhwa province in top panel and in Swat and rural Peshawar in the bottom panel. Gender differences are apparent, with female education lagging behind male education throughout the entire country but especially in high intensity districts. The urban-rural difference in years of schooling is in the range of 1 to 1.3 years of school for boys and 1.4 to 1.8 years for girls. In the lower panels it can be seen that Swat had the highest number of years of education completed for girls under the age of 18, while rural Peshawar had among the lowest years of schooling in the data for KPK in the affected districts.

Furthermore, in the areas with no attacks, mean years in education for girls 5.4 years, which is not too different than the low (5.6) and high intensity areas (4.8), implying that there was not significant level of discrepancy in education level between the attacked treatment areas and the control areas with no attacks and the baseline level of education is not skewed. The terrorist attacked those districts which were easily accessible to them, e.g. Peshawar is on the border with FATA, which is the hideout for TTP (Figure 2.3). Nearer to the border with Punjab, the number of attacks die down. The twelve no attacked districts do not share a border with FATA (accept Tank and Dera Ismael Khan, which experienced other forms of terrorist attacks).

Table 2.4 shows the enrolment rates in the higher intensity, low intensity, and no attack districts prior and subsequent to the Taliban campaign. It can be seen that enrolment improved in the later years for all cohorts in all three types of districts, reflecting a general tendency in developing countries for schooling outcomes to improve over time (Chamarbagwala and Morán, 2008). Table 2.4 also implies that the cohort of children who were affected by the terrorist attacks did not attain less schooling on average than

[10] Global Terrorism Database

[11] In the summer 2010, Pakistan experienced a massive flood which covered 1/5th of the country. Many residents from the sample districts had to migrate/evacuate from their towns, hence causing attrition in the treatment sample.

previous cohorts. In the full sample of province, the raw difference-in-difference shows a 0.4 percent gender differential in enrolment rates, where girls are on average have lower school enrolment than boys, both before and after the treatment period. However, in the high intensity districts, the enrolment gender differential decreased by 1.8 percent. These results provide preliminary evidence that the enrolment rates of girls in affected districts may not have been adversely affected by terrorist violence.

Figures 2.4, 2.5, 2.6, and 2.7 show enrolment nationally and in KPK for the survey years 2004 to 2009. Figure 2.4 shows the enrolment rates for the entire country. It is evident that, nationally, school enrolment increased during the five survey years at a similar rate for boys and girls. It is also evident that boys' enrolment rate was about 10 percent higher than that of girls. In figures 2.5, 2.6, and 2.7, the sample is restricted by terrorism intensity levels. Figure 2.6, shows that in the low intensity districts there was a drop in enrolment rates for girls in the first year of school attacks (2007-08) and recovery in the following year. Figure 2.5, shows that the opposite applied for high intensity districts. Figure 2.7,restricts the sample to districts which had no reported school attacks. Within these districts, there was little movement in enrolment rates over time. These figures provide preliminary evidence that girls' enrolment may have been effected by the terrorist attacks on schools.

2.5 Empirical Estimation and Results

The identification strategy used in this paper exploits the variation in intensity of terrorist attacks on schools across districts of Khyber Pukhtoonkhwa during 2007-2009. The enrolment level in districts which experienced no attacks act as a control group for what enrolment would've looked like in the absence of terrorist attacks. To identify an individual's exposure to violence during school years, their enrolment is matched with their district of residence. The baseline specification is presented below:

$$E_i = (Female)\mu + (Treated\ years)\xi + (Intensity)\tau + (Intensity * Treatedyears)\gamma + (Intensity * Female)\eta + (Female * Treated\ years)\theta + (Highintensity * Treated\ years * Female)\delta + \beta(X_i)$$

where the dependant variable is E_i which measures the enrolment status of individual i and female is the gender of the individual i. Intensity is a vector of dummies (low, high) for attack intensity level in district of residence. Districts that didn't experience any terrorist activities act as the omitted group. The intensity level dummies are further restricted by two exposure survey years, 2007-08 and 2008-09, as the pattern of attacks

was very different in these two years as can be seen in figure 2.2. As discussed in figure 2.2, the attacks in Swat districts decreased in 2009 while continued in Peshawar. This exogenous shock allows for a difference-in-difference comparison of the school attacks for a short period in 2009. If there is an impact on enrolment rates for girls, I expect to find a decrease in the subsample of Swat. Treated years is a dummy variable for whether the individual was surveyed in 2007-08 or 2008-09. Observations from 2004-06 are used as the control group. The year dummies (2007-08 and 2008-09) and district intensity dummies (High Intensity and Low intensity) control for the effects of treatment years and treatment districts that are constant across all individuals in the same cohort. The interaction of intensity level and survey year gives the difference-in-difference estimates on the effects of intensity level in the year of enrolment. The triple interaction of female with treatment years and district intensity level is the variable of interest in the regressions, measuring the gender-specific impact of residing in regions that experienced terrorism after 2007 after controlling for cohort, gender and conflict effects individually and their interactions. $\beta(X_i)$ includes standard individual level characteristics of region, household size, parental education and income, birth order, and marital status. All regressions are estimated by probit with robust standard errors.

Results:

Table 2.5 presents the estimates of the probit regressions where column 1 displays the results for the full sample of those aged 18 or under in all of Khyber Pukhtoonkhwa province. Column 2 to 4 divides the cohort by age groups 3 to 9, 10 to 14 and 15 to 18; this is the breakdown for primary, secondary, and higher secondary schooling levels (grade 1-4, 5-9, and 10-12). The coefficients on the control variables of individual and household characteristics have the expected signs. Girls are about 27 percent less likely to be enrolled for all age groups, confirming the gender gap in enrolment illustrated in figures 4-8. Urban areas have higher enrolment rates for all age cohorts. The variables for age and age-squared have positive and negative signs respectively, suggesting that the enrolment curve follows an inverted *U-shape* as age increases. Household size has a negative effect on the enrolment of those aged 10-18, suggesting that older children are often used as alternative caregiver for younger siblings in the household. Being married reduces the likelihood of being enrolled by 30 percent for the subsample of pupils aged 15-18[12]. Children who are employed are 40 to 50 percent less likely to be going to school. One additional year of parental education increases the probability that the child is enrolled by are 2-3 percent. Also, household monthly earnings can have an income effect; if education is considered normal good, richer families will buy more schooling for their children.

[12] An interaction term of gender and marital status shows that this effect is driven by girls of marriageable age. The regressions coefficients do not change significantly.

The full sample regression in column 1 shows a reduction of 3.37 percent in the probability of being currently enrolled in the survey year 2007-08. When the sample is restricted by intensity level, the estimated likelihood of girls being enrolled declines by 10.3 percent in 2007-08 in the low intensity districts. For the high intensity districts, there is no significant decline for girls in 2007-08. Moreover, the estimated enrolment rates in the high intensity districts increase by roughly 3 percent in the year 2008-09. In other words the negative effect from the previous year disappears. In columns 2-4, the regression is rerun by age groups of 6-9 years, 10-14 years, and 15-18 years. For the age group 10-14, girls are 23 percent less likely to be enrolled in the year 2007-2008 for low intensity districts while for the remaining two groups, there are no significant effects. There is no significant effect of the youngest group of primary-school going girls. This is consistent with the nature of the Taliban threats, which were primarily aimed at girls aged 10 or above. This result is consistent with existing literature on schooling and conflict which finds that only secondary schooling bears the brunt of violence (Justino, 2011). In the year 2008-09, the estimated enrolment for girls aged 3-9 increases by about 4 percent in the high intensity districts and 7 percent in the low intensity districts. There are no significant effects on the enrolment of girls aged 10-14 or 15 and older. The likely explanation for no effect on girls older than 15 years is that enrolment rates were already quite low for older girls as due to the practice of purdah in the Pushtoon culture where older girls are forced to drop out of schools by families who expect to marry them off. These results points towards only a short-lived impact of school attacks on districts which experienced violence. In the existing literature discussed in section 3, the effect of conflict on female education shows a gender gap of 12-17 percent for secondary education. Comparing Pakistan with other countries under conflict, it is observed that the magnitude of the effect terrorism is short-lived and relatively small.

Case studies for Swat and Peshawar districts: Among the high intensity districts, Swat and Peshawar were the focal points of terrorist attacks on schools where these two districts experienced the highest frequency in attacks on girls' schools (GTD data). These two districts are the most populous of attacked districts and, according to Census reports, had the highest enrolment rates in the province and thus it is worth investigating whether the nature of the disruption caused by the terrorist attacks was the same in both districts. In the Swat District, 172 schools were reported destroyed or damaged between 2007 and March 2009 as the Taliban fought and eventually took control of the area. In spring 2009, Pakistan army started a military operation to drive out insurgents and regained control of the area (O'Malley, 2010). In the Peshawar district, girls' schools were attacked only in the rural areas. Unlike Swat, Peshawar experienced an increase in total number of schools bombed in 2009. The PSLM data for 2008-09 was collected in Khyber Pukhtoonkhwa during August, 2008 and June, 2009. The timing of the

data collection makes it possible to determine the effects of the end of the attacks by comparing enrolment in Swat and Peshawar in 2008-09. If girls were not deterred from schools, I'd expect to see them return to schools as soon as Swat district was cleared from insurgents in 2009. However, because the attacks continued in Peshawar throughout the timeframe of the PSLM data, I would expect that any effects would continue through 2009.

To identify the effects of exposure to violence during school years for girls in Swat and Peshawar districts, I have modified the baseline econometric specification as follows:

$$E(Swat)_i = (Female)\gamma + (Treated\ Years)\eta + (Female * Treated\ years)\theta + \beta(X_i)$$

$$(Peshawar)_i = (Female)\gamma + (Treated\ Years)\eta + (Female * Treated\ years)\theta + \beta(X_i)$$

where the dependant variables measure the enrolment status of individual i in the subsamples of Swat and Peshawar districts . The *difference-in-difference* coefficient, which is the interaction of female and treatment years, measures the gender-specific impact of the terrorist attacks in Swat and Peshawar in the years after 2007. $\beta(X_i)$ includes standard individual level characteristics of region, household size, parental education and income, birth order, and marital status. The regressions are estimated by probit with robust standard errors.

Table 2.6 gives the estimates for the regressions for the subsample of Swat and rural Peshawar. Due to the reduction in sample size, the results are less statistically significant than in the full sample regressions[13]. The results for the Swat are consistent with the pooled sample of intensity level by districts. In the first year of the attacks, the enrolment rates for girls goes down by 7.85 percent but the affect disappears in the second year, implying that the attacks only had a short term impact. This short-lived impact in Swat coincides with the military action which cleared the insurgents from the area. Schools opened soon after the army took back control of the district, and the results suggest that girls returned to their studies as soon as was possible. In the subsample of Peshawar suburbs, I do not find any significant coefficients for the difference-in-difference variables. It is worth noting that the attacks in Peshawar districts continued beyond survey year 2008-09, therefore new rounds of the data would shed further light on the effectiveness of the attacks.

Madrassa enrolment: The threatening night letters sent out to schools urged pupils to join madrassas (unregistered schools that teach religious curriculum rather than ministry

[13]The samples of Swat and Peshawar include individuals aged 18 or less. Unlike the full sample regressions, I was not able to restrict the sample by age group as the number of observations was too small to run a regression in Stata.

of education-approved curriculum) in place of regular schools. If the Taliban's threats were successful in intimidating the public into joining madrassas, I expect to see a jump in madrassas enrolment in the high-intensity districts. Previous research on madrassa enrolment show that religious school are an unpopular schooling choice as enrolment has always been less than one percent, only prevalent in low-income areas without public or private schooling options. Due to an ongoing dramatic growth of private schools, the number of areas without public or private schooling options has reduced considerably. In 1983 there were approximately 3,300 private primary and secondary schools in the four provinces (Jimenez and Tan, 1987) . In 2000 there were 32,000 private schools, a nearly ten-fold increase (Khwaja et al., 2006). The total enrolment in religious schools is only about one percent of the total sample of enrolled students. For the average Pakistani child of school going age, the most popular alternative to government schooling is a private school, not a madrassa (Khwaja et al., 2006).

In order to test for the effects of terrorism on madrassas enrolment in Khyber Pukhtoonkhwa, I use the school type variable in the PSLM and code a dummy for madrassa enrolment conditional on being enrolled in school. That is, students who are currently in enrolment and have reported 'religious school' as school type are coded as 1, the rest enrolled in school types other than religious schools are coded as 0. To identify the effect of school bombing on conditional enrolment rates in religious schools, I run the following regressions:

$$E(Religious\ School)_i =$$

$$(Female)\mu + (Treated\ years)\xi + (Intensity)\tau + (Intensity\ level * Treatedyears)\gamma + (Intensity\ intensity * Female)\eta + (Female * Treated\ years)\theta + (High\ intensity * Treated\ years * Female)\delta + \beta(X_i)$$

$$E(Religious\ School\ for\ boys)_i =$$
$$(Intensity\ level)\gamma + (Treated\ years)\theta + (High\ intensity * Treated\ years)\delta + \beta(X_i)$$

$$E(Religious\ School\ for\ girls)_i =$$
$$(Intensity\ level)\gamma + (Treated\ years)\theta + (High\ intensity * Treated\ years)\delta + \beta(X_i)$$

where the dependant variable is $E(Religious\ School)_i$ which measures the enrolment status of individual i in a madrassa (religious school). $E(Religious\ School\ for\ boys)_i$ and $E(Religious\ School\ for\ girls)_i$ are the dependant variables for the sample restricted by gender. The specification in the full sample of madrassa enrolment regression is the same as the full sample regression of regular school enrolment. The difference-in-difference-in-difference coefficient measures the impact of being female on conditional

madrassa enrolment in an affected district during affected years. The interaction of female with treatment years and district intensity level measures the gender-specific impact of residing in regions that experienced high terrorism after 2007 on the enrolment in madrassas. The regression has also been run with the sample restricted by gender. The control variables used are the same as the full sample regressions. The difference-in-difference coefficient, which is the interaction term of intensity level and treated years, measures the impact on madrassa enrolment in an affected district during affected years for boys and girls separately.

Table 2.7 shows the regressions for the sample of boys and girls under the age of 19 years[14]. I find significantly negative results for madrassas enrolment in all samples for the year 2007-08 and 2008-09. The difference-in-difference terms of gender and year, year and intensity level, and gender and intensity level are all negative and highly significant with magnitude varying of 1 percent or less. The interaction of female in high intensity areas shows that girls are 1 percent less likely to be enrolled than boys. The sample was further restricted by age group but significance and precision is lost due to the low number of observations. Thus, children were less likely to be enrolled in religious schools after 2007. Column 1 shows the estimate for the full sample of children of school going age of Khyber Pukhtoonkhwa, where the difference-in-difference-in-difference estimate shows that in high intensity districts, girls are 2.3 percentage points more likely to be enrolled in madrassas than boys, implying that both boys and girls are less likely to be enrolled in madrassas but the difference is smaller for girls. Even though the enrolment in madrassas is decreasing in the province, the rate of decrease is smaller for girls than boys. This result is congruous with the estimates in columns 2 and 3 which show the estimates for the subsamples of boys and girls, respectively, of school going age in Khyber Pukhtoonkhwa province. In the high intensity districts, the likelihood of being enrolled in religious schools declined by between 1.4 and 0.91 percent for boys and between 1.1 and 0.87 percent for girls. This is in line with finding of Asim Khwaja that in settlements where regular schooling options exist, less than two percent of enrolled students are in madrassas with no evidence of significant increases in recent years. It can be concluded that the Taliban's' demands for joining religious schools were widely ignored by the public in the affected districts and madrassas are not an important part of enrolment decisions of Pakistani pupils (Khwaja et al., 2006).

[14]Household controls can be made available on request

2.6 Conclusion

This study takes a step towards understanding the impact of terrorist activities in north-western Pakistan since 2006. The increased insurgency in the north-western regions of Pakistan threatened the educational attainment of young girls and boys, with the Taliban specifically targeting the education of girls. I examine the enrolment rates of girls by using five consecutive rounds of the Pakistan Standards of Living Measurement survey.

The empirical strategy uses a difference-in-difference-in-difference approach, comparing the differences in enrolment across three dimensions, gender, district (separated by intensity of attacks), and years. I first estimate the gender differential for total school enrolment in the affected districts and then estimate the impact on enrolment in religious schools. The results suggest that the impact of these terrorist attacks was relatively modest and short-lived. Girls aged 10-14 in the districts of North-western Pakistan that experienced terrorist incidents between 2007 and 2009 had 10.3 percent lower enrolment rates in the first year of attacks. In the following year, when the Pakistani military retook control over some of the affected areas, this effect fades away, suggesting that students returned to schools as soon control was regained in the most-affected areas. Moreover, there is no evidence of dramatic increases in religious school enrolment rates. Enrolment in religious schools has not seen any increases beyond the 2 percent enrolment rate, pointing at failed intimidation attempts of the terrorists.

The results of this paper are largely at odds with what has been reported in the media. Countless media reports in the last decade claim that increased presence of terrorists is driving girls out of schools and boys into madrassas[15] [16] [17]. The results presented here speak differently than what is popularly believed, suggesting the effects of the Taliban's terrorism campaign were relatively modest. There is no evidence for substantial drop in the school enrolment rates in the worst affected districts or an increase in the enrolment rates of religious schools. There is a relatively small effect estimated for girls aged 10-14 during 2007-08, the years of highest-intensity terrorist attacks, followed by a rapid return to normality after the Pakistani counterinsurgency measures in 2008. Therefore, the results presented in this paper show that the claims presented by the media are highly exaggerated and blown out of proportion. Contrary to popular perception driven by media reports of Taliban violence against girls attending school, the impact of these terrorist attacks was only short-lived.

[15] IRIN News, "Pakistan: Swat Militants Driving Girls Out of School." January 20, 2009.
[16] IRIN News, "Child soldiers in Swat Valley" May 26, 2008
[17] Declan Walsh, "Taliban reaches beyond Swat Valley in Pakistan." April 25, 2009

FIGURE 2.1: Pakistan's administrative provinces

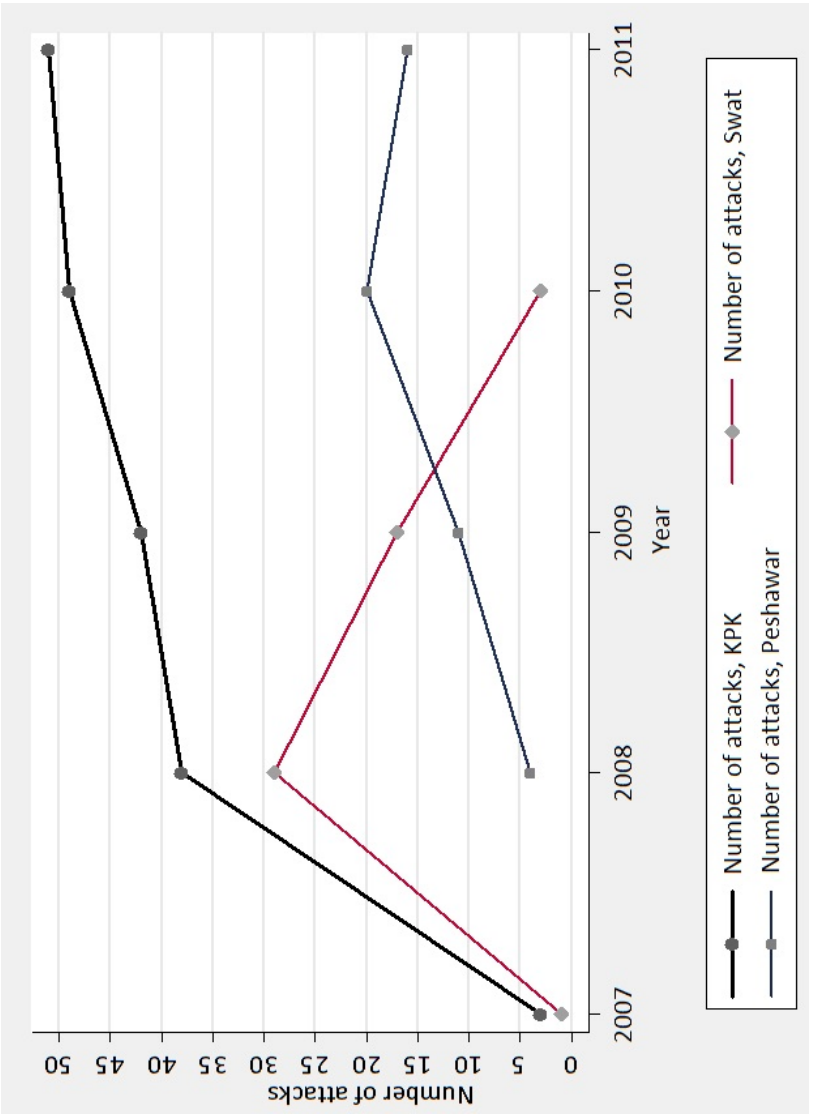
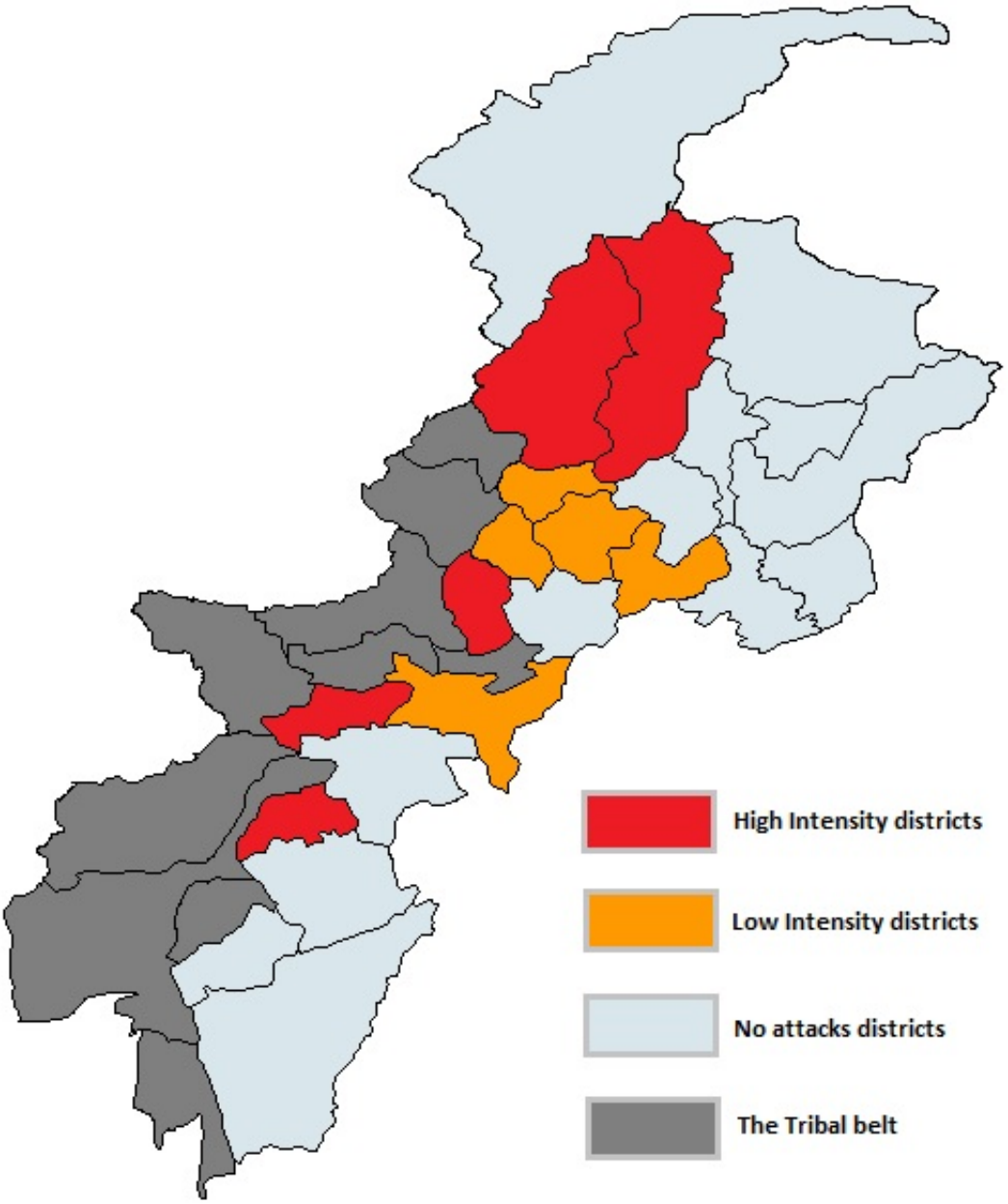


FIGURE 2.2: Number of educational institutions attacked in KPK, 2007-2011

FIGURE 2.3: Intensity level by districts of KPK.



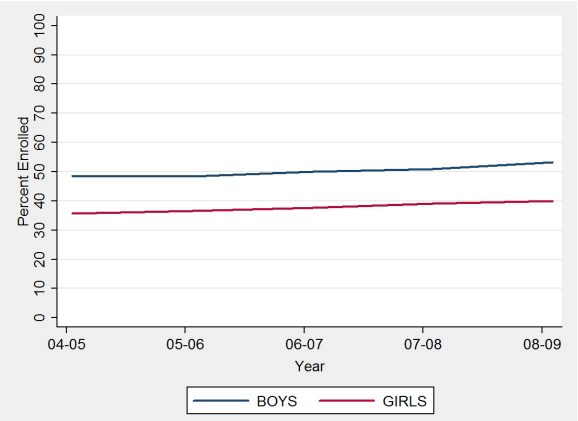


FIGURE 2.4: Percent Enrolled by gender, all provinces

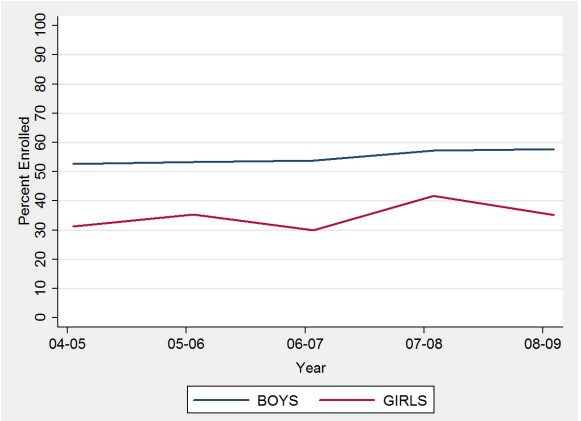


FIGURE 2.5: Percent Enrolled by gender, high intensity districts

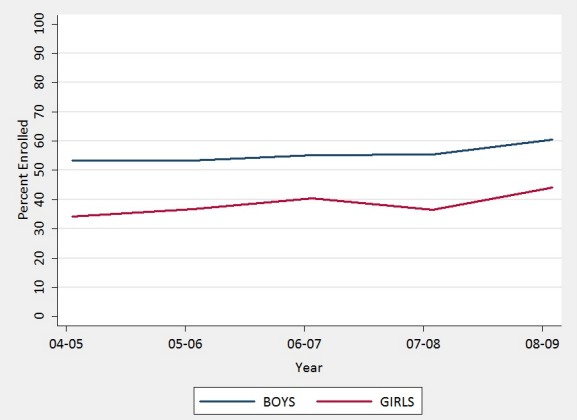


FIGURE 2.6: Percent Enrolled by gender, low intensity districts

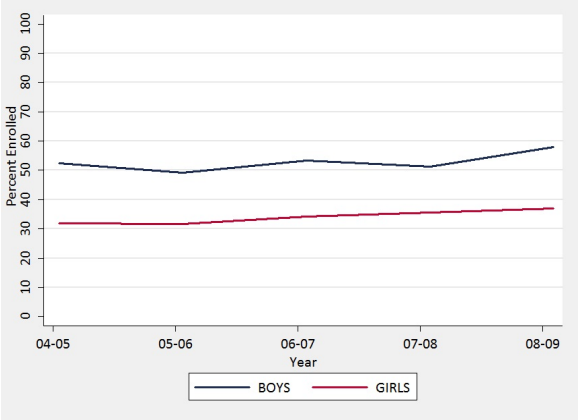


FIGURE 2.7: Percent Enrolled by gender, No attacks districts

TABLE 2.1: Variables and coding used in estimation

Variables	**Description and coding**	**Expected sign**
Currently Enrolled	1 if currently enrolled	Dependent variable
Age, Age^2	Age in years and age-squared	Positive, Negative
Urban	Summy, 1 if living in urban area	Positive
Married	1 if yes	Negative
First born	Dummy, 1 if first-born child	Negative
Father edu	Years of completed education of father	Positive
Mother edu	Years of completed education of mother	Positive
Father's income	Log of father's monthly income	Positive
Mother's income	Log of mother's monthly income	Positive
Child works	Dummy, 1 if child is employed	Negative
Religious school	1 if current enrolment is at a madrassa	Variable of interest
High Intensity	1 if lives in district with 10+ of attacks Swat, Bannu, Dir, Hangu, and Peshawar.	Variable of interest
Low Intensity	1 if lives in district with low number of attacks Malakand, Mardan, Charsadda, Peshawar urban, Noshehra, Swabi, and Mansehra	Variable of interest
Intensity*Year	Interaction of intensity level and treatment years	Variable of interest

TABLE 2.2: Descriptive statistics

Mean Estimation	**Control years**	**2004-06**	**Treated years**	**2007-09**
Variable	**Mean**	**S.D.**	**Mean**	**S.D.**
Currently enrolled	0.436	0.496	0.467	0.499
Female	0.476	0.499	0.472	0.499
Household size	8.803	4.151	8.425	3.677
Urban	0.337	0.473	0.324	0.468
First born	0.149	0.356	0.153	0.36
Father's years of education	3.991	4.843	4.339	4.923
Mother's years of education	1.433	3.307	1.529	3.428
Father's monthly income in rupees	4650	7987	8739	16787
Mother's monthly income in rupees	191	1651	274	3348
Religious school enrolment	0.011	0.105	0.008	0.092
Child works	0.085	0.279	0.039	0.194

TABLE 2.3: Educational attainment in pre-attack years 2004-2006, by region, intensity level, and gender for sample of individuals aged 18 or younger.

	BOYS			**GIRLS**		
	Mean	**S.D.**	**n**	**Mean**	**S.D.**	**n**
KPK Province						
Urban	7.17	4.34	12707	6.4	4.22	8099
Rural	5.87	4.03	28127	4.66	3.82	13093
Total	6.27	4.17	40834	5.33	4.07	21192
High Intensity						
Urban	7.08	4.23	2802	5.85	4.03	1544
Rural	5.64	4.01	9056	4.42	3.76	3837
Total	5.98	4.11	11858	4.83	3.9	5381
Low Intensity						
Urban	7	4.53	5047	6.31	4.38	3215
Rural	6.02	4.03	4696	4.69	3.71	2501
Total	6.53	4.33	9743	5.6	4.18	5716
No attack						
Urban	7.39	4.17	4858	6.73	4.11	3340
Rural	5.96	4.03	14375	4.79	3.89	6755
Total	6.32	4.11	19233	5.43	4.07	10095
Swat						
	6.36	4.06	2318	4.96	3.81	1116
Peshawar						
	5.52	3.95	1325	3.94	3.65	435

TABLE 2.4: Enrolment status by gender in KPK from 2004-2009

	Girls	**Boys**	**Diff**
KPK Province			
After	0.3803	0.5768	-0.1965
Before	0.3421	0.5342	-0.1921
Diff	-0.03814	-0.0425	-0.0044
High Intensity			
After	0.3692	0.5756	-0.2064
Before	0.3114	0.5366	-0.2252
Diff	0.0579	0.0390	0.0188
Low Intensity			
After	0.4253	0.5949	-0.1695
Before	0.3962	0.5477	-0.1515
Diff	0.0292	0.0472	-0.0180
No attack			
After	0.3676	0.5696	-0.2020
Before	0.3377	0.5264	-0.1886
Diff	0.0299	0.0432	-0.0133

TABLE 2.5: Probit regressions on enrolment status in KPK, 2004-2009 - Marginal effects

Currently Enrolled	**Full sample**	**Age 3-9**	**Age 10-14**	**Age 15-18**
Female	-0.231***	-0.145***	-0.317***	-0.286***
	(0.00645)	(0.0104)	(0.00997)	(0.0133)
Age	0.280***	0.709***	0.0751**	0.482***
	(0.00196)	(0.0123)	(0.0358)	(0.114)
Age^2	-0.0127***	-0.0426***	-0.00476***	-0.0173***
	(9.28e-05)	(0.000946)	(0.00149)	(0.00345)
Hh size	-0.000806**	-0.00177***	-0.00698***	-0.00120
	(0.000355)	(0.000523)	(0.000563)	(0.000792)
Married	-0.252***		-0.0806	-0.294***
	(0.0102)		(0.0579)	(0.0114)
First born	0.00274	-0.00195	-0.00331	0.00265
	(0.00488)	(0.00934)	(0.00766)	(0.00834)
Urban	0.0854***	0.0813***	0.0980***	0.0845***
	(0.00409)	(0.00655)	(0.00607)	(0.00852)
Father years education	0.0201***	0.0174***	0.0235***	0.0269***
	(0.000363)	(0.000575)	(0.000652)	(0.000774)
Mother years education	0.0195***	0.0211***	0.0212***	0.0327***
	(0.000709)	(0.00112)	(0.00176)	(0.00174)
Father log income	-0.00413***	-0.00517***	-0.00371***	-0.00378***
	(0.000256)	(0.000404)	(0.000414)	(0.000555)
Mother log income	0.00335***	0.00187*	0.00488***	0.00390***
	(0.000649)	(0.00103)	(0.00108)	(0.00146)
Year 2007-08	-0.0306**	-0.00484	-0.0557**	0.0138
	(0.0120)	(0.0195)	(0.0228)	(0.0274)
Year 2008-09	0.0671***	0.0753***	0.0978***	0.0753***
	(0.00652)	(0.0103)	(0.0117)	(0.0141)
High intensity	0.0157**	0.00871	0.0207*	0.0228
	(0.00716)	(0.0112)	(0.0121)	(0.0152)
Low intensity	-0.00506	0.0357***	-0.0294**	-0.0401**
	(0.00808)	(0.0132)	(0.0144)	(0.0165)
Year 2007-08*High	0.0700***	0.0698**	0.109***	0.0223
	(0.0176)	(0.0274)	(0.0247)	(0.0379)
Year 2007-08*Low	0.0611***	0.0277	0.118***	0.0344
	(0.0215)	(0.0340)	(0.0300)	(0.0456)
Year 2008-09*High	-0.0147	-0.0189	-0.00194	-0.0159
	(0.0104)	(0.0166)	(0.0197)	(0.0224)
Year 2008-09*Low	-0.0154	-0.0389**	-0.0159	-0.00301
	(0.0117)	(0.0187)	(0.0227)	-0.0246
Female*High	-0.0463***	-0.0337**	-0.0484***	-0.0710***
	(0.0104)	(0.0164)	(0.0175)	(0.0222)
Female*Low	0.0357***	0.000669	0.0585***	0.0680***
	(0.0120)	(0.0187)	(0.0168)	(0.0252)
Year 2007-08*Female	0.0333*	0.00680	0.0641***	0.0215
	(0.0181)	(0.0287)	(0.0247)	(0.0393)
Year 2008-09*Female	-0.0419***	-0.0443***	-0.0660***	-0.0411**
	(0.00951)	(0.0151)	(0.0172)	(0.0207)
Year 2007-08*Female*High	0.0321	0.0405	-0.0137	0.0546
	(0.0255)	(0.0405)	(0.0432)	(0.0562)
Year 2007-08*Female*Low	-0.0992***	-0.0161	-0.217***	-0.110*
	(0.0274)	(0.0485)	(0.0628)	(0.0602)
Year 2008-09*Female*Low	0.0226	0.0701**	-0.00189	0.0109
	(0.0176)	(0.0284)	(0.0290)	(0.0369)
Year 2008-09*Female*High	0.0279*	0.0397	0.0196	0.00975
	(0.0160)	(0.0251)	(0.0252)	(0.0354)
Observations	127,768	52,535	33,282	24,614
Percent Enrolled	45.95	47.89	68.29	42.9
Percent Enrolled and Female	35.7	41.14	51.26	27.65

Notes: Robust s.e. in parentheses, ***p<0.01, **p<0.05, *p<0.1
Percent enrolled is the enrolment rate for full sample. *Percent enrolled & female* is the enrolment rate for the subsample of girls

TABLE 2.6: Probit regressions on current enrolment in Swat and Peshawar - Marginal effects

Currently Enrolled	**Swat District**	**Peshawar Rural Areas**
Female	-0.231***	-0.330***
	(0.018)	(0.02)
Age	0.294***	0.254***
	(0.009)	(0.009)
Age^2	-0.0131***	-0.0122***
	(0.001)	(0.001)
Hh size	-0.000243	0.00555***
	(0.001)	(0.002)
Married	-0.262***	-0.0972
	(0.037)	(0.066)
First born	-0.00971	0.0715***
	(0.0233)	(0.0253)
Urban	0.0903***	
	(0.016)	
Father education	0.0168***	0.0222***
	(0.0016)	(0.002)
Mother education	0.0123***	0.0232***
	(0.003)	(0.006)
Father log income	-0.00230*	-8.54e-05
	(0.001)	(0.001)
Mother log income	-0.000453	0.00189
	(0.0036)	(0.004)
Year 2007-08	0.123***	0.0402
	(0.029)	(0.029)
Year 2008-09	-0.0190	0.0330
	(0.024)	(0.023)
Year 2007-08*Female	-0.078**	0.0561
	(0.040)	(0.044)
Year 2008-09*Female	-0.0433	-0.0517
	(0.034)	(0.034)
Observations	6,048	4,676
Percent Enrolled	45.05	39.68
Percent Enrolled and Female	35.22	25.22

Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Percent enrolled is the enrolment rate for full sample.
Percent enrolled and female is the enrolment rate for the subsample of girls.

TABLE 2.7: Probit regressions on current enrolment in madrassas in KPK - Marginal effects

Religious school enrolment	**Full Sample**	**Girls**	**Boys**
Female	0.00986***		
	(0.002)		
Year 2007-08	0.0119***	-0.00278	0.0117***
	(0.004)	(0.004)	(0.004)
Year 2008-09	0.00210	-0.00494**	0.00208
	(0.001)	(0.002)	(0.001)
Year 2007-08*High	-0.0142***	-0.0109***	-0.0137***
	(0.001)	(0.003)	(0.001)
Year 2007-08*Low	-0.00971***	0.00658	-0.00945***
	(0.002)	(0.008)	(0.002)
Year 2008-09*High	-0.00933***	-0.00873***	-0.00909***
	(0.001)	(0.002)	(0.001)
Year 2008-09*Low	-0.00442**	-0.00121	-0.00433**
	(0.002)	(0.003)	(0.002)
Female*High Intensity	-0.00975***		
	(0.001)		
Female*Low Intensity	-0.00270		
	(0.002)		
Year 2007-08*Female	-0.0100***		
	(0.002)		
Year 2008-09*Female	-0.00827***		
	(0.002)		
Year 2007-08*Female*High	0.0809*		
	(0.0472)		
Year 2007-08*Female*Low	0.0482*		
	(0.0293)		
Year 2008-09*Female*Low	0.00808		
	(0.00662)		
Year 2008-09*Female*High	0.0236**		
	(0.0113)		
Observations	59,079	21,790	37,197
percent Enrolled	1.76	1.87	1.69
Percent Enrolled and Female	1.87		

Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Percent enrolled is the enrolment rate for full sample.
Percent enrolled and female is the enrolment rate for the subsample of girls.

Chapter 3

The Impact of Terrorist Activities on Female Employment - Evidence from North-western Pakistan

3.1 Introduction

This study contributes to the growing literature on effects of terrorism on labour market outcomes of individuals by focusing on the experience of Pakistan since 2007 (Shemyakina, 2010) (Blattman and Annan, 2010) (Menon and Rodgers, 2010) (Kecmanovic, 2013) (Kondylis, 2008) (Fernandez and Pena, 2011). The microeconomic impact of terrorism on civilian populations can be substantial and persistent. Not only do people living in troubled areas suffer injuries and have their property destroyed, they may also be displaced from their towns, lose their means of livelihood, or be unable to take part in the labour market or education. All of these effects may result in a permanent decline in their stock of human capital and earnings. Furthermore, since war costs tend to be disproportionately borne by the underprivileged and most vulnerable populations, conflict may intensify poverty and inequality (Chamarbagwala and Morán, 2008). Understanding the short-term and longer-term economic consequences of terrorism is thus important for implementing post-conflict reconstruction/rehabilitation efficiently and helping identify those populations that reconstruction policy should target.

Although men are typically more affected by direct conflict-related death, in Pakistan's case women face more challenges, as the terrorists have specifically targeted women.

Specifically, the Taliban in the northern areas of Pakistan have aimed at barring women from taking part in public sphere by sending threatening letters to the public, blowing up public property, and attacking women who defied any ban. Female employment in Pakistan had increased considerably between 1990 and 2006 from 15 percent to 20 percent, although participation rate has always been below that of males[1]. The targeting of women by the Taliban was therefore seen as a threat to the improvement in women's future socio-economic status.

This paper estimates the impact of terrorist activities of the Taliban on the labour market outcomes of Pakistani women using five consecutive rounds of the Pakistan Social and Living Standards survey (PSLM) from the years 2004 to 2009. This data is merged with data on terrorist attacks compiled from the Global Terrorism Database (GTD). The variation in intensity of violence, measured in number of terrorist attacks in each district of Khyber Pukhtoonkhwa over time, is used to identify the effect of terrorism on the employment rates of women. The first estimation looks at the effects of attacks on the employment rates of all women and men. As a robustness check, I then estimate this separately for men and women in the age groups of 18 and younger and 19 and older. A second robustness check separately estimates the effects of these attacks on employment rates by marital status. The Taliban threatened women and tried to exclude them from the public sphere. If these threats were perceived to be credible, I would expect to see a drop in overall female employment rates relative to male employment rates after the bombings. The empirical analysis suggests that there is a negative impact on women's overall employment rates only the first year of the attacks, i.e. 2007-08. By 2009, this effect seems to disappear, pointing to a short-lived fear affect created by the terrorism. This is in line with the previous chapter on effects of terrorist attacks on educational attainment, which measured a relatively short lived impact on employment rates to girls in the affected districts.

This paper is structured as follows. Section 3.2 looks at the background of the Taliban. Section 3.3 review existing literature. Section 3.4 describes the data while the empirical strategy and results of the estimation are presented in section 3.5 and 3.6. Section 3.7 concludes the paper.

3.2 Background: Who are the Taliban?

Tehreek-e-Taliban Pakistan (TTP) is a terrorist organisation operating in Pakistan that was formed in the days of NATO operations in Afghanistan. After the American intervention in Afghanistan, a section of radicals started a movement inside Pakistan to

[1]ILO, 2014

support the Afghani Taliban. TTP members consist of locals from the tribal areas and adjacent districts. There are also reports of foreigners within the TTP. The South Asia Terrorism Portal estimates place the total number of operatives between 30,000 and 35,000. Headquartered in the South Waziristan Agency of FATA, TTP has spread its networks into all of Pakistan's four provinces, establishing various chapters and groups led by local commanders with common organisational goals. The TTP has also made its presence felt in neighbouring Afghanistan in recent times. In recent years, other banned terrorist outfits have joined forces with the TTP (Lashkar-e-Tayiba, Jaish-e-Muhammad, Harkat-ul-Jihad-e-Islami, Sipah-e-Sahaba Pakistan). The TTP has been banned by Pakistan, US, Canada, Britain, and by the UN Security Council (SAT, 2014).

One of the main aims of the Taliban is to impose strict Sharia law, the main tenets of which include restricting the participation of women in public life. As discussed in chapter 2, the Taliban aimed to bar girls from attending schools by blowing up school buildings. They also imposed a strict dress-code for women who leave the house (burqa[2]). Incidents of public flogging[3], targeting health workers[4] and aid workers[5], killings of female entertainers[6], and large-scale intimidation of the population were reported in the media. The Taliban demanded *unislamic* businesses to close (Video stores, cable service providers, and internet cafes), they also warned women to start wearing hijab or "have their faces maimed with acid". They also issued threats to anyone working for a foreign organisation and attacked Nato supplier trucks, and journalists, threatened non-Muslims residents , voters, and journalists in Swat and adjacent areas[7].

3.3 Literature Review

Pakistani/South Asian women and LFP

The underlying theoretical approach of this paper is the basic model of labour supply. Becker developed a theoretical model of time allocation within the household, following the traditional theory of utility maximization where it is assumed that the households are producers as well as consumers. An increase in wage rate is likely to induce a decline in the amount of time used on consumption activities and an increase in market production resulting from relative increase in the value of time. Almost similar argument is presented by Samuelson (Becker, 1965) (Samuelson, 1956). The classical labour supply model postulates that that labour supply decisions are made to maximize utility subject

[2]Taliban issue burqa warning – Daily Times, 2008
[3]Pakistan to probe girl's flogging" – BBC News, 2009
[4]Taliban trap civilians in Pakistani war zone – Gulf News, 2009
[5] U.S. Aid worker slain in Pakistan – NY Times, 2008
[6]In Pakistan, Radio Amplifies Terror of Taliban – NY Times, 2009
[7]Taliban threaten Kalash tribe, Ismailis in Chitral – Dawn News, 2009

to budget constraints. This utility depends on amount of market goods and leisure time where individual faces two types of constraints: first, the price of good and price of leisure i.e. wages per hour. The individual must forgo their wage when they devote an hour to leisure rather than work. Second, the total amount of time available to the individual is limited and fixed, which may be allocated between leisure and work. The effect of a change in the wage rate on leisure depends on the relative magnitudes of the income effect and the substitution effect. A change in the price of labour (wages) can either cause an income effect or a substitution effect. A wage increase leads to more income and greater utility, which has an income effect on leisure, where the individual can afford to consume more leisure time. However, this wage increase also makes leisure more expensive as each hour of work is more lucrative, leading to a negative substitution effect on consumption of leisure and a positive substitution effect on labour supply. Wage increases make work more attractive, and the individual consumes less leisure time and more work hours, thus substituting consumption goods for leisure (Killingsworth, 1983).

In a developing country setting, the Becker model might not hold true. An alternative labour supply model suggested by Gronaue, which links spouses' wage with home production and leisure, would be more appropriate in this setting. The model predicts that an increase in the wage rate of the employed decreases the time allocated for work of the spouse. The income effect is negative in the case of the wife while it is positive in the case of the husband's. Thus, on the whole, one would expect the wage rate of husband and work of the wife to be negatively correlated and leisure to be positively correlated (Gronaue, 1977).

Gender inequalities in Pakistan

Pakistan suffers from severe gender inequalities, not only with respect to human development and service access, but with respect to basic rights, participation in economic activity and in development of decision-making. These not only translate into greater disadvantage for poor women than for men, but also hinder a household's ability to earn income and pull themselves out of poverty. Customary practices, denial of property and inheritance rights, absence of available and accessible protection and justice to women, their lack of information about legal, economic or political rights, and mobility collectively deny opportunities to women (Mumtaz, 2007).

Customary practices: Family honour and societal values in some conservative parts of South Asia impose strict purdah restricting women to the home, and thus reducing their ability to work outside the house (Chen, 1995). According to Hanna Papanek, even the small numbers of women who work in urban areas face a lot of segregation in the workplace and crowding into what are seen as female occupations. Most women who are working full-time are either in the field of medicine or teaching as these career

choices are deemed respectable for women. Moreover, there is segregation in education as parents prefer to send their daughters to all-girls schools and colleges. These constraints often push women into self-employment and unpaid work, or entirely out of the labour market (Papanek, 1973).

Majority of Pakistani women are confined to domestic space or activities related to the fulfilment of family's needs. While permitted to undertake activities outside the household like going distances to fetch water, fuel or fodder, they are not expected to take part in any other public activity. Older women may exceptionally enter the market if widowed or without any male bread-earner in the household.

Denial of property rights and Land ownership of women: Pakistani women's lack of information about legal, economic or political rights, absence of protection and justice to women, and restricted mobility collectively deny women opportunities of owning and accessing assets and resources. They have little access or control over productive resources, even in situations where they may have the legal right to own and inherit property. These unequal rights can affect a woman's power to influence resource allocation and investment decisions at all levels.

Shirkat Gah's field based study found that according to customary practice, generally in all the four provinces of Pakistan, women do not inherit property. In Khyber Pukhtoonkhwa province, the daughters do not inherit land except in some areas closer to Punjab. Also, their share can be forfeited in favour of male family members. Furthermore, households on the lower end of the income distribution rarely own land and women within these are even less likely to inherit or own property (Gah, 1995) (Mumtaz and Noshirwani, 2007).

Mobility: The rise and influence of religion-based forces are additional factors in the way of women's empowerment, especially affecting their mobility. According to Pakistan Participatory Poverty Assessment (PPPA), women felt that religion and the issue of protecting their honour restricted their mobility. In FATA, women are not only unable to access health services but are now restrained from farm work. A study of women's autonomy in rural Punjab reconfirms limited mobility: 'The three dimensions to the problem are that they need to seek permission to go to certain places; restrictions on going alone to various places and the need to observe purdah' (Sathar and Kazi, 1997).

Pakistani women's secondary position is reflected in the poor female literacy rate (40 percent in 2004–05) compared to that of males (65 percent); a high maternal mortality ratio (450 per 100,000) besides perhaps the highest morbidity rate in Asia. Women's life expectancy is barely equal to that of men's (65 years for women and 64 for men) and the country is one of the few in the world to have a negative sex ratio (100 women to 108

men). Also, participation in Pakistan is particularly low, with only 16 percent of women in active employment, compared to 35 percent in India, 23 percent in Bangladesh, 40 percent in Sri Lanka, and over 78 percent in Nepal (Bank, 2004). Among the four provinces of Pakistan, female labour force participation is lowest in the province of Khyber Pakhtunkhwa having only 36.3 percent as compared to Sind which is 42.75 percent, 43.6 percent in Baluchistan, and 48.5 percent in Punjab. Although, participation rate has increased gender wise as a whole in the country, it is still low at just 14 percent for female compared to 49.3 percent for male, while the unemployment rate is 8.5 percent for female and 4.3 percent for male (Economic Survey of Pakistan, 2000).

According to the Labour Force Survey (LFS) 2006-07, the illiterate working age population in Pakistan is 50.17 million out of which 62.6 percent are females. As a result majority of women falls in unpaid family worker and unemployed categories, where 64 percent of all working women were located in the agricultural sector. In comparison, the share of all working men in agriculture was a much lower 36 per cent. Moreover, they are less likely than men to participate in labour market particularly in paid work.

One explanation for women's low labour force participation in South Asia rests on the classic U hypothesis, which postulates that in the aggregate, female participation rates tend to be higher when an economy is organized around family based production in agriculture. In developing countries like Pakistan, the cost of living is increasing in both urban and rural areas due to increasing demand for education, health services and consumer durables. The income of male members of the household may not be sufficient to maintain the standard of living. As a consequence, the demand for females in the labour force increases in order to contribute their share to household rising budget. Conversely, With economic growth and increased urbanization, participation often declines as women stay at home and men go out to work. At still higher levels of income per capita, female participation rises again as labour market options for women increase (Das, 2006).

Previous literature examining the labour supply in South Asia shows that for men, the likelihood for being in the labour force increases with education but for women there is a significant decline with higher levels of education (Das and Desai, 2003). The following explanations can be articulated for South Asian women's low labour force participation – the first is a demand side argument which postulates that the supply of well-paying, secure jobs for educated women is low. Hence educated women, who also belong to the higher socioeconomic strata, prefer to opt out of the labour force, rather than accept low status jobs in the informal sector. The second - supply side argument - rests on cultural norms and values of the region which may prevent higher status households from allowing women to join the labour force (Das, 2006).

Determinants of Female Labour Force Participation in South Asia

Years of Education: Much of the early research on labour supply argued that, in developed countries, there is a positive relationship between education and labour force participation as education increases productivity and thus wages in the workplace. Studies in 1960s when female employment began to rise in the United States as well as more recent studies show that women with higher education are more likely to be employed than women with lower education (Bowen and Finnegan, 1960) (Cain, 1966) (Tienda and Cordero-Guzman, 1992). But this result does not hold true for developing countries as most studies show that education has an opposite impact, i.e. labour force participation of women declines with education (Kingdon and Unni for India (Kingdon and Unni, 2001), Fafchamps and Quisumbing for Pakistan (Fafchamps and Quisumbing, 1997), and Das and Desai for India (Das and Desai, 2003)). Education is potentially related to employment through both income and substitution effects. In assortive mating, educated women marry educated men with higher income forming a high-income household. Women in such marriages prefer to withdraw from work or not join at all as the household does not need their income contribution. Conversely, educated women are expected to receive higher incomes than less educated women, which lead to positive participation rates. However, the effect of education on wages may be weaker in Pakistan than elsewhere because of discrimination in the labour market where the market wage premium is fairly small for educated women. In Pakistan, there are few jobs for women in regular salaried or formal jobs – either as office workers or as factory workers, resulting in women's concentration in the informal sector. Thus, the salary gains to education are relatively small. Moreover, many educated women prefer withdrawing from the labour market to work in menial jobs as casual labourers or on family farms. Fafchamps and Quisumbing study the effects of human capital on productivity and labour allocations in rural Pakistan, finding that education is associated with higher probability of being in non-farm work for men, but not for women (Fafchamps and Quisumbing, 1997).

In South Asian countries, a woman's decision of to enter or exit the labour market is affected by the characteristics of the head of the household, usually the husband or the father. The household heads' education level, earnings, employment status and type determine the socio-economic status of the household which ultimately affects the participation of women in the labour market. Wages act in two effects: the substitution effect and the income effect. The substitution effect is positively correlated with workforce participation for men as higher wages mean higher incentives to work. The income effect works in the opposite direction, as higher income means workers can afford leisure. Hence, women who have husbands from the high income group prefer to stay home due to a negative income effect. Studies carried out in South Asia show that increases in husband's income and education level *lowers* the probability of women being employed.

Only after controlling for husband's income, the relation between education level and paid work participation becomes positive. That is, it follows a *U curve* where participation rate is higher for uneducated women, and then it falls as education level rises, and rises again with higher levels of education. Thus, as education level for women rises, the husband's income exerts a downward pressure on wife's labour force participation. Bordia Das finds that husband's education as well as his wages lowers the probability of women being employed. Sultana et. al., Blattman and Annan, Khan and Khan have also found similar results. They argue that the driving force behind this relationship is a pure income effect; uneducated husbands have low productivity (and thus low earnings) in the labour market and thus the women of the household are pushed into the labour market. It may also be postulated that uneducated husbands/household heads have more children compared to educated husbands; therefore the household is more likely to be poor. If the total household income is low, women are more likely to join the labour force (Sultana et al., 1994) (Blattman and Annan, 2010) (Das, 2006) (Khan and Khan, 2009).

Household size: Two alternative hypotheses have been postulated about the effect of household size on female labour force participation. First, in larger households there are likely to be multiple male earners, and thus, in the presence of labour market discrimination, there is little need for labour force participation by women. Secondly, larger households have more mouths to feed, so women may have to be economically active in order to provide for dependent children or parents. Also, in larger households, other family members (elder daughters, sisters, mother, and/or the mothers-in-law) may contribute to housekeeping and child-care, enabling women to join the labour market. Household composition, as well as size plays an important role in female labour force participation, as mothers of young children are more likely to remain at home. Previous research has found that the locality of the household has a significant effect on the labour force participation of women (Salway, Rehman, and Jesmin for Bangladesh (Salway and Jesmin, 2003); Fleischer and Applebaun for Israel (Fleischer and Applebaun, 1992)). Rural women in Pakistan are more likely to participate in economic activities than urban women because there are fewer barriers to female employment in farm work or manual labour than to jobs in the secondary or tertiary sectors (Jamil, 2001). The refined participation rate for females is 16.8 percent in rural areas and 10.0 percent in urban areas[8].

Studies on Pakistan's female LFP

Only a few studies analyse the factors affecting female participation rates in Pakistan. Shah examines the changing role of women in Pakistan between 1951 and 1981, and

[8]Federal Bureau of Statistics - Pakistan, 2003

concludes that a female's labour force participation decision is inversely related to her family's socioeconomic status, as indicated by ownership of durable goods, her husband's level of education, and observance of *purdah*[9] (Shah et al., 1986). Shah et al. examine some of the socioeconomic and demographic factors that determine female participation rates decisions for all four provinces in Pakistan. Their results show that labour force participation has a significant and inverse relationship with the nuclear family and the child-woman ratio. However, some studies have found a positive relationship between female participation rates and marital status, the dependency ratio, and literacy rate (Shah et al., 1986). Chishti et al. present a case study of Karachi whereby they analyse the demographic and socioeconomic factors that affect female participation rates. Their results show that labour force participation is positively related to an increase in expected earnings, wages, and level of education (Chishti et al., 1989). Another interesting observation is that the presence of a male figure in the household reduces the likelihood of female participation rates. However, the presence of other females in the household increases the probability that a female might work. Ibraz focuses on rural Pakistan, and observes that various cultural practices, such as purdah, constrain females from active participation in the labour force (Irbaz, 1993). Naqvi and Shahnaz have conducted a similar study and identified household-related factors that lead to female participation in economic activities. Empirical findings suggest that females' economic participation is significantly influenced by factors such as age, level of education, and marital status (Naqvi and Shahnaz, 2002). Ejaz investigates factors that determine female participation rates in Pakistan by using a sample of females aged 15–49. The results suggest that age and educational attainment have significant and positive effects on female participation rates. The results also show that single women have higher participation rates than married women. The greater the probability of a female belonging to a nuclear family and having access to a vehicle, the more likely she is to participate in economic activities, whereas a large number of children and the availability of home appliances reduces the probability of female participation rates. In terms of the effect of a nuclear family, Ejaz's results contradict those of Shah et al. Reducing the burden of childcare on females and facilitating their education is likely to lead to higher female participation rates in Pakistan. The available literature shows that various economic and sociological factors have a significant effect on female participation rates. However, some important factors have been neglected, especially those relating to household issues such as empowerment, fertility, and family structure. The present study, therefore, attempts to identify and present a comprehensive analysis of all such factors (Shah et al., 1986) (Ejaz, 2007).

[9]See chapter 2, footnote 6

Effects of Violence/Conflict:

Wars and civil conflicts have substantial destructive impacts on human capital formation, infrastructure, institutions, output, and growth at the country-level, yet the evidence of their impacts at the micro-level is mixed. Most articles in this growing literature analyse the effects of conflict on a variety of individual and household level outcomes and generally find significant impacts on some, but not all, outcomes of interest. The existing literature on the impact of conflict on individual and household outcomes focuses primarily on the outcomes of children (Stewart and Wang, 2001) (Collier, 1999a) (Collier et al., 2003) (Hoeffer and Reynal-Querol, 2003). A brief summary of the mechanisms of effects of violence and findings of previous research are discussed below:

Female LFP and Terrorism - Direction of causal effect: In order to identify the factors which have a significant relationship with violence, it is critical to establish the direction of any causal effects. Caprioli found that states characterized by gender inequality and structural hierarchy exhibit patterns of violence and hence were more likely to experience intrastate conflict between 1960 and 2001 (Caprioli, 2005). Robison et al. use the ideology of terrorist groups to identify Leftist and Islamist transnational terrorist attacks between 1973 and 2002. They proposed that female labour force participation might influence terrorism, especially religious terrorism, as the freedom/liberation of women can be seen as a threat to groups where gender relations are viewed as divinely ordained. They find evidence that increased female labour force participation was negatively associated with Islamist attacks. In a following study, Robison revised the hypothesis in line with previous results where women in public society exert a non-violent influence which reduces terrorism (Robison, 2010) (Robison and Jenkins, 2006).

Other research provides evidence in support of the direction of an effect from terrorism to female participation rates. Berrebi and Klor found in Israel that terrorism had a significant negative impact on non-defence-related companies while displaying a significantly positive effect on defence-related companies. The effects that terrorism has on these industries could manifest in female employment if terrorism differentially affects industries that employ a disproportionate number of males over females or vice versa. If industries that are negatively affected by terrorism employ a larger share of women, female labour force participation may be more affected by the terrorist attacks than male labour force participation. Additionally, if women occupy more precarious positions in industries negatively affected by terrorism, these industries may shed those jobs first during difficult times following an attack (Berrebi and Klor, 2010). In 2010 the United Nations World Tourism Organization reported that the women make up a large proportion of the formal tourism workforce, specifically in service and clerical jobs within the

industry, though they are poorly represented at the professional levels [10]. Some studies on the subject of terrorism and tourism have documented a significant deleterious relationship between the two (Thompson, 2011) (Enders et al., 1992) (Sandler and Enders, 2008). These connections provide a clear basis for a directional effect of terrorism onto female labour force participation. The employment sectors in Khyber Pukhtoonkhwa that would likely have been most affected by the presence of terrorist would be manufacturing, health[11], education[12], small business, and tourism[13], all of which are highly female-intensive (Sadaquat and Sheikh, 2010).

Added worker effect: In the absence of a formal credit market or social insurance, women in the household are expected to join the labour force in order to smooth household income and make up for the loss in their husbands' earnings due to war-related disruptions, departures, injuries, or deaths. Empirical evidence from industrialized countries suggests that the added worker effect was strong during the Great Depression and World War II (Acemoglu and Lyle, 2004) (Finegan and Margo, 1994) (Prieto-Rodriguez and Rodriguez-Gutierrez, 2003). Prior research in developing countries has found some evidence of an added worker effect, but the effects fluctuate in size and have fixated mainly on economic crises rather than conflict or terrorism. Parker and Skoufias, and McKenzie found fairly large added worker effects for Mexico during the 1994 Peso crisis and Argentina's financial crisis of 2002. Cho and Newhouse, in contrast, find a relatively smaller effect for seventeen middle-income economies during the 2009 economic crisis. Cross-country studies point to the counter-cyclicality of women's labour supply in developing countries, especially in Asia and Latin America (McKenzie, 2004) (Bhalotra and Umana-Aponte, 2010) (Parker and Skoufias, 2004) (Signorelli et al., 2012) (Cho and Newhouse, 2013).

Poverty: Violence-related shocks can significantly exacerbate on the poverty status of households. Wars, terrorism and civil conflict not only cause human fatalities, they also destroy infrastructure, assets and livelihoods, and displace populations. These effects are likely to push the worse-hit households into extreme poverty, even if these households were not poor off to begin with The literature identifies several coping strategies for such households: they may use of savings in the form household assets in order to diversify income resort to informal mutual support networks e.g. family, friends, ethnic groups, and neighbours, or intra-household decisions such as cutting meals and portions, relying

[10] United Nations World Tourism Organization, 2010

[11] A large number of door-to-door health workers are women. There have been numerous incidents of attacks on vaccination teams in KPK

[12] The Taliban targeted female employment in education by bombing girls' schools in KPK

[13] Swat has always been a top summer resort in KPK, attracting travellers from all over the country. When the Taliban took over, many tourist attractions were destroyed.

on wild foods and moving to food camps (Shemyakina, 2006) (Justino and Verwimp, 2006) (de Walque, 2004) (Fafchamps and Czukas, 1998) (Barrett and Webb., 2001).

Death within the household: Deaths and injuries within the household are some of the most visible effects of violent conflicts, requiring significant adaptation by the members. Donovan et. al. research the effect of adult deaths on 1500 rural Rwandan households using survey of self-reported coping strategies. They found that some households sell assets, adjust their crop mix, adjust area planted or hire more labour. The effect on farm labour supply was dominant: 6 out of 10 (5 out of 10) households reported a reduction in farm labour due to a male (female) adult death and 50 (80) percent of households reported no effect on other income generating activities for a male (female) death. Beegle, researching the effect of adult mortality on the labour supply of Tanzanian households, did not find an increase in hours farmed by surviving household members after an adult death, but found decreased activity in the farming. The author draws attention to the fact that households experiencing decreased output or profit after an adult death not necessarily experience a reduction of income, production or consumption per capita (Justino and Verwimp, 2006) (et. al., 2003) (Beegle, 2005).

Effects on Children: Akresh and de Walque exploit variation across provinces in the intensity of the 1994 genocide in Rwanda and find that school-age children exposed to the genocide complete almost one-half year less schooling and are 15 percentage points less likely to complete third or fourth grade (Akresh and de Walque, 2008). Blattman finds that child soldiering increases political participation in Northern Uganda but it does not appear to affect non-political community participation. Blattman and Annan study additional consequences of child soldiering in Northern Uganda and find that former child soldiers' loss in schooling is about equal to the length of time of abduction into the rebel group. Furthermore, they find that child soldiering halves the likelihood of skilled employment and decreases earnings by one third but has little impact on psychological problems, aggression, and social exclusion (Blattman and Annan, 2010). Akresh and Verwimp find that girls born after a shock during Rwanda's civil conflict exhibit 0.72 standard deviations lower height for age z-scores while there is no impact on boys' health status. Merrouche for Cambodia, Shemyakina for Tajikistan, Lopez and Wodon for Rwanda, de Walque for Cambodia, Bundervoet and Verwimp for Burundi, and Stewart et. al. for Sub-Saharan African countries from 1960 until 1990, all find that enrolment levels rebounded after crisis in their respective study areas (Shemyakina, 2006) (de Walque, 2004) (Lopez and Wodon, 2005) (Merrouche, 2007) (Akresh and Verwimp, 2006).

3.4 Data Description

The main source of data for this study is the five rounds of the Pakistan Social and Living Standards Measurement survey collected from 2004 to 2009. The PSLM is an annual nationally-representative survey conducted since 2004-05. The survey is carried out annually in all four provinces, although the tribal region is not present in all rounds. The survey is organised at the level of the household and covers education, health, social capital, fertility and marriage, employment, and economic status. This study relies on data from only Khyber Pukhtoonkhwa province, which was the primary area of Taliban presence. The fieldwork for the fourth round of the PSLM was conducted in Khyber Pukhtoonkhwa between July, 2007 and June, 2008. The fieldwork for the fifth round was conducted in Khyber Pukhtoonkhwa between August, 2008 and June, 2009 and in Swat between January, 2009 and June, 2009. This coincides roughly the military operation which began in January of the same year and ended in July.

Table 3.1 shows variable definitions, their coding, and expected signs. The dependant variables for my estimation are a series of employment status dummies, covering whether a women is in work or, alternatively, in specific types of work (paid employment, self-employment, agricultural employment, and unpaid employment). To measure the intensity of attacks, I have created dummy variables for residence in high and low intensity districts. High intensity districts are defined by twenty or more reported terrorist incidents in the Global Terrorism Database (GTD) data (Dir, Swat, Bannu, Hangu, Kohat, Dera Ismail Khan, and Peshawar). Similarly, low intensity districts are defined by 1-19[14] reported school attacks in the GTD data (Malakand, Mardan, Charsadda, Buner, Nowshera, Shangla, Mansehra, Swabi, Tank, and Chitral). No attacks districts are the remaining six districts of Khyber Pukhtoonkhwa with no reported terrorist incidents in the GTD data (Karak, Abbotabad, Batagram, Kohistan, Haripur, and Lakki Marwat) (See figure 3.1). The remaining variables are the standard determinants of employment in developing countries, which are discussed extensively in the literature section.

The data for terrorist incidents comes from South Asia Terrorism Portal (SATP) and the GTD, which have detailed information on terrorist incidents between 1970 and 2011. This data is disaggregated at district level by intensity of terrorist attacks. Figure 3.2 shows a sudden increase in terrorist attacks after 2006 and a decline after 2009. Much of the decline from 2009 onwards can be attributed to a sharp decrease in the number of terrorist attacks in Swat, as a result of Operation *Rah-e-Rast*, in which the military regained control of the area. Incidents beyond 2009 were predominantly carried out in Peshawar district.

[14]The affected districts had either very few terrorist incidents or very high, hence any cut-off between say 15 and 40 would classify high and low essentially the same way.

The descriptive statistics for the main variables of interest are presented in table 3.2. The top panel shows the sample statistics for the years 2004 to 2006 (before attacks) while the bottom panel shows the sample for the years 2007 to 2009 (during and after attacks). The first reported attacks were from June, 2007 while the survey for the year 2007-08 was conducted from July, 2007 to June 2008, during the time period when the Taliban were in control of Swat. The fieldwork for the last round of the survey was carried out in KPK till 2009, just after the spring army offensive in Swat and the Taliban had been cleared from the district. This allows me to examine the short term impact of exposure to terrorist activities in the worst affected districts.

Table 3.3 shows the proportion of women in employment for the sample years for the entire country and by province. In the year 2008-09, the level of employment went down by roughly 6 percent, while in KPK the employment went down from 22 to 18 percent in the last two survey years. This shows the overall business cycle had an independent effect on employment in Pakistan. Table 3.4 gives the breakdown of employment by type, gender, and province for the survey years used in this paper, 2004-2009. Most of the woemn employed are unapid workers. In KPK province, half of the women employed are in unpaid work. Table 3.5 shows the employment rates in the entire province, higher intensity, low intensity, and no attack districts prior and subsequent to the Taliban campaign. It can be seen that employment decreased in the later years for all cohorts in all types of work, reflecting a trend in the data due to the business cycle where unemployment in the country increased from 5 percent to 5.2 percent in 2009[15]. In the full sample of KPK, the overall employment gender differential is 0.44 percent. For different types of work, the raw difference-in-difference for women is about 2 percent less than that of men. For other forms of work (self-employment, farm work and paid employment), the differences are negligible. Restricting the sample by intensity level does not change the direction of the differences. In high intensity districts, the overall difference employment is slightly positive for women. For the different types of employment, the only negative difference is for women in paid work by 2.7 percent, while in low intensity and no attacks districts the difference in between negative 1.5 to 1.75 percent. In other forms of work, the differences are again miniscule. Table 3.5 implies that the cohort of women who were affected by the terrorist attacks has lower rates of employment in paid work than previous cohorts. These results provide preliminary evidence that the employment rates of women in affected districts may have been somewhat adversely affected by terrorist violence.

[15]Pakistan Employment Trends, 2012

3.5 Empirical strategy/Model specifications

The determinants of labour force participation are estimated by using the binary probit model, with robust standard errors. The probit model is appropriate as the dependent variable is discrete, rather than continuous. The model estimates the probability that the dependent variable (employment) is equal to one, given a set of characteristics. This probability of being currently employed is regressed with several covariates in the model gathered in a vector X,

$$P[LFP = 1] = F(X\beta) \; and \; P[LFP = 0] = 1 - F(X\beta)$$

where β measures the effect of changes in the independent variables on the probability of the discrete dependent variable of employment status.

General representation of the model:

The identification strategy used in this paper exploits the variation in intensity of terrorist presence and activities across districts of Khyber Pukhtoonkhwa during 2007-2009. The employment level in districts which experienced no attacks act as a control group for what employment would have looked like in the absence of terrorism. To identify an individual's exposure to violence, they are matched with their district of residence and year. The baseline specification is presented below:

$$P[E_i] = (Female)\mu + (Treated\ Years)\xi + (Intensity)\tau + (Intensity * Treated\ Years)\gamma + (Intensity * Female)\eta + (Female * Treated\ Years)\theta + (High\ Intensity * Treated\ Years * Female)\delta + \beta(X_i)$$

where the dependant variable is E_i which measures the employment status of individual i and female is the gender of the individual i. The employment variable is divided into five types of employment; any form of work, paid work, self-employment, farm work, or unpaid work. Overall employment variable is a dummy which equals 1 if the individual is employed, regardless of type. All employment definitions follow the HIES report of 2013[16]. A person is considered employed if they worked for at least one hour during the month, had a job, or ran an enterprise such as shop, business, farm or service establishment during the last year.

If the Taliban's demand that women should quit paid work and remain at home was successful, it's expected that, in the affected districts and time periods, women would

[16]HouseholdIntegrated Economic Survey of Pakistan,2013

either completely drop out of the labour force or switch from paid employment to farm work, unpaid work, or home-based self-employment. *Intensity* is a vector of dummies (low, high) for attack intensity level in district of residence. Districts that didn't experience any terrorist presence are the omitted group in the regressions. The intensity level dummies are further restricted by two exposure survey years, 2007-08 and 2008-09, as the pattern of attacks was very different in these two years as can be seen in figure 2. This exogenous shock allows for a difference-in-difference-in-difference comparison of the terrorist presence in the periods 2007-08 and 2008-09. If the attacks affected the employment of women, I expect to find a negative coefficient for the triple interaction variables. *Treated years* is a dummy variable for whether the individual was surveyed in 2007-08 or 2008-09. Observations from 2004-06 are used as the control. The year dummies (2007-08 and 2008-09) and district intensity dummies (High Intensity and Low intensity) control for the effects of treatment years and treatment districts that are constant across all individuals in the sample. The interaction of intensity level and survey year gives the difference-in-difference estimates on the effects of intensity level in the year of employment. The triple interaction of female with treatment years and district intensity level is the variable of interest in the regressions, measuring the gender-specific impact of residing in regions that experienced terrorism after 2007 after controlling for cohort, gender and conflict effects individually and their interactions. $\beta(X_i)$ includes standard individual and household-level characteristics motivated by the discussion in the previous section. These include region, household size, parental education and income, household head's income and education, number of children in the household, number of family members in employment, and marital status. The expected signs on the coefficients of these variables are shown in table 3.1.

3.6 Results of Estimation

The regression estimates are presented in table 3.6, 3.7, 3.8, and 3.9. Table 3.6 gives the estimate for full sample, while rest of the tables carry out robustness checks using several specifications for young individuals aged 18 or younger, aged 19 or older, married individuals, and single individuals. The discussion on the estimates is presented as under.

Individual's characteristics: The results on controls are generally in line with the expectations in table 3.1. Employment exhibits an inverted U-shape as age increases, which is a standard outcome for increase in age. Older individuals are less likely to be in labour force as age increases, hinting towards an inverted *U-shape* of the employment curve. It is worth noting that as age has a positive effect on employment for all forms

of work for individuals approaching 18 years of age, where the net effect of age[17] is increasing as age approaches 18[18]. Years of education[19] has a positive coefficient for all forms of work except farm work and unpaid work. This result is intuitive as only very young labourers are used as unpaid worker, who would have no education. Next, marriage increases the probability of being employed in all forms of work except unpaid work. This corresponds with the results in table 3.7 where only younger individuals are positively employed in unpaid work. Most of the married individuals in the sample are aged 18 or older. Moreover, married individuals with families would want some sort of remunerations for work. For the full sample, parents' education decreases employment in all types of work. In educated families, it is expected that education is given priority over low paying jobs. Therefore, these individuals would pursue education and not be in work. Parents' income increases overall employment of those aged 19 or older. For single individuals, parents' education decreases probability of employment for all types of work. Fathers and mother's education, both have a negative coefficient, meaning more educated families don't have younger family members in work. Education and income of household head decreases the probability of employment for women in all forms of employment (income effect).

Household characteristics: The probability for being employed is a decreasing function of household size at all levels of employment except unpaid work. Larger households in Pakistan are a rural phenomenon where people live in joint families. Poorer households do engage in unpaid work such as bonded farm workers or village landlords' servants who are paid in kind rather than money. Complementarily, as the number of children in the household increases (holding household size constant), the probability of employment for all type of work also increases. This is likely because more children mean fewer family members who are capable of employment, and also more mouths to feed. Location of residence has the expected signs in all specifications[20]: overall, the probability of being in

[17] Net effect of age: The knowledge and experience that accumulates with age can partially offset any decrease in cognitive functioning that may also occur with age, such that the net effect of age can be negative for older individuals.

[18] In this group, younger individuals are intuitively less likely to be working, especially in paid employment as younger individuals are in education. The result is only positive for individuals in unpaid work; many unpaid farm and family workers are children of farmers/labourers who are working as bonded labourers. As age gets closer to 18, the employment variable for all types becomes positive. Older children are have more opportunities for paid work or self-employment, hence the positive coefficient on these types of employment.

[19] For single individuals, years in education increase the probability to be employed in paid and self-employment while negative for farm employment. This is intuitive as single people usually live with their parents. Since the parents or other married family members are in work, single individuals have the option to drop out of employment and pursue other options such as education. For married individuals, years of education increases probability of being employed in paid and self-employment for both men and women while decreases employment in farm and paid work.

[20] It is worth mentioning that younger individuals are less likely to be employed in urban areas. It is likely that young individuals in urban areas are still in education. As for married individuals, living in an urban area increases probability of employment for men but decreases for women.

employment in urban areas in negative while types of work give expected outcome, with more likelihood to be employed in paid and self-employment while less probability to be employed in farm or unpaid work. This is highly intuitive as Pakistan is an agricultural economy with more people employed in rural farms while urban settings have more opportunities for businesses and formal paid employment. This is in line with previous research discussed in section 3. Finally, on the gender interaction variables, girls are less likely to be employed in all forms of work. Younger females in Khyber Pukhtoonkhwa practice purdah and less likely to engaged in employment. Usually, younger women are engaged in housework or looking after younger siblings. Interaction of female and number of family members in work is positive for paid and self-employment while negative for farm and unpaid work. Interaction of gender with parents' education and income gives expected outcomes. Married women are less likely to be employed in all forms of work while men are more likely to be employed in paid and self-work.

Variables of interest/Difference-in-Difference estimates: The baseline probabilities of overall employment were *higher* in both high and low intensity areas relative to the zero-attack areas. These districts include Peshawar, Swat, and Dera Ismael Khan, which are highly populous districts with large metropolitan areas. It is expected that employment would be high in these areas as there are more opportunities for all forms of work. There is a negative coefficient on employment for the year 2008-09, indicating that the effect on the probability of being in employment drops from 3 percent in 2007-08 to -3.5 percent in 2008-09, which can be attributed to the business cycle of 2009. After controlling for gender in the double interaction difference-in-difference variable, the gender differential in employment in the treated years remains, with women less likely to be employed than men in both treatment years. The gender-year interaction coefficient goes from 11[21] percent to -4 percent in the years 2007-08 to 2008-09. This negative effect in 2008-09 holds for all forms of work, implying that the economic recession hit women worse than men. As for second difference-in-difference term, the gender-intensity level interaction, women in both low and high intensity area are less likely to be employed than men in overall employment, self-employment, and unpaid work.

The main variables of interest are the triple interaction *difference-in-difference-in-difference* terms. The coefficient for women in high and low intensity areas in 2007-08 is negative for overall employment for the full sample (column 1), with a value in the range of 6 percent to 7 percent. In the second year of the attacks, the negative effect of overall employment seems to disappear for low intensity districts. For high intensity district, the negative effect decreases from 7 to 1.5 percent. This result is in line with the estimates of the education chapter, where the *fear-effect* of terrorism quickly diminishes after the

[21] This positive coefficient is mostly driven by women in unpaid work. For all other forms of paid work (farm and nonfarm), the gender differential is negative in all years.

first year of the attacks. After the onset of the terrorist activities in 2007-08, female workers are dissuaded from work. They soon return to work as the terrorist activities get weakened due to the military operations[22]. When restricted by employment type (columns 2-5), this negative result remains for paid work and farm work. In high intensity areas, the probability of being employed in paid work for women decreases by 1 percent in the second year of attacks while the probability of unpaid work increases by 1 percent. It is likely that these women switched to competing activities; younger women dropped out of work in favour of education and household work and older women opting for household work in place of paid work. After losing opportunities for paid work, women could switch jobs by taking up unpaid work in place of paid or self-employment.

The results suggest that the Taliban attacks had only a modest and short-lived effect on female employment levels. The estimates for regression by age group and marital status give a similar result.

Robustness check: In order to establish that the results for the full sample hold for different specifications and are not driven by the controls, a number of sample groups are used to run the employment model. First, I run the regressions for sample of 18 year olds or younger individuals, and over 18 years old individuals. Lastly, I split the sample by marital status i.e. married (currently married, divorced, or widowed) and single (never married). The division of the sample at age 18 is made as this is the normal end of higher secondary schooling, marking a discrete change in terms of time use options. Individuals aged 18 or younger are of school going age. Those who are not in education are likely to be in unskilled or unpaid work. For further check, the sample is divided by marital status. The literature for developing countries suggests marital status correlates with participation rates, marriage increases labour force participation for men, but decreases it for women. Married individuals are likely to behave differently in the labour market decisions than single individuals. Therefore, tables 3.7 and 3.8 examine employment of married and unmarried individuals separately. The significant results with these modified specifications are upheld.

Tables 3.7, 3.8, and 3.9 show the regression results split by age and marital status. The control variables are the same as in table 3.6; however, in the interest of expediency, these coefficients are not reported. In the triple interaction difference-in-difference-in-difference term for the age group samples, in both high and low intensity areas, women are less likely to be employed in the first year of the attacks for overall employment. The coefficient for 19 year olds or older is between -14 and -16 percent in 2007-08, which becomes insignificant in 2008-09. For the sample of 18 or younger, the result has the same direction but smaller magnitude. For types of work, there is a negative effect in

[22]See chapter 2 for details on the military operations

unpaid work and farm work for 18 and 19 in year 2007-08. In the following year, the negative effect only stays for paid and while it's positive for unpaid work. For women aged 19 or older, the negative effect remains for paid employment in high intensity districts while it stays for farm work and unpaid work in low intensity districts. In gist, there is a slight negative gender differential for women in paid work, which is offset by a positive gender differential in unpaid work in the treatment districts. This affect is more pronounced for younger women, and suggests that much of the adjustment to the attacks occurred by women switching from more formal to less formal work, rather than leaving the labour force.

For the samples by marital status, both single and married women are less likely to be employed in the high and low intensity districts while the opposite is true for men. For the sample of men in paid work, there is a positive effect in the first year of attacks which increases slightly in the second year. Men's participation rates were not affected by the conflict in the region. For men in farm work, there is a negative effect in both years which slightly decreases in 2008-09. For married women, the overall employment has a negative probability, which is consistent with existing theories on labour supply behaviour of married women. In the difference-in-difference terms, there is a negative effect in overall employment in both low and high intensity areas. This effect disappears in the second year in both high and low intensity districts. There is though a small negative effect in farm work in high intensity districts and in paid work, farm work and unpaid work in low intensity districts.

Lastly, for the sample of single individuals, in the double interaction difference-in-difference terms, there is a negative effect for the first year of attacks in all forms of employment for both genders. By type of employment, there is only a negative gender differential for farm and unpaid work in both high and low intensity districts. In the second year, the negative effect disappears for overall employment, though there is some negative differential for unpaid and farm work. In gist, single women and married women experienced a decrease in relative employment in the first year of the attacks, which fades away in the following year, although there is a negligible negative effect on farm and unpaid work.

To summarize the regression estimates, for overall employment in the full sample regression, there is a coefficient of -7 percent for difference-in-difference-in-difference term. This increases slightly in the following year to -1.6 percent. In the low intensity area, the difference-in-difference-in-difference coefficient goes from -6 percent insignificant in the year 2007-08 to insignificant and very small in the following survey year. In the age group samples, the outcome is very similar with a negative gender differential in the year 2007-08 which disappears in the year 2008-09. Lastly, for the samples by marital status,

both samples experienced a decreasing probability of employment in 2007-08 in high intensity and low intensity areas with coefficients ranging between 1 and 2 percent for single and 4 to 5.5 percent for married individuals, which disappears in the year 2008-09. These results suggest that the Taliban attacks had only a modest and short-lived effect on female employment levels in the affected areas of Khyber Pukhtoonkhwa.

3.7 Conclusion

This study takes a step towards understanding the impact of terrorist activities in North-western Pakistan since 2007 on women's employment. The Taliban insurgency in the North-western regions of Pakistan specifically threatened the participation of women in the labour market, as one of the main goals of their terror campaign was to keep women at home. I examine the employment rates of women and men in the Khyber Pukhtoonkhwa province by using five consecutive rounds of the Pakistan Standards of Living Measurement survey.

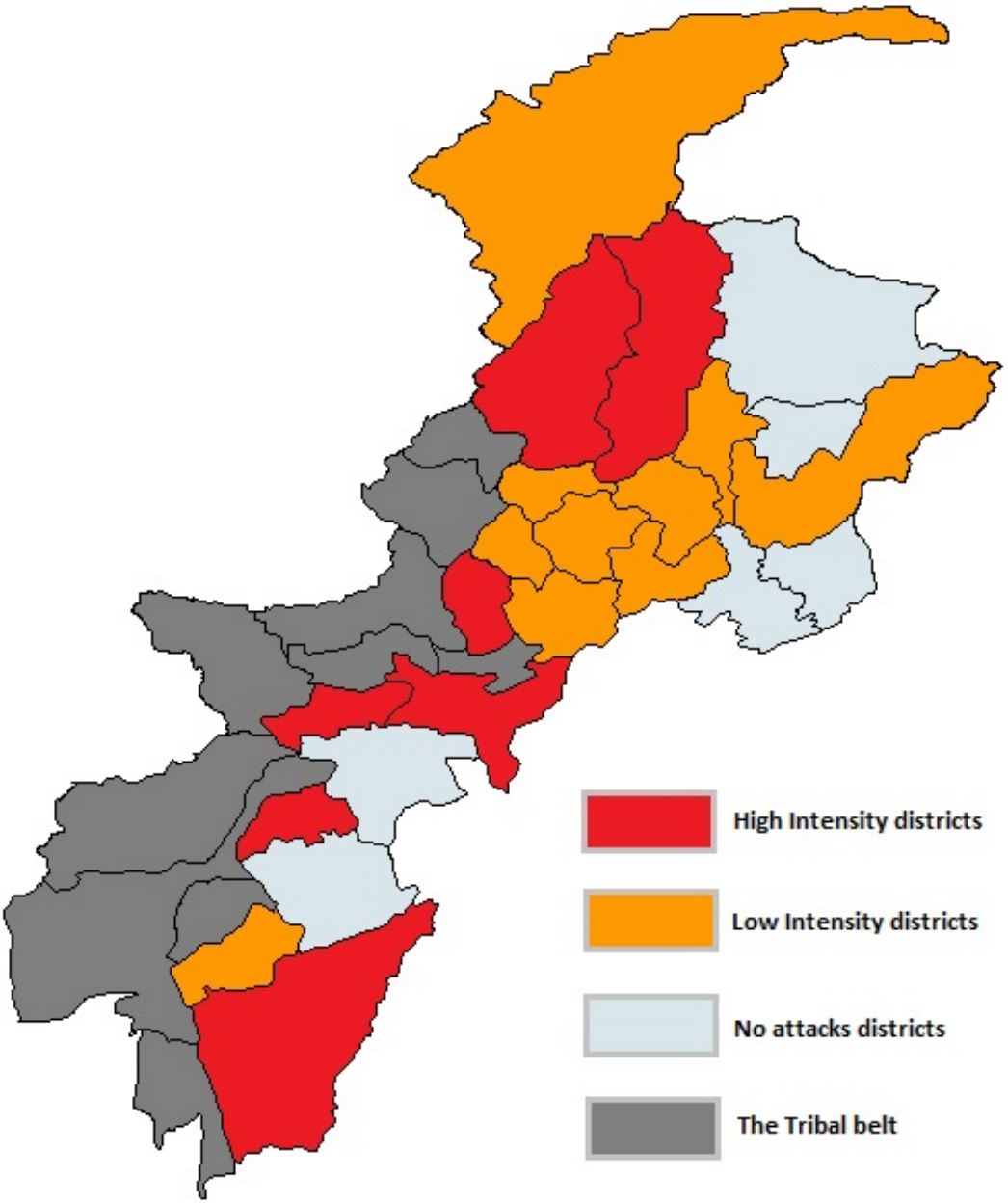
The empirical strategy uses a *difference-in-difference-in-difference* approach, comparing the differences in employment across three dimensions, gender, district (separated by intensity of attacks), and years. The results suggest that the impact of these terrorist attacks was relatively modest and short-lived. For instance, females aged 18 or younger in the districts of North-western Pakistan that experienced terrorist incidents between 2007 and 2009 had 1.56 percent lower employment rates relative to men in the first year of attacks. In the following year, when the Pakistani military retook control over some of the affected areas, this effect fades away. There is a very small negative effect for paid work for women in the affected districts but overall employment level does not seem to show a decrease in employment rates.

The results presented here speak differently than what is popularly believed; suggesting the fear effect of the Taliban's terrorism campaign was relatively modest. There is no evidence for a substantial drop in the labour force participation rates in the worst affected districts. There is a relatively small effect estimated for women in paid employment in the years of highest-intensity terrorist attacks, followed by a rapid return to normality in overall employment after the Pakistani counterinsurgency measures in 2009. These results are congruous with the estimates of education outcomes in the same districts: the impact of these terrorist attacks was only short-lived.

TABLE 3.1: Descriptive and coding of Variables.

Variables	**Description and coding**	**Expected Sign**
Currently Employed	Dummy, 1 if currently employed	Dependant Variable
Age, Age^2	Age in years and age-squared	Positive, Negative
Household Size	Number of hh members	Ambiguous
Years edu	Years of edu of individual	Positive
Urban	Dummy, equals 1 if living in urban area	Ambiguous
Married	Dummy, equals 1 if yes	Negative
Children in hh	Number of children in household	Negative
Family members in work	Number of family members in work, excluding the individual	Ambiguous
Father edu	Years of completed education of father	Negative
Mother edu	Years of completed education of mother	Negative
Parents' income	Parents' monthly income	Negative
Husband/head income	Husband's/Household Head's monthly income	Negative
Husband/head edu	Years of education of husband/Household Head	Negative
High Intensity	Dummy, equal 1 if lives in district with 20 or more attacks	Variable of interest
Low Intensity	Dummy, equal 1 if lives in district with 19 or fewer attacks.	Variable of interest
Intensity*Year	Interaction, equals 1 if lives in district in treatment years	Variable of interest
Intensity*Year*Female	Interaction, equals 1 if female and lives in district in treatment years	Variable of interest

FIGURE 3.1: Intensity level by districts of KPK.



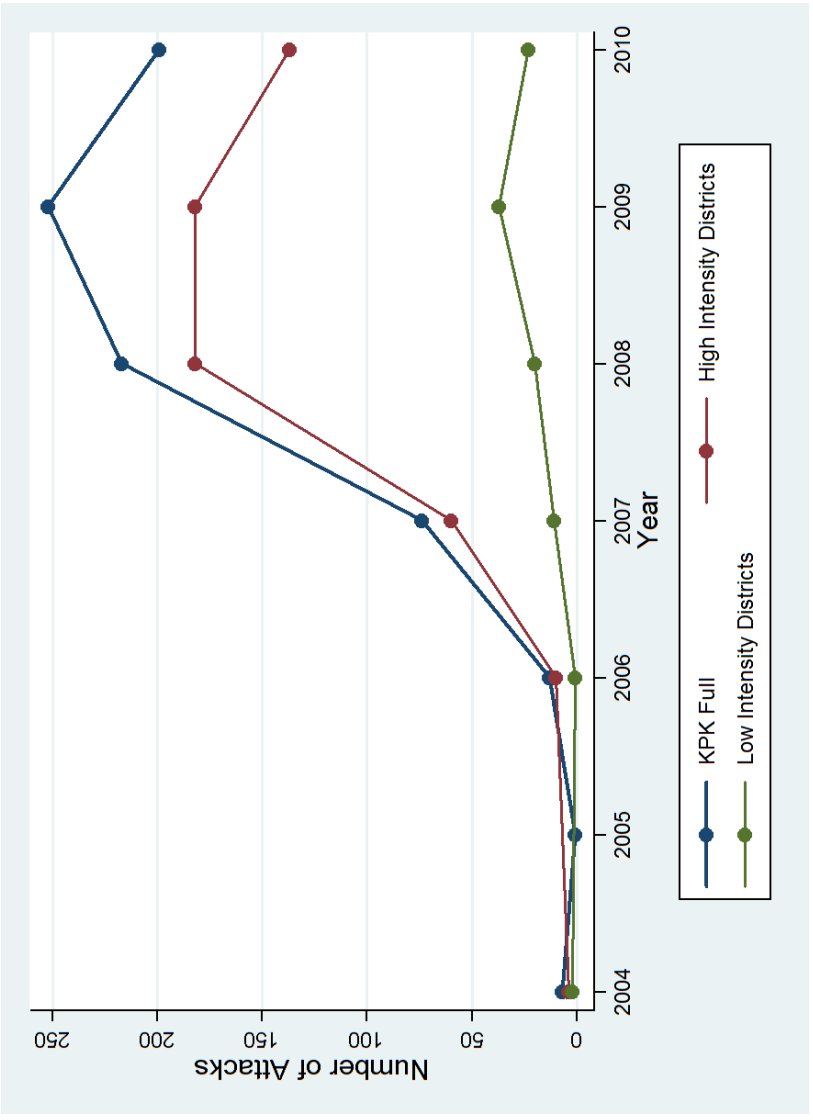


FIGURE 3.2: Number of terrorist incidents in Khyber Pukhtoonkhwa.

TABLE 3.2: Descriptive Statistics.

Before	**Mean**	**Standard dev.**	**Observations**
Age	21.79	18.02	143456
Age^2	799.64	1196	143456
Household size	9.97	5.47	143456
Urban	0.27	0.44	143456
Years edu	2.57	4.02	143456
Female	0.5	0.5	143456
Married	0.37	0.48	143456
Father edu	3.88	4.99	143456
Mother edu	0.97	2.83	143456
Head edu	3.96	4.99	143456
Head income	4456	9062	143456
Parents' income	4591	9185	143456
Family members in work	1.92	1.77	143456
Children in hh	4.65	3.4	143456
After	**Mean**	**Standard dev.**	**Observations**
Age	22.28	18.09	113724
Age^2	823.31	1193	113724
Household size	9.35	4.8	113724
Urban	0.26	0.44	113724
Years edu	2.68	4.11	113724
Female	0.49	0.5	113724
Married	0.38	0.48	113724
Father edu	3.98	5.04	113724
Mother edu	0.96	2.9	113724
Head edu	4.06	5.05	113724
Head income	7254	11178	113724
Parents' income	7415	11336	113724
Family members in work	1.45	1.17	113724
Children in hh	4.24	3.03	113724

Table 3.3: Employment rates in Pakistan, by province

Year	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**
Pakistan	0.2498	0.2808	0.2621	0.2798	0.2134
Punjab	0.2776	0.3022	0.2870	0.3031	0.2310
Sindh	0.2614	0.3156	0.2777	0.3182	0.2176
KPK	0.2048	0.2301	0.2212	0.2250	0.1805
Baloch	0.2261	0.2387	0.2231	0.2364	0.2005

Table 3.4: Percent Employed by type, region, and gender.

PROVINCE		**Pakistan**	**Punjab**	**Sindh**	**KPK**	**Baloch**
Any employment						
	M	41.40	43.8	43.64	36.17	38.32
	F	6.60	9.38	6.04	4.8	2.2
Paid employment						
	M	20.64	20.51	22.75	18.57	20.14
	F	3.04	4.59	2.65	1.78	1.07
Self employment						
	M	8.90	11.4	7.33	8.22	6.08
	F	0.69	1.04	0.43	0.57	0.29
Farm employment						
	M	8.17	8.12	9.19	6.27	8.96
	F	0.67	0.96	0.26	0.83	0.28
Unpaid employment						
	M	7.40	6.82	8.91	5.01	9.3
	F	4.72	5.29	5.96	2.57	4.03

TABLE 3.5: Employment rates by gender in KPK, Pakistan.

Type	**KPK**			**High Intensity**			**Low Intensity**			**No attacks**		
	Before	**After**	**Diff**	**Before**	**After**	**Diff**	**Before**	**After**	**Diff**	**Before**	**After**	**Diff**
Any												
female	0.061	0.032	-0.029	0.049	0.019	-0.03	0.073	0.039	-0.034	0.066	0.038	-0.028
male	0.377	0.343	-0.034	0.382	0.346	-0.036	0.38	0.362	-0.017	0.377	0.336	-0.041
Diff	-0.316	-0.311	0.004	-0.334	-0.328	0.006	-0.306	-0.323	-0.017	-0.311	-0.298	0.013
Paid												
female	0.02	0.015	-0.005	0.019	0.013	-0.006	0.023	0.019	-0.003	0.019	0.014	-0.005
male	0.179	0.194	0.014	0.179	0.2	0.021	0.188	0.202	0.014	0.178	0.187	0.009
Diff	-0.159	-0.179	-0.019	-0.16	-0.186	-0.027	-0.165	-0.182	-0.017	-0.159	-0.173	-0.015
Self												
female	0.009	0.002	-0.007	0.009	0.002	-0.007	0.009	0.002	-0.006	0.009	0.002	-0.007
male	0.084	0.079	-0.005	0.09	0.082	-0.008	0.081	0.081	0.000	0.079	0.072	-0.007
Diff	-0.076	-0.077	-0.001	-0.081	-0.08	0.001	-0.073	-0.079	-0.006	-0.07	-0.07	0.000
Farm												
female	0.01	0.007	-0.003	0.007	0.002	-0.005	0.012	0.011	-0.001	0.011	0.009	-0.002
male	0.065	0.06	-0.005	0.06	0.052	-0.008	0.068	0.068	0.000	0.075	0.07	-0.004
Diff	-0.055	-0.053	0.002	-0.053	-0.051	0.003	-0.056	-0.057	-0.001	-0.064	-0.061	0.003
Unpaid												
female	0.028	0.023	-0.005	0.015	0.009	-0.006	0.039	0.025	-0.014	0.033	0.033	
male	0.051	0.049	-0.003	0.055	0.047	-0.007	0.046	0.049	0.002	0.052	0.051	-0.002
Diff	-0.024	-0.025	-0.002	-0.04	-0.039	0.001	-0.008	-0.024	-0.016	-0.019	-0.018	0.001

TABLE 3.6: Probit regression for full sample by employment type - marginal effects

Full sample	**Any work**	**Paid emp**	**Self emp**	**Farm work**	**Unpaid work**
Age	0.0219***	8.82e-05***	0.00219***	0.00125***	0.00391***
	(0.001)	-3.13E-05	-6.00E-05	-4.24E-05	-7.10E-05
Age^2	-0.000266***		-2.57e-05***	-1.10e-05***	-5.38e-05***
	-2.55E-06		-7.32E-07	-4.21E-07	-1.11E-06
Household size	-0.00876***	-0.00147***	0.000279***	-0.000242***	-0.000374***
	(0.001)	(0.001)	-7.58E-05	-5.87E-05	-9.95E-05
Urban	-0.00972***	0.00998***	0.00937***	-0.0119***	-0.00977***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.157***	-0.112***	-0.0188***	-0.0239***	-0.0174***
	(0.005)	(0.004)	(0.001)	(0.001)	(0.002)
Years edu	0.00768***	0.00825***	0.000753***	-0.000559***	0.000379***
	(0.001)	(0.001)	-5.02E-05	-4.04E-05	-6.37E-05
Married	0.184***	0.115***	0.0195***	0.00839***	-0.0161***
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
Children in hh	0.00723***	-0.00256***	-0.000223**	0.000434***	-0.000178
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Father edu	-0.00560***	-0.00302***	-0.000558***	-0.000352***	-0.00145***
	(0.001)	(0.001)	-4.46E-05	-4.16E-05	-6.76E-05
Mother edu	-0.00253***	-0.000854***	-0.000155**	-0.000541***	-0.000879***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Parents' income	2.86E-08	-4.98e-07***	8.48e-08***	-4.82e-08***	2.16e-07***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Family members in work	0.0213***	0.00548***	-0.000572***	-0.000425***	0.00653***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Family members in work*female	0.0128***	0.00487***	0.00239***	-0.000808***	0.000744***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Father edu*female	0.000586*	0.00223***	-0.000158	-0.000675***	-0.000371***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mother edu*female	0.00548***	0.00320***	-0.000169	0.000907***	-0.00113***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Parents' income*female	0.00617***	0.00257***	0.000626***	0.00156***	0.00139***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married*female	-0.152***	-0.0541***	-0.0188***	-0.00926***	0.0170***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High intensity	0.0233***	0.0108***	0.00362***	-0.00101	-0.00143
	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
Low intensity	0.0196***	0.00801***	0.00267***	-0.00044	0.00142
	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
2007-08	0.0307***	0.00990**	-0.00380***	0.00098	0.00153
	(0.007)	(0.004)	(0.001)	(0.001)	(0.002)
2008-09	-0.0351***	-7.89E-05	-0.00158**	-0.00182***	0.00459***
	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
Female*high intensity	-0.0468***	-0.00449	-0.00330***	0.00028	-0.0159***
	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Female*low intensity	-0.0431***	7.08E-05	-0.00294**	-0.000774	-0.0140***
	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
2007-08*female	0.110***	-0.00943	-0.00193	-0.000372	0.0569***
	(0.016)	(0.007)	(0.004)	(0.002)	(0.009)
2008-09*female	-0.0417***	-0.0132***	-0.0118***	0.000214	-0.00669***
	(0.005)	(0.004)	(0.001)	(0.001)	(0.001)
2007-08*High intensity	-0.0158***	0.00276	-0.00199	-0.00308***	0.00730**
	(0.006)	(0.004)	(0.002)	(0.001)	(0.003)
2008-09*High intensity	0.00196	0.00628**	-0.000651	-0.00113*	-0.00572***
	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)
2007-08*Low intensity	-0.0174***	0.0141***	-0.000792	-0.00431***	-0.00443**
	(0.006)	(0.005)	(0.002)	(0.002)	(0.002)
2008-09*Low intensity	0.000781	0.00267	-0.000328	0.00125*	-0.00266**
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
2007-08*female*high	-0.0723***	0.000127	-0.00302	-0.00577***	-0.0160***
	(0.003)	(0.009)	(0.004)	(0.001)	(0.001)
2007-08*female*low	-0.0615***	-0.00533	-0.00266	0.00114	-0.0131***
	(0.005)	(0.008)	(0.004)	(0.003)	(0.001)
2008-09*female*high	-0.0157**	-0.0107**	-0.00145	-0.00544***	0.0106***
	(0.007)	0.005)	(0.004)	(0.001)	(0.004)
2008-09*female*low	-0.00163	-0.00772	0.00215	-0.00442***	-0.00352*
	(0.008)	(0.005)	(0.004)	(0.001)	(0.002)
Observations	257,180	257,180	257,180	257,180	257,180
Pseudo R^2	0.4966	0.3019	0.2854	0.3131	0.1754
Prob.Chi^2	0.000	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 3.7: Probit Regression on Employment Status, by age groups - marginal effects

Sample by age	**18 yrs Any work**	**19 yrs Any work**	**18 yrs Paid emp**	**19 yrs Paid emp**	**18 yrs Self emp**	**19 yrs Self emp**	**18 yrs Farm work**	**19 yrs Farm work**	**18 yrs Unpaid work**	**19 yrs Unpaid work**
High intensity	0.00855***	0.0375***	0.00556***	0.00473	0.00204***	0.00697***	-0.000193	-0.00239**	-0.000345	-0.00407*
	(0.001)	(0.008)	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Low intensity	0.00640***	0.0435***	0.00428***	0.00246	0.00151***	0.00546***	-2.97E-05	-0.00111	0.000234	0.00402*
	(0.001)	(0.007)	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
2007-08	-0.00088	0.101***	-0.000204	0.0156	-0.00148*	-0.00869**	-0.002***	0.00721**	-0.00093	0.00131
	(0.002)	(0.021)	(0.001)	(0.010)	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.005)
2008-09	-0.0187***	-.0559***	-0.00173*	0.00447	-.00278***	-0.0016	-.0027***	-0.00138	0.00286***	0.00626**
	(0.002)	(0.009)	(0.001)	(0.005)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
Female*high intensity	-.00804***	-0.154***	-0.00246**	-0.00635	-0.001	-0.0121***	0.00276**	-.00626***	-0.00397***	-0.0361***
	-0.00136	-0.00982	-0.00106	-0.00794		-0.00398	-0.00118	-0.00204	-0.000607	-0.00177
Female*low intensity	-.00951***	-0.116***	-0.00187*	0.00716	-0.000934*	-0.00902**	0.00126	-0.00458**	-0.00472***	-0.0279***
	(0.001)	(0.010)	(0.001)	(0.008)	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)	(0.002)
2007-08*female	0.0234***	0.207***	-.00639***	-7.11E-05	-.00293***	0.00824	-.0029***	0.000441	0.0199***	0.119***
	(0.008)	(0.031)	(0.001)	(0.018)	(0.001)	(0.014)	(0.001)	(0.005)	(0.006)	(0.020)
2008-09*female	-0.0171***	-.0860***	-.00583***	-0.0185**	-.00281***	-0.0301***	-.00186**	-0.00213	-0.00477***	-0.00783**
	(0.002)	(0.014)	(0.001)	(0.009)	(0.001)	(0.005)	(0.001)	(0.002)	(0.001)	(0.001)
2007-08*High intensity	-0.00194	-0.0475**	-0.00148	0.0155	-0.000884	-0.0038	0.000922	-.00782***	0.00303	0.0170**
	(0.002)	(0.019)	(0.001)	(0.011)	(0.001)	(0.005)	(0.001)	(0.001)	(0.002)	(0.008)
2008-09*High intensity	0.00720***	0.0216*	0.00103	0.0240***	0.00115	-4.33E-05	0.00157	-0.00347**	-0.00363***	-0.00408
	(0.003)	(0.012)	(0.001)	(0.006)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.003)
2007-08*Low intensity	-0.0034	-.0593***	0.00144	0.0355***	0.000174	-0.00286	-0.000792	-0.0104***	-0.00260***	-0.00376
	(0.002)	(0.019)	(0.002)	(0.012)	(0.002)	(0.005)	(0.001)	(0.001)	(0.001)	(0.005)
2008-09*Low intensity	0.00681***	0.000282	0.00166	0.00523	0.00132	-0.000807	0.000571	0.00241	-0.00265***	0.00267
	(0.003)	(0.011)	(0.001)	(0.006)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.004)
2007-08*female*high	-0.0156***	-0.162***	0.00717	0.00158	0.532***	-0.00984	0.331***	-0.0118***	-0.00582***	-0.0315***
	(0.001)	(0.021)	(0.007)	(0.020)	(0.127)	(0.011)	(0.128)	(0.003)	(0.001)	(0.001)
2007-08*female*low	-0.0131***	-0.140***	0.00855	-0.0174		-0.00643		0.00708	-0.00376***	-0.0285***
	(0.001)	(0.022)	(0.007)	(0.017)		(0.012)		(0.008)	(0.001)	(0.002)
2008-09*female*high	-0.000624	0.000131	-0.00137	-0.0226**	-0.00135	-0.0009	-0.00126	-.00815***	0.0130***	0.0118
	(0.006)	(0.022)	(0.003)	(0.011)	(0.002)	(0.011)	(0.001)	(0.002)	(0.005)	(0.007)
2008-09*female*low	-0.00483	0.0211	-0.00370**	-0.00668	-0.000661	0.0086		-0.0078***	0.00521*	-0.0166***
	(0.005)	(0.020)	(0.002)	(0.012)	(0.002)	(0.012)		(0.002)	(0.003)	(0.003)
Hh controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	140,751	116,429	140,751	116,429	138,176	116,429	128,547	116,429	140,751	116,429
Pseudo R^2	0.2832	0.4377	0.254	0.2963	0.1576	0.2155	0.1317	0.2738	0.2654	0.1402
Prob Chi^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 3.8: Probit Regression on Employment Status for married individuals aged 15 or older in KPK - marginal effects

	Women Any work	**Men Any work**	**Women Paid emp**	**Men Paid emp**	**Women Self emp**	**Men Self emp**	**Women Farm work**	**Men Farm work**	**Women Unpaid work**	**Men Unpaid work**
High intensity	-0.03***	0.0065	0.00104	-0.0048	-0.00079	0.017**	-0.004***	-0.0137**	-0.0281***	-0.0087***
	(0.002)	(0.008)	(0.001)	(0.009)	(0.001)	(0.007)	(0.001)	(0.006)	(0.002)	(0.002)
Low intensity	-0.021***	0.0193**	0.0021	-0.00238	-0.00065	0.0122*	-.0028***	-0.00709	-0.0162***	0.000448
	(0.002)	(0.008)	(0.001)	(0.009)	(0.001)	(0.007)	(0.001)	(0.005)	(0.001)	(0.002)
2007-08	0.141***	0.0731***	0.000159	0.00732	-.0024*	-.040**	0.00052	0.0355**	0.0771***	0.0103
	(0.014)	(0.016)	(0.003)	(0.022)	(0.001)	(0.017)	(0.002)	(0.015)	(0.009)	(0.007)
2008-09	-0.027***	-0.0221**	-0.000159	0.0145	-.006***	-0.0086	0.00152*	-0.00386	0.00518***	0.0018
	(0.003)	(0.010)	(0.002)	(0.012)	(0.001)	(0.009)	(0.001)	(0.007)	(0.002)	(0.003)
2007-08*High	-0.040***	-0.0483**	0.00297	0.0433*	0.000657	0.00689	-.0046***	-0.042***	-0.0167***	0.00775
	(0.002)	(0.024)	(0.004)	(0.025)	(0.002)	(0.021)	(0.001)	(0.012)	(0.001)	(0.007)
2008-09*High	-0.00443	0.0157	-0.0025	.0469***	0.00145	0.00422	-.004***	-.0226***	0.0023	-0.00117
	(0.005)	(0.011)	(0.002)	(0.015)	(0.002)	(0.011)	(0.001)	(0.008)	(0.003)	(0.004)
2007-08*Low	-0.038***	-0.0553**	0.00184	0.097***	0.00215	0.00426	-0.0012	-.0647***	-0.0169***	-0.00692
	(0.002)	(0.025)	(0.004)	(0.026)	(0.003)	(0.021)	(0.002)	(0.009)	(0.001)	-0.00436
2008-09*Low	5.19E-05	0.00626	-.00274*	0.00685	0.0028	0.00085	-0.00154*	0.00943	-0.0110***	0.00222
	(0.005)	(0.012)	(0.002)	(0.014)	(0.003)	(0.011)	(0.001)	(0.009)	(0.002)	(0.004)
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	54,286	41,964	54,286	41,964	54,286	41,964	54,286	41,964	54,286	41,964
Pseudo R^2	0.1481	0.1925	0.2436	0.1089	0.0494	0.0469	0.1316	0.1436	0.1882	0.2166
Prob.Chi^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

TABLE 3.9: Probit regression on Employment Status for unmarried individuals aged 15 or older in KPK - Marginal effects

	Women Any work	**Men Any work**	**Women Paid emp**	**Men Paid emp**	**Women Self emp**	**Men Self emp**	**Women Farm work**	**Men Farm work**	**Women Unpaid work**	**Men Unpaid work**
High intensity	-0.00154	0.0262***	0.00169**	0.0151***	0.000487	0.00551***	-0.000464	0.000478	-0.0033	-0.00379***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Low intensity	-0.00430***	0.0193***	0.00156**	0.00994***	2.95E-05	0.00438***	-0.00025	0.000283	0.00124	-0.00447***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
2007-08	0.0236***	0.00563	-0.000361	0.0057	-0.000922	-0.00334	-0.00294**	-0.000931*	0.00447	0.00858***
	-0.00485	-0.00696	-0.0015	-0.00465	-0.00109	-0.00249	-0.00116	-0.000483	-0.00545	-0.00209
2008-09	-0.0238***	-0.0431***	-0.00418***	0.00232	-0.00441***	-0.00239*	-0.00583***	-0.00128***	0.00542**	-0.00214***
	-0.00178	-0.0036	-0.000962	-0.00234	-0.000835	-0.00137	-0.000966	-0.000425	-0.00276	-0.000646
2007-08*High	-0.0146***	-0.00826	0.000352	-0.00212	-0.00185**	-0.00587***	-0.00229	-0.00129***	0.0120*	-0.00464***
	-0.000868	-0.00647	-0.00178	-0.00404	-0.000776	-0.00192	-0.00144	-0.000341	-0.00693	-0.000372
2008-09_high	0.00418	0.00495	0.000964	0.00161	-0.00109	-0.00226	0.00255	-0.00106***	-0.0129***	0.00230*
	(0.003)	(0.005)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
2007-08*Low	-0.0119***	-0.0107*	0.00136	0.0043	-0.00206***	-0.00266	-0.00177	-0.00115***	-0.0108**	-0.00340***
	(0.001)	(0.006)	(0.002)	(0.005)	(0.001)	(0.003)	(0.002)	(0.001)	(0.004)	(0.001)
2008-09*Low	0.00511	0.00119	0.000491	0.000974	2.54E-06	-0.00111	0.00167	-0.00135***	-0.00601**	0.00122
	(0.003)	(0.005)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.003)	(0.001)
HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	78,288	89,532	78,288	89,532	78,288	89,532	89,532	78,288	89,532	78,288
Pseudo R^2	0.2136	0.3558	0.2557	0.2981	0.1006	0.1728	0.1249	0.1549	0.2368	0.1133
Prob.chi^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Chapter 4

Minority Status & Income Determination in Ghana: Testing the Enclave Effect

4.1 Introduction

There is significant literature across social sciences, which analyses discrimination in labour markets on the grounds of race and ethnicity. In Ghana, however, little work has been done in measuring discrimination and what is known comes mainly from qualitative studies. Discussions about economic policy between international organisations and African governments rarely touch upon issues relating to ethnicity. And yet recent contributions to the literature on cross-country differences in economic performance indicate that ethnic fractionalization, i.e., the segmentation of a population into several groups that are distinct in terms of language and culture, is associated with very high economic costs in terms of lower rates of economic growth due to the adoption of dysfunctional macroeconomic policies, lower levels of trust, weak norms of civic cooperation, and increased probabilities of civil war (Barr and Oduro, 2000) (Collier and Hoeffler, 1998) (Easterly and Levine, 1997) (Knack and Keefer, 1997).

Understanding how ethnic diversity can impact the economy at a micro level is a necessary condition for identifying policy interventions. We need to know how and why ethnic identity and ethnic boundaries affect the economic decisions that people make during their everyday lives. Through such an investigation we may be able to identify the conditions under which the negative effects of ethnic diversity on economic outcomes might be minimised.

This paper looks at the influence of ethnicity on the decision to enter self employment in Ghana and the push/pull factors which affect the rewards in the different sectors of employment. This paper particularly investigates whether non-dominant ethnic group(s) face discriminatory treatment in the labour market, compared to the dominant ethnic group, and to test for the presence of ethnic enclaves. First, I look into factors that drive ethnic minorities out of formal sector employment. If membership of the dominant ethnic group leads to a wage premium, all things equal, this hints towards preferential treatment. That is, I test whether Non-Akans (non-dominant group) living in Akan (dominant group) regions suffer from detrimental consequences of socio-economic discrimination more than living in Non-Akan regions. In the absence of discrimination in hiring or wages the formal employment sector, there would be no premium for belonging to dominant ethnic group. This could be due to government regulations in the formal sector of Ghana. Alternatively, the Ghana trade Union Congress is actively implementing rules in the public sector (Addai, 2011).

Next, I estimate the influence of ethnicity in the decision to enter non-farm self-employment as well as the rewards reaped in the non-farm informal sector. The informal sector in Ghana is composed of small scale organisations and self employed individuals who operate without the rules and benefits that are present in the paid sector. If minority groups face discrimination in the paid sector, it is expected that these obstacles would lead to increased representation of the discriminated group in this sector. The contribution of this paper is to test for the existence of the Ethnic Enclave effect for Ghana - How does living in an enclave affect labour market outcomes for the non-dominant groups? If enclaves are important for self employment, the likelihood of being self-employed is even higher if non-dominant group is in an 'enclave' where members form a network which raises opportunity of gainful trade. *Minority community* variables in the Southern and Northern region are constructed for the ethnic minorities. If minority enclaves exist in Ghana, I expect to find that minority entrepreneurs who reside in enclaves are more likely to be in self-employment and achieve greater returns than those minorities who operate outside of the enclave.

The ethnic groups studied in this paper have been pooled into two major ethnicities: The dominant group (Akan from the South) and the minority group (Mole Dagbani and Ewe from the North). The distinction between the Northerners and the Southerners is the most meaningful ethnic split in Ghana; the Northerners are subordinate to Southern Akans in every aspect of social and economic status, such as education, occupation, income, and political power. Their cultural orientation is more traditional, and most reside in villages and small towns. The regional segregation between Northerners and the Southerners represents differential access to opportunities. Northerners are more

likely than Southerners to reside in small communities and in rural places, where occupational and economic opportunities are scarce. Consequently, many Northerners in Ghana search for jobs in Southern towns (Collier, 1999b).

The paper is structured as follows. Section 4.2 discusses the theoretical background, section 4.3 provides an analytical review of ethnicity in Ghana, and Section 4.4 discusses the data and empirical strategy. Section 4.5 analyzes the empirical findings, and Section 4.6 presents conclusions.

4.2 Theoretical background

Discrimination is complex, multifaceted and deeply ingrained in behaviour, and difficult to measure or quantify. Discrimination is understood to exist when some superficial characteristic is used in an attempt to restrict individuals' access to the available economic, political, and social opportunities for advancement (D'Amico, 1987). The targeted discrimination groups may vary, across locations, but in general include: women, immigrants, youth, elderly, children, disabled, or LGBT individuals. In the West African labour market most vulnerable to racial/ethnic discrimination seem to be ethnic and religious minorities.

Labour market discrimination is define as a situation in which persons who provide labour market services and who are equally productive in a physical or material sense are treated unequally in a way that is related to ethnicity (Altonji and Blank, 1999). The theoretical explanations of labour market discrimination are concerned with how and why productively-irrelevant characteristics influence the labour market behaviour of employers and workers (Swinton, 1977). There are several economic theories which explain discrimination:

Becker focused on the effects of a taste for discrimination. In his model discriminating employers behave as if the price associated with hiring a worker from the less favoured group is their wage plus what he calls the *coefficient of discrimination*. Employers may practice this *taste for discrimination* based on different market valuations of group-specific characteristics. As a result, wage differentials would arise in the presence of such discriminatory practices on the part of employers and similar workers doing the same job would be paid differently depending on their social group. In addition, if good jobs are in short supply and rationed, in the presence of discrimination, employers prefer to employ dominant ethnic group workers (Becker, 1957).

The Marxist approach views racism as a tactic used by employers to introduce class cleavages within the working class. Economic gain rather than psychic preference is

then the main motive for discrimination. Wage discrimination simply pays in terms of maximizing profits. Jobs are organized to take wage advantage of ethnic workers, and the tactic is intended to minimize labour costs by weakening the workers' bargaining position, or perhaps to stall the worker- stemming long-run threat to the capitalistic system. Employers' wellbeing is therefore improved as they are able to raise their expected incomes through discrimination (Baran and Sweezy, 1966).

The idea that competition may eventually eliminate discrimination led to the development of the statistical discrimination hypothesis . Discrimination results from the profit maximizing response of employers to uncertainty about the quality of individual workers, while the real or subjective distributions favour the group which receives preferences. Stereotyping plays the major role in this approach. Statistical models of discrimination predict that if employers perceive minority group as being generally less productive than majority group, and if it is difficult to measure the actual workers' productivity, then minority members with above-average productivity may receive below-average returns (Arrow, 1973) (Phelps, 1972) (Aigner and Cain, 1977).

Phelps argues imperfect information at the hiring stage may translate into lower earnings. For instance, in the presence of imperfect information, employers may be unable to accurately assess the quality of non-dominant ethnic group workers (Phelps, 1972). As a result, employers may offer higher wages and higher positions to co-ethnic workers. In the presence of incomplete information, employers may screen candidates on the basis of perceived differences in productivity. Therefore, workers from non-dominant ethnic groups must have lower reservation wages in order to compete with otherwise observationally identical groups. In the Ghanaian context, discrimination of this form could be leading to both current labour market discrimination and feedback effects and consequent earnings differentials between members of different ethnic groups (Barr and Oduro, 2000).

Self-Employment as a consequence of discrimination: If ethnic minorities face the mentioned labour market obstacles and if they are unable to obtain formal employment, they are more likely to be pushed into the involuntary self-employment in the informal sector, to escape low wages or unemployment. That is, if the rewards in the waged sector are reduced in the presence of discrimination, minority/migrant workers are less likely to be found in that sector. This leads to an increased representation of the discriminated minority groups in the informal/self employment sector. That is, self employment is the last resort for those denied access to formal work. Taking a less pessimistic view, ethnic minorities might enter the informal sector voluntarily where they enjoy non-wage features that maximise utility rather than earnings (Gunther and Launov, 2011). That

is, they are pulled into self-employment to take advantage of kin specific characteristics which can provide informal means of increasing income even in the absence of discrimination in the formal sector. Hence, the informal sector can provide a comparative advantage for workers who wouldn't be better off in the formal sector (Clark and Drinkwater, 2000).

Minority Enclaves: By developing in an ethnic labour market, minority members can avoid direct competition from members from dominant group. Minority groups may be able to mobilize resources and produce opportunities that would have been denied to them in the broader formal labour market. Moreover, the clustering of members of an ethnic group is an important pull factor to enter self-employment, as it can increase entrepreneurial opportunities by providing a self-supporting economic environment with access to informal credit and labour through family ties. This phenomenon is known as the Enclave Effect. Enclaves are defined as a cluster of individuals from an ethnic group who reside within the same geographical location, for example, a neighbourhood, a village or a community. While living in enclaves can exclude minorities from equal access to opportunities and rewards, it might provide protection from discrimination generated by competition.

The idea of ethnic enclaves was first introduced by Portes and Wilson in the context of the USA (Wilson, 1980). They argue that immigrants who enter the US labour market are discriminated against because they are distinct from the mainstream. Often, they reside in geographical clusters. If immigrants have the necessary human capital, they build their own self-employed ventures which are a part of an "ethnic labour market". Portes and Jensen argue that Ethnic enclaves provide positive rewards to their members and argue that ethnic entrepreneurship is an unorthodox, but important avenue for social mobility of ethnic minorities and can suggest alternative policies for those still mired in poverty (Portes and Jensen, 1992). Thus, clusters of immigrant entrepreneurs can actually generate the characteristics of the primary labour market. These entrepreneurs also prefer to hire individuals from their own ethnic group, thus creating a social and labour network, which interacts as a group with the outside market. In so doing, the enclave has the solidarity and protection of numbers, and helps its members to circumvent discrimination. It also skirts competition from the mainstream and majority (Das, 2006). The role of ethnicity in labour markets has been empirically tested for several developed and developing countries; Semyonov for Israel, Evans for Australia, Clark and Drinkwater for UK, and Das for India. All found the existence of ethnic enclaves in their respective country settings (Semyonov, 1988) (Das, 2006) (Evans, 1989) (Clark and Drinkwater, 1998).

Previous research on discrimination in the Ghanaian formal sector: Existing literature on Ghana has given mixed results; Barr and Oduro find no evidence of discrimination in hiring and payment in the Ghanaian manufacturing sector, however, the Northerners are paid less due to less productivity (Barr and Oduro, 2000). In contrast, Collier and Garg find that in the public sector, dominant ethnic groups receive wage premium which is not due to productive characteristics. Collier and Garg discuss that it is a common feature of African societies that individuals belong to kin-groups which impose reciprocated obligations. However, these practices differ in a multi-segmented economy, for example, in the traditional small scale sector, kin groups can act as insurance and transfer institutions which succeed in lowering transaction costs. However, in the formal employment sector where large scale production takes place, firms employ multiple kin groups. Kin group preference is thus curtailed in the formal sector due to management practices and competition. 'Kin groups can have different economic effects depending upon the sector in which they are located. In the small scale sector production is organised on an intra-kin group basis. The kin group lowers transactions costs compared with atomistic behaviour. Whereas in the large scale sector production is organized on an inter-kin group basis. The patronage which kin groups seek to enforce is restrained by organizational innovations not found in non-kin groups societies (Collier, 1999b)'. They test for kin group favouritism in the public and private sector only. For the private sector, they find no evidence of kin group preference in wages and conclude that workers are paid according to human capital attributes. However, in the public sector, there is some evidence of wage premium for the dominant ethnic group. Barr and Oduro investigate the effects of ethnic identity and ethnic boundaries on labour market outcomes in the Ghanaian manufacturing sector and find large differentials between ethnic groups, specifically Northerners. They look at earnings differentials between members of different ethnic groups and employers' relatives, unrelated co-ethnics, and other workers and do not find any evidence of statistical discrimination. Most of the differential is explained by observed worker characteristics, in particular education and family background, which vary across ethnic groups. However, there is preferential treatment given to co-ethnics in hiring, suggesting that kinship networks are playing an important role in Ghanaian labour market (Barr and Oduro, 2000).

4.3 The Setting: Ghana

This section relies heavily on research by the Centre for Research on Inequality, Human Security and Ethnicity (CRISE) on West African economies titled *Horizontal Inequalities in Nigeria, Ghana and Côte d'Ivoire* (Langer et al., 2007).

Ghana, like most countries in Africa is a multi-ethnic, multi-religious and multi-cultural society. Its current population, which is estimated at about twenty million, is a vast mosaic of large and small ethnic groups. It is estimated that there are about ninety-two separate ethnic groups in Ghana. These groups are often classified into a few large groups, namely, Akan, Mole Dagbani, Ewe, Ga Adangbe, Guan, and Gurma. According to the 2000 census, the predominant group is the Akan (49.1 percent), followed by the Mole Dagbani (16.5 percent), then the Ewe with (12.7 percent), the Ga Adangbe (8.0 percent), the Guan (4.4 percent), the Gurma (3.9 percent), the Grusi with (2.8 percent), the Mande–Busanga (1.1 percent) and then others (1.5 percent) members of the population (Ghana Statistical Service (GSS) 2000). Moreover, Ghana's ethnic map is almost coterminous with its religious map. Christians (69 percent) are predominantly Akan are found largely in the southern sections while Muslims (16 percent) live mainly in the Northern section. Traditional religions are evenly distributed among the various ethnic groups throughout the country (GSS, 2000). The spatial distribution of the two major foreign religions, Islam and Christianity, almost coincides with the division of the country into the northern half which is poor and disadvantaged, and the southern half which is wealthy and more developed.

Socio-Economic Inequalities in Ghana: Like most West African countries that have the Gulf of Guinea as a southern border, Ghana shows a developmental disparity between the North and South regions. This disparity arose due to a combination of circumstances and policies. The current inequalities and ethnic tensions are contributed to the ethnic rivalries during the colonial era and the effect of colonialism on different groups and regions of the country, coupled with the uneven distribution of social and economic resources in both the colonial and post independence Ghana and geography. The British colonial policy of investing more heavily in those regions where exploitable resources, such as gold, diamonds, timber, and cocoa, were available or readily produced and cheapest to export. Also, the geographical concentration of most agricultural activities and resources, particularly tree crops such as cocoa, as well as natural resources, notably minerals and forest resources, in the Southern regions (Langer et al., 2007).

Dominance of the Akan: Even though no part of Ghana is ethnically homogeneous, a main feature of the county's ethnic polarization is the north–south divide and the dominance of the southern half of Ghana in general, and in particular by the Akan group,

who have relative economic and political dominance over other groups. The southern regions of the Greater Accra, Eastern and Western, Central and Ashanti Regions are predominantly ethnically and linguistically Akan. These areas have a higher index of development than the Northern and Upper Regions which are ethnically non-Ewe and non- For example, the index of development of the Northern (0.11) and Upper Regions (0.071) are far below the indices of the other Akan regions, from 0.265 and higher. In addition, of the five regions classified as poor in Ghana in 1999, poverty levels are highest in the Northern Regions (Langer et al., 2007).

Affirmative Action in Ghana: In order to redress ethnic inequalities in economic and political fields, post-independent regimes have adopted various affirmative action policies and programmes[1]. The policies range from the distribution of government-controlled resources, staffing of the public bureaucracy, key appointive positions in government and the public sector, distribution of symbolic goods, coupled with the centralization of political power. The problem of inequality has also been partially addressed through representation and appointments of individuals from a variety of ethno-regional and religious backgrounds to prominent positions in the government and state services. Research has shown that at least in the metropolitan areas of Accra region, institutional structures as well as distribution of symbolic and bureaucratic resources that promote inclusion and participation have helped to check ethnic polarization in the society (Langer et al., 2007).

How Ghana compares with neighbouring economies: The North-South divide in Ghana is not peculiar to Ghana alone. It can be found almost in every coastal West African country. For instance in Nigeria, CRISE studies have found evidence of persisting economic, political, social, and cultural inequalities. The core poverty is twice as high in the Northwest of the country as in the Southeast. Some of the economic inequalities can be traced to discriminatory allocation of government projects and grants, and differential access to key sectors of the economy, such as oil and gas, and telecommunications. Many CRISE studies show the existence of inequalities and discriminatory practices based on ethnic divide and religion. These studies found evidence of discrimination in terms of job opportunities, conditions of work, educational opportunities and in preference in places residence. Affirmative action programmes like the Federal Character Principle and the Federal Character Commission are currently managing these inequalities. However, these programs have not been able to ensure the adequate representation of small ethnic minority groups in mixed ethnic states (Langer et al., 2007).

Like Ghana and Nigeria, Côte d'Ivoire is also confronted by a serious socioeconomic North-South divide. Once more, the origins of this socio-economic North-South divide

[1]Ghana Human Development Report 1997

are diverse and relate to such factors as ecological and climatic differences, the differential impact of colonial policies and post colonial economic development policies. The developmental North-South divide is also likely to have increased significantly due to the civil war. Moreover, in the rebel-controlled Northern regions, government services in the educational and health spheres are no longer provided at all or are at least badly affected due to the conflict. Only recently a small number of schools and some other government services have been opened up again.

4.4 Data and Methodology

The data used in this study is from the fifth round of the Ghana Living Standards Survey 2005 (GLSS-5). The GLSS-5 covers 8,687 households in 580 enumeration areas and, is representative at the national and regional level. It has a special focus on employment, labour force characteristics, and employment income, making it particularly suitable for the current study. Only individual fifteen years of age and older - who reported that they were employed during the past seven days were included in the analysis.

Data on employment earnings and types of employment feature prominently in the current study and merit additional attention. Average monthly earnings were used as the measure of employment earnings, defined as total weekly income from employment multiplied by 4.33. The GLSS 5 allows for multiple estimates of self-employment income. However, the reliability of income estimates derived from reported gross revenues less operating expenses are questionable. Instead, direct reported net earnings from a given self-employment activity is used (Heintz and Slonimczyk, 2007).

The indicators for type of employment used in this study classified employment along three dimensions: employment status (waged employment or self-employment), formality of the employment activity (formal or informal), and sector (public v. private). Individuals were classified based on their primary job. The methods chosen for differentiating informal employment from formal employment were adapted from the recommendations of the 17th International Conference of Labour Statisticians, which suggested that the definition of informal employment should include both (1) employment in informal enterprises (including all forms of self-employment) and (2) wage employment in informal jobs outside of informal enterprises. Self-employed individuals were considered to be operating informally if their enterprise was not registered with any government agency. Wage workers were considered to be working informally if they did not have any kind of employment contract (Hussman, 2004).

Table 4.1 describes the variables used in the earnings regressions. The major independent variables used are education in levels specification, marital status, age, experience, regional dummies, main occupation, household characteristics and ethnicity. Table 4.2 shows summary statistics of labour force by each region and the main ethnic and religious groups. The sample of 10,080 earners is divided into three types of employment; paid employees, informal sector employees and enterprise owners. The labour force is dominated by self-employment either as farmers or in the non-agricultural sector. About forty percent of the paid jobs are concentrated in the capital region, Accra. Fifty percent are scattered in the six Southern regions and only ten percent in the three Northern regions. Moreover, the paid employment sector is dominated by the Akan groups with fifty percent of the jobs in the formal sector. Table 4.3 presents the descriptive statistics separately for the dominant and non-dominant groups. In the full sample, it can be seen that the dominant group has higher earnings and higher education than the non-dominant groups. However, in the paid sector, the non-dominant Ewe group seems to be receiving a wage premium. The education level is roughly comparable for all groups in paid employment. Turning to the self employment sector, the earnings are significantly lower than the paid sector and the education level is also lower than in paid work.

Model Specification:

This section outlines the empirical model of the factors which determine individuals' choice of employment sector and extent of variations in earnings for each ethnic group.

Determinants of employment type are estimated by using the binary probit model. The discrete dependent variable is estimated as a probability; in this context employment type is the discrete dependent variable, which takes on a value of 1 if a person is in employment type, e.g. paid, self or informal employment and zero otherwise. This probability of being in self-employment/formal employment is regressed with several covariates in the model gathered in a vector X:

$$P[Employment = 1] = F(X\beta) \text{ and } P[Employment = 0] = 1 - F(X\beta)$$

where β measures the effect of changes in the independent variables on the probability of individual is employed in the formal/informal sector. The major independent variables used are region of residence, education (specified in levels) , marital status, age, experience, household characteristics and ethnicity. The probit model for full sample for sectors of employment is presented below:

General Specification: Sector of Employment Probit

$$P[Sector\ of\ Employment_{ih}] = \alpha_1 + (Level\ of\ education)_{ih}\ \beta_1 + (Individual\ characteristics)_{ih}\ \beta_2 + (Urban)_{ih}\ \beta_3 + (Region\ dummies)_{ih}\ \beta_4 + (Household\ characteristics)_{ih}\ \beta_5 + (Occupation\ dummies)_{ih}\ \beta_6 + (Ethnicity\ dummy)_{ih}\ \beta_7 + (Ethnicity * Region\ interaction)_{ih}\ \beta_8 + \xi_{ih}$$

Where $P[Sector\ of\ Employment]$ equals 1 if participating in type of work and 0 if not. *Level of Education* are the education dummies for primary, secondary, sixth form, and tertiary education. *Urban* equals 1 if lives in an urban area and 0 if belongs to rural area. *Region dummies* equal 1 if from the North, South or Accra region. *Ethnicity dummies* equal 1 if belongs to Akan, Ewe or Mole Dagbani groups. *Ethnicity*Region interaction* equals 1 if belongs to ethnicity e from region r. ξ_{ih} Individual-specific error or random component.

General Specification, Mincerian Earnings Function:

The standard Mincerian approach is adopted for the estimation of earning function in different sectors of employment.

$$(Log - Income)_{ih} = \alpha_1 + (Education\ dummies)_{ih}\ \beta_1 + (Individual\ characteristics)_{ih}\ \beta_2 + (urban)_{ih}\ \beta_3 + (Region\ dummies)_{ih}\ \beta_4 + (Household\ characteristics)_{ih}\ \beta_5 + (Occupation\ dummies)_{ih}\ \beta_6 + (Ethnicity\ dummies)_{ih}\ \beta_7 + (Ethnicity * Region\ interaction)_{ih}\ \beta_8 + \xi_{ih}$$

where $(Log - Income)$ is the log of earnings (wages or income) for individual i. *Level of Education* are the dummies for completed primary, secondary, sixth form, or tertiary education. *Individual characteristics* is a vector of observed characteristics of individual i. *Household characteristics* is a vector of observed characteristics of the household *Urban* equals 1 if lives in an urban area and 0 if belongs to rural area. *Region dummies* is a dummy if from the North, South, Accra regions *Ethnicity dummies* is a dummy if belongs to Akan, Ewe or Mole Dagbani groups *Ethnicity*Region interaction* equals 1 if belongs to ethnicity e from region r. ξ_{ih} Individual-specific error or random component.

The major independent variables used in this study are standard for estimating employment probabilities and earning equations in the existing literature (Barr and Oduro, 2000) (Das, 2006) (Heintz and Slonimczyk, 2007) (Clark and Drinkwater, 2000) (Collier, 1999b). Theoretically, the education has a positive relationship with employment in the formal sector of the labour market i.e. the higher the education level of a worker, the more likely it is that he/she will be employed in the formal sector. As for the marriage variable, it is expected to be inversely proportional to participation rates of women, while positively proportional to those of men. Previous research shows that earnings in

the informal sector in the rural areas are lower than that of urban areas (Heintz and Slonimczyk, 2007). However, self employment rates are expected to be higher in urban areas due to structure of opportunities and the absence of farm related work (Das, 2006).

The household size is also considered to affect participation in both paid and self employment, especially for women. One reason, among other factors, why women may have lower earnings is that they are disproportionately responsible for unpaid, non-market activities such as household chores and taking care of young children. Because women must take responsibility for these non-remunerative activities, their ability to obtain and keep employment is reduced thereby causing lower earnings even after controlling for education, type of employment, and similar factors. Thus, one would expect a negative estimate for the household size and number of children variables, if the responsibility for childcare argument were the primary determinant or women's disadvantage in the Ghanaian labour market (Hertz and Winters, 2008). Also, the 'female' indicator is expected to be to either become insignificant or, at least, have an effect of smaller magnitude once the presence of a child is controlled for.

Since the focus of this paper is on effects of ethnicity on labour market outcomes in Ghana, my main interest is in the effect of ethnicity variables and their interactions in the discussion of results. The sign and significance of β_8 in the earnings equation tells us whether a particular group has an earnings advantage when compared to another excluded group. In order to account for geographical differences in earnings among ethnic groups, region dummies are interacted with the ethnicity dummies. That is, to investigate whether returns associated with region vary across ethnicity, an interaction term for ethnicity and region is added to the model. For example, if the Mole Dagbani-Accra interaction term in the paid employment earnings regression turns out to be negative, then it can be concluded that Mole Dagbani have an earnings disadvantage in the Accra region when employed in the formal sector. Lastly, ϵ_i is the individual-specific error.

I started by estimating OLS models of earnings functions on the dominant ethnic group Akan, and non-dominant Non-Akan wage earners to provide some baseline results. However, naive OLS estimates of earnings functions potentially suffer from sample selectivity and will not be reliable unless such biases are removed. The sample selection bias (SSB) occurs in the OLS estimates when the variable of interest is only observed for a selected non-random sample of the population of interest. Specifically, when observations are selected in a process that is not independent of the outcome of interest, selection effects may lead to biased inferences regarding a variety of labour market outcomes. In the context of this study, it is not observed whether the informal sector is voluntarily chosen by individuals as an employment opportunity or if individuals are pushed into informal

employment because of entry barriers into the formal sector. Moreover, wages are observed only for individuals participating in the paid labour force. Most studies focus on waged workers, whereas many individuals in developing countries are self-employed rather than in waged work and have income from owned businesses rather than paid wages. Consequently, the estimates of the earning function will be biased as the sample of paid employed, as well as the self-employed are a potentially non-random draw from the population.

Heckman's correction for sample selectivity is used to correct of SSB. This entails estimating the employment participation equation, and the predicted probabilities of employment participation from this equation are used to derive the selectivity term λ , which is then included in the main earnings function[2]. To identify λ, the employment participation equation must include exclusion restrictions that are not part of the vectors in the Mincerian earnings equation. The key challenge is finding suitable instruments that have an impact on sector of employment but are not part of the individual characteristics vector in earning equation.

There are a number of factors, both observable and unobservable, which influence the choice of sector of employment. The specification in the Heckman selection equation used in this study has been guided by Rees and Shah, Collier and Garg, and Clark and Drinkwater (Clark and Drinkwater, 1998) (Collier, 1999b) (Rees and Shah, 1986). The selection equation contains all standard variables from the earnings equations and some additional instrumental variables, which are discussed below:

For Formal Sector: Family background indicators such as father's employment in the public sector could have a positive influence on the propensity to be in formal paid work. Father's work may reflect endogeneity of preference and even nepotism in the formal sector. Also, differences in paid-employment rates could be driven by factors such as father's education and mother's education. Family background variables constitute valid instruments if they affect sector choice through their effect on schooling or inter generational transmission of ability. Family background can be a proxy omitted ability, school quality, and out-of-school learning environment or reflects nepotistic family connections[3] (Heckman and Hotz, 1989).

For Self Employment Sector: The number of children in household and access to credit can have a positive impact on the propensity to be in non-farm self employment. Kids in household can affect the probability to be in self employment, it may have a positive or negative influence on the propensity to enter self-employment. Children may provide

[2]Only father's education and father's paid employment are used here. Mother's education could not be used due to data limitations

[3]See Appendix for a detailed derivation of the Heckman model.

a source of informal (and possibly low-paid but trusted) labour in a family business. Alternatively, the presence of children may induce risk-averse individuals to choose paid-employment over the relatively less certain rewards of self-employment. Family workers may provide cheap and reliable source of labour. Moreover, access to credit can also increase the propensity to be self employed. Members of ethnic groups can have access to informal sources of finance through social networks. Specifically, dummy variables indicating whether the individual has successfully obtained a business loan was used. If credit rationing and imperfect access to credit were responsible for observed differences in propensity to be in self employment, it is expected these variables to pick up the effect (Clark and Drinkwater, 1998).

4.5 Discussion Of Estimation Results

In this section, estimation results for Heckman selection model and results for the test of the Enclave Hypothesis are presented. In the presence of preferential treatment for dominant group in hiring and wages, the expected result for the paid sector Heckman earnings model would have a positive and significant coefficient for the dominant group only. Conversely, in a competitive market, the earnings of employees would reflect only their productivity. Hence, the earnings and selection equation is expected to be insignificant. This is only the case if the model is correctly specified. If there are omitted variable which effect wages and are correlated to ethnicity, then there will be a positive effect for the dominant group, even with perfect competition. The expected outcomes for paid employment sector are summarised in the table below:

Expected results - paid work	Dominant	Non-dominant
Perfect competition	$\sim$	$\sim$
Preference for dominant	Positive	$\sim$

Next, if enclaves provide better labour market outcomes for ethnic minorities and also increase the likelihood of having a lucrative business, the expected result would be a positive coefficient for the non-dominant group in a region who are concentrated a particular community. The expected outcomes for non-farm self employment sector are summarised in the table below:

Expected results - self emp	Dominant	Non-dominant
Enclave effect	$\sim$	Positive
No enclave effect	$\sim$	$\sim$

Selection Corrected Earning Function Paid Employment: Table 4.5 displays parameter estimates from the GLSS5 for Ghana in the paid employment sector. The selection equations control for membership of the ethnic groups of Ghana. Potentially, membership of the dominant ethnic group gives rise to a wage premium because of preferential recruitment to high wage jobs as well as to preferential promotion once recruited. As shown in the summary statistics, the formal sector pays higher wages than the informal sector, so co-ethnic preference at the recruitment stage would be revealed in the sector choice probit.

Selection probit equations that control for sample selection bias in the earnings equation are considered first. The selection equations exhibit standard features with positive effects of urban region and education; propensity to be in paid employment increases if individual is a single male who is living in urban region and has higher education and experience. The LAMBDA term is large and statistically significantly negative for the paid employment regressions.

For determining sector choice in paid employment, identification instruments are adopted from Collier and Garg (Collier, 1999b). Father's education and a variable indicating whether father worked in formal sector can provide identification as this many reflect family background, endogeneity of preference or even nepotism. Differences in paid-employment rates may be perpetuated through the inter-generational transmission of paid-employment propensities. It could also be driven by family background, variables such as father's education. Family background variables constitute valid instruments if they affect sector choice through their effect on schooling or inter generational transmission of ability as it proxies omitted ability, education quality, and out-of-school learning environment or reflects nepotistic family connections[4](Heckman and Hotz, 1989). The estimation shows that father's education increases propensity to be in paid employment while father in paid work has no effect. These estimates point towards absence of nepotism in the formal sector in Ghana where only human capital is rewarded.

Having controlled for selection in paid employment, I now test the effects of minority status on earnings in the formal sector of Ghana. The earnings equation for the paid sector shows positive returns for working in Accra, having work experience and being married. However, higher education seems to have no impact on earnings in the paid employment sector. Education affects occupation outcomes but not earnings within occupation. This finding is consistent with previous research on Ghana, others also find mixed evidence regarding returns to education in Ghana (Heintz and Slonimczyk, 2007)

[4]See Methodology section for a formal discussion of these instruments.

(Sackey, 2004) (Teal, 2001). The occupation variables have expected signs; public sector workers with contractual criterion of formality have a significant effect on earnings [5].

Since the principal focus of the paper is the affect of ethnicity on employment, I will now focus on the ethnicity indicators. I find no reliable evidence of hiring or earning disadvantages for ethnic minorities. One striking result from the earnings equation is that the non-dominant group Mole Dagbani is more likely to be in paid employment when compared to excluded group, Akan. However, Mole Dagbani receive an earning disadvantage of twenty percentage points, primarily due to their low level of education. This differential remains after controlling for observed personal characteristics. However, this result is only significant at 10 percent, so this result should be interpreted with caution. The results for Ewe groups are similar to those of Mole Dagbani group. They are more likely to be in self employment when compared to the excluded group but do not receive a wage premium in the paid sector employment. Hence, there is no conclusive evidence about favouritism in Ghana; the paid employment sector of Ghana does not reward membership of dominant group. Turning to the interaction term which estimates the difference in difference for being an ethnic group in paid employment in the Accra region, the selection probit would reveal any preferential treatment given to the dominant Akan group. The interaction terms for both non-dominant groups are insignificant which points towards absence of preferential treatment in the public sector in the Accra region. This may be due to hiring rules and quotas which prevent over-representation of any ethnic group within the formal sector (Collier, 1999b). Either pressure for co-ethnics preference is not a feature of Ghanaian organizations or that pressure is successfully restrained within the paid sector. Looking at the interaction terms for the Northern region, the Mole Dagbani group is less likely to be in paid employment when in the Northern region. This is likely due to the disproportionate distribution of the paid sector in Ghana. Very few of the paid individuals are found in the Northern regions.

The explanation for the main findings from the paid employment sector is that the Ghanaian formal sector operates under the support of accepted rules and regulations which are enacted and implemented by the government (Addai, 2011). However, only those living in metropolitan areas have access to these well-paying formal sector jobs.

Selection corrected earning function for Self employment: Table 4.6 reports the estimates for the propensity to be in self employment. The probit estimates for those in self-employment exhibit standard features[6] with positive effect of industry of employment,

[5]The regressions also control for education level, experience, and occupation type. The coefficients on these variables are secondary to the analysis and are not reported in the table.

[6]The coefficients on these variables are secondary to the analysis and are not reported in the table.

location[7] , gender[8] while negative impact of higher education[9].

For determining sector choice in self employment, identification instruments are adopted from Rees and Shah, Clark and Drinkwater, and Collier and Garg (Clark and Drinkwater, 1998) (Collier, 1999b) (Rees and Shah, 1986). The identification instruments all turn out to be positive and highly significant; the number of children in household and access to credit can have a positive impact on the propensity to be in non-farm self employment, as family workers may provide cheap and reliable source of labour. As for the second instrument of access to credit, households that have taken out a loan for business purpose have higher propensity to be in self employment. However, Susu microfinance accounts have a puzzling outcome[10]. Land ownership also increase propensity to be in non-farm self employment. Household land can provide a rent-free site for setting up a home business which can significantly reduce production costs.

When compared to the excluded dominant group Akan, the other non-dominant groups are more likely to be in non-farm self-employment. After controlling for selection in non-farm self employment, I now look at earnings in self employment. Returns to self employment are increasing if the business is located in an urban area and if owner has education and experience in the business. There is also a significantly positive effect on earnings if the enterprise owner keeps account of the profits in the business, hinting towards the size and quality of the enterprise. However, age of the individual has a negative impact on earnings in self-employment[11].

Next, judging from the interaction terms for Mole Dagbani and Ewe in Accra and Northern region, the Ewe group have highest returns in self employment in both Accra and Northern region. On the other hand, the Mole Dagbani, a non-dominant group in the Accra region, is disadvantaged in the Accra when in self-employment.

The Enclave Effect: The final aim in this section is to test for the existence of ethnic enclaves in Ghana and estimate the effect of living in an enclave on economic outcomes. If enclaves are important for ethnic minorities, then it might be expected that

[7]Living in an urban area also increases propensity to be in non-farm self employment as the rural areas are mostly home to farmers and other agricultural unpaid workers.

[8]Women are more likely to be in non-farm self employment than being in paid work. This points towards the gender wage gap in the formal sector; Ghanaian women prefer being self employed than accepting low paying jobs in the formal sector(Addai, 2011) (Hertz and Winters, 2008)

[9]The propensity to be in non-farm self employment goes from positive to negative when education level increases from primary to tertiary. This is intuitive as those with tertiary education will find it easier to get formal sector paid employment.

[10]Having a Susu account decreases the propensity to be in self-employment.

[11]This is a counter-intuitive but the earning function in self employment might not necessarily exhibit the same features as that in paid employment. Consider age, older workers are considered more experienced so they are paid accordingly in paid employment. However, the non-farm self employment sample is of business owners whose earnings are profits from the business. Tthe argument of age and experience is less convincing when applied to self employment.

concentration of an ethnic group in an area can increase their propensity to be in self employment, as the existence of clusters of members of an ethnic group can increase entrepreneurial opportunities by providing a self-supporting economic environment with access to informal credit and labour through family ties.

The GLSS 5 has information on *communities* (enumeration areas) within each region with information about the ethnic composition and population of the area. For the estimation of the enclave effect, the selection model is augmented with a variable that measures the concentration of an ethnic group in an enumeration area. For example, a *Mole Dagbani* community in the *Southern region* would be an enumeration area where this group is reported as the major ethnic group.

If ethnic enclaves increase the chances of non-farm self employment, a positive and significant coefficient should be observed for the *minority enclave* indicator. In table 4.7 [12], presents the results for the augmented self-employment Heckman equations. Judging from change in significance of the variables of interest, it can be concluded that the previous self-employment regression had an omitted variable bias. The Northern region indicator, which was previously insignificant, is now positive and highly significant. This makes better intuitive sense as this region has less opportunities of waged work. Therefore, more individuals would prefer non-farm self employment to informal farm work. Also, the interaction terms for both included groups with regions have also become insignificant, indicating that the previous results from the self-employment regressions are unreliable. The remaining controls have similar features to the self-employment equation. The identification instruments remain positive and highly significant.

Turning to the minority enclave effect, sixteen minority community dummies (eight for Ewe and eight for Mole Dagbani) in regions where the ethnic group is in minority were added to the regression. It is observed that only Ewe communities seem to benefit from residing in enclaves; four out of the eight Ewe communities have significant results for the self-employment propensities whereas only two Mole Dagbani communities come out with high significance for self employment. As for returns in self-employment, Mole Dagbani groups are significantly disadvantaged by living in communities. For example, *Mole-Enclave-South5*, a Mole Dagbani community in the Southern region, has significantly decreasing earnings in self-employment. For the Ewe group, earnings seem to increase with the rise in ethnic concentration in the Northern region. Hence, the results from this analysis demonstrates that the *minority enclave hypothesis* does not hold for Mole Dagbani but it does so for the Ewe groups.

Why might Ewe enclaves be better than Mole Dagbani enclaves? To answer this, further explore the nature and quality of the enclaves across ethnic groups is required. Table 4.4

[12]The coefficients on these variables are secondary to the analysis and are not reported in the table.

gives some indication of the enclave quality for Ewe and Mole Dagbani groups by focusing on the level of employment in the community. The Ewe enclaves are more economically advanced than the Mole Dagbani enclaves. The Majority of wage earners in the Mole Dagbani enclaves are engaged in farm work while Ewe enclaves have higher percentages of observations in the formal sector of employment, hinting at better economic conditions of the community.

The main finding from the enclave results are that the Ewes in Ghana are pulled into self employment where these effects are more pronounced in areas where there are fewer opportunities for formal work, like the Northern region. They live and operate their businesses in geographical clusters, in much the same way as Portes and his colleagues have described the businesses operations of Chinese and other Asians in the US cities (Portes and Jensen, 1992). Thus for the Ewe groups, it is fairly apparent that minority enclaves are a reality. However, the Mole Dagbani are unlikely to be in self employment and are least likely to built minority enclaves. There is no evidence of the 'push' factor for them in the same way as for the Ewe. The Mole Dagbani group lack the means to form minority enclaves and thus they crowd into casual labour, as shown in the enclave quality estimates.

4.6 In Conclusion

This paper uses the Ghana Living Standards Survey 2005 to empirically analyse the employment outcomes of ethnic minorities in Ghanaian labour market.

Like in most developing economies, the formal sector in Ghana forms only small part of the labour market and concentrated in the capital region, Accra. It is possible that the limited options in paid work create a tendency of preferential treatment being given to the dominant groups in the population. There is no concrete evidence to support the existence of preferential treatment for the dominant group. Contrary to what was expected, the non-dominant group, Mole Dagbani, are more likely to be in paid sector in the capital region of Accra. This evidence of *reverse discrimination* in paid formal sector is a striking finding. Plausible explanation here is that the public sector is well regulated and hiring rules and quotas which prevent over-representation of any ethnic group within the formal sector (Collier, 1999b).

In the to less-developed regions outside the metropolitan areas, the absence of paid work opportunities has resulted in ethnic groups entering the informal sector , with the effect of creating create characteristics of primary labour market in terms of earnings. Non-dominant groups Mole Dagbani in Southern regions and Ewe in the Northern regions

are pulled into non-farm self employment where access to credit and family workers are important determinants of entry into entrepreneurship. One important pull factor for ethnic minorities into self employment is the geographical concentration of co-ethnics, an *enclave*. Self employment outcomes are even better if non-dominant group is in an enclave where members form a network which raises opportunity of gainful trade. The Enclave Effect holds for the Ewe groups where the self employment outcomes are higher if Ewe members live in an enclave rather than being dispersed across the region.

More research is needed to identify the factors behind patterns of ethnicity in the labour markets in Ghana and to develop appropriate policy responses. As mentioned earlier, other studies of employment in Ghana suggest that social capital (e.g. kinship networks and information networks) may be important in determining wage differentials and access to formal employment opportunities (Barr and Oduro, 2000) (Collier, 1999b). The analysis presented here suggests that improved access to education should help to improve outcomes in the formal labour market among Ghanaians.

TABLE 4.1: Variable in selection equation and wage equation, and their coding.

Variable	**Description and coding**
Type of employment	Participation during last week equals 1 if participated 0 otherwise
	Types:
	Formal sector paid work
	Informal sector paid work
	Non-farm Self Employment
Age, Age^2	Age in years
	Age squared as continuous variable
Marital status	Single Equals 1 if single, 0 otherwise
Log-wage	Natural log of monthly wages in Cedi
Log-income	Natural log of monthly earnings in Cedi
Education,6 dummies	No education (reference)
	Primary, Equals 1 if completed Primary education
	Middle, Equals 1 if completed Middle education
	Secondary, Equals 1 if completed Secondary education
	Sixth Form, Equals 1 if completed Sixthform education
	Tertiary, Equals 1 if completed Tertiary education
Region, 3 Dummies	North
	South
	Accra
Household size	Number of individuals in the household
Kids in household	Number of children in the household aged 14 or younger
Urban	Equals 1 if belongs to urban region
Occupation	5 Dummies for Formal employment
	4 Dummies for Informal employment
Enclave variable	Dummies for enclaves in each region
Ethnicity, 3 dummies	Akan
	Ewe
	Mole Dagbani
Religion, 2 dummies	Christian
	Non-Christian
Some workers	Dummy, if enterprise has employees
Father yrs edu	Years of education completed by father
Father's work	Father employed in the public sector
Business loan	Dummy, whether taken out a loan for business
SUSU Microfinance	Dummy, whether taking part in Susu
Own Land	Dummy, whether family owns some land
Lambda	Selectivity term

TABLE 4.2: Composition of the labour force by region and ethnicity

Type	**Formal**	**Informal**	**Enterprise**	
(a) Region	Percent (n.)	Percent (n.)	Percent (n.)	Total LF (N.)
South	51.28	59.03	56.1	56.67
	(764)	(2604)	(2345)	(5713)
Accra	37.79	19.97	25.86	25.05
	(563)	(881)	(1081)	(2525)
North	10.94	20.99	18.04	18.28
	(163)	(926)	(754)	(1843)
Total	100	100	100	100
	(1490)	(4410)	(4180)	(10080)
(b) Ethnic group	Percent (n.)	Percent (n.)	Percent (n.)	Total LF (N.)
Akan	49.73	45.53	47.11	46.81
	(741)	(2008)	(1969)	(4718)
Ewe	26.78	20.39	23.01	22.42
	(399)	(899)	(962)	(2260)
Mole Dagbani	23.49	34.08	29.88	30.77
	(350)	(1503)	(1249)	(3102)
Total	100	100	100	100
	(1490)	(4410)	(4180)	(10080)

TABLE 4.3: Descriptive statistics of various groups of earners

Full Sample	**Akan**	**Ewe**	**Mole**
Weekly Wages (Cedi)	248,315	244,359	165,904
No Edu	16.77	21.28	60.2
Primary	14.79	17.83	12.79
Secondary	56.99	48.81	21.62
sixth-form	0.7	1.24	0.32
tertiary	5.81	5.75	2.19
technical	4.94	5.09	2.87
Paid employment			
Weekly Wages (Cedi)	341,142	597,345	354,263
No Edu	1.75	1.25	18.29
Primary	3.64	3.26	6.29
Secondary	52.5	50.88	40.57
sixth-form	1.89	5.01	1.71
tertiary	20.78	19.55	13.14
technical	19.43	20.05	20
Self Empolyment			
Weekly Income (Cedi)	290076	205059	187408
No Edu	13.95	24.43	60.3
Primary	16.16	22.47	14.66
Secondary	61.63	46.39	21.87
sixth-form	0.6	0.62	0.16
tertiary	4.98	3.4	1.51
technical	2.67	2.68	1.51

TABLE 4.4: Quality of ethnic enclaves

Enclave Quality	**Ewe South 1**	**Ewe South 3**	**Mole South 1**	**Mole South 3**
Paid employed	36.67	6.45	24.14	2.94
Self employed	36.67	39.52	17.24	2.94
Farm work	26.67	54.05	58.63	94.12
Total	l00	100	100	100

TABLE 4.5: Heckman selection wage regression for paid employment

Heckman model	**Wage Equation** Log of Wages	**Selection Equation** Paid employment
Mole Dagbani	-0.201*	0.305***
	(-0.122)	(0.074)
Ewe	-0.12	0.171***
	(0.081)	(0.056)
Accra	0.165**	-0.0108
	(0.068)	(0.056)
North	-0.528	0.737**
	(0.352)	(0.301)
Ewe*Accra	0.094	0.067
	(0.200)	(0.155)
Mole Dagbani*Accra	0.239*	0.0102
	(0.145)	(0.114)
Ewe*North	0.472	0.737
	(0.549)	(0.467)
Mole Dagbani*North	0.421	-0.788**
	(0.377)	(0.313)
Urban	-0.152	0.576***
	(0.170)	(0.043)
Female	0.0995	-0.704***
	(0.213)	(0.086)
Household Head	0.0989	0.00635
	(0.099)	(0.080)
Female household Head	0.109	0.0322
	(0.139)	(0.105)
Age	-0.002	0.00243
	(0.003)	(0.002)
Single	-0.348***	0.353***
	(0.117)	(0.060)
Education dummies	Yes	Yes
Experience dummies	Yes	Yes
Occupation dummies	Yes	
Father education		0.0827*
		(0.044)
Father Work		0.0596
		(0.062)
Lambda		-0.759**
		(0.376)
Constant	13.17***	-2.194***
	(0.917)	(0.141)
Observations	9,800	9,800
Censored obs	8341	8341
Uncensored obs	1459	1459
	Wald $chi^2(28) = 225.32$	Prob.$chi^2 = 0.0000$

Notes: p-values reported in parentheses
Excluded groups are Akan, Southern region, No education
Lambda is the selection correction term for paid employment

TABLE 4.6: Heckman selection wage regression for self employment

Heckman model	**Income Equation** Log of Income	**Selection Equation** Enterprise owner
Mole dagbani	0.035	-0.009
	(0.0745)	(0.0544)
Ewe	-0.182***	0.147***
	(0.064)	(0.0472)
Accra	0.226***	-0.079
	(0.065)	(0.0489)
North	-0.269	0.343
	(0.312)	(0.250)
Ewe*Accra	0.558***	-0.331***
	(0.180)	(0.125)
Mole Dagbani*Accra	-0.314**	0.267***
	(0.130)	(0.096)
Ewe*North	1.966***	0.436
	(0.376)	(0.326)
Mole Dagbani*North	-0.191	0.0106
	(0.319)	(0.257)
Urban	0.154**	0.410***
	(0.060)	(0.033)
Female	-0.564***	1.036***
	0.180	0.077
Household head	0.213	0.274***
	(0.139)	(0.076)
Female household head	-0.17	-0.167*
	(0.145)	(0.086)
Age	-0.0097***	0.0064***
	(0.002)	(0.002)
Single	-0.0355	-0.431***
	(0.089)	(0.051)
Some workers	-0.0415	
	(0.069)	
Keep account	0.326***	
	(0.057)	
Own land	-0.022	0.179***
	(0.047)	(0.033)
Susu account owner	-0.216***	-0.137***
	(0.044)	(0.032)
Kids in hh		0.0174**
		(0.007)
Business loan		0.516***
		(0.048)
Education dummies	Yes	Yes
Experience dummies	Yes	Yes
Occupation dummies	Yes	
Lambda		-0.480***
		(0.168)
Constant	12.06***	-1.211***
	(0.320)	(0.128)
Observations	9,592	9,592
Censored obs	5575	5575
Uncensored obs	4017	4017
	Wald $chi^2(29) = 1082.98$	Prob.$chi^2 = 0.0000$

Notes: p-values reported in parentheses
Excluded groups are Akan, Southern region, No education
Lambda is the selection correction term for self employment

TABLE 4.7: Testing the Enclave effect for ethnic minorities in Ghana

Heckman model	**Income Equation**	**Selection Equation**
	Log of income	Enterprise owner
Ewe	0.083	0.0378
	(0.129)	(0.089)
Mole	-0.143	0.0187
	(0.129)	-0.0834
North	-0.629	0.863**
	(0.421)	(0.384)
Accra	0.0149	0.161
	(0.149)	(0.101)
Mole*north	0.15	-0.446
	(0.428)	(0.393)
Ewe*north	-0.305	-0.142
	(0.752)	(0.700)
Mole*centre	-0.115	0.171
	(0.229)	(0.155)
Ewe*centre	-0.217	-0.0506
	(0.341)	(0.203)
Mole-enclave-south1	0.44	-0.386
	(0.516)	(0.289)
Mole-enclave-south2	-0.188	0.118
	(0.346)	(0.246)
Mole-enclave-south3	-0.006	-0.279
	(0.573)	(0.296)
Mole-enclave-south4	-0.301	0.532**
	(0.314)	(0.237)
Mole-enclave-south5	-0.707**	0.497**
	(0.31)	(0.236)
Mole-enclave-south6	0.816	1.023*
	(0.587)	(0.556)
Mole-enclave-south7	1.147	-0.632
	(1.205)	(0.580)
Mole-enclave-south8	-2.43***	-0.0553
	(0.592)	(0.439)
Ewe-enclave-south1	-0.43	0.502*
	(0.381)	(0.267)
Ewe-enclave-south2	0.114	0.379
	(0.350)	(0.256)
Ewe-enclave-south3	-0.18	0.491***
	(0.196)	(0.141)
Ewe-enclave-south4	-0.0736	-0.465
	(0.528)	(0.315)
Ewe-enclave-south5	-0.446	-0.379
	(0.554)	(0.308)
Ewe-enclave-south6	-0.142	1.250***
	(0.772)	(0.485)
Ewe-enclave-south7	-0.506***	0.336***
	(0.174)	(0.126)
Ewe-enclave-north1	2.640***	0.324
	(0.670)	(0.627)
Kids in hh		0.0148*
		(0.008)
Business loan		0.575***
		(0.066)
Lambda	-0.584***	
	(0.222)	
Constant	12.36***	-1.310***
	(0.467)	(0.177)
Observations	5,454	5,454
Censored Observations	3522	3522
Uncensored observations	1932	1932
	Wald $chi^2(45) = 480.00$	Prob $chi^2 = 0.0000$

Notes: p-values reported in parentheses
Excluded groups are Akan, Southern region, No education
Lambda is the selection correction term for self employment

Chapter 5

Conclusion

This thesis contributes to the growing literature on the effects of religion and ethnicity on education and labour market outcomes of individuals by focusing on the experience of Pakistan and Ghana.

The first two chapters look at the gender-specific effects of Islamic terrorism on education and employment rates in north-western Pakistan, by using the difference-in-difference-in-difference approach. The results presented suggest that the Taliban failed in intimidating the public and the effect of their terrorism campaign on female education and employment was negligible. There is a relatively small effect estimated for girls aged 10-14 during 2007-08, the years of highest-intensity terrorist attacks, followed by a rapid return to normality after the counterinsurgency measures in 2009. Girls aged 10-14 in the districts of north-western Pakistan that experienced terrorist incidents between 2007 and 2009 had 10.3 percent lower enrolment rates in the first year of attacks. In the following year, when the Pakistani military retook control over some of the affected areas, this effect fades away, suggesting that students returned to schools. Moreover, there is no evidence of dramatic increases in religious school enrolment rates. Enrolment in religious schools has not seen any increases beyond the 2 percent enrolment rate. Second, there is no evidence for a substantial drop in the labour force participation rates in the worst affected districts. Females aged 18 or younger in the districts of north-western Pakistan that experienced terrorist incidents between 2007 and 2009 had 1.56 percent lower employment rates in the first year of attacks. In the following year, when the Pakistani military retook control over some of the affected areas, this effect fades away.

The final paper uses the Ghana Living Standards Survey 2005 to empirically analyse the employment outcomes of ethnic minorities in Ghanaian labour market. The results show no evidence to support the existence of preferential treatment for the dominant

group. The non-dominant group is more likely to be in paid sector in the capital region. A plausible explanation is that there are hiring rules and quotas which prevent over-representation of any ethnic group within the formal sector (Collier, 1999b). However there is some evidence of ethnic enclaves in less developed regions. In the to less-developed regions outside the metropolitan areas, the absence of paid work opportunities has resulted in ethnic groups entering the informal sector, where they engage in lucrative self-employment. Non-dominant groups in Southern regions and Northern regions are pulled into non-farm self employment. Finally, ethnic enclaves are an important determinant of entry into entrepreneurship, as there is easy access to credit and family workers.

Appendix A

Chapter 2

A.1 Robustness Checks

A.1.1 Placebo Tests

In order to ensure that the estimates reflect the impact of terrorism only, a series of falsification tests known as a placebo test are performed, in which I artificially reassign the terrorism period to the years 2004 to 2006, each of the 3 years not directly exposed to terrorism. If the years 2007-08 and 2008-09 heavily experienced terrorism and other years did not, the expectation is that the high and low intensity districts in unexposed years should not be affected by terrorism, thus should not yield a decreasing probability of enrolment in those years. Therefore, confidence in estimates that they reflects the effect of terrorism would be severely undermined if similar negative estimates are obtained when terrorism is artificially assigned to years not directly exposed to terrorism.

The *difference-in-difference-in-difference* was run for a time period in the *before* years from 2004 to 2006 to perform a falsification placebo. Two-year treatment period (years 2005-06 and 2006-07) and one-year control period (year 2004-05) were created to conduct a placebo test, asking whether the false years predict the change in enrolment as well as the true ones. Table A.1 shows that in the pre-treatment period for the regression of enrolment for full sample and age groups of 3-9 (primary level), 10-14 (secondary level), and 15-18 (post-secondary level).

With the exception of the girls aged 15-18 in low intensity districts in year 2005-06, these false interaction terms are not significant. For the sample of children enrolled in the age group 15-18, there is a 12 percent decrease in enrolment probability in the year 2005-06 in the low intensity areas, however this is only significant at 10 percent.

For the year 2006-07, this affect becomes insignificant. For the age group samples, girls in schooling has a similar outcome. For girls in primary education, there is in fact an increase in the probability of enrolment in the year 2005-06 of 9 percent. For girls in post-secondary education, there is a negative probability of enrolment, which is intuitive as there a very few girls enrolled from that age group. This result confirms that in the absence of the terrorist attacks, there would have been no negative effect on education, i.e. drop due to unobserved reasons. These Placebo tests confirm that the initial results are robust and further support the credibility of the identification strategy of this study.

For remaining regressions of the case studies of Peshawar and Swat, a false treatment year of 2005-06 is added to the regression, which comes out insignificant (Table A.2). For the madrassa enrolment, the estimates, though negative, are insignificant (Table A.3). Hence the placebos support the estimates of the initial results.

A.1.2 Interaction Terms in Probit Models

Empirical economists often estimate interaction terms to infer how the effect of one independent variable on the dependent variable rely on the magnitude of another independent variable. Difference-in-difference models, which measure the difference in outcome over time for the treatment group compared to the difference in outcome over time for the control group, are examples of models with interaction terms. The magnitude of the interaction effect in nonlinear models does not equal the marginal effect of the interaction term, can be of opposite sign, and its statistical significance is not calculated by standard software (Ai and Norton, 2003).

The interaction effect of a non-linear model, which is often the variable of interest in empirical studies, cannot be evaluated simply by looking at the sign, magnitude, or statistical significance of the coefficient on the interaction term. Instead, the interaction effect requires computing the cross derivative or cross difference. Like the marginal effect of a single variable, the magnitude of the interaction effect depends on all the covariates in the model. In addition, it can have different signs for different observations, making simple summary measures of the interaction effect difficult (Ai and Norton, 2003).

Linear Probability model:

As a further robustness check for the probit estimates for this paper, I rerun the regressions using the Linear Probability Model instead of the probit using the same variables. The results for the regressions of enrolment rates (Table A.4) are consistent with the probit estimates in sign and magnitude of the interaction terms, with a negative effect on probability of enrolment for girls in secondary education, which fades away in the

following years, and positive effect for girls in primary education. For the rest of the estimation, the probit model is consistent with LPM (Tables A.4 A.5).

TABLE A.1: Placebo regressions on enrolment status in KPK, 2004-2006.

Currently Enrolled	**Full sample**	**Age 3-9**	**Age 10-14**	**Age 15-18**
Female	-0.247***	-0.166***	-0.360***	-0.294***
	(0.0128)	(0.0212)	(0.0223)	(0.0283)
Age	0.249***	0.610***	0.0458	0.240*
	(0.00230)	(0.0147)	(0.0474)	(0.142)
Age^2	-0.0113***	-0.0359***	-0.00349*	-0.00985**
	(0.000110)	(0.00114)	(0.00197)	(0.00429)
Hh size	-0.00104**	-0.00246***	-0.00866***	-0.00270***
	(0.001)	(0.001)	(0.001)	(0.000913)
Married	-0.223***		-0.110*	-0.250***
	(0.0117)		(0.0621)	(0.0131)
Urban	0.0809***	0.0831***	0.102***	0.0650***
	(0.005)	(0.008)	(0.008)	(0.010)
Father education	0.0180***	0.0162***	0.0220***	0.0247***
	(0.000447)	(0.000699)	(0.000882)	(0.00101)
Mother education	0.0189***	0.0216***	0.0206***	0.0292***
	(0.000852)	(0.00132)	(0.00215)	(0.00202)
Parents monthly income	6.22e-07***	-8.81e-08	5.62e-07	2.72e-06***
	(2.29e-07)	(2.98e-07)	(5.91e-07)	(8.65e-07)
Year 2005-06	-0.0277**	-0.0201	-0.00638	-0.0683**
	(0.0127)	(0.0205)	(0.0261)	(0.0283)
Year 2006-07	0.0357***	0.0373**	-0.001	0.0306
	(0.00999)	(0.0161)	(0.02)	(0.0227)
High Intensity	0.0516***	0.124***	0.0477	-0.0176
	(0.0163)	(0.0255)	(0.0335)	(0.0363)
Low Intensity	0.0175	0.0885***	-0.0175	-0.0287
	(0.0148)	(0.0243)	(0.0304)	(0.0329)
Female*High Intensity	-0.0412*	-0.0889**	-0.0252	-0.0401
	(0.0235)	(0.0363)	(0.0460)	(0.0543)
Female*Low Intensity	0.0135	0.00345	-0.000791	0.0262
	(0.0223)	(0.0358)	(0.0403)	(0.0502)
Year 2005-06*High	-0.00804	-0.0850***	-0.00685	0.0964*
	(0.0213)	(0.0317)	(0.0459)	(0.0511)
Year 2005-06*Low	0.0370	0.00957	0.0188	0.141***
	(0.0227)	(0.0361)	(0.0442)	(0.0541)
Year 2006-07*High	-0.0392**	-0.114***	-0.0277	0.0336
	(0.0174)	(0.0264)	(0.0382)	(0.0407)
Year 2007-06*Low	-0.0399**	-0.0758***	-0.0237	-0.0444
	(0.0165)	(0.0264)	(0.0349)	(0.0366)
Year 2005-06*Female	0.0439**	0.0415	0.0186	0.111**
	(0.0199)	(0.0318)	(0.0340)	(0.0460)
Year 2006-07*Female	0.0228	0.0220	0.0347	-0.00327
	(0.0154)	(0.0247)	(0.0264)	(0.0339)
Year 2005-06*Female*Low	-0.0291	-0.0616	0.0700	-0.126**
	(0.0321)	(0.0510)	(0.0532)	(0.0632)
Year 2005-06*Female*High	0.0228	0.0907*	0.0408	-0.0877
	(0.0324)	(0.0521)	(0.0558)	(0.0663)
Year 2006-07*Female*Low	0.0351	0.0161	0.0593	0.0799
	(0.0260)	(0.0414)	(0.0419)	(0.0582)
Year 2006-07*Female*High	-0.0118	0.0505	-0.0461	-0.0211
	(0.0265)	(0.0431)	(0.0513)	(0.0604)
Observations	79,233	32,376	20,484	15,186

TABLE A.2: Placebo regressions on enrolment status in Swat and Peshawar, 2004-2006.

Enrolment status	**Swat**	**Peshawar**
Female	-0.230***	-0.335***
	(0.021)	(0.023)
Year 2005-06	-0.0276	-0.0597
	(0.026)	(0.042)
Year 2005-06*Female	0.0196	0.0997
	(0.038)	(0.071)
Age	0.268***	0.220***
	(0.010)	(0.013)
Age^2	-0.0120***	-0.0107***
	(0.001)	(0.001)
Hh size	-0.00139	0.00396
	(0.002)	(0.004)
Married	-0.235***	-0.0389
	(0.046)	(0.079)
First born	-0.0181	0.0555
	(0.029)	(0.037)
Urban	0.0189	
	(0.021)	
Father education	0.0155***	0.0214***
	(0.002)	(0.003)
Mother education	0.0109***	0.0311***
	(0.004)	(0.009)
Father log income	7.05e-05	-0.001
	(0.001)	(0.002)
Mother log income	0.0026	0.001
	(0.005)	(0.007)
Observations	3,895	2,104

TABLE A.3: Placebo regressions on enrolment status in religious schools, 2004-2006.

Madrassa enrolment	**Girls**	**Boys**
Year 2005-06*High intensity	-0.0171***	-0.0133***
	(0.003)	(0.002)
Year 2005-06*Low Intensity	-0.00343	-0.00413
	(0.004)	(0.003)
Age	0.0011	-0.0002
	(0.002)	(0.001)
Age^2	-5.27e-06	4.09e-05
	(9.76e-05)	(6.87e-05)
Hh size	4.71e-05	-0.00014
	(0.001)	(0.001)
Married		0.0138
		(0.0200)
First born	0.0088	0.0088**
	(0.005)	(0.004)
Urban	-0.0153***	-0.0068***
	(0.004)	(0.002)
Father education	0.00054	-0.0003
	(0.001)	(0.001)
Mother education	-0.0016***	-0.0010**
	(0.001)	(0.001)
Father log income	0.00073***	0.00026
	(0.000236)	(0.000165)
Mother log income	0.0009*	-0.0005
	(0.001)	(0.001)
Observations	8,547	14,867

TABLE A.4: LPM regressions on enrolment status in KPK, 2004-2009.

Currently Enrolled	**Full sample**	**Age 3-9**	**Age 10-14**	**Age 15-18**
Female	-0.175***	-0.247***	-0.107***	-0.317***
	(0.005)	(0.011)	(0.007)	(0.009)
Age	0.172***	0.319***	0.372***	0.0738**
	(0.001)	(0.093)	(0.006)	(0.0314)
Age^2	-0.00787***	-0.0119***	-0.0195***	-0.00452***
	(4.29e-05)	(0.003)	(0.005)	(0.00131)
Hh size	-0.00156***	-0.00110*	-0.00187***	-0.00611***
	(0.000242)	(0.000620)	(0.000357)	(0.000522)
Married	-0.215***	-0.166***	-0.434***	-0.0901*
	(0.00645)	(0.00747)	(0.144)	(0.0503)
First born	-0.00337	-0.00310	-0.00162	-0.00319
	(0.00375)	(0.00691)	(0.00655)	(0.00648)
Urban	0.0612***	0.0690***	0.0549***	0.0901***
	(0.00284)	(0.00698)	(0.00437)	(0.00555)
Father years education	0.0141***	0.0224***	0.0118***	0.0190***
	(0.000245)	(0.000609)	(0.000375)	(0.000474)
Mother years education	0.0116***	0.0237***	0.0123***	0.0105***
	(0.000422)	(0.00107)	(0.000646)	(0.000803)
Father log income	-0.00292***	-0.00309***	-0.00357***	-0.00339***
	(0.000181)	(0.000444)	(0.000279)	(0.000362)
Mother log income	0.00219***	0.00287**	0.00117*	0.00365***
	(0.000450)	(0.00112)	(0.000699)	(0.000866)
Year 2007-08	-0.0209**	0.0122	-0.00223	-0.0516***
	(0.00879)	(0.0240)	(0.0132)	(0.0174)
Year 2008-09	0.0468***	0.0684***	0.0525***	0.0643***
	(0.00459)	(0.0124)	(0.00700)	(0.00828)
High intensity	0.0110**	0.0243*	0.00509	0.0164*
	(0.00505)	(0.0136)	(0.00768)	(0.00937)
Low intensity	-0.00178	-0.0334**	0.0258***	-0.0291***
	(0.00571)	(0.0148)	(0.00888)	(0.0108)
Year 2007-08*High	0.0468***	0.0181	0.0443**	0.0863***
	(0.0122)	(0.0331)	(0.0181)	(0.0232)
Year 2007-08*Low	0.0434***	0.0270	0.0185	0.115***
	(0.0147)	(0.0399)	(0.0224)	(0.0288)
Year 2008-09*High	-0.00898	-0.0186	-0.0119	0.00335
	(0.00745)	(0.0201)	(0.0114)	(0.0131)
Year 2008-09*Low	-0.0127	-0.00921	-0.0299**	-0.0140
	(0.00834)	(0.0216)	(0.0128)	(0.0150)
Female*High Intensity	-0.0318***	-0.0603***	-0.0225*	-0.0447***
	(0.00746)	(0.0177)	(0.0115)	(0.0153)
Female*Low Intensity	0.0302***	0.0529***	0.00368	0.0719***
	(0.00835)	(0.0197)	(0.0130)	(0.0169)
Year 2007-08*Fem	0.0321**	0.0183	0.00995	0.0719***
	(0.0127)	(0.0316)	(0.0198)	(0.0267)
Year 2008-09*Female	-0.0248***	-0.0420**	-0.0258**	-0.0238*
	(0.007)	(0.017)	(0.011)	(0.0141)
Year 2007-08*Fem*High	0.0258	0.0284	0.0340	0.0257
	(0.0180)	(0.0446)	(0.0276)	(0.0369)
Year 2007-08*Fem*Low	-0.0830***	-0.0949*	-0.0155	-0.187***
	(0.021)	(0.054)	(0.034)	(0.0448)
Year 2008-09*Fem*Low	0.0120	0.0148	0.0449**	-0.00605
	(0.013)	(0.029)	(0.019)	(0.0248)
Year 2008-09*Fem*High	0.0158	0.0123	0.0271	0.0123
	(0.011)	(0.027)	(0.017)	(0.0228)
Constant	-0.181***	-1.525**	-0.951***	0.586***
	(0.005)	(0.767)	(0.015)	(0.185)
Observations	127,768	24,614	52,537	33,282
R-squared	0.336	0.240	0.354	0.206

TABLE A.5: LPM regressions on enrolment status in Swat and Peshawar, 2004-2009.

Enrolment status	Swat	Peshawar
Female	-0.162***	-0.274***
	(0.013)	(0.018)
Year 2007-08	0.0812***	0.0302
	(0.019)	(0.023)
Year 2008-09	-0.0200	0.0220
	(0.018)	(0.019)
Year 2007-08*Female	-0.0393	0.0447
	(0.029)	(0.032)
Year 2008-09*Female	-0.0283	-0.0350
	(0.026)	(0.027)
Age	0.171***	0.158***
	(0.003)	(0.004)
Age^2	-0.0077***	-0.0078***
	(0.001)	(0.001)
Hh size	-0.00119	0.00342**
	(0.001)	(0.001)
Married	-0.264***	-0.0536
	(0.027)	(0.039)
First born	-0.0118	0.0620***
	(0.0185)	(0.020)
Urban	0.0669***	
	(0.011)	
Father education	0.0113***	0.0167***
	(0.001)	(0.001)
Mother education	0.0075***	0.0172***
	(0.002)	(0.003)
Father log income	-0.00165**	-0.0003
	(0.001)	(0.001)
motherlogincome	-0.000536	0.00131
	(0.002)	(0.003)
Constant	-0.208***	-0.150***
	(0.020)	(0.028)
Observations	6,048	4,676
R-squared	0.344	0.321

TABLE A.6: LPM regressions on enrolment status in religious schools, 2004-2009.

Madrassa enrolment	**Girls**	**Boys**
Year 2007-08	-0.00410	0.0144***
	(0.005)	(0.005)
Year 2008-09	-0.00597**	0.00315*
	(0.002)	(0.002)
Year 2007-08*High Intensity	-0.0105**	-0.0274***
	(0.005)	(0.005)
Year 2007-08*Low Intensity	0.00860	-0.0193***
	(0.008)	(0.006)
Year 2008-09*High Intensity	-0.00907***	-0.0125***
	(0.003)	(0.002)
Year 2008-09*Low Intensity	-0.00132	-0.00660***
	(0.003)	(0.002)
Age	-0.00023	0.00021
	(0.001)	(0.001)
Age^2	7.11e-05	4.43e-05
	(0.001)	(0.001)
Hh size	-0.000198	-0.000296***
	(0.000136)	(0.000104)
Married	-0.0283***	0.0428
	(0.003)	(0.027)
First born	0.00384	0.00433**
	(0.003)	(0.002)
Urban	-0.0101***	-0.00828***
	(0.002)	(0.001)
Father education	0.000224	-0.000318**
	(0.001)	(0.001)
Mother education	-0.000754***	-0.000476**
	(0.001)	(0.001)
Father log income	0.00032**	0.00034***
	(0.001)	(0.001)
Mother log income	0.00034	-0.00027
	(0.001)	(0.001)
Constant	0.0155**	0.0101*
	(0.007)	(0.005)
Observations	21,882	37,197
R-squared	0.005	0.005

Appendix B

Chapter 3

B.1 Placebo Test:

In order to ensure that the estimates reflect the impact of terrorism only, a series of falsification tests, similar to the tests in chapter 2, are performed. I artificially reassign the terrorism period to the years 2004 to 2006, each of the 3 years not directly exposed to terrorism. If the years 2007-08 and 2008-09 heavily experienced terrorism and other years did not, the expectation is that the high and low intensity districts in unexposed years should not be affected by terrorism, thus should not yield a decreasing probability of employment in those years. Therefore, confidence in estimates that they reflects the effect of terrorism would be severely undermined if similar negative estimates are obtained when terrorism is artificially assigned to years not directly exposed to terrorism.

The *difference-in-difference-in-difference* was run for a time period in the *before* years from 2004 to 2006 to perform a falsification placebo. Two-year treatment period (years 2005-06 and 2006-07) and one-year control period (year 2004-05) were created to conduct a placebo test, asking whether the false years predict the change in employment as well as the true ones. Table B.2 shows that in the pre-treatment period for the regression for overall employment, and employment types of paid work, self employment, farm work and unpaid work.

Placebo for employment chapter shows that in the year immediately before the terrorist attacks, employment for women has increasing rates in overall employment. In the survey year 2006-07 (preceding the actual treatment years), the difference-indifference-in-difference estimate for the probability of employment for women increases to 7 percent. In types of work regressions, the positive effect is only present for farm work and unpaid work, meaning that before the increase in terrorist activities, women were mostly engaged in farm work and unpaid work.

Linear Probability model:

Following the discusson on interaction terms for probit in appenxix A, I rerun the regressions using the Linear Probability Model instead of the probit using the same variables as a further robustness check for the probit estimates for this paper. The results for the regressions of employmet rates (Table B.5) are consistent with the probit estimates in sign and magnitude of the interaction terms. For the rest of the estimation, the probit model is consistent with LPM (tables B.6, B.7 B.8).

TABLE B.1: Placebo regression for full sample by employment type, Years 2004-2006

Full sample	**Any work**	**Paid emp**	**Self emp**	**Farm work**	**Unpaid work**
Age	0.0226***	0.00770***	0.00254***	0.00133***	0.00377***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age^2	-0.00028***	-9.97e-05***	-3.01e-05***	-1.14e-05***	-5.14e-05***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hh size	-0.00862***	-0.00156***	0.000723***	-0.000518***	-0.000999***
	(0.001)	(0.001)	(0.0013)	(0.001)	(0.001)
Urban	-0.0146***	0.0107***	0.0130***	-0.0172***	-0.0119***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.199***	-0.106***	-0.0420***	-0.0274***	-0.0176***
	(0.012)	(0.008)	(0.007)	(0.003)	(0.003)
Years in education	0.0113***	0.00449***	0.00117***	-0.000615***	0.000899***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married	0.247***	0.0391***	0.0317***	0.0160***	-0.0167***
	(0.00602)	(0.00244)	(0.00202)	(0.00147)	(0.00113)
Children in hh	0.00608***	9.00e-05	-0.000589***	0.000749***	-2.35e-05
	(0.00011)	(0.001)	(0.0015)	(0.001)	(0.001)
Father education	-0.00725***	-0.00173***	-0.000694***	-0.000477***	-0.00147***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Mother education	-0.00367***	-0.000558***	-0.000362***	-0.000748***	-0.000788***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Parents monthly income	2.96e-07***	-3.96e-07***	8.88e-08***	-1.20e-07***	1.28e-07***
	(9.49e-08)	(1.25e-07)	(2.33e-08)	(4.47e-08)	(2.09e-08)
Family members work	0.0254***	0.00306***	-0.000648**	0.000280	0.00843***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Family workers*Female	0.0171***	0.00680***	0.00325***	-0.000212	0.000903***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Father edu*Fem	0.000798	0.00112***	-0.000212	-0.000789***	-0.000179
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Mother edu*Fem	0.00502***	0.00323***	-0.000181	0.00132***	-0.00124***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Parents income*Female	0.00498***	0.00142***	0.000843***	0.00147***	0.000895***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
Married*Female	-0.200***	-0.0524***	-0.0282***	-0.0145***	0.0154***
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)
High Intensity	0.0107	0.00434	0.0100***	-0.00784***	-0.00348
	(0.007)	(0.003)	(0.002)	(0.001)	(0.002)
Low intensity	0.0107	0.000261	0.00825***	-0.00621***	0.00268
	(0.007)	(0.003)	(0.002)	(0.001)	(0.002)
Female*High Intensity	-0.0877***	-0.00226	-0.00528	-0.00998***	-0.0248***
	(0.00944)	(0.00716)	(0.00551)	(0.00255)	(0.00202)
Female*Low Intensity	-0.0476***	0.00610	-0.000481	-0.00166	-0.0135***
	(0.011	(0.008	(0.006)	(0.003)	(0.002)
Year 2005-06*Female	0.101***	0.00826	0.00844	0.00156	0.0230***
	(0.021	(0.012	(0.011	(0.00343)	(0.007
Year 2006-07*Female	0.0182	0.0148**	0.0165**	0.00358	0.00212
	(0.011)	(0.007)	(0.007)	(0.003)	(0.003)
Year 2005-06*High	-0.0200*	0.0164**	-0.00666**	0.00436	-0.00433
	(0.010)	(0.007)	(0.003)	(0.003)	(0.003)
Year 2006-07*High	0.0245***	0.00138	-0.00453**	0.0109***	0.00653**
	(0.009)	(0.004)	(0.002)	(0.003)	(0.003)
Year 2005-06*Low	-0.0155	0.0215***	-0.00532*	0.00172	-0.00726***
	(0.010)	(0.007)	(0.003)	(0.002)	(0.002)
Year 2006-07*Low	0.0183**	0.00348	-0.00452**	0.00950***	0.00238
	(0.008)	(0.004)	(0.002)	(0.002)	(0.003)
Year 2005-06*Female*High	-0.0328**	-0.0132	0.00948	0.00345	0.0124
	(0.016)	(0.008)	(0.013)	(0.008)	(0.009)
Year 2005-06*Female*Low	-0.0642***	-0.00861	-0.00260	-0.00538**	-0.00954***
	(0.011)	(0.009)	(0.008)	(0.0025)	(0.003)
Year 2006-07*Female*High	0.0669***	0.00291	-0.00120	0.0250*	0.0241**
	(0.020)	(0.009)	(0.007)	(0.013)	(0.009)
Year 2006-07*Female*Low	0.00533	-0.00545	-0.00460	0.000728	-0.00123
	(0.015)	(0.007)	(0.006)	(0.003)	(0.004)
Observations	143,456	143,456	143,456	143,456	143,456

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE B.2: Probit Placebo Regression on Employment Status, by age groups

Sample by age	**18 yrs Any work**	**18 yrs Paid emp**	**18 yrs Self emp**	**18 yrs Self emp**	**18 yrs Farm work**	**19 yrs Unpaid work**	**19 yrs Any work**	**19 yrs Paid emp**	**19 yrs Farm work**	**19 yrs Unpaidwork**
High intensity	0.00172	0.00445*	0.00162	-0.00417**	-0.00379**	0.0516***	0.0253***	0.00675***	-0.00849***	-0.00314
	(0.00481)	(0.00247)	(0.00207)	(0.00192)	(0.00173)	(0.00754)	(0.00377)	(0.00196)	(0.00103)	(0.00222)
Low intensity	0.00679	0.000285	0.00366*	-0.00191	0.00171	0.0368***	0.0131***	0.00472**	-0.00366***	0.00580***
	(0.00458)	(0.00223)	(0.00206)	(0.00168)	(0.00162)	(0.00723)	(0.00355)	(0.00187)	(0.000962)	(0.00219)
Year 2005-06	0.0184**	-0.00456	-0.000587	0.00177	0.00233	0.153***	-0.0227**	0.000540	0.00830**	0.0136*
	(0.00745)	(0.00283)	(0.00296)	(0.00255)	(0.00227)	(0.0259)	(0.00911)	(0.00580)	(0.00336)	(0.00698)
Year 2006-07	-0.00669	-0.00220	0.00234	0.00208*	-0.00783***	0.00233	-0.00238	0.00502**	-0.00578***	-0.0110***
	(0.00447)	(0.00222)	(0.00149)	(0.00119)	(0.00206)	(0.00935)	(0.00459)	(0.00250)	(0.00124)	(0.00284)
Female*High	-0.0335***	0.000202	0.00304	0.000201	-0.0112***	-0.187***	-0.0164**	-0.0115**	-0.0136***	-0.0394***
	(0.00626)	(0.00706)	(0.00715)	(0.00537)	(0.00180)	(0.00979)	(0.00735)	(0.00557)	(0.00161)	(0.00160)
Female*Low	-0.0214***	0.00535	-0.00257	-0.00126	-0.00627***	-0.132***	0.00253	-0.00167	-0.00829***	-0.0402***
	(0.00669)	(0.00823)	(0.00406)	(0.00360)	(0.00177)	(0.0104)	(0.00779)	(0.00614)	(0.00157)	(0.00166)
Year 2005-06*Fem	0.0270*	0.00551	-0.00920***		0.00495	0.138***	0.0258	0.0374	0.00601	0.0281**
	(0.0148)	(0.0137)	(0.00103)		(0.00427)	(0.0330)	(0.0257)	(0.0230)	(0.00586)	(0.0110)
Year 2006-07*Fem	0.0245**	0.0311***	0.0140	0.00180	0.00129	-0.0158	0.0147	0.0374***	0.00313	-0.0104***
	(0.00966)	(0.0119)	(0.0102)	(0.00353)	(0.00267)	(0.0152)	(0.0109)	(0.0105)	(0.00298)	(0.00352)
Year 2005-06*High	-0.00771	0.0121*	0.000814	0.000492	-0.00328*	-0.0718***	0.0133	-0.00669	0.000799	-0.00594
	(0.00608)	(0.00730)	(0.00403)	(0.00314)	(0.00184)	(0.0227)	(0.0129)	(0.00546)	(0.00307)	(0.00542)
Year 2006-07*high	0.0248***	0.00509	0.00223	0.00576	0.00892***	-0.00795	-0.0231***	-0.000260	0.0127***	-0.00140
	(0.00700)	(0.00316)	(0.00255)	(0.00359)	(0.00324)	(0.0115)	(0.00493)	(0.00293)	(0.00256)	(0.00368)
Year 2005-06*Low	-0.0115**	0.0145*	-0.00156	-0.00112	-0.00507***	-0.0518**	0.0316**	-0.00372	-0.00457**	-0.0113**
	(0.00539)	(0.00793)	(0.00264)	(0.00203)	(0.00128)	(0.0236)	(0.0142)	(0.00587)	(0.00225)	(0.00455)
Year 2006-07*Low	0.0122**	0.00935***	-0.000770	0.00253	0.000845	0.0152	-0.0160***	7.36e-05	0.00778***	0.000380
	(0.00587)	(0.00350)	(0.00188)	(0.00231)	(0.00198)	(0.0115)	(0.00508)	(0.00291)	(0.00208)	(0.00361)
Year 2005-06*Fem*High	-0.00180	-0.00883**	0.577***		0.0197	-0.0469	-0.00857	0.0216	-0.00256	-0.00417
	(0.0142)	(0.00385)	(0.176)		(0.0147)	(0.0325)	(0.0234)	(0.0222)	(0.00633)	(0.00781)
Year 2005-06*Fem*Low	-0.0200***	-0.00605	0.732***		-0.00374	-0.0668**	-0.00111	-0.00477	-0.00477	0.00566
	(0.00725)	(0.00610)	(0.153)		(0.00247)	(0.0303)	(0.0240)	(0.0138)	(0.00471)	(0.00944)
Year 2006-07*Fem*High	0.0373*	-0.00424	-0.00378	0.00433	0.0196	0.0677***	0.0129	-0.00724	0.0217***	0.0142*
	(0.0198)	(0.00554)	(0.00259)	(0.00880)	(0.0123)	(0.0219)	(0.0138)	(0.00753)	(0.00790)	(0.00778)
Year 2007-07*Fem*Low	0.00419	-0.00768*	0.000744	0.00399	-5.31e-06	0.0385*	0.00132	-0.0103	0.00713	0.0362***
	(0.0111)	(0.00398)	(0.00629)	(0.00700)	(0.00332)	(0.0203)	(0.0126)	(0.00672)	(0.00458)	(0.00916)
Observations	79,233	79,233	79,233	72,663	79,233	116,429	116,429	116,429	116,429	116,429

TABLE B.3: PRoobit Placebo regression on Employment Status for married individuals aged 15 or older in KPK

	Women	**Women**	**Women**	**Women**	**Women**	**Men**	**Men**	**Men**	**men**	**Men**
High Intensity	-0.0467***	0.000463	0.000751	-0.00994***	-0.0310***	0.0144*	0.0398***	0.0250***	-0.0499***	-0.00764***
	(0.00275)	(0.00139)	(0.00129)	(0.00111)	(0.00169)	(0.00740)	(0.00904)	(0.00730)	(0.00530)	(0.00223)
Low Intensity	-0.0339***	0.00115	0.00186	-0.00440***	-0.0286***	0.0183**	0.0234***	0.0161**	-0.0230***	0.000315
	(0.00271)	(0.00132)	(0.00126)	(0.000720)	(0.00164)	(0.00729)	(0.00878)	(0.00709)	(0.00521)	(0.00225)
Year 2005-06	0.102***	0.00113	0.00629	0.00425**	0.0189***	0.0935***	-0.0670***	0.0165	0.0331**	0.0219**
	(0.0116)	(0.00374)	(0.00460)	(0.00204)	(0.00427)	(0.0182)	(0.0244)	(0.0222)	(0.0156)	(0.00888)
Year 2006-07	-0.0154***	0.000547	0.00759***	-0.00295***	-0.0178***	-0.0181*	0.00169	0.0235**	-0.0351***	-0.00969***
	(0.00335)	(0.00173)	(0.00191)	(0.000788)	(0.00165)	(0.00970)	(0.0115)	(0.00941)	(0.00677)	(0.00304)
2005-06*High Intensity	-0.0161***	0.000697	0.00168	0.000996	0.00129	-0.0837**	0.0239	-0.0347	0.0160	-0.0110***
	(0.00503)	(0.00423)	(0.00351)	(0.00239)	(0.00379)	(0.0341)	(0.0299)	(0.0211)	(0.0176)	(0.00376)
2006-07*High Intensity	0.0359***	0.000623	-0.00243**	0.0181***	0.00676*	-0.00178	-0.0537***	-0.0137	0.0648***	0.00253
	(0.00704)	(0.00224)	(0.00113)	(0.00422)	(0.00367)	(0.0118)	(0.0135)	(0.0108)	(0.0114)	(0.00432)
2005-06*Low Intensity	-0.0223***	0.00338	-0.00222	-0.00302***	0.00236	-0.0528	0.0773**	-0.0255	-0.0234*	-0.0119***
	(0.00407)	(0.00493)	(0.00178)	(0.000970)	(0.00365)	(0.0325)	(0.0308)	(0.0218)	(0.0139)	(0.00350)
2006-07*Low Intensity	0.0281***	7.70e-06	-0.00242**	0.00536***	0.0248***	0.00318	-0.0455***	-0.00836	0.0418***	0.00548
	(0.00609)	(0.00208)	(0.00111)	(0.00186)	(0.00452)	(0.0115)	(0.0134)	(0.0109)	(0.0101)	(0.00440)
Observations	54,286	54,286	54,286	54,286	54,286	41,964	41,964	41,964	41,964	41,964

TABLE B.4: Probit Placebo regression on Employment Status for unmarried individuals aged 15 or older in KPK

	Women Any work	**Men Any work**	**Women Paid emp**	**Men Paid emp**	**Women Self emp**	**Men Self emp**	**Women Farm work**	**Men Farm work**	**Women Unpaid work**	**Men Unpaid work**
High Intensity	-0.0093***	0.027***	0.0027***	0.0154***	-0.0006	0.00165	-0.00113***	-0.00033	-0.0111***	-0.00570***
	(0.0015)	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000382)	(0.001)	(0.002)	(0.001)
Low Intensity	-0.00814***	0.018***	0.00231***	0.0104***	-0.00029	0.00294***	-0.0015***	-0.000532	-0.0037*	-0.0051***
	(0.0015)	(0.0029)	(0.000872)	(0.00173)	(0.000810)	(0.00109)	(0.000444)	(0.000809)	(0.00198)	(0.000598)
2005-06	0.0485***	0.0683***	0.00511	-0.0127***	0.00305	-0.00264	0.000469	0.00754**	0.0270***	0.00563***
	(0.00739)	(0.0115)	(0.00351)	(0.00349)	(0.00297)	(0.00291)	(0.000912)	(0.00302)	(0.00683)	(0.00177)
2006-07	0.0107***	0.0282***	0.00475***	-0.00135	0.00643***	0.00402***	0.00156***	0.00529***	-0.0146***	-0.00204***
	(0.00215)	(0.00450)	(0.00127)	(0.00230)	(0.00138)	(0.00152)	(0.000549)	(0.00123)	(0.00259)	(0.000620)
2005-06*High Intensity	-0.00965***	-0.0276***	-0.00273*	0.0172**	0.00174	0.00102		-0.00389***	-0.0124***	-0.000943
	(0.00191)	(0.00561)	(0.00140)	(0.00818)	(0.00287)	(0.00420)		(0.00115)	(0.00398)	(0.00109)
2006-07*High Intensity	0.0168***	0.00718	-0.000462	-0.000802	0.000995	0.00511**		0.00127	0.0188***	0.00563***
	(0.00368)	(0.00519)	(0.00114)	(0.00273)	(0.00125)	(0.00212)	0.00348**	(0.00138)	(0.00455)	(0.00176)
2005-06*Low Intensity	-0.00913***	-0.0216***	-3.18e-05	0.0148*	0.00129	0.00155	(0.00151)	-0.00206	-0.0140***	-0.00244***
	(0.00191)	(0.00620)	(0.00230)	(0.00787)	(0.00259)	(0.00431)	1.75e-05	(0.00155)	(0.00367)	(0.000715)
2006-07*Low Intensity	0.00772***	0.00677	-0.000892	5.17e-05	-5.68e-05	0.00126	(0.00102)	0.00140	0.0111***	0.00198*
	(0.00285)	(0.00507)	(0.00106)	(0.00273)	(0.000977)	(0.00172)	0.00349**	(0.00136)	(0.00395)	(0.00117)
							(0.00143)			
Observations	78,288	89,532	78,288	89,532	78,288	89,532	74,883	89,532	89,532	78,288

TABLE B.5: LPM regressions on employment status in KPK, 2004-2009.

Full sample	**Any work**	**Paid emp**	**Self emp**	**Farm work**	**Unpaid work**
Age	0.0200***	0.0101***	0.00342***	0.00342***	0.00506***
	(0.001)	(0.001)	(0.001)	(0.000162)	(0.001)
Age^2	-0.000256***	-0.000144***	-4.75e-05***	-2.47e-05***	-6.51e-05***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hh size	-0.00764***	-0.00362***	0.000190	-0.000603***	-0.00145***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban	-0.00992***	0.0119***	0.0230***	-0.0335***	-0.0185***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.106***	-0.0549***	-0.0101***	-0.0507***	-0.00557**
	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)
Years education	0.00885***	0.0105***	0.00173***	-0.00447***	0.00105***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married	0.472***	0.235***	0.153***	0.0956***	-0.0302***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Children in household	0.00519***	0.00101***	0.000238	0.000743***	0.000242
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Father education	-0.00528***	-0.00105***	-0.000570***	-0.00224***	-0.00305***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mother education	-0.00239***	-0.000382	0.000218	-0.00179***	-0.00125***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Parents monthly income	2.12e-08	-7.74e-07***	4.10e-07***	3.29e-08	6.78e-07***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Family members work	0.0228***	0.00853***	-0.00351***	-0.00352***	0.0201***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
family work*Fem	0.00564***	0.00116	0.00461***	0.00330***	-0.00495***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Father edu*Fem	0.00217***	0.000103	-0.000249*	0.00191***	0.000885***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mother edu*Fem	0.00390***	0.00172***	-0.00145***	0.00411***	-0.000202
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Parents income*Fem	0.00277***	0.00142***	6.90e-05	0.00157***	0.00106***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married*Female	-0.608***	-0.290***	-0.174***	-0.142***	0.0123***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Year 2007-08	0.0821***	-0.0168*	0.00893	-0.0109	0.104***
	(0.012)	(0.009)	(0.006)	(0.007)	(0.010)
Year 2008-09	0.000112	-0.00163	-0.00226	0.00745**	-0.0189***
	(0.005)	(0.005)	(0.003)	(0.004)	(0.004)
High Intensity	0.0286***	0.0168***	0.0165***	-0.0124***	-0.00504**
	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)
Low Intensity	0.0262***	0.0113***	0.0113***	-0.00634**	0.00228
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)
2007-08*Female	0.0345***	0.0215**	-0.0118**	0.00802	0.00216
	(0.008)	(0.009)	(0.006)	(0.007)	(0.006)
2008-09*Female	-0.0433***	-0.000297	-0.00496	-0.00775**	0.00961***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
Female*High Intensity	-0.0533***	-0.0113***	-0.0195***	0.0122***	-0.0313***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Female*Low Intensity	-0.0511***	-0.00723*	-0.0130***	0.00338	-0.0323***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
Year 2007-08*High Intensity	-0.0198**	0.00845	-0.0104*	-0.0217***	0.0152**
	(0.009)	(0.009)	(0.00)	(0.007)	(0.006)
Year 2008-09*High Intensity	0.00181	0.0164***	-0.00210	-0.00242	-0.0141***
	(0.005)	(0.006)	(0.004)	(0.004)	(0.004)
2007-08*Low Intensity	-0.0208**	0.0348***	-0.00564	-0.0342***	-0.0102
	(0.009)	(0.009)	(0.006)	(0.007)	(0.006)
Year 2008-09*Low Intensity	0.000509	0.00777	-0.00105	0.00713*	-0.00520
	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)
Year 2007-08*Fem*High	-0.0935***	-0.00673	0.00742	0.0165**	-0.113***
	(0.012)	(0.010)	(0.006)	(0.007)	(0.010)
Year 2007-08*Fem*Low	-0.0751***	-0.0296***	0.00374	0.0319***	-0.0815***
	(0.012)	(0.010)	(0.007)	(0.007)	(0.009)
Year 2008-09*Fem*High	0.008	-0.0205***	0.001	-0.00595	0.0219***
	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
2008-09*Fem*Low	0.00883	-0.0124**	0.001	-0.0122***	0.003
	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
Observations	257,180	257,180	257,180	257,180	257,180
R-squared	0.495	0.249	0.130	0.125	0.053

TABLE B.6: LPM Regression on Employment Status, by age groups

Sample by age	**18 yrs Any work**	**18 yrs Paid emp**	**18 yrs Self emp**	**18 yrs Self emp**	**18 yrs Farm work**	**19 yrs Unpaid work**	**19 yrs Any work**	**19 yrs Paid emp**	**19 yrs Farm work**	**19 yrs Unpaidwork**
High Intensity	0.212***	0.296***	0.257***	-0.0270	-0.0224	0.107***	0.0275	0.0878***	-0.0605**	-0.0569*
	(0.0276)	(0.0385)	(0.0549)	(0.0505)	(0.0376)	(0.0219)	(0.0215)	(0.0243)	(0.0273)	(0.0333)
Low Intensity	0.163***	0.237***	0.197***	-0.00413	0.0150	0.125***	0.0144	0.0696***	-0.0279	0.0550*
	(0.0272)	(0.0382)	(0.0550)	(0.0487)	(0.0360)	(0.0215)	(0.0211)	(0.0240)	(0.0260)	(0.0318)
Year 2007-08	-0.0236	-0.0121	-0.286	-0.449***	-0.0643	0.276***	0.0872*	-0.123*	0.156***	0.0178
	(0.0627)	(0.0855)	(0.212)	(0.134)	(0.0815)	(0.0553)	(0.0528)	(0.0650)	(0.0598)	(0.0700)
Year 2008-09	-0.562***	-0.105*	-0.436***	-0.452***	0.172***	-0.164***	0.0260	-0.0206	-0.0347	0.0845**
	(0.0470)	(0.0564)	(0.106)	(0.0857)	(0.0444)	(0.0271)	(0.0271)	(0.0310)	(0.0329)	(0.0412)
Female*High Intensity	-0.248***	-0.164**	-0.159*	0.294***	-0.326***	-0.491***	-0.0377	-0.172***	-0.174***	-0.718***
	(0.0491)	(0.0796)	(0.0909)	(0.0969)	(0.0629)	(0.0361)	(0.0477)	(0.0619)	(0.0638)	(0.0510)
Female*Low Intensity	-0.300***	-0.119	-0.147	0.149	-0.400***	-0.354***	0.0412	-0.123**	-0.122**	-0.484***
	(0.0488)	(0.0789)	(0.0908)	(0.0961)	(0.0613)	(0.0345)	(0.0464)	(0.0609)	(0.0572)	(0.0457)
2007-08*Female	0.409***	-0.937***	-3.272***	-2.957***	0.614***	0.545***	-0.000415	0.0979	0.0109	0.846***
	(0.0992)	(0.195)	(0.225)	(0.160)	(0.112)	(0.0772)	(0.105)	(0.160)	(0.119)	(0.0901)
2008-09*Female	-0.701***	-0.495***	-0.639**	-0.383	-0.429***	-0.260***	-0.113*	-0.507***	-0.0550	-0.115**
	(0.138)	(0.159)	(0.308)	(0.304)	(0.0848)	(0.0457)	(0.0591)	(0.109)	(0.0634)	(0.0559)
2007-08*High Intensity	-0.0537	-0.0970	-0.148	0.111	0.162*	-0.142**	0.0862	-0.0510	-0.247***	0.199***
	(0.0673)	(0.0887)	(0.217)	(0.154)	(0.0914)	(0.0596)	(0.0569)	(0.0692)	(0.0695)	(0.0767)
2008-09*High Intensity	0.165***	0.0573	0.137	0.180*	-0.308***	0.0615*	0.132***	-0.000558	-0.0932**	-0.0587
	(0.0538)	(0.0635)	(0.117)	(0.103)	(0.0587)	(0.0339)	(0.0334)	(0.0378)	(0.0428)	(0.0519)
2007-08*Low Intensity	-0.0986	0.0770	0.0234	-0.131	-0.215**	-0.180***	0.186***	-0.0380	-0.367***	-0.0543
	(0.0678)	(0.0885)	(0.217)	(0.158)	(0.0955)	(0.0595)	(0.0569)	(0.0694)	(0.0704)	(0.0768)
2008-09*Low Intensity	0.158***	0.0898	0.157	0.0728	-0.204***	0.000814	0.0301	-0.0104	0.0575	0.0360
	(0.0533)	(0.0631)	(0.117)	(0.103)	(0.0551)	(0.0328)	(0.0325)	(0.0371)	(0.0400)	(0.0485)
2007-08*Fem*High	-1.181***	0.294	2.976***	2.452***	-1.394***	-0.563***	0.00915	-0.143	-0.465**	-0.977***
	(0.151)	(0.200)	(0.322)	(0.352)	(0.199)	(0.0923)	(0.115)	(0.179)	(0.191)	(0.119)
2007-08*Fem*Low	-0.651***	0.333			-0.378**	-0.469***	-0.109	-0.0895	0.151	-0.742***
	(0.133)	(0.204)			(0.156)	(0.0910)	(0.114)	(0.178)	(0.156)	(0.112)
2008-09*Fem*High	-0.0166	-0.0884	-0.254	-0.230	0.481***	0.000377	-0.144*	-0.0117	-0.257**	0.145*
	(0.169)	(0.192)	(0.422)	(0.356)	(0.113)	(0.0620)	(0.0753)	(0.139)	(0.103)	(0.0797)
2008-09*Fem*Low	-0.145	-0.295	-0.104		0.253**	0.0601	-0.0399	0.102	-0.239***	-0.285***
	(0.174)	(0.196)	(0.375)		(0.112)	(0.0577)	(0.0722)	(0.130)	(0.0831)	(0.0725)
Observations	140,751	140,751	138,176	128,547	140,751	116,429	116,429	116,429	116,429	116,429

TABLE B.7: LPM regression on Employment Status for married individuals aged 15 or older in KPK

	Women	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
High Intensity	-0.0548***	0.00394*	-0.00158	-0.0131***	-0.0590***	0.00656	-0.00664	0.0153**	-0.0160**	-0.0136***
	(0.00462)	(0.00227)	(0.00156)	(0.00225)	(0.00362)	(0.00685)	(0.00843)	(0.00710)	(0.00660)	(0.00358)
Low Intensity	-0.0409***	0.00488**	-0.00146	-0.0104***	-0.0421***	0.0166**	-0.00202	0.0112	-0.0132**	0.00178
	(0.00472)	(0.00224)	(0.00155)	(0.00235)	(0.00383)	(0.00666)	(0.00823)	(0.00684)	(0.00663)	(0.00357)
2007-08	0.215***	0.00392	-0.00470**	0.00458	0.192***	0.0666***	0.00876	-0.0342**	0.0504***	0.0154
	(0.0158)	(0.00566)	(0.00231)	(0.00625)	(0.0148)	(0.0150)	(0.0203)	(0.0150)	(0.0182)	(0.00987)
2008-09	-0.0485***	0.00164	-0.00736***	0.00671*	0.00450	-0.0199**	0.0120	-0.0106	-0.00220	0.00141
	(0.00536)	(0.00289)	(0.00147)	(0.00345)	(0.00510)	(0.00879)	(0.0106)	(0.00884)	(0.00853)	(0.00447)
2007-08*High Intensity	-0.190***	0.00102	0.00139	-0.0103*	-0.165***	-0.0347**	0.0401*	-0.000443	-0.0626***	0.00815
	(0.0155)	(0.00645)	(0.00265)	(0.00591)	(0.0139)	(0.0165)	(0.0222)	(0.0171)	(0.0186)	(0.0107)
2008-09*High Intensity	0.0245***	-0.00512	0.00168	-0.0131***	0.00312	0.0135	0.0439***	0.00663	-0.0248**	-0.00312
	(0.00609)	(0.00347)	(0.00179)	(0.00369)	(0.00559)	(0.0107)	(0.0132)	(0.0112)	(0.0102)	(0.00552)
2007-08*Low Intensity	-0.175***	0.00174	0.00301	-0.00496	-0.164***	-0.0430***	0.0828***	-0.00330	-0.0946***	-0.0172
	(0.0156)	(0.00657)	(0.00273)	(0.00604)	(0.0140)	(0.0165)	(0.0223)	(0.0170)	(0.0185)	(0.0106)
2008-09*Low Intensity	0.0194***	-0.00486	0.00235	-0.00690*	-0.0167***	0.00550	0.00846	0.000970	0.0102	0.00279
	(0.00621)	(0.00339)	(0.00179)	(0.00388)	(0.00568)	(0.0105)	(0.0128)	(0.0107)	(0.0104)	(0.00559)
Constant	0.00652	-0.0483***	0.00133	0.00622	0.0630***	0.374***	0.355***	-0.0261	-0.0985***	0.276***
	(0.00878)	(0.00486)	(0.00282)	(0.00407)	(0.00705)	(0.0200)	(0.0215)	(0.0171)	(0.0152)	(0.0113)
Observations	54,286	54,286	54,286	54,286	54,286	41,964	41,964	41,964	41,964	41,964
R-squared	0.083	0.092	0.004	0.017	0.076	0.214	0.114	0.043	0.108	0.099

TABLE B.8: LPM regression on Employment Status for unmarried individuals aged 15 or older in KPK

	Women Any work	**Men Any work**	**Women Paid emp**	**Men Paid emp**	**Women Self emp**	**Men Self emp**	**Women Farm work**	**Men Farm work**	**Women Unpaid work**	**Men Unpaid work**
High Intensity	-0.00578*	0.0302***	0.00487***	0.0223***	0.00109	0.00891***	0.00101	-0.00204	-0.0181***	-0.00843***
	(0.00298)	(0.00409)	(0.00179)	(0.00321)	(0.00122)	(0.00197)	(0.00105)	(0.00178)	(0.00209)	(0.00266)
Low Intensity	-0.0115***	0.0236***	0.00361**	0.0142***	-1.99e-05	0.00764***	0.000889	-0.00178	-0.0198***	-0.00150
	(0.00291)	(0.00400)	(0.00175)	(0.00313)	(0.00116)	(0.00191)	(0.00103)	(0.00178)	(0.00209)	(0.00268)
Year 2007-08	0.0505***	0.00516	0.00338	0.00839	-0.00291	-0.00261	-0.00310*	-0.00813**	0.0462***	-0.00497
	(0.00867)	(0.00955)	(0.00311)	(0.00790)	(0.00200)	(0.00358)	(0.00173)	(0.00328)	(0.00803)	(0.00702)
Year 2008-09	-0.0357***	-0.0426***	-0.00743***	0.00548	-0.00587***	-0.00178	-0.00322***	-0.0112***	-0.0114***	0.00610*
	(0.00286)	(0.00456)	(0.00194)	(0.00377)	(0.00111)	(0.00221)	(0.00104)	(0.00194)	(0.00232)	(0.00339)
2007-08*High Intensity	-0.0581***	-0.00630	0.00148	0.00199	-0.00254	-0.0135***	-0.00236	-0.00230	-0.0485***	0.0144*
	(0.00831)	(0.0104)	(0.00354)	(0.00880)	(0.00210)	(0.00396)	(0.00175)	(0.00338)	(0.00739)	(0.00748)
2008-09*High Intensity	0.00860**	-0.00280	0.001000	0.00310	-0.00156	-0.00648**	-0.00182	0.00511**	0.0113***	-0.0149***
	(0.00348)	(0.00580)	(0.00240)	(0.00488)	(0.00135)	(0.00287)	(0.00125)	(0.00237)	(0.00271)	(0.00408)
2007-08*Low Intensity	-0.0431***	-0.00690	0.00445	0.0179**	-0.00194	-0.00690*	-0.00217	-0.00205	-0.0391***	-0.0131*
	(0.00830)	(0.0105)	(0.00360)	(0.00888)	(0.00203)	(0.00401)	(0.00174)	(0.00341)	(0.00739)	(0.00740)
2008-09*Low Intensity	0.0102***	-0.00617	0.000368	0.00454	-0.000323	-0.00359	-0.00258**	0.00297	0.0102***	-0.00648
	(0.00341)	(0.00568)	(0.00236)	(0.00476)	(0.00131)	(0.00282)	(0.00122)	(0.00236)	(0.00267)	(0.00420)
Constant	0.00116	-0.146***	-0.0122***	-0.0956***	0.00118	-0.0307***	0.00390***	-0.00174	0.00902***	-0.0389***
	(0.00291)	(0.00428)	(0.00180)	(0.00331)	(0.00111)	(0.00207)	(0.00111)	(0.00182)	(0.00203)	(0.00280)
Observations	78,288	89,532	78,288	89,532	78,288	89,532	78,288	89,532	78,288	89,532
R-squared	0.083	0.274	0.071	0.157	0.008	0.041	0.007	0.030	0.049	0.069

Appendix C

Chapter 4

C.1 Heckman Two-Step method

One common approach to the SSB problem is Heckman's two-step estimator, also known simply as the Heckman. This approach involves estimation of a probit model for selection, followed by the insertion of a correction factor—the inverse Mills ratio, calculated from the probit model—into the second OLS model of interest.

The Heckman two-step method is used to correct for this sample selection bias. In the first step of the process, the probit model for employment is estimated for all observations in the sample. Then, the estimates are used to construct the inverse Mills ratio. In the second step, the earning function is estimated by OLS with all the independent variables from the initial earning function, as well as the selectivity term λ.

Step 1 - Estimation probit model of employment type: Z is exogenous in the earning function E(u/X,Z)=0. X is a subset of Z, that is, there is at least one more variable in the employment decision equation. By using all the observations of those participating in employment type as well as those who are not, estimate the probit of employment type on Z_i and obtain γ to compute the inverse mills ratio, $\lambda(Z_i\gamma)$

$$(Type\ of\ Employment)_D = Z_{ih}\ \gamma + error_{ih}$$

Step 2 - Estimation of corrected earning function: OLS is then used to estimate the corrected wages for the entire sample. Estimated coefficients would now be unbiased and consistent. The null hypothesis is tested for $\rho = 0$ for sample selection bias.

$$(Log\ income)_{ih} = \alpha_1 + X_{ih}\ \beta_2 + \rho\ \gamma\ (Z_{ih}\ \gamma) + error_{ih}$$

The decision to enter paid employment / self employment (selection equation) is modelled using the selection equation:

$$Z_i = \alpha_1 + \beta_1(X_i) + \beta_2(W_i) + \eta_i$$

where Z_i is an index of paid employment or self employment propensity, X_i is a vector of worker characteristics from the earnings regressions. W_i is a vector of characteristics which influence sector choice which are excluded from the earnings equations

For sample of workers in the different categories of employment, the extent of variation in wages amongst ethnic/religious groups can be established by estimating the traditional Heckman-Mincerian wage regressions. The estimation is done separately for each type of employment by ethnic group.

$$ln\ wage_i = \alpha_1 + \beta_1\ (x_i) + \beta_2\ (E_i) + \beta_3\ (R_i) + \beta_4\ (E_i R_i) + \xi_{1i}$$

where ln-wage is log of earnings for worker i, α_1 is the constant term, E_i is a vector of ethnicity dummies. X_i is the vector of personal characteristics of each worker i which are standard for estimate earning equations. The sign and significance of β_2 tells us whether a particular group has an earnings advantage when compared to another excluded group. In order to account for geographical differences, vector of region dummies R_i is added. Then, to investigate whether returns associated with region vary across ethnicity, an interaction term for ethnicity and region $E_i R_i$ is added to the model.

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