

**B** | Global Economy  
and Development  
at BROOKINGS



# HOW DO EDUCATION AND UNEMPLOYMENT AFFECT SUPPORT FOR VIOLENT EXTREMISM?

EVIDENCE FROM EIGHT ARAB COUNTRIES

Kartika Bhatia  
Hafez Ghanem

# **How do education and unemployment affect support for violent extremism?**

## **Evidence from eight Arab countries**

Kartika Bhatia and Hafez Ghanem<sup>1</sup>

### **Abstract:**

This paper represents a contribution to the literature on the relationship between economic development and radicalization or support for violent extremism. It uses survey data from eight Arab countries to analyze how education and unemployment affect support for violent extremism. Previous empirical work has failed to demonstrate any link between unemployment and radicalization. Our analysis shows that, while it seems to be true that unemployment on its own does not impact radicalization, unemployment among the educated leads to a greater probability of radicalization. Hence, our work provides empirical support to the view that relative deprivation is an important driver of support for violent extremism. Individuals whose expectations for economic improvement and social mobility are frustrated are at a greater risk of radicalization.

**Key Words:** Human capital, economic under-performance, violent extremism, radicalization

**JEL Codes:** I20, I24, D74, O15

### *Authors' note:*

Hafez Ghanem is a non-resident senior fellow at the Brookings Institution and Vice President of the World Bank for the Middle East and North Africa. Kartika Bhatia is a Research Analyst in the Office of the Regional Vice President, Middle East and North Africa, the World Bank.

### *Disclaimer:*

The Brookings Institution is a nonprofit organization devoted to independent research and policy solutions. Its mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations for policymakers and the public. The conclusions and recommendations of any Brookings publication are solely those of its author(s), and do not reflect the views of the Institution, its management or its other scholars.

Brookings recognizes that the value it provides is in its absolute commitment to quality, independence and impact. Activities supported by its donors reflect this commitment and the analysis and recommendations are not determined or influenced by any donation. A full list of contributors to the Brookings Institution can be found in the Annual Report at <https://www.brookings.edu/about-us/annual-report/>.

---

<sup>1</sup> The World Bank, Washington DC. We thank Shantayanan Devarajan and colleagues in the Chief Economist of the Regional Vice-Presidency for the Middle East and North Africa (MNACE) for providing useful comments. The findings, interpretations, and conclusions in this paper are those of the authors and do not necessarily represent the views of the World Bank, its Board of Executive Directors, or the governments they represent.

## 1. Introduction

The year 2016 saw a spate of global terrorist attacks in United States, Ivory Coast, Belgium, France, Pakistan, Turkey and Nigeria, which has led to an increased focus on ways to combat terrorism and specifically, the threat of Daesh (Arabic acronym for ISIS, Islamic State of Iraq and Syria). Figures from Institute for Economics and Peace show that terrorist violence in 2014 rose by 80 per cent to 32,685 casualties compared to 2013 and then fell back by ten per cent in 2015. Even with the decline, 2015 was the second deadliest year for terrorism since 2000. This is a global challenge, but it is particularly important for the development community. Increasingly, development practitioners are interested in preventing terrorism for two reasons. First, most terrorism victims live in developing countries. The vast majority of terrorist attacks have occurred in just five countries: Iraq, Nigeria, Afghanistan, Pakistan, and Syria, with private citizens and property being the prime target of most attacks. Second, violence and instability have negative impacts on development outcomes. Huge declines in tourism and foreign direct investment have led to falling growth rates in countries like Egypt and Tunisia. More dramatically, Hallaj (2015) argues that Syria has lost well over 30 years of development and economic growth.

Terrorist violence has taken many forms all over the world. While the majority of terrorist violence is carried out by organizations like Boko Haram, Daesh and the Taliban, most attacks in the west are carried out by lone wolves.<sup>2</sup> In fact, Daesh encourages “isolated actions of self-radicalized people, who have absolutely no direct contact with Daesh, and yet who consciously act in its name”.<sup>3</sup> Recent attacks in Tunisia, Egypt, Brussels, and Paris have been carried out by individuals returning after becoming radicalized in Iraq, Syria, and Libya. A common thread among all terrorist attackers is their support for violent extremism or radical militant ideas. Hence preventing ‘radicalization’ rather than ‘terrorism’ can be an effective first step towards combating terrorism.

Radicalization or violent extremism can refer to both the expression of extreme views as well as the actual exercise of violence. The U.S. Agency for International Development (USAID) defines radicalization as the act of “[a]dvocating, engaging in, preparing or otherwise supporting ideologically motivated or justified violence to further social, economic and political objectives” (USAID 2011). The U.K. Department for International Development (DFID) considers radicalization as terrorism and defines it as “the use of and facilitation of violence targeted on civilians as a means of rectifying grievances, real or perceived, which form the basis of increasingly strong exclusive group identities” (DFID 2013). In this paper, we investigate what is driving support for radicalization or violent extremism among the general population in Middle East-North Africa.

The nascent literature on drivers of radicalization has highlighted several factors, with recent reports citing *frustrated expectations of individuals for economic improvement and social mobility*’ as a key driver.<sup>4</sup> Taspinar (2009) calls this phenomenon relative deprivation – *the absence of opportunities relative to expectations*. This paper empirically tests the importance of a specific type of *relative deprivation* linked to labor market outcomes (which do not reflect educational attainment) in fueling support for violent extremism. Previous academic studies have not found any conclusive links between employment and income and support for militant

---

<sup>2</sup> Lone wolf terrorism is defined as terrorist acts committed by individuals who act alone and without the support of a terrorist organization.

<sup>3</sup> How should the world respond to Terrorism? The Atlantic, April 2, 2016.

<sup>4</sup> Sep, 2011 ‘The development response to violent extremism and insurgency’, USAID. Also see, Taspinar (2009).

groups (Blair et al. 2013; Berman et al. 2011). There is also no consensus on the relationship between education and violent extremism. Anecdotal evidence suggests a positive relation between higher education and involvement in terrorism. On the one hand, Kreuger and Maleckova (2003) find that education is uncorrelated to participation in, and support for, terrorism. On the other, Azam and Thelen (2008) show that high education levels discourage participation in terrorist activity. In this paper, we argue that **lack of adequate employment opportunities for educated individuals** is fueling support for violent extremism among general population. Our view is also supported by recent analysis of data related to Daesh foreign recruits. A 2016 report released by the Combating Terrorism Center (CTC), West Point provides an analysis of 4,600 Daesh foreign fighters from the Islamic State's personnel records. The data reveals that the fighters were relatively well-educated when compared to education levels in their home countries, but most previously held low-skilled positions. The 2016 Middle East North Africa (MENA) Economic Monitor by the World Bank also analyzes the same Daesh foreign fighters' personnel dataset and concludes that the average fighter from MENA is more educated than what is typical of their cohort in their countries.<sup>5</sup> Hence, frustration over failure to secure jobs commensurate with their education status could have played a role in radicalizing those fighters.

We use data from Gallup World Poll to investigate if educated individuals with poor or no jobs are more inclined to support violent extremism in MENA countries. We concentrate on MENA since the region is the biggest supplier of foreign fighters to Iraq and Syria. The region's crisis of civil unrest and terrorism makes it necessary to understand the socio-economic and political context behind radicalization. Our results show that relative deprivation has a significant association with radicalization. Individuals with secondary educations who are unemployed or underemployed have the highest risk of becoming radicalized. We are cautious in claiming a causal story, but this link remains significant under variety of robustness checks – alternate specification, different measures of radicalization, estimating results using the World Values Survey and finally, controlling for individual's political grievances, economic welfare, physical and mental health, community attachment and social network. Interestingly, the  $R^2$  values from our regressions are relatively low, reflecting the notion that much of perceived radical beliefs are unexplained and unobservable.<sup>6</sup>

This paper is divided into five sections. Section 2 presents an overview of available evidence on the economic drivers of violent extremism. Section 3 describes our data and gives descriptive statistics. Sections 4 and 5 present the results and discuss their implications. The appendix presents sensitivity analysis and tests the robustness of our results.

## **2. Concerned literature: Economic drivers of support for violent extremism**

Empirical scholarship on drivers of support for radicalization and violent extremism is underdeveloped, albeit growing in recent years. While there is a large body of work on the characteristics of terrorists and economics of terrorism<sup>7</sup>, only a handful of studies exist on the determinants of support for violent extremism. These studies consider multiple individual level factors like poverty, education, religiosity, and role of Islam in explaining support for violent

---

<sup>5</sup> Devarajan, Shantayanan; Mottaghi, Lili; Do, Quy-Toan; Brockmeyer, Anne; Joubert, Clement Jean Edouard; Bhatia, Kartika; Abdel Jelil, Mohamed; Shaban, Radwan Ali; Chaal-Dabi, Isabelle; Lenoble, Nathalie. 2016. *Economic and social inclusion to prevent violent extremism*. Middle East and North Africa (MENA) Economic Monitor. Washington, D.C. World Bank Group.

<sup>6</sup> The low R-square is common to studies analyzing opinions using Gallup and World Values Survey.

<sup>7</sup> See. Alan B. Krueger (2007), Savun and Phillips (2009), Ibrahim (1980) and Krueger and Maleckova (2003).

extremism but fail to come up with a clear consensus.<sup>8</sup> Below we present a brief overview of some of the work from Muslim majority countries.

Shapiro and Fair (2010) and Blair et al. (2013) study the relationship between poverty and support for terrorism in Pakistan. Shapiro and Fair (2010) focus on urban Pakistanis and find little evidence linking poverty, religiosity, support for Islamist politics and support for democratic values to support for militant nationalist and Islamist organizations. Their findings suggest that public support for militancy varies across different militant groups and specific political grievances are an important, but not decisive, driver of support. Blair et al. (2013) conduct a 6,000 person nationally representative survey in Pakistan and conclude that poor individuals dislike militants more than middle-class Pakistanis. The dislike is strongest among urban poor, especially those living in neighborhoods exposed to militant violence.

Madiha Afzal (2015) analyzes data from Pew Global Attitudes in Pakistan and finds that people with higher education levels have less favorable views of Pakistani Taliban. In another report<sup>9</sup>, she undertakes a course review of government and private schools following official government curriculum for grades 9 and 10. The report illustrates that Pakistani high school education does not equip students to counter radical narratives and instead promotes intolerance.

Shafiq and Sinno (2010) use Pew's Global Attitudes Survey (GATS) data from 2005 to study the relationship between education (as well as income) and support for suicide bombings across six Muslim countries – Indonesia, Pakistan, Jordan, Lebanon, Turkey, and Morocco. They hypothesize that educational attainment and income directly discourages support for suicide bombings but indirectly encourages support for suicide bombings through political dissatisfaction. Their results show that the effect of education and income on public support for suicide bombings varies across countries and targets, pointing to the difficulties of making generalization about Muslim countries.

Fair and Shepherd (2006) and Mousseau (2011) use 2002 Pew Global Attitudes data to study the demand for terrorism in 14 Muslim countries. Fair and Shepherd (2006) find that women, youth, computer users, those who believe that Islam is under threat and those who believe that religious leaders should play a larger role in politics are more likely to support terrorism. They also find that the very poor are less likely to support terrorist attacks. However, their results show significant variation across countries, suggesting caution in generalization. Results from Mousseau (2011) show that support for Islamist terrorism is highest among the urban poor. He attributes the rise of Islamic terrorism to highly insecure economic conditions faced by poor in large cities.

Kiendrebeogo and Ianchovichina (2016) use Gallup survey data from 27 developing countries to study the characteristics of radicalized individuals. They find that the typical radicalized individual is more likely to be young, unemployed, and struggling to meet ends, relatively uneducated, and not as religious as others but more willing to sacrifice their own life for his or her beliefs.

Jenkins (2011) examines 82 cases of homegrown terrorism in the U.S. from 2002 through 2010 and finds that the recruits were young (average age 32 and median age 27) and had completed secondary education, with many enrolled in college but never graduating. Most were Muslim and started their journey toward radicalization online.

---

<sup>8</sup> See World Bank (2015) for a strategic review of the literature.

<sup>9</sup> USIP Special Report "Education and Attitudes in Pakistan: Understanding perceptions of terrorism", April 2015.

McCauley and Moskaleiko (2008) review 12 mechanisms at individual, group and mass levels that lead individuals and groups to radicalization and terrorism. They find state action and intergroup competition more important than individual psychology in understanding radicalization process.

In this paper, we focus on the demand for violent extremism and try to understand if a lack of economic opportunities among educated citizens is driving support among non-participants. We are among the first to provide evidence for relative deprivation as a key contributor towards radicalization. Taspinar (2009) considers relative deprivation and human development as key elements for explaining radicalization, but he does not provide any empirical evidence to support his hypothesis. Our work can be related to two recent studies that explore the link between educational returns and protest participation in the Arab world. Campante and Chor (2012) show that highly educated individuals who earn less than what is predicted by their biographical characteristics are more likely to participate in political protests. Shafiq and Vignoles (2015) find a negative association between protest participation and earnings gap (difference between actual and expected educational return) during the Arab Winter (2012-14), but not during the Arab Spring (2010-11).

### **3. Data and descriptive statistics used in our analysis**

Data used in this study comes from the Gallup World Poll. The Gallup World Poll is a nationally representative survey of populations aged 15 and above conducted in more than 160 countries since 2006. Our sample consists of the following countries: Algeria, Egypt, Iraq, Lebanon, Palestine, Tunisia, and Yemen for 2011 and Qatar for 2012.<sup>10</sup> The survey respondents are asked several questions related to their socio-economic status, political and religious beliefs and their opinions on society, country and events. They were also asked the following question concerning their support for violent extremism:

*Q1. I would like you to indicate to which extent it can be morally justified. Events of Sept 11th in U.S.– that is, the attack on the World Trade Center.*

Response to this question ranged from 1 through 5 with 1 being not justified at all to 5 being completely justified.

Figure 2 presents the distribution of answers to Q1 in the pooled sample. About 9.5% of respondents think that the attack on World Trade Center on Sep 11, 2001 is “completely justified”. If we add to this people who believe the attacks are “mildly justifiable”, the number increases to 15.8%. The significant size of this number is a cause for worry, as it appears to indicate fairly widespread support for violent extremism in the eight countries. Figure 3, shows that responses to Q1 vary significantly across countries. Palestine has 18.18% respondents supporting violent extremism while Algeria, Egypt, Qatar, Tunisia, and Yemen have more than 8% of their sampled population completely supporting attacks on 9/11. Lebanon and Iraq have 5 and 4% of respondents supporting violent extremism, respectively. Figure 4 presents the distribution of responses to Q1 by income categories. Radicalization support appears evenly distributed across different income quintiles. The figure on its own does not provide support to the commonly held view that the poor are more likely to be radicalized.

Table 1 presents the distribution of responses for Q1=4 (the 9/11 attacks are mildly justified) and Q1=5 (the 9/11 attacks are fully justified) by various socio-economic characteristics. The

---

<sup>10</sup> We select these countries based on availability of data for three key variables: radicalization, education and employment status.

first two rows suggest that radicals are mostly men. Among those who completely justify 9/11 attacks, 53% are men. Focusing on column 2 we find that 95% of extreme radicals respond that they are religious with 55% of them above the age of 30 and 64% of them living in a large city or its suburb. Most (66%) have secondary or tertiary education and only 15% of them are unemployed or underemployed.

#### 4. Empirical specification and results

How do education and employment impact support for violent extremism? To try to respond to this question consider the following model.

$$Y_i = \alpha_0 + \alpha_{1,s}educ_{i,s} + \alpha_{2,j}empl_{i,j} + \alpha_{3,sj}(empl * educ)_{i,sj} + \beta X_i + \varepsilon_i$$

Where  $\alpha$ s and  $\beta$ s are unknown parameters and  $Y$  is the ordinal variable *usa\_911* (individual's support for attack on the World Trade Center on 9/11). *educ<sub>i,s</sub>* is education status of individual  $i$  where  $s$  is either primary, secondary or tertiary educated. *empl<sub>i,j</sub>* is employment status for individual  $i$  where  $j$  has 3 categories: (a) full-time employed /employed part time but don't want full time/out of work force, (b) self-employed, and (c) unemployed/underemployed.<sup>11</sup> Next we have interactions between education and employment status ranging from *employed\*primary*, *employed\*secondary...self-employed\*primary...unemployed/underemployed\*tertiary*. The interaction terms measure if the impact of education on support for violent extremism changes with employment status. As per our hypothesis, we expect the coefficients on the interaction terms to be positive.  $X$  includes controls like gender, age, age squared, income, income squared, rural/urban status, religiosity, and country-year dummies.<sup>12</sup> Standard errors in all regression estimates are robust (Huber/White/sandwich estimator).

We are interested in identifying the coefficients for the education-employment interaction terms. We have data at the individual level for seven Arab countries for 2011 and Qatar for 2012. Our specification uses variation in education-employment status across individuals within a country-year. There is concern that the association between relative deprivation and radicalization is due to some unobserved variable that has a confounding impact and does not reflect a causal effect. Due to lack of panel dimension and instruments, we are unable to control for unobservable confounders and hence are cautious to claim a causal link between relative deprivation and radicalization. Still, we perform multitudes of robustness checks to provide evidence to support our hypothesis. Apart from socio-economic and demographic variables, we control for variety of possible theories explaining radicalization that could be correlated with our unemployment-education interaction terms (Appendix A3). We also estimate our results by choosing another measure for radicalization and also using a different dataset – World Values Survey (Appendix A1 and A2). While none of these empirical strategies can fully eliminate concerns about bias from selection and omitted variables, we find that the results are consistent across different approaches, arguably giving us more confidence that the estimated relationship is causal.

Table 2 shows the Ordinary Least Squares (OLS) estimates using Gallup data on the pooled sample. The dependent variable is support for attacks on 9/11 which we use as a proxy for support for violent extremism in general. Column 1 is the base level where we regress our

<sup>11</sup> Results remain the same if we use the six employment categories separately instead of grouping them into three.

<sup>12</sup> Appendix B gives a detailed description of all the variables.

outcome variable on education, employment status and socio-economic controls. Column 2 adds interactions between education and employment status. Column 3 adds country-year dummies to control for unobserved country-year factors influencing support for violent extremism.

It is often argued that education does not reduce the probability of supporting violent extremism. After all, the leaders of extremist groups are often highly educated individuals. Our results do not support this argument. The education variables in column 1 and 2 are not significant. However, in column 3, tertiary education has a significant negative coefficient. For those who are employed or out of work force (i.e. not looking for jobs), being tertiary educated has a negative impact on support for violent extremism.

But the impact of education reverses for unemployed or underemployed people. For example, in column 3, the effect of tertiary education on support for 9/11 attacks is -0.154 but given the interaction terms, the net effect is  $-0.154 - 0.100*\text{self-employed} + 0.253*\text{unemployed/underemployed}$ . If an individual is full time or part-time employed or out of work force, the impact of tertiary education is -0.154 (which is the coefficient for tertiary), but if the person is unemployed or underemployed, then the effect is  $-.154+0.253=0.099$ . In our case, both secondary and tertiary education have an increasing impact on support for extremism when a person is unemployed or underemployed.

The result on employment-education terms captures the essence of our relative deprivation hypothesis. The interaction terms between unemployment/underemployment and secondary and tertiary levels of education are positive and statistically significant. Educated people who are unemployed/underemployed are more likely to support violent extremism. Education on its own can reduce the probability that a person supports violent extremism. However, an educated person who is unemployed, or is earning a low salary doing a low productivity job in the informal sector (underemployed) is likely to feel frustrated, and hold a grudge against a society that is unable to provide him with the job he or she deserves after they put the time, effort and financial resources to complete their education. People with unresolved grievances like this are more likely to support violent extremism.

The results presented in Table 2 also shed some light on how other variables affect support for violent extremism. We find no impact for income and demographic variables on support for violent extremisms. We first ask whether sex and age affect support for violent extremism. The coefficient for female has the expected negative sign in column 2 and 3, but it is not statistically significant. Hence, this result does not support the conventional wisdom that women will tend to be less supportive of violent extremism than men. Age has a U-shaped relation with support for violent extremism, but is not statistically significant.

Since radicalization is linked to a certain interpretation of religion, it would appear to make sense that religious people would be more likely to support it than the non-religious. Contrary to popular and mainstream narrative, religiosity does not impact support for violent extremism in our sample. Even though majority of respondents in the sample consider religion to be an important part of their daily life, the effect of religiosity goes away once we control for economic characteristics. This result holds through while we perform various robustness checks (See Appendix A). In Appendix A2, we check our main results using World Values Survey data (Wave 6) and find that people who consider religion to be rather or very important in their daily life are less supportive of violence against others. This suggests that after controlling for socio-economics characteristics, being religious does not make people more

radical on average. Our results lend some support to the idea of ‘Islamization of radicalization’ proposed by Olivier Roy as opposed to radicalization of Islam.<sup>13</sup>

Income has a negative coefficient while income squared has a positive coefficient in all three columns. This means that at low income levels the tendency toward violent extremism falls with income up to a certain threshold, and then it starts rising. However the coefficients are not significant (except for income in column 1 and 2). Where a person lives does not seem to affect their views on violent extremism. The coefficients for small town and large city are significant in column 1 and 2 but lose their significance in column 3 when we add country-year dummies.

### Results from ordered logistic regression model

Since our response variable (*usa\_911*) is ordinal, we next consider an ordered logistic regression model to look at the behavior of education-unemployment interaction terms. In non-linear models, the estimation and interpretation of the coefficients associated with the interaction term between two variables is complicated.<sup>14</sup> The simple intuition from linear regression models does not extend to non-linear models. The marginal effect of a change in both interacted variables is not equal to the marginal effect of changing just the interaction term. Consider the non-linear model:

$$E[y|x_1x_2] = F(\beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_{12}(x_1 * x_2))$$

Where the function F is a logit or probit transformation. Let  $v = [\beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_{12}(x_1 * x_2)]$ . The marginal effect of a continuous variable  $x_1$  on the conditional expected value of y is as follows:

$$\frac{\partial E(y|x_1x_2)}{\partial x_1} = \frac{dF}{dv} (\beta_1 + \beta_{12}x_2)$$

And the cross partial effect is:

$$\begin{aligned} \frac{\partial^2 E(y|x_1x_2)}{\partial x_1 \partial x_2} &= \frac{\partial}{\partial x_2} \left[ \frac{dF}{dv} (\beta_1 + \beta_{12}x_2) \right] \\ &= \left[ \frac{dF}{dv} \beta_{12} \right] + \left[ \frac{d^2 F}{dv^2} (\beta_1 + \beta_{12}x_2)(\beta_2 + \beta_{12}x_1) \right] \end{aligned}$$

Even if the interaction effect  $\beta_{12} = 0$ , the above expression still has a non-zero value. Also, the sign of  $\beta_{12}$  does not necessarily indicate the sign of the cross-partial effect. In contrast for a linear model, the interaction effect  $\frac{\partial^2 E(y|x_1x_2)}{\partial x_1 \partial x_2}$  is equivalent to the marginal effect,  $\frac{\partial E(y|x_1x_2)}{\partial (x_1x_2)} = \beta_{12}$  of the interaction term  $x_1x_2$ .

Table 3 gives us the result from an ordered logistic model. Our main results are similar to OLS. The interaction terms between unemployment/underemployed and secondary and tertiary education are positive and statistically significant. As previously mentioned, we cannot simply take the coefficient of the interaction term as the interaction effect. We can use the *margins* command in STATA to get the expected probability that the outcome will be 1 for various employment status and various values of education status. We have to do this for each of the values of the response variable, *usa\_911*. After obtaining the predicted probabilities we plot these using *marginsplot*. To simplify the graph, we rearrange the employment status variable as an indicator variable with two categories: unemployed (includes underemployed)

<sup>13</sup> See, “The Islamization of radicalism”, Slate, June 2, 2016.

<sup>14</sup> See Ali and Norton (2003) and Norton, Wang and Ai (2004).

and employed (included employed full time, employed part-time but don't want full time, self-employed and out of work force). Next, we keep only age, religious, female, income, education status, employment status and interaction of education and employment status as predictors.

Figure 5 plots predicted probabilities for the five values of *usa\_911*. In the figure, on the x axis education status varies from 1 to 3 (primary, secondary and tertiary). On the y axis, we have the predicted probability from an ordered logistic regression of *usa\_911* on age, religiosity, gender, income education status, employment status and interaction of education and employment status. Except for education and employment, all other variables are kept at their mean values. The pattern of probability is similar for *usa\_911*=2 to *usa\_911*=5 and different for *usa\_911*=1. When *usa\_911*=1, unemployed people have higher probability for not supporting 9/11 attacks at primary education and employed people have higher probability for secondary and tertiary education. For rest of the values of *usa\_911*, the pattern reverses. For primary education status, employed individuals have a higher probability to support 9/11 attacks but for secondary and tertiary education level, being unemployed has a higher probability. Secondary educated unemployed people have the highest likelihood of supporting violent extremism with unemployed tertiary educated people being the second closest.

Another way to look at this is to plot the difference in predicted probabilities between unemployed and employed for each value of education status. Figure 6 plots the difference in probabilities for all 5 values of *usa\_911* with age, religion, gender and income at their mean values. When *usa\_911*=1 (violent extremism is not justified at all), difference in probability between employed and unemployed people is positive for primary educated and negative for secondary and tertiary educated people. When *usa\_911*=5 (violence is completely justified), difference in probability is negative at primary schooling and positive for secondary and tertiary education levels. The difference in probability for *usa\_911*=2 to *usa\_911*=5 has an upwards trend till secondary education and then tapers down. The difference is highest for secondary level education. **To summarize, unemployed/underemployed educated individuals are more likely to support violent extremism with unemployed secondary educated people having the highest probability for radicalization followed by tertiary educated unemployed/underemployed.**

The above plots keep income, age, gender and religion at their mean levels. For ordered logistic regression, marginal effect for the interaction depends on the values of the covariate even if the covariate is not part of the interaction itself. Next we show results from varying the covariates and calculating the predicted probabilities again. Figure 7 plots predicted probability for *usa\_911*=5 for different income quintiles keeping age, gender and religion at mean values. At all income quintiles, unemployed secondary educated people have the highest likelihood for supporting violent extremism, followed by primary employed and then tertiary unemployed. Figure 8 plots predicted probability for *usa\_911*=5 for different age levels keeping income, gender and religion at mean values. As age increases, predicted probability falls for all employment and education combinations for *usa\_911*=5. Once again, unemployed secondary educated people have the highest likelihood of justifying 9/11 for all age groups with youth having the higher probability.

We perform a variety of robustness checks which are detailed in Appendix A. We check our results using an alternate definition of radicalization from Gallup Database– “*support for attacks in which civilians are the target*” (Appendix A1). To further check if our results are not being driven by the type of question or dataset used, we look at a similar question from World Values Survey (WVS) - “*support for violence against other people*” (Appendix A2).

Finally, we control for other popular explanations for support of VE – life satisfaction, political grievance, physical and mental health, community attachment, social networks and communication (Appendix A3). The unemployment-education interaction terms remain positive and significant throughout reiterating the strong link between relative deprivation and radicalization.

## 5. Concluding remarks

Our conclusion that unemployed or underemployed educated Arab youth are more likely to be radicalized is cause for serious concern, because unemployment in many Arab countries seems to rise with the level of education, and many new graduates are only able to find low-paying jobs in the informal sector.<sup>15</sup> This underlines the importance of education and labor market reforms for preventing violent extremism.

More research on education in the Arab world is needed. Steer et al (2014) point out that, while Arab countries have succeeded in rapidly increasing access to education, the quality of education remains a problem. Using data from 13 Arab countries, they conclude that about 48 percent of lower secondary school students are not learning. They fail basic literacy and numeracy tests. Even those who learn are not equipped with the skills required in a 21<sup>st</sup> century market place. Curricula in Arab countries rely too much on rote learning and do not help students acquire skills, like problem solving and working in teams, demanded in today's globalized markets.

Arab education systems seem to have been geared toward producing public sector employees, and many Arab youth continue to express a preference for public employment. But Arab public sectors are no longer able to hire the large numbers of graduates that come out of schools and universities every year. This means that young people graduate from Arab schools and universities with diplomas, but many of them have either not learnt; or have learnt but the skills they acquired do not match those demanded by the labor market. From their perspective they have fulfilled their part of the social contract. They have studied and passed exams, and their families have born the financial burden of their education. They feel frustrated because by failing to provide them with jobs that reflect their level of educational attainment society is not respecting its part of the contract.

The problem is not only with education, or the supply of labor. There is also a serious problem with the demand for labor, and more research on Arab labor markets and business environment is needed. Schiffbauer et al (2015) argue that policies in many Arab countries have been captured by a few politically connected firms. Hence, they create privileges rather than an open and transparent business environment that encourages private sector growth and job creation. Many educated youth have to wait, sometimes for years, in order to get a job. Those who cannot wait join the informal sector where wages are low and where there is no job security or social protection. Whether unemployed or underemployed in the informal sector, educated youth feel that they have a serious grievance against society.

---

<sup>15</sup> The unemployment rate for university graduates in Tunisia is more than 30%, and in Jordan it is more than 35%. More than two-thirds of new entrants in the labor market in Egypt who find jobs are in the informal sector. See Ghanem (2016) for more details.

The empirical evidence from eight Arab countries presented here indicates that higher education reduces the probability of an individual supporting violent extremism (Table 3).<sup>16</sup> However, education coupled with unemployment or underemployment is associated with greater radicalization. This underlines the importance of reforming Arab education systems and labor market policies, to deal with the phenomenon of unemployed educated youth. Inasmuch as violent extremism affects the whole world and not just the Arab countries, those reforms could be considered as global public good.

---

<sup>16</sup> Hence, our result is similar to Afzal (2015) who argues that higher education in Pakistan discourages radicalization. She believes it is due to the superior, tolerant and unbiased curriculum taught at college level as compared to high school.

## References

- Ai, C. R. and E. C. Norton. 2003. "Interaction terms in logit and probit models." *Economics Letters* 80(1): 123–129
- Ai, C. R., Wang, H. and E. C. Norton. 2004. "Computing interaction effects and standard errors in in logit and probit models." *The Stata Journal* 4(2): 154-167
- Afzal, Madiha. 2015. "What's the relationship between education, income and favoring the Pakistani Taliban?" Future Development Blog, Brookings.
- Azam, Jean-Paul and Veronique Thelen. 2008. "The roles of foreign aid and education in the war on terror." *Public Choice* 135 (3-4)
- Berman, Eli, Michael C., Joseph H. Felter and Jacob Shapiro. 2011. "Do working men rebel? Employment and insurgency in Afghanistan, Iraq and the Philippines." *Journal of Conflict Resolution* 55(4): 496-528.
- Blair, G., Christine Fair, C., Malhotra, N. and Shapiro, J. N. 2013. "Poverty and Support for Militant Politics: Evidence from Pakistan." *American Journal of Political Science*, 57: 30–48.
- Bloch, F., Rao, V., Desai, S. 2004. "Wedding celebrations as conspicuous consumption: signaling social status in rural India." *Journal of Human Resources* 39, 675–695.
- Brown, P., Bulte, E., Zhang, X., 2011. "Positional spending and status seeking in rural China." *Journal of Development Economics* 96, 139–149.
- Campante, Filipe R. and Davin Chor. 2012. "Why Was the Arab World Poised for Revolution? Schooling, Economic Opportunities, and the Arab Spring." *Journal of Economic Perspectives*, 26(2): 167-88.
- DFID. 2013. Countering violent extremism and terrorism: DFID's role and contribution.
- Fair, C. Christine and Bryan Shepherd. 2006. "Who Supports Terrorism? Evidence from Fourteen Muslim Countries." *Studies in Conflict & Terrorism* 29: 51-74.
- Fehr, E., Schmidt, K.M., 1999. "A theory of fairness, competition and co-operation." *Quarterly Journal of Economics* 114, 817–868.
- Frijters, P., Leigh, A., 2008. "Materialism on the march: from conspicuous leisure to conspicuous consumption?" *Journal of Soc. Economics* 37, 1937–1945.
- Ghanem, H. 2016. "The Arab Spring Five Years Later: Toward Greater Inclusiveness." Brookings Institution Press. Washington, D.C.
- Hallaj O. 2015. "The Balance Sheet of Conflict: Criminal Revenues and Warlords in Syria." NOREF Report, Norwegian Peacebuilding Resource Centre, Oslo.

Hey, J.D. and P. Lambert. 1980. "Relative Deprivation and the Gini Coefficient: Comment." *Quarterly Journal of Economics*, 95, 567-573.

Ibrahim S. 1980. "Anatomy of Egypt's militant Islamic groups: Methodological note and preliminary findings." *International Journal of Middle East Studies*. Vol 12, No. 4, pp. 423-453.

Jacob N. Shapiro and C. Christine Fair. 2010. "Understanding Support for Islamist Militancy in Pakistan." *International Security* 34, no. 3, pp. 79-118.

Jenkins, Brian Michael. 2011. "Stray Dogs and Virtual Armies: Radicalization and Recruitment to Jihadist Terrorism in the United States since 9/11." Santa Monica, Calif.: RAND Corporation, OP-343-RC.

Kiendrebeogo, Y. and Ianchovichina, E. 2016. "Who Supports Violent Extremism in the Developing Countries? Analysis of attitudes based on value surveys". Policy Research Working Paper Series 7691. The World Bank.

Krueger, Alan B. 2007. "What makes a terrorist?" Princeton. NJ: Princeton University Press.

Krueger, Alan, and Maleckova, Jitka. 2003. "Education, poverty and terrorism: Is there a causal connection?" *Journal of Economic Perspectives* 17 (4): 119-44.

Mousseau, Michael. 2011. "Urban poverty and support for Islamist terror: Survey results of Muslims in fourteen countries." *Journal of Peace Research*, Vol. 48, No. 1, pp. 35-47.

McCauley, Clark and Moskalenko, Sophia. 2008. "Mechanisms of Political Radicalization: Pathways toward Terrorism." *Terrorism and Political Violence*, 20:3, 415-433.

Runciman, W.G. 1966. "Relative Deprivation and Social Justice". Routledge, London.

Savun, B. and Philips, Brian J. 2009. "Democracy, Foreign Policy, and Terrorism." *The Journal of Conflict Resolution*. Vol. 53, no. 6, pp. 878-904.

Schiffbauer, M. Sy, A. Hussain, S. Sahnoun, H. and Keefer, P. 2015. "Jobs or Privileges: Unleashing the Employment Potential of the Middle East and North Africa." The World Bank. Washington D.C.

Shafiq, M. Najeebm, and Abdulkader H. Sinno. 2010. "Education, Income, and Support for Suicide Bombings: Evidence from Six Muslim Countries." *Journal of Conflict Resolution* 54(1): 146-78.

Shafiq, M. Najeeb and Anna Vignoles 2015. "Returns or revolution? Education, earnings, and protest during the Arab Spring and the Arab Winter." Paper presented at the Association for Analytic Learning about Islam and Muslim Societies (AALIMS) Annual Meeting, Conference on Islam and Human Capital, Princeton University. Princeton, NJ

Steer, L. Ghanem H. and M. Jalbout. 2104. "Arab Youth: Missing Educational Foundations for a Productive Life?" Center for Universal Education at Brookings. Washington D.C.

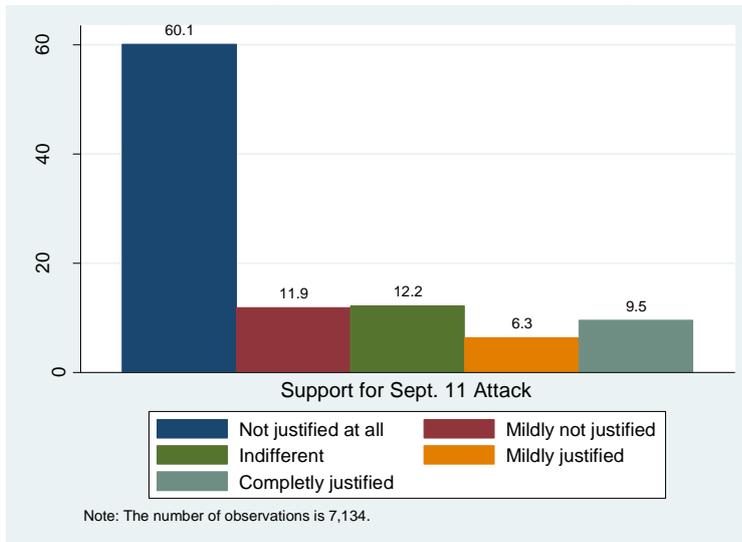
Taşpınar, Ömer. 2009. "Fighting Radicalism, not 'Terrorism': Root Causes of an International Actor Redefined." *SAIS Review of International Affairs*, Volume 29, No. 2, pp. 75-86.

USAID 2011. News and Information. <https://www.usaid.gov/news-information/fact-sheets/development-response-violent-extremism>

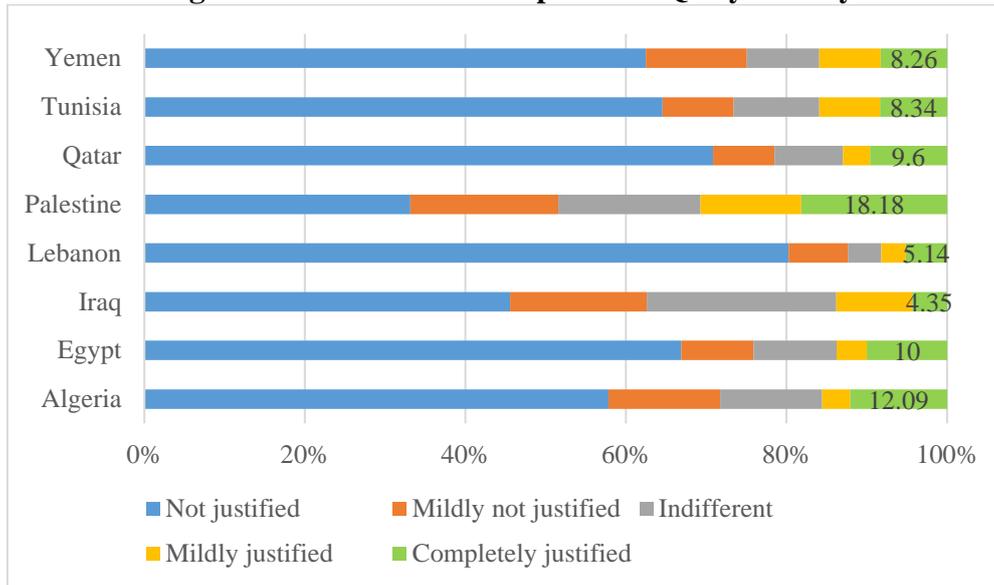
World Bank. 2015. "Preventing Violent Extremism with Development Interventions: A Strategic Review." Mimeo. Washington D.C.

Yitzhaki, S. 1979. "Relative Deprivation and the Gini Coefficient." *Quarterly Journal of Economics*, 93, 321-324.

**Figure 2: Distribution of responses to Q1 (% of all respondents in pooled sample)**

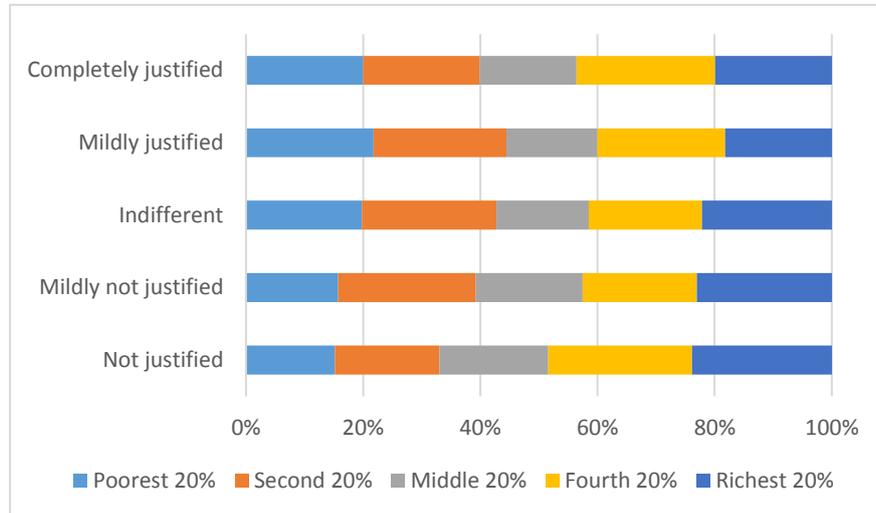


**Figure 3: Distribution of responses to Q1 by country**

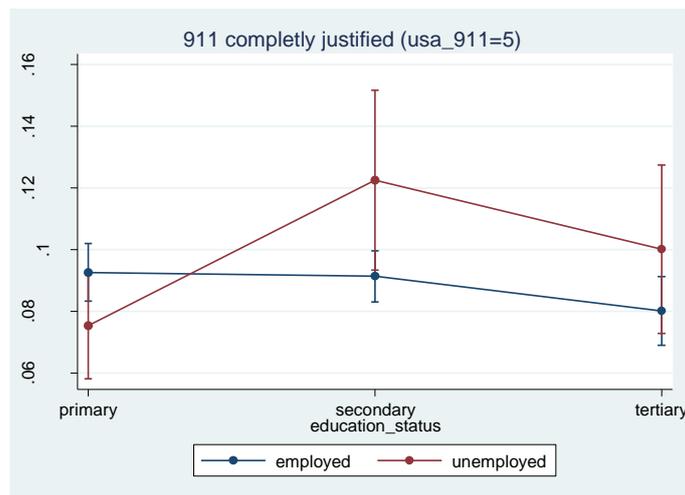
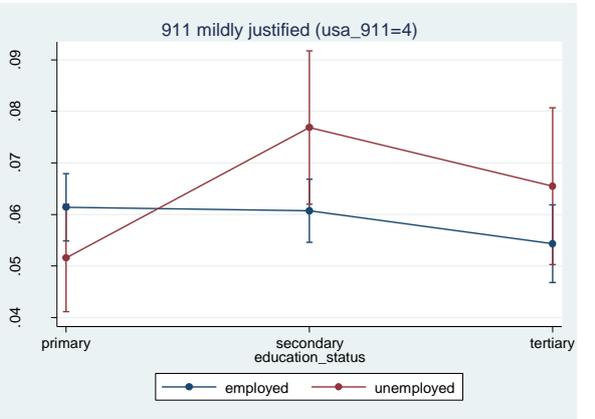
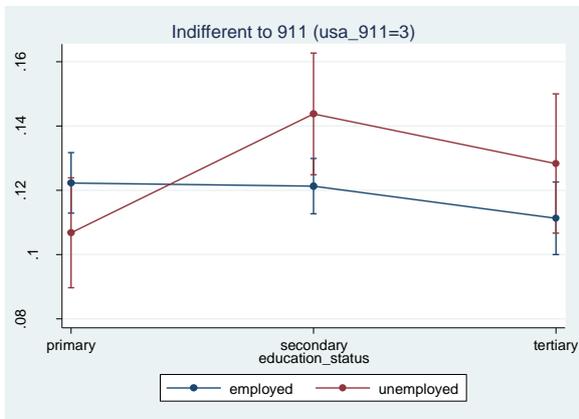
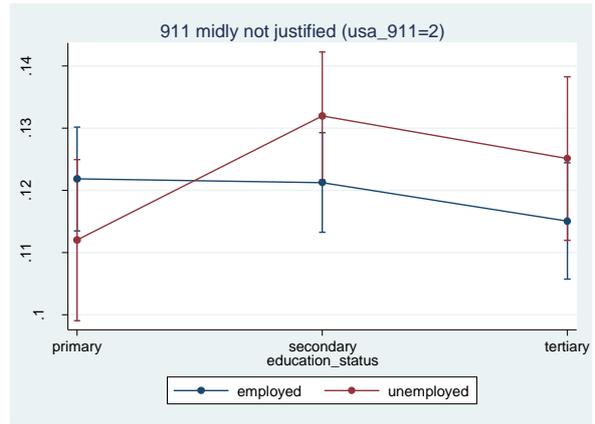
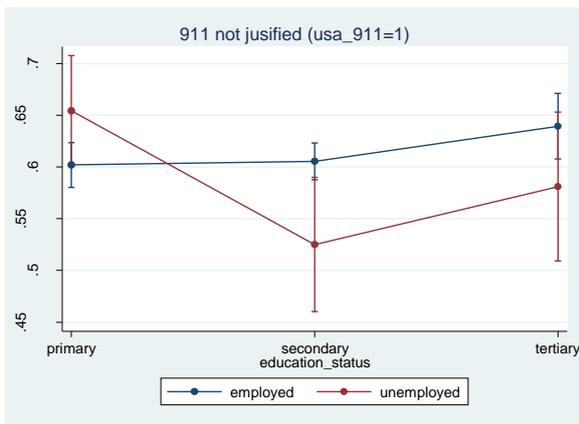


Note: Number of observations: Algeria (1001); Egypt (900); Iraq (920); Lebanon (953); Palestine (902); Qatar (833); Tunisia (959); Yemen (666).

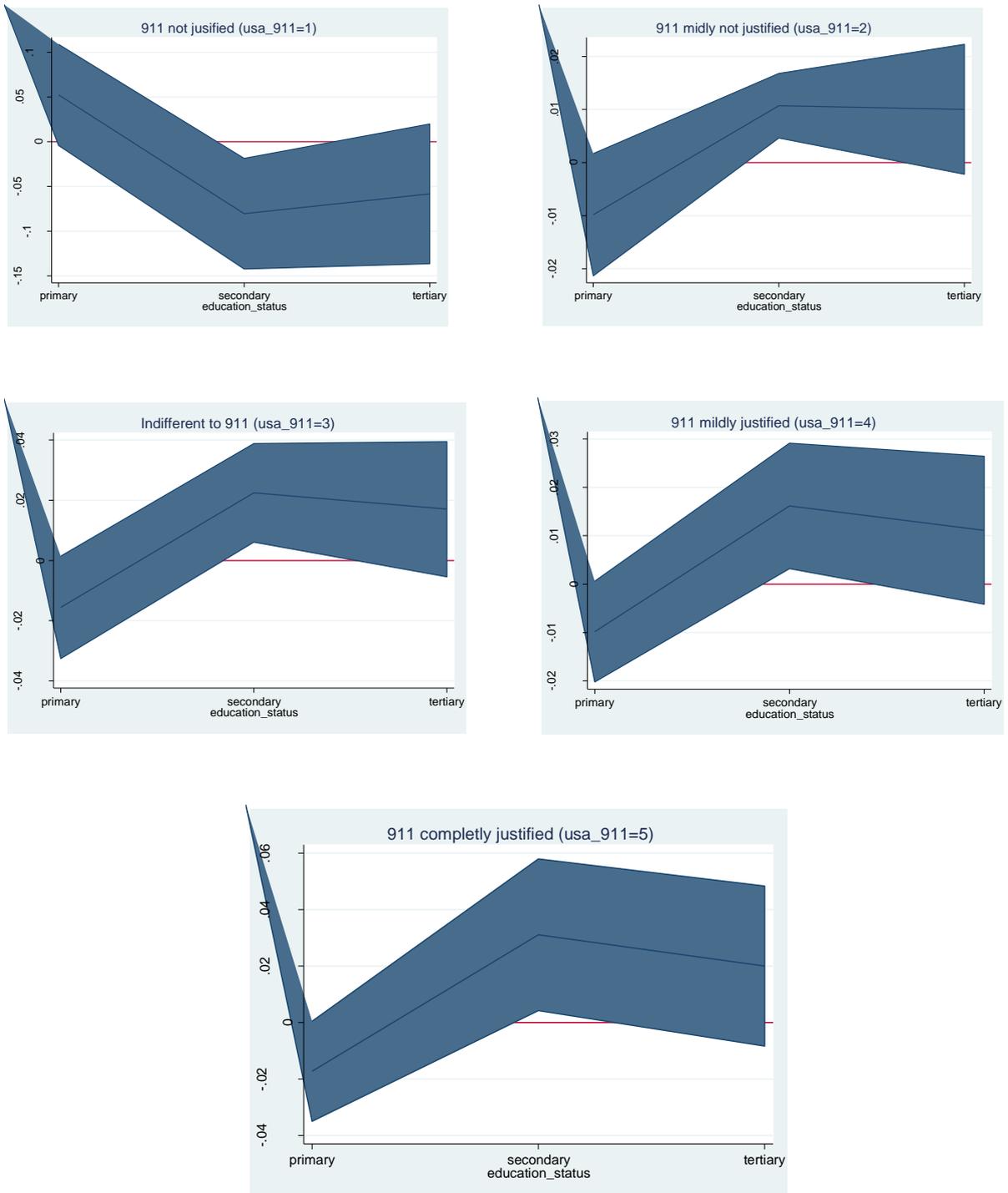
**Figure 4: Distribution of responses to Q1 by income quintiles**



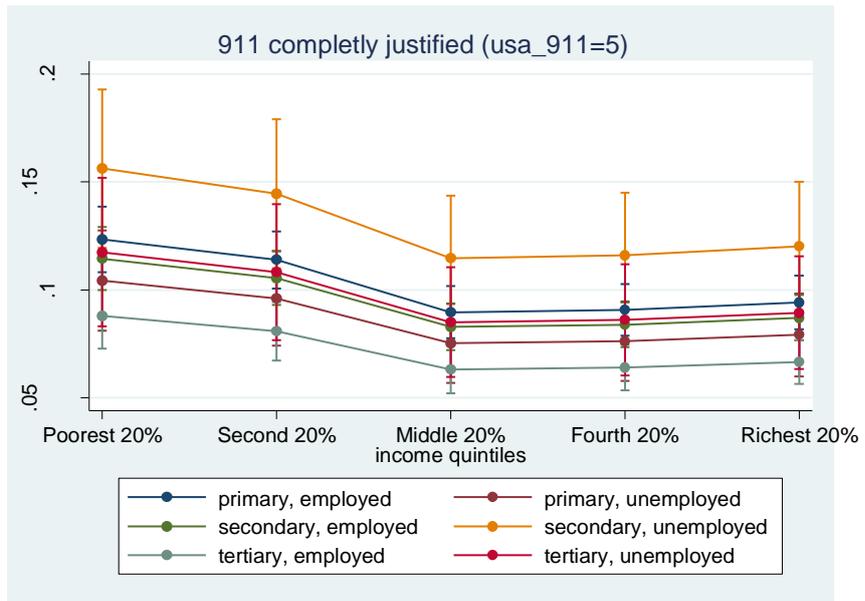
**Figure 5: Predicted probability of USA\_911=1 to 5**



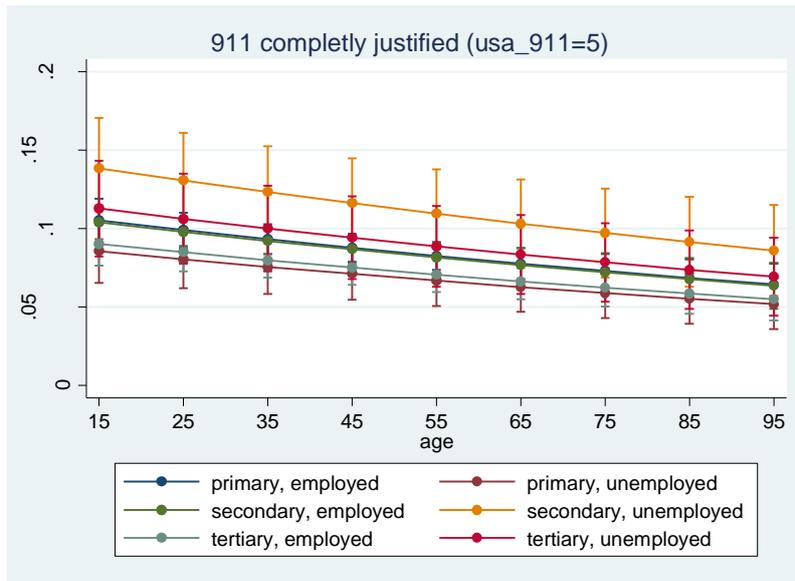
**Figure 6: Difference in probability for usa\_911**



**Figure 7: Predicted probability for different income quintiles**



**Figure 8: Predicted probability for different age levels**



**Table 1: Proportion (%) of respondents who support attacks on 9/11 by various characteristics**

	<b>Mildly justified (Q1=4)</b>	<b>Completely justified (Q1=5)</b>
<b>Gender</b>		
Male	51.33	52.72
Female	48.67	47.28
<b>Age Category</b>		
Youth (15-29)	41.35	45.19
Adult (30-64)	55.06	50.22
Old (65+)	3.60	4.59
<b>Religion</b>		
Religious	92.99	95.25
Not religious	7.01	4.75
<b>Urban/Rural</b>		
Rural area	18.22	15.03
Small town	14.00	21.43
Large city	49.56	46.73
Suburb	18.22	16.82
<b>Education</b>		
Primary	35.33	34.17
Secondary	49.11	51.99
Tertiary	15.56	13.84
<b>Employment Status</b>		
Employed/Out of work force	76.67	75.85
Self-Employed	10.44	9.13
Unemployed/underemployed	12.89	15.02

Note: See Appendix B for description of variables.

**Table 2: Dependent variable “Attack on 9/11” (Results from OLS)**

VARIABLES	(1)	(2)	(3)
	Base Level	Adding interactions	Adding Country-Year FE
Female	0.002 (0.034)	-0.002 (0.034)	-0.006 (0.034)
Age	-0.679 (0.717)	-0.576 (0.718)	-0.853 (0.703)
Age_sq	0.077 (0.102)	0.062 (0.102)	0.100 (0.100)
Religious	0.039 (0.058)	0.036 (0.058)	0.058 (0.059)
Income	-0.347** (0.147)	-0.356** (0.146)	-0.172 (0.156)
Income_sq	0.011 (0.008)	0.011 (0.008)	0.007 (0.008)
<b>Urban area (Base – Rural area or farm)</b>			
Small town/village	0.194*** (0.061)	0.194*** (0.060)	0.054 (0.063)
Large city	0.174*** (0.048)	0.176*** (0.048)	-0.061 (0.051)
Suburb of large city	-0.008 (0.055)	-0.004 (0.055)	0.010 (0.060)
<b>Education status (Base – Primary 1 to 8 years)</b>			
Secondary to 3 year of tertiary (secondary)	0.037 (0.039)	0.018 (0.045)	-0.068 (0.046)
4 years of tertiary and beyond (tertiary)	-0.055 (0.053)	-0.070 (0.059)	-0.154** (0.061)
<b>Employment Status (Base – Employed full time/ part time but do not want full/out of work force)</b>			
Self-employed	-0.071 (0.051)	0.027 (0.086)	0.039 (0.084)
Unemployed/Underemployed	0.071 (0.051)	-0.131 (0.087)	-0.127 (0.086)
<b>Interaction Terms</b>			
Self-employed*secondary		-0.163 (0.109)	-0.122 (0.107)
Self-employed*tertiary		-0.168 (0.139)	-0.100 (0.140)
Unemployed/underemployed*secondary		0.308*** (0.112)	0.308*** (0.110)
Unemployed/underemployed*tertiary		0.259* (0.141)	0.253* (0.139)

**Country-Year Dummies (Base: Algeria-2011)**

Egypt-2011 dummy			-0.189*** (0.068)
Iraq-2011 dummy			0.150** (0.067)
Lebanon-2011 dummy			-0.449*** (0.064)
Palestine-2011 dummy			0.652*** (0.074)
Qatar-2012 dummy			-0.140* (0.084)
Tunisia-2011 dummy			-0.128** (0.063)
Yemen-2011 dummy			-0.193** (0.078)
Constant	5.443*** (1.423)	5.327*** (1.422)	4.710*** (1.418)
Observations	6,984	6,984	6,984
R-squared	0.026	0.028	0.065

---

Robust standard errors in parentheses

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

**Table 3: Dependent variable “Attack on 9/11” (Results from Ordered Logistic Regression)**

VARIABLES	(1)	(2)	(3)
	Base Level	Adding interactions	Adding country-year FE
female	0.008 (0.050)	0.001 (0.051)	-0.008 (0.051)
age	-0.687 (1.048)	-0.518 (1.048)	-1.265 (1.062)
age_sq	0.064 (0.150)	0.039 (0.150)	0.142 (0.152)
religious	-0.018 (0.086)	-0.020 (0.086)	0.081 (0.090)
income	-0.320 (0.228)	-0.342 (0.227)	-0.299 (0.240)
income_sq	0.004 (0.012)	0.005 (0.012)	0.013 (0.013)
<b>Urban area (Base – Rural area or farm)</b>			
Small town/village	0.258*** (0.087)	0.260*** (0.087)	0.101 (0.094)
Large city	0.285*** (0.070)	0.291*** (0.070)	-0.068 (0.075)
Suburb of large city	-0.035 (0.085)	-0.024 (0.085)	0.092 (0.094)
<b>Education status (Base – Primary 1 to 8 years)</b>			
Secondary to 3 year of tertiary (secondary)	0.031 (0.057)	-0.007 (0.065)	-0.141** (0.068)
4 years of tertiary and beyond (tertiary)	-0.143* (0.082)	-0.171* (0.094)	-0.307*** (0.097)
<b>Employment Status (Base – Employed full time/ part time but do not want full/out of work force)</b>			
Self-employed	-0.107 (0.081)	0.045 (0.124)	0.061 (0.123)
Unemployed/Underemployed	0.137* (0.070)	-0.203 (0.129)	-0.206 (0.129)
<b>Interaction Terms</b>			
Self-employed*secondary		-0.274 (0.168)	-0.222 (0.169)
Self-employed*tertiary		-0.243 (0.253)	-0.139 (0.264)
Unemployed/underemployed*secondary		0.516***	0.526***

		(0.156)	(0.158)
Unemployed/underemployed*tertiary		0.399*	0.432**
		(0.209)	(0.213)
Constant cut1	-3.607*	-3.459*	-3.979*
	(2.077)	(2.071)	(2.110)
Constant cut2	-3.058	-2.909	-3.401
	(2.077)	(2.071)	(2.110)
Constant cut3	-2.315	-2.164	-2.632
	(2.076)	(2.071)	(2.109)
Constant cut4	-1.731	-1.580	-2.038
	(2.076)	(2.071)	(2.108)
Observations	6,984	6,984	6,984
Country-Year FE	N	N	Y

---

Robust standard errors in parentheses

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

## Appendix A

Below we perform a variety of checks to test the robustness of our unemployment-education effects. In section A1, we consider another definition of radicalization from Gallup World Poll. In section A2, we use data from World Values Survey (Wave 6) to test our hypothesis. Finally in Section A3, We consider other factors driving support for violent extremism.

### Appendix A1: Another definition of radicalization

In this paper we have chosen a specific definition of violent extremism – support for attacks on September 11, 2001 at the World Trade Center. We believe that this question is the least ambiguous and clearly connotes a terrorist act. Gallup dataset also includes another question which has been used as a proxy for radicalization (See, Kiendrebeogo and Ianchovichina 2016).

*Q2. I would like you to indicate to which extent it can be morally justified. Other attacks in which civilians are the target (1 – cannot justified at all ... 5 – completely justifiable).*

**Figure A1: Distribution of responses to Q2 (% of all respondents in pooled sample)**

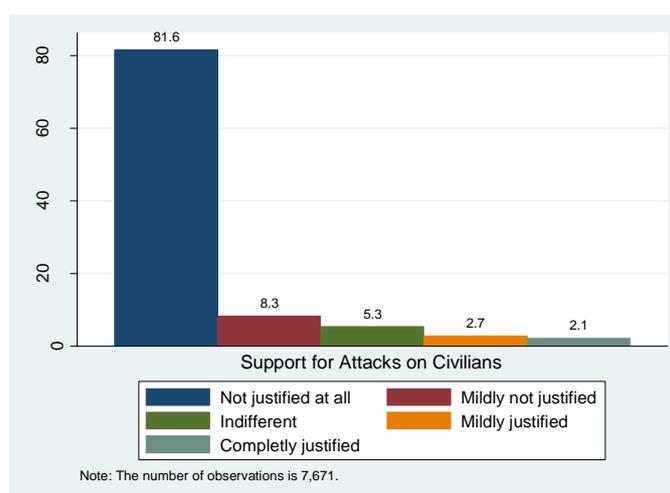


Figure A1 gives the distribution of Q2 in the pooled sample. Only, 5% of population mildly or completely supports attacks against civilians.

**Table A1: Dependent variable “Attack on civilians” (Results from OLS)**

VARIABLES	(1)	(2)	(3)
	Base Level	Adding interactions	Adding Country-Year FE
female	-0.016 (0.021)	-0.018 (0.022)	-0.022 (0.021)
age	0.053 (0.445)	0.057 (0.446)	0.005 (0.426)
age_sq	-0.022 (0.063)	-0.023 (0.063)	-0.016 (0.060)
religious	-0.030 (0.038)	-0.030 (0.038)	-0.052 (0.037)
income	-0.265** (0.103)	-0.265*** (0.103)	0.034 (0.113)
income_sq	0.011** (0.005)	0.011** (0.005)	-0.004 (0.006)
<b>Urban area (Base – Rural area or farm)</b>			
Small town/village	0.195*** (0.035)	0.196*** (0.035)	0.014 (0.034)
Large city	0.233*** (0.027)	0.234*** (0.027)	0.002 (0.026)
Suburb of large city	0.087*** (0.030)	0.089*** (0.030)	0.029 (0.030)
<b>Education status (Base – Primary 1 to 8 years)</b>			
Secondary to 3 year of tertiary (secondary)	0.066*** (0.024)	0.046* (0.028)	-0.035 (0.027)
4 years of tertiary and beyond (tertiary)	0.012 (0.035)	0.005 (0.039)	-0.076* (0.039)
<b>Employment Status (Base – Employed full time/ part time but do not want full/out of work force)</b>			
Self-employed	-0.094*** (0.029)	-0.112*** (0.040)	-0.091** (0.039)
Unemployed/Underemployed	0.001 (0.033)	-0.072 (0.050)	-0.066 (0.048)
<b>Interaction Terms</b>			
Self-employed*secondary		0.045 (0.059)	0.081 (0.057)
Self-employed*tertiary		-0.030 (0.074)	0.031 (0.074)
Unemployed/underemployed*secondary		0.122* (0.069)	0.127* (0.066)
Unemployed/underemployed*tertiary		0.072	0.056

		(0.092)	(0.088)
<b>Country-Year FE (Base- Algeria-2011)</b>			
Egypt-2011			-0.187*** (0.041)
Iraq-2011			-0.105*** (0.040)
Lebanon-2011			-0.283*** (0.039)
Palestine-2011			0.533*** (0.054)
Qatar-2012			0.045 (0.063)
Tunisia-2011			-0.199*** (0.038)
Yemen-2011			-0.247*** (0.043)
Constant	2.807*** (0.946)	2.821*** (0.946)	1.667* (0.925)
Observations	7,520	7,520	7,520
R-squared	0.023	0.023	0.087

---

Robust standard errors in parentheses

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

In Table A1, we present results from using Q2 as our dependent variable. Our main result remains similar to Q1 or support for 9/11 attacks. Being unemployed or underemployed with secondary education has a strong association with support for violent extremism. The interaction term between tertiary education and unemployment is no longer significant. The results from ordered logistic regression are also similar (table not shown here).

### **Appendix A2: Results from World Values Survey**

To further check if our results are not being driven by the type of question or dataset used, we look at a similar question from World Values Survey (WVS). The WVS are representative national surveys of the basic values and beliefs of the general public. We use data from Wave 6 (2010-2012) for Algeria, Egypt, Iraq, Lebanon, Palestine, Tunisia, Qatar, and Yemen. In wave 6, respondents were asked “*Please tell me whether you think it can always be justified, never be justified, or something in between: Violence against other people*”. Responses ranged from 1 through 10 with 1 being “never justifiable” to 10 being “completely justifiable”. Looking at the distribution of response to this question, 5% of people think it is mildly to completely justified (ranking 7-10) undertaking violence against other people. This is comparable to 5% for Q2 (ranking 4 and 5) from Gallup World Poll (See figure A1).

**Table A2: Dependent variable “Violence against other people” from World Values Survey, Wave 6 (2010-12)**

VARIABLES	(1)	(2)	(3)
	Base Level	Adding interactions	Adding Country-Year FE
female	-0.046 (0.044)	-0.041 (0.045)	-0.105** (0.044)
age	0.293 (0.994)	0.307 (0.995)	0.960 (0.982)
age_sq	-0.063 (0.139)	-0.065 (0.139)	-0.163 (0.137)
income	0.015 (0.010)	0.014 (0.010)	0.031*** (0.011)
<b>Religion in your life (Base – Not at all Important)</b>			
Not v imp	-0.300 (0.288)	-0.299 (0.288)	-0.269 (0.289)
Rather imp	-0.715*** (0.252)	-0.718*** (0.252)	-0.702*** (0.256)
Very imp	-1.357*** (0.241)	-1.354*** (0.241)	-1.192*** (0.248)
<b>Employment Status (Base – Employed full time/out of work force)</b>			
Self-employed	-0.022 (0.070)	-0.195** (0.096)	-0.197** (0.095)
unemployed/part-time	0.119* (0.061)	0.250** (0.098)	0.273*** (0.095)
<b>Education status (Base – No schooling/primary)</b>			
secondary	0.041 (0.051)	0.058 (0.060)	0.050 (0.060)
tertiary	-0.115** (0.058)	-0.117* (0.066)	-0.094 (0.067)
<b>Interaction Terms</b>			
Self-employed*secondary		0.284* (0.148)	0.246* (0.146)
Self-employed*tertiary		0.315* (0.179)	0.220 (0.175)
Unemployed/Part-time*secondary		-0.263** (0.134)	-0.325** (0.130)
Unemployed/Part-time*tertiary		-0.148 (0.155)	-0.218 (0.152)
Constant	3.131* (1.782)	3.096* (1.784)	1.545 (1.765)

Country-Year FE	N	N	Y
Observations	9,018	9,018	9,018
R-squared	0.024	0.025	0.060

Note: Algeria (2013), Palestine (2013), Egypt (2012), Iraq (2012), Qatar (2010), Lebanon (2013), Tunisia (2013), Yemen (2014). Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A2 gives the OLS result from regressing the ordered variable “violence against other people” on socio-economic variables. Column 1 includes female, age, age\_sq, income, religion, education and employment variables as independent variables. Column 2 adds interaction terms between education and employment status. Column 3 adds country-survey year dummies. The interaction between self-employment and secondary and tertiary education is positive and significant and between unemployment and secondary education status is negative and significant. The contrasting results for self-employed and unemployed people are hard to interpret. They could be driven by the ambiguity surrounding interpretation of phrase ‘violence against other people’. The question follows a series of statements where respondents were asked to choose their position on different issues like homosexuality, divorce, prostitution, sex before marriage, euthanasia, for a man to beat his wife, and parents beating children. Hence it is possible that unemployed respondents do not relate this to radicalization and terrorism but rather consider it as a tougher stance on crime.

### **Appendix A3: Alternate Theories**

Below we assess how our interaction terms fare when we consider other explanations for support of violent extremism popular in academic literature in an effort to control for potential omitted variable bias.

- ***Economic Welfare***

Our indicator for household income does not capture a person’s subjective view of his well-being. People with the same income can have different levels of life satisfaction. Lower levels of life satisfaction may lead to an increased support for violent extremism and can be correlated with one’s education-employment status. We use the following question from Gallup to capture life satisfaction:

*Life satisfaction: Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?*

Gallup considers individuals who rate their current lives as "7" or higher as "thriving," code 1. Individuals are "suffering" if they report their current lives as a "4" and lower, code 3. All other individuals are "struggling", code 2.

**Table A3.1: Testing Alternate Theories: Life satisfaction**

VARIABLES	(1) usa_911
<b>Life satisfaction (Base level – suffering)</b>	
struggling	-0.020 (0.042)
thriving	-0.047 (0.053)
<b>Interaction terms (only significant terms shown)</b>	
Unemployed/underemployed*secondary	0.311*** (0.111)
Unemployed/underemployed*tertiary	0.245* (0.140)
Country-Year FE	Y
Observations	6,959
R-squared	0.064

Note: All regression includes female, age, age\_sq, urban, religious, income and income\_sq. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A3.1 gives us the results. For the sake of brevity, we suppress other control variables and only show the education-employment interaction terms which are significant. People who consider themselves as struggling or thriving are less supporting of violent extremism compared to people who are currently suffering as evident from the negative sign. However the coefficients are not significant. The interaction terms between unemployed/underemployed and secondary/tertiary education are still significant.

- **Political Grievances**

Public discourse and scholarly evidence gives attention to grievances with domestic politics as possible motivations for rise in Islamist terrorism. To capture domestic political grievances we consider the following indicator (Yes/No) variables:

*corr\_govt: Is corruption widespread throughout the government located in country?*

*corr\_business: Is corruption widespread within businesses located in country?*

*Index\_institutions: The index consists of the following 4 questions:<sup>17</sup>*

*Do you have confidence in the military? ; Do you have confidence in the judicial system and courts? ; Do you have confidence in the national government? ; Do you have confidence in the honesty of elections?*

**Table A3.2: Testing Alternate Theories: Political Grievances**

VARIABLES	(1) usa_911	(2) usa_911
-----------	----------------	----------------

<sup>17</sup> For each individual record the following procedure applies: The four items are recoded so that positive answers are scored as a “1” and all other answers (including don’t know and refused) are assigned a score of “0.” If a record has no answer for an item then that item is not eligible for inclusion in the calculations. An individual record has an index calculated if it has valid scores for at least three questions. A record’s final index score is the mean of valid items multiplied by 100.

corr_govt	0.007 (0.073)	
corr_business	0.078 (0.061)	
index_institutions		0.0003 (0.001)
<b>Interaction terms (only significant terms shown)</b>		
Unemployed/underemployed*secondary	0.270* (0.149)	0.294** (0.129)
Unemployed/underemployed* tertiary	0.546*** (0.200)	0.501*** (0.194)
Country-Year FE	Y	Y
Observations	3,942	3,452
R-squared	0.095	0.050

Note: All regression includes female, age, age\_sq, urban, religious, income and income\_sq. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A3.2 add these variables to our main equation.<sup>18</sup> None of the political grievance variables are significant. Results for our interaction terms are significant implying that educated individuals having no jobs or part-time jobs are supportive of violent extremism.

- ***Community Attachment, Social networks and Communication***

Isolation, lack of access to network of family and friends, detachment with community and access to information and communication technology are some other potential factors that may affect an individual's likelihood of becoming radicalized.

#### Community Attachment Index

*Are you satisfied or dissatisfied with the city or area where you live?*

*In the next 12 months, are you likely/unlikely to move away from the city or area where you live?*

*Would you recommend the city/area where you live to a friend as a place to live, or not?*

We group these three questions to create an index named *community\_attachment*. For each individual, positive answers are scored as 1 and other answers as 0. A record's final index score is the mean of valid items.

#### Social Well-being

An individual's access to social network of family and friends and his level of isolation is captured by the following questions:

*Social\_well1: If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?*

*Social\_well2: In the city or area where you live, are you satisfied or dissatisfied with the opportunities to meet people and make friends?*

*Time\_family: On an average day, roughly how much time do you spend with family and relatives?*

<sup>18</sup> Column 1 does not include Yemen and Qatar and column 2 does not include Lebanon and Qatar.

*Time\_friends: On an average day, roughly how much time do you spend with friends?*

Communication

We have information on household's access to landline telephone, mobile, TV and internet.

**Table A3.3: Testing Alternate Theories: Community Attachment, Social Well-being and Communications**

VARIABLES	(1) usa_911	(2) usa_911	(3) usa_911
community_attachment	-0.007 (0.051)	-0.015 (0.014)	
time_family		0.006 (0.017)	
time_friends		-0.087** (0.042)	
social_well1		0.064* (0.036)	
social_well2			0.049 (0.039)
landline			-0.035 (0.063)
mobile			-0.068 (0.093)
TV			-0.135*** (0.042)
internet			
<b>Interaction terms (only significant terms shown)</b>			
Unemployed/underemployed*secondary	0.306*** (0.110)	0.297*** (0.110)	0.309*** (0.111)
Unemployed/underemployed* tertiary	0.250* (0.139)	0.297** (0.141)	0.238* (0.139)
Observations	6,979	6,634	6,921
R-squared	0.065	0.066	0.067

Note: All regression includes female, age, age\_sq, religious, urban, income, income\_sq and country-year dummies. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A3.3, column 1 adds the community attachment index to our main equation. The index is negative implying that individuals who are satisfied with their cities and don't want to move out are less supportive of attacks on 9/11. However it is not significant. In column 2, we add variables indicating social-wellbeing and networks. Interestingly, people who have relatives and friends to help them out in troubled times are not supportive of violent extremism but people who are satisfied with the opportunities to make friends in their city are supportive of violent extremism. This highlights the complex relation between social networks and

radicalization. A radicalized individual need not be an isolated person. He can be part of a community of people who may also hold extreme views. Finally, in column 3 we see that individuals with access to internet are less supportive of radical opinions. In all three columns, the unemployment-education interaction terms are positive and significant reiterating the strong link between relative deprivation and radicalization.

- ***Physical and mental health***

Psychological theories attempting to explain radicalization are focused on mental illness, negative experience, repressed sexuality etc. Perhaps, people who have poor physical and mental health are more likely to support violent objectives. The Physical Health Index measures perceptions of one’s own health. It also captures aspects of daily negative experiences like pain, worry and sadness.

- *Do you have any health problems that prevent you from doing any of the things people your age normally can do? (Yes/No)*
- *Now, please think about yesterday, from the morning until the end of the day. Think about where you were, what you were doing, who you were with, and how you felt. Did you feel well-rested yesterday? (Yes/No)*
- *Did you experience the following feelings during a lot of the day yesterday? How about physical pain? (Yes/No)*
- *Did you experience the following feelings during a lot of the day yesterday? How about worry? (Yes/No)*
- *Did you experience the following feelings during a lot of the day yesterday? How about sadness? (Yes/No)*

For each individual, the five questions are recoded so that favorable answers are scored as a “1” and all other answers (including don’t know or refused) are a “0.” If a record has no answer for an item, then that item is not eligible for inclusion in the calculations. An individual record has an index calculated if it has at least four out of five valid scores (0 or 1). The record’s final score is the mean of valid items multiplied by 100.

**Table A3.4: Testing Alternate Theories: Physical and mental health**

VARIABLES	(1) usa_911
index_physical_health	-0.002***

	(0.001)
<b>Interaction terms (only significant terms shown)</b>	
Unemployed/underemployed*secondary	0.307*** (0.110)
Unemployed/underemployed*tertiary	0.253* (0.138)
Country-Year FE	Y
Observations	6,984
R-squared	0.066

---

In table A3.4, we find that the Physical Health Index has a negative and significant coefficient implying that people who perceive their physical and mental health as poor are more supportive of violent extremism. The education-unemployment interactions are still positive and significant. Further, when we include all the new control variables from Table A3.1-A3.4 together and run our regression, the interaction between unemployment/underemployment and secondary or tertiary education remains positive and significant.

### Appendix B

Variable	Description	Source

female	Dummy with one for female and 0 for male	Gallup World Poll and WVS
age	log of age	Gallup World Poll and WVS
age_sq	age squared	Gallup World Poll and WVS
religious	Is religion an important part of your daily life (1=yes, 0=no)	Gallup World Poll
income	log of household income	Gallup World Poll
income_sq	income squared	Gallup World Poll
urban	where do you live – 0 “A rural area or on a farm”; 1 “A small town or village”; 2 “A large city”; 3 “A suburb of a large city”	Gallup World Poll
educ_status	What is your level of education – 0 “Completed elementary education or less (up to 8 years of basic education); 1 “Three year secondary education and some education beyond secondary education (9-15 years of education)”; 2 “Completed four years of education beyond high school and/or received a 4-year college degree”	Gallup World Poll
emp_status	What is your employment status – 0 “Employed full time for an employer or employed part time do not want full time or Out of workforce”; 1 “Employed full time for self”; 2 “Unemployed or Employed part time want full time”	Gallup World Poll
usa_911	There are many acts some people may do in life. I will read out to you a number of these acts. I would like you to indicate to which extent it can be morally justified. Events of Sept 11th in USA, that is, the attack on the World Trade Center? 1 Cannot be justified at all 2 "2" 3 "3" 4 "4" 5 Completely justifiable	Gallup World Poll
civ_viol	I would like you to indicate to which extent it can be morally justified. Other attacks in which civilians are the target. 1 Cannot be justified at all 2 "2" 3 "3" 4 "4" 5 Completely justifiable	Gallup World Poll



life_satisfaction	Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? 1-4 “suffering”; 5-6 “struggling” 7-10 “thriving”	Gallup World Poll
corr_govt	Is corruption widespread throughout the government located in country? (1=Yes, 0=No)	Gallup World Poll
corr_business	Is corruption widespread within businesses located in country? (1=Yes, 0=No)	Gallup World Poll
index_institutions	Index created from 4 questions: Do you have confidence in the military? (1=Yes, 0=No) Do you have confidence in the judicial system and courts? (1=Yes, 0=No) Do you have confidence in the national government? (1=Yes, 0=No) Do you have confidence in the honesty of elections? (1=Yes, 0=No)	Gallup World Poll
community_attachment	Index created from 3 questions: Are you satisfied or dissatisfied with the city or area where you live? (1=Yes, 0=No) In the next 12 months, are you likely/unlikely to move away from the city or area where you live? (1=likely, 0=unlikely) Would you recommend the city/area where you live to a friend as a place to live, or not? (1=Yes, 0=No)	Gallup World Poll
social_well1	If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not? (1=Yes, 0=No)	Gallup World Poll
social_well2	In the city or area where you live, are you satisfied or dissatisfied with the opportunities to meet people and make friends? (1=satisfied, 0=not satisfied)	Gallup World Poll
time_family	On an average day, roughly how much time do you spend with family and relatives?	Gallup World Poll
time_friends	On an average day, roughly how much time do you spend with friends?	Gallup World Poll
landline	Does your home have a landline telephone? (1=Yes, 0=No)	Gallup World Poll
mobile	Does your home have a cellular phone? (1=Yes, 0=No)	Gallup World Poll
TV	Does your home have television? (1=Yes, 0=No)	Gallup World Poll

internet	Does your home have access to the Internet? (1=Yes, 0=No)	Gallup World Poll
Index_physical_health	<p>Index created from 5 questions: Do you have any health problems that prevent you from doing any of the things people your age normally can do? (Yes/No)</p> <p>Now, please think about yesterday, from the morning until the end of the day. Think about where you were, what you were doing, who you were with, and how you felt. Did you feel well-rested yesterday? (Yes/No)</p> <p>Did you experience the following feelings during a lot of the day yesterday? How about physical pain? (Yes/No)</p> <p>Did you experience the following feelings during a lot of the day yesterday? How about worry? (Yes/No)</p> <p>Did you experience the following feelings during a lot of the day yesterday? How about sadness? (Yes/No)</p>	Gallup World Poll