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Evidence from Daesh Foreign Recruits

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Abstract

Transnational terrorist organizations such as the Islamic State group (also known as ISIS/ISIL or Daesh) have shown an ability to attract radicalized individuals from many countries to join their ranks. Using a novel data set that reports countries of residence and educational levels of a large sample of Daesh's foreign recruits, this paper finds that a lack of economic opportunities—measured by unemployment rates disaggregated by country and education level—explains foreign enrollment in the terrorist organization, especially for countries that are geographically closer to the Syrian Arab Republic.

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Unemployment and Violent Extremism: Evidence from Daesh Foreign Recruits*

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1 Introduction

The world has experienced a dramatic increase in the number of terrorist attacks since 2000 and especially since 2011. According to the Institute for Economics and Peace (2017), 106 countries were affected in 2016 with OECD countries suffering the highest number of casualties since the 9-11 attacks. The transnational nature of terrorism has become more salient with the emergence of multi-national terror groups such as Al-Qeada or more recently the Islamic State in Iraq and the Levant (ISIL, a.k.a ISIS or Daesh, its Arabic acronym); the U.N. estimates that over 25,000 foreign fighters went to Iraq and the Syrian Arab Republic between the start of the civil war in 2011 and September 2016 to fight for either Daesh or the Al-Nusra Front (United Nations 2017). Some of these fighters have engaged in extreme levels of violence in Syria and Iraq, others have perpetrated terrorist attacks in third countries, and those who ultimately return to their home countries may constitute threats to domestic security (*The Atlantic* 2017).

The unprecedented levels of international recruitment by terrorist organizations make efforts to curb radicalization at home all the more pressing. Yet, the drivers of radicalization into violent extremism are still being debated. Quantitatively studying these issues requires data with a source of variation that allows establishing a causal link between potential drivers and measures of radicalization. To that end, this paper leverages a unique dataset of Daesh's personnel records of its foreign recruits (Sky News 2016, CNN 2016, Zaman AlWasl 2016). The dataset is believed to have been leaked to journalists and contains information on 3,965 foreign recruits including their age, education, countries of residence, and self-reported knowledge of Islam. Dodwell, Milton and Rassler (2016) report that the cache contains 31 percent of the total number of foreign fighters who entered Syria in the same period.

Exploiting individual-level education information for these fighters, we link the size of a contingent of fighters to the economic conditions faced by workers in their countries of residence who have the same level of education, by distinguishing primary, secondary and tertiary education. Beginning non-parametrically, we document a correlation between the *within-country* relative unemployment rate faced by workers from a specific country and education level and the corresponding relative number of recruits. We then conduct panel regressions in which we estimate the impact of unemployment on the propensity to join the terrorist group, controlling for country and education-level fixed effects. The estimated coefficients indicate that higher unemployment rates are a push factor towards radicalization, especially for countries at a shorter

distance to Syria, with an elasticity of 0.25; a one percentage point increase in the unemployment rate leads to 42 additional Daesh recruits. The elasticity steeply decreases further away from Syria and becomes both economically and statistically insignificant past the average distance of 2,500 km. The results are robust to the inclusion of education-specific wage rates, strengthening the case for a causal interpretation of these results.

The rich dataset also allows us to revisit the oft-debated relationship between education and radicalization. An opportunity-cost view of radicalization would suggest that high education levels discourage participation in terrorism (Azam and Thelen 2008). Yet Krueger and Malečková (2003) find no such correlation. First, aspiring Daesh recruits have more education than the average male in their country of origin. Second, exclusive information on self-reported knowledge of Sharia and desired role in the organization shows that aspirations differ across education groups: administrators are relatively more likely to have a tertiary education, suicide fighters are relatively more likely to have a secondary education and fighters are relatively more likely to have a primary education only. In addition, religious knowledge is low overall and associated with the more highly educated recruits. Thus, higher education seems to be associated with high intrinsic motivation to join the terror group. The effect of education on the propensity to radicalize is therefore ambiguous, which might explain why earlier studies found varying results.

Our paper contributes to two connected literatures. First, our work contributes to the economic literature on the drivers of violent extremism and terrorism, as reviewed in (Krueger and Malečková 2003). This literature has found no significant or even a positive relationship between terrorism and incomes at the individual and country level (Krueger and Malečková 2003, Krueger 2007, Krueger and Laitin 2008, Abadie 2006). Benmelech and Klor (2016) find a positive relationship between GDP per capita and a country's likelihood of having nationals among the Daesh fighters, a finding which we replicate in cross-country regressions. However, our data are disaggregated enough to allow us to go further than existing studies towards causal estimates, by allowing country fixed effects. The lack of within-country variation has been a limitation for most earlier studies. Krueger and Malečková (2009) is one exception, which uses a dyadic dataset whereby the country of origin of a terrorist and the country of destination where the attack is perpetrated are both known and controlled for. They document a higher number of terrorist incidents "when people of one country disapprove of the leadership of another country." While our study is methodologically similar to Krueger and Malečková (2009), it arguably tests for a first-order driver of radicalization – unemployment – providing direct evidence that individual-level

socioeconomic conditions drive participation in violent extremism. While our study is the first to establish this relationship for violent extremism, our results are consistent with previous studies showing that providing work opportunities reduces other forms of violence, in the context of youths susceptible to crime in Chicago (Davis and Heller 2017), Liberian ex-combatants (Blattman and Miguel 2010) or Indian villagers affected by the Maoist rebellion (Fetzer 2014).

More generally, our paper speaks to the large body of work that analyzes the proximate causes of violent conflict. Blattman and Miguel (2010) review that literature. While the causal relationship between socio-economic conditions and conflict has been established (Miguel, Satyanath and Sergenti 2004, Bazzi and Blattman 2014, Harari and Ferrara *forthcoming*), less progress has been made in identifying the underlying mechanisms. On the one hand, supply-side mechanisms associate wealth with the intrinsic or extrinsic motivation of individuals to become insurgents (Collier and Hoeffler 1998, Dube and Vargas 2013, Guardado and Pennings 2017). On the other hand, Fearon and Laitin (2003) interpret the negative wealth-conflict gradient as due to variations in the presence of government forces or in state capacity more generally (Sanchez de la Sierra 2017). As the individuals drawn to violence in our setting migrate to Iraq and Syria rather than fight in their home country, we can rule out the latter as an explanation for our results. The same reason can also explain why our results differ from Berman, Shapiro and Felter (2011a), who find a *negative* relationship between unemployment and violence in Afghanistan, Iraq and the Philippines. Providing a conceptual foundation for this result, Berman, Callen, Felter and Shapiro (2011b) suggest that unemployment can affect conflict by changing civilians' incentives to side with the government in its fight against insurgencies. Specifically, the authors argue that higher unemployment rates could lower violence by lowering the government's cost of buying information about insurgents from civilians. This mechanism can also be ruled out in our setting – again because recruits migrate to Iraq and Syria. Our results are thus most consistent with the class of supply-side mechanisms. Among the latter, we can rule out neither an opportunity-cost nor a grievance view of radicalization (Collier and Hoeffler 2004), but we note that a grievance view would be more consistent with anecdotal evidence that Daesh wages are low and with Bahney, Iyengar, Johnston, Jung, Shapiro and Shatz (2013), who examine the payments made to Al-Qaeda fighters in Iraq and reject the idea that monetary incentives play a large role in explaining participation.

The rest of the paper is organized as follows. In section 2, we describe the data and examine Daesh recruits' education levels. In section 3, we present our main results, i.e. the association between unemployment and Daesh enrollment. Section 4 concludes.

2 What Characterizes Daesh Foreign Recruits?

2.1 Data

The analysis conducted in this paper combines personnel records on Daesh foreign recruits and socio-economic information about the countries of residence of these individuals before they joined the terrorist group. The data are believed to have been leaked by a defector and made available to many institutions including various news organizations such as Syria's Zaman al Wasl (which in turn shared the data with our team), Germany's Süddeutsche Zeitung, WDR, and NDR, Britain's Sky News, and U.S.-based NBC News.[1]

The data are a cross-section of the group's foreign workforce during a time period stretching from early 2013 to late 2014 (Dodwell et al. 2016). The information is on foreign recruits who joined the ranks of the terrorist group *in* Syria and Iraq rather than on individuals who have remained in their home country and pledged allegiance to the organization. The records include information on a recruit's country of residence, citizenship, education, age and marital status. An original feature of the data is that they also contain information on self-reported knowledge of Sharia, desired role in the terrorist organization and previous jihadist experience. In contrast to previous studies on terrorism (see e.g. Abadie 2006 and Benmelech and Klor 2016) or on civil conflicts more generally speaking (see survey from Blattman and Miguel 2010), we have more detailed information on terrorist recruits. In particular, in the Daesh personnel records, individuals report having either no education or primary, high school or university level education.[2] We can thus construct recruitment statistics by country of residence and level of education, distinguishing primary education and below, secondary, and tertiary. After removing observations without either country of residence or education, we are left with a sample of 2,987 recruits. Table 1 provides summary statistics of Daesh recruits (also available in Dodwell et al. 2016).

[1] World Bank (2016) provides a more detailed description of the data and undertakes a comparison of the various sources of information on the Daesh foreign workforce and finds them broadly consistent. In particular, our data are identical to the ones described in Dodwell et al. (2016) and closely match Benmelech and Klor (2016), who instead use experts' estimates of Daesh recruits. In the Appendix, Table B2 gives a breakdown of records by country of last residence, while Figure B1 compares expert estimates with our personnel records and shows a 0.77 positive correlation.

[2] The data contain levels of schooling, rather than years. We are therefore able to match it easily to ILOSTAT categories.

Table 1: Summary Statistics of Daesh Recruits

Variable	Mean	Std. Dev.	Min.	Max.	N
Number of recruits by country:					
unconditional	17.446	76.121	0	708	168
conditional on being positive	50.534	123.592	1	708	58
Number of recruits by country-education:					
unconditional	5.815	29.381	0	423	504
conditional on being positive	21.873	53.952	1	423	134
Number of fighters by country-education:					
unconditional	4.052	11.287	0	93	134
conditional on being positive	6.873	14.056	1	93	79
Number of suicide fighters by country-education:					
unconditional	2.843	9.084	0	80	134
conditional on being positive	6.684	13.033	1	80	57
Number of administrators by country-education:					
unconditional	0.5	1.822	0	18	134
conditional on being positive	2.577	3.478	1	18	26

We combine this data with country-level macroeconomic data also disaggregated by education levels.[3] We use ILOSTATA data to construct education-level-specific data on unemployment for most countries, yielding 183 country*education-level observations.[4] For the wage data, we use the International Income Distribution Data Set (I2D2) to compute median wage by education level for each country. The dataset is a global harmonized household survey database compiling data from household surveys and labor force surveys. Given that the frequency of data collection is not consistent across countries, we take median wage data for the year 2013 and replace the missing values with the closest lead or lag during 2010-2016. Since we will be computing relative wages, we do not attempt to deflate or convert the nominal wage information. When we include the wage, unemployment and education variables together, we are left with only 28 country*education-level observations from 12 countries. For robustness, we also use a second version of the wage variable,

[3]We use macro data from 2013 to best match the personnel records on Daesh foreign recruits. If data from 2013 are missing, we use the nearest available year.

[4]To maximize the number of observations, we use the total unemployment rate in our main results, but obtain qualitatively similar results when using the male unemployment rate or the youth unemployment rate.

specific to the male population between 18 and 36.

Augmenting the data with observations from 107 countries that do not supply Daesh recruits leads to a final dataset that consists of a maximum of 504 country*education-level observations. Table 2 describes the country-level variables we use (total population, Muslim population, per capita GDP, political freedom measures, corruption index and distance to Syria) as well as the country-by-education-level variables (unemployment and wage rates). Detailed variable definitions and their sources are provided in Appendix Section C.

Table 2: Descriptive Statistics of Macroeconomic Variables

Panel A: Descriptive Statistics at Country Level					
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Distance to Syria	3254	2253	174	10030	168
Per capita GDP (thousand)	14.6	20.8	0.26	113.73	164
Human Development Index	0.68	0.16	0.33	0.94	161
Total Muslim population (millions)	9.67	29.77	0.001	204.85	166
Total population (millions)	42.93	149	0.3	1357	165
Corruption Index	41.79	19.725	8	91	162
Index of political rights	3.543	2.124	1	7	162
Ethnic fractionalization	0.458	0.26	0	0.930	157
Linguistic fractionalization	0.403	0.288	0.002	0.923	154
Religious fractionalization	0.426	0.24	0.002	0.86	158
Average self-reported religiosity	0.743	0.244	0.142	0.998	162
Government Restrictions Index	3.352	2.199	0.2	9.1	164
Social Hostilities Index	2.659	2.494	0	9	164

Panel B: Descriptive Statistics at Country-Education Level					
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Relative wage	0.70	0.54	0	5.20	229
Unemployment rate	13.4	11.8	0	71.4	313

Note: Relative wage is normalized to 1 for tertiary education.

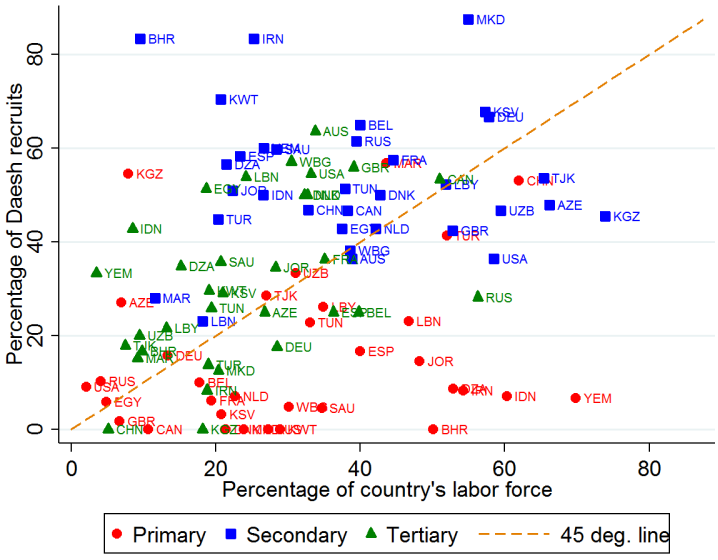
One limitation is due to recent unemployment and wage rate information not being available for all countries. Table B3 in the Appendix shows the countries for which we have these data, and countries that supply Daesh recruits. Given the lack of sufficient overlap between the unemployment and wage variables, we henceforth proceed in two steps. First, we conduct our analyses using the unemployment variable only, hence omitting the wage variable. If wages and unemployment are uncorrelated, this approach is innocuous. We indeed find that the residuals of unemployment and wages, after partialling out country and education fixed effects, are uncor-

related, as illustrated in Appendix Figure B2. We nonetheless verify that our results are robust to controlling for wages using the smaller sample of countries where we have both wages and unemployment data by education categories.

2.2 Education and Violent Extremism

To examine the role of education in explaining radicalization, we compare in Figure 1 the distribution of schooling attainments among Daesh recruits and in the labor force of their country of residence. With few exceptions, Daesh recruits are more likely to have a secondary or tertiary education than the average worker in their country of residence. Conversely, there are fewer recruits that have only a primary education or less, relative to the labor force in their country of residence. This pattern is consistent with an existing body of evidence from different contexts, which shows that terrorists often come from middle-class or even college-educated backgrounds (Krueger 2007).

Figure 1: Schooling Attainment Among Daesh Recruits Relative to their Country of Origin



We can dig further by looking at recruits' knowledge of Sharia and their stated preference in terms of occupation in the terrorist organization. Self-reported knowledge of Sharia is available for almost 80 percent of observations and is generally low with less than a quarter of recruits reporting an intermediate or high level of knowledge. We estimate a simple logit of having intermediate or

high level of knowledge on schooling attainment, controlling for age, marital status and the point of entry into Syria at which the information was recorded. The significant odd shifters are reported in Table 3. Relative to their primary educated peers, individuals with tertiary education are much more likely to be knowledgeable about Islamic law as are individuals with secondary education, to a lesser extent.

Table 3: Significant Factor Changes in the Odds of a Recruit having High or Intermediate Knowledge of Sharia Law

	coef.	z-stat	P-value	e^b	e^{bStdX}
Secondary	0.5250	3.5820	0.0000	1.6910	1.3000
Tertiary	1.1047	7.1290	0.0000	3.0180	1.6520
Age	0.0119	1.8740	0.0610	1.0120	1.0990
Married	0.3590	3.2590	0.0010	1.4320	1.1790

Note: Factor changes obtained from a logit model: the dependent variable is whether the recruit reports a high or intermediate knowledge of Sharia law. Independent variables are age, marital status, schooling attainment and point of entry into Syria. Only significant factor changes are reported (ten percent level or higher). b= raw coefficient. z= z-score for test of b=0. $P > |z|$ = p-value for z-test. $e^b = exp(b)$ = factor change in odds for unit increase in X. $e^b StdX = exp(b * SDofX)$= change in odds for SD increase in X

This finding might also help explain why lower education levels have not been found to be correlated with terrorist activity; while higher education might indeed increase the opportunity cost of joining a terrorist organization, it might at the same time affect individuals' intrinsic motivation.

Further evidence can be obtained by considering the subset of 1,050 individuals (31 percent of the sample) for whom a desired role within the organization is recorded. These roles - administrator, fighter or suicide fighter/bomber – call, a priori, for different skills and reflect different motivations. For example, one may hypothesize that candidates to suicide have powerful intrinsic or ideological motivations, which may or may not be connected to their or their peers' economic opportunities.

We estimate a simple multinomial logit model to examine which individual traits and which characteristics of the country of origin affect the odds of choosing each role. Besides schooling attainment, the regressors include individual characteristics such as age, marital status and dummies for the point of entry into Syria, and country characteristics such as the distance to Syria, unemployment rate, GDP per capita, fraction of the population that is Muslim and indexes for

political rights and corruption. Only the significant odds shifters are reported in Table 4.[5]

Table 4: Significant Factor Changes in the Odds of a Recruit's Aspiration

	coef.	z-stat	P-value	e^b	e^{bStdX}
Unemployment rate					
Fighters vs. Administrator	0.0807	1.652	0.098	1.084	1.553
Fraction Muslim (log)					
Administrators vs. Fighters	0.5034	1.859	0.063	1.654	1.621
Suicide vs. Fighters	0.4783	2.513	0.012	1.613	1.582
Secondary					
Suicide vs. Administrators	1.099	1.836	0.066	3.001	1.733
Suicide vs. Fighters	0.909	3.050	0.002	2.482	1.576
Tertiary					
Administrators vs. Fighters	1.763	2.984	0.003	5.831	2.236
Suicide vs. Fighters	1.141	3.070	0.002	3.130	1.683
Age					
Administrators vs. Fighters	0.033	1.795	0.073	1.034	1.297

Note: Factor changes obtained from a multinomial logit model: the dependent variable is the desired role in Daesh expressed by the recruit (administrator, fighter or suicide attacker). Independent variables are distance between country of origin and Syria, GDP per capita, fraction of Muslims in the population, indexes for political rights and corruption, age, marital status, schooling attainment and point of entry into Syria. Only significant factor changes are reported (ten percent level or higher). b= raw coefficient. z= z-score for test of b=0. $P > |z|$ = p-value for z-test. $e^b = exp(b)$ = factor change in odds for unit increase in X. $e^b StdX = exp(b * SDofX)$= change in odds for SD increase in X. SDofX = standard deviation of X

Overall, the results systematically separate the aspiring fighters from the aspiring administrators. Aspiring administrators are more likely to be highly educated. They are also more likely to come from countries with higher proportions of Muslims, to be older and to have a tertiary education relative to fighters. In the Appendix Table B1, we also break down declared occupations according to the aspiration reported and find that aspiring administrators are more likely to have worked previously as private employees and in professional occupations. Administrators may possess relatively rarer skills which Daesh would have to search for globally.

In contrast, fighters are more likely to have a primary education only, to come from high-unemployment countries and to report manual work, crafts person or "none" as their previous occupation. This is consistent with the idea that it may be easier for Daesh to attract unskilled individuals facing high unemployment rates into becoming soldiers. Interestingly, recruits from countries with low fractions of Muslims are also more likely to be aspiring fighters.

[5]The full results of the model are available upon request.

Lastly, being a candidate for suicide operation correlates strongly with secondary education and to a lesser extent with tertiary education. Regarding their former occupation, candidates for suicide operations look similar to fighters, with the exception that they more often report no former occupation. In contrast to the two previous aspirations, a skill requirements explanation is perhaps less convincing. An alternative hypothesis is that candidates to suicide operation must have very strong ideological and psychological motivations that are more likely developed by individuals with higher levels of education.

Education, therefore, potentially correlates with both intrinsic and extrinsic motivations to radicalize, making it difficult to detect any empirical regularity in the data linking education and terrorism. We next turn our attention to other socio-economic variables and examine the effect on radicalization of unemployment rates and wages specifically.

3 What Drives Participation in Violent Extremism?

3.1 Methodology

This section discusses how we causally identify the effect of unemployment on individuals' likelihood to enlist as foreign fighters for a terrorist organization. Relying on a stylized occupational choice model, we aim to test the grievance/opportunity cost explanation of conflict participation (Collier and Hoeffler 1998), whereby the average earnings among individuals in the segment of the labor force of country c that has education level e determines both their levels of discontent and hence propensity to radicalize, and their opportunity cost of joining the terrorist organization.

Participation of individual i in the terrorist organization is ruled by inequality $B_{ice} \geq C_{ice}$, where benefits are given by

$$B_{ice} = e^{\theta^B_{ice}} \left[w_{ce}(1 - U_{ce})\right]^{-\beta^B}$$

and the cost function is set to reflect the opportunity cost of labor of and the actual travel cost to join Daesh in Syria:

$$C_{ice} = e^{\theta^C_{ice}} \left\{\Gamma(D_c) + \left[w_{ce}(1 - U_{ce})\right]^{\beta^C}\right\}.$$

Both benefits and costs have an idiosyncratic component (θ^B_{ice} and θ^C_{ice}, respectively) and a measure $w_{ce}[1 - U_{ce}]$ of the prevailing average earnings, i.e. the product between wage w_{ce} and the probability $1 - U_{ce}$ of being employed; U_{ce} is the unemployment rate among workers with education e in country c. The average earnings term is meant to capture a grievance effect in the

benefit function and an opportunity-cost effect in the cost function. We assume that the elasticity of the benefit (resp. cost) function with respect to average earnings is a constant β^B (resp. β^C). Finally, the cost function also includes the cost of migrating to Syria and is therefore an increasing function of travel distance D_c.

The participation constraint can then be written as

$$\left(\theta^B_{ice} - \theta^C_{ice}\right) - \left(\beta^B + \beta^C\right) \ln[w_{ce}(1 - U_{ce})] \geq \ln\left\{1 + \frac{\Gamma(D_c)}{[w_{ce}(1 - U_{ce})]^{\beta_C}}\right\} \tag{1}$$

We next denote $\beta \equiv \beta^B + \beta^C$ and decompose $\theta^B_{ice} - \theta^C_{ice} \equiv \alpha + \eta_c + \mu_e + \nu_{ce} + \varepsilon_{ice}$, i.e. a constant, country and education-level effects, and country-education and individual error terms. Finally, we log-linearize the right-hand side of (1) and write the participation constraint as:

$$-\varepsilon_{ice} \leq \alpha - \beta \ln[w_{ce}(1 - U_{ce})] - \gamma \ln D_c \cdot \ln[w_{ce}(1 - U_{ce})] + \eta_c + \mu_e + \nu_{ce} \tag{2}$$

Denoting LF_{ce}, the size of the labor force with education e in country c, and assuming that ε is exponentially distributed with rate 1, the number of recruits with education e in country c is then given by

$$\ln N_{ce} = \ln LF_{ce} + \alpha - \beta \ln\left[w_{ce}(1 - U_{ce})\right] - \gamma \ln D_c \cdot \ln\left[w_{ce}(1 - U_{ce})\right] + \eta_c + \mu_e + \tilde{\nu}_{ce}. \tag{3}$$

We further decompose the error term $\tilde{\nu}_{ce}$ into a vector of observables Z_{ce} that includes $\ln LF_{ce}$, so that $\tilde{\nu}_{ce} = Z_{ce}\delta + \nu_{ce}$. We can then rewrite equation (3) as

$$\ln N_{ce} = \alpha + \beta[U_{ce} - \ln w_{ce}] + \gamma \ln D_c \cdot [U_{ce} - \ln w_{ce}] + Z_{ce} \cdot \delta + \eta_c + \mu_e + \nu_{ce}. \tag{4}$$

Note that we linearized $\ln(1 - U) \approx -U$ in equation (4). Equation (4) is our main empirical specification. Under the assumption that $Cov(\nu_{ce}, U_{ce} - \ln w_{ce} | \eta_c, \mu_e, Z_{ce}) = 0$, the impact of unemployment on terrorist recruitment is measured by β, which combines both grievance and opportunity-cost effects. In this specification, we can control for observed and unobserved predictors of terrorist recruitment that are constant across education-levels within a country, and those that are constant within education-level categories across countries. The coefficient γ then captures the heterogeneity of impact, measuring the extent to which individuals residing in countries closer to Syria are more sensitive to economic conditions than individuals living further away from Syria.

3.2 Unemployment and Violent Extremism: A Graphical Illustration

We first provide graphical evidence of the link between unemployment and the supply of Daesh recruits in a way that illustrates the identification of our regression results. Correlations between unemployment and radicalization obtained by way of cross-country regressions can be spurious, resulting from unobserved country characteristics that affect both unemployment and the measure of radicalization at hand. Instead, we exploit within-country variation in unemployment and in the number of Daesh recruits. In this section, we provide a way to visualize this within-country variation and confirm that a correlation between unemployment and radicalization is present even after removing the cross-country variance from both variables.

Equation (4) implies that the coefficient β measures the extent to which a higher unemployment rate for a given education level in a given country leads to a larger cohort of Daesh foreign recruits for that same education level and country. In other words, if, say, France has higher unemployment rate among secondary- versus tertiary-educated young males, β tells us the extent to which we see relatively more Daesh recruits from France with secondary rather than tertiary education.

To examine this graphically, we first normalize the number of Daesh recruits in each country-schooling level (N_{ce}) by the proportion of the country's population with that schooling level (P_{ce}).

$$\widetilde{n}_{ce} \quad = \quad log(N_{ce}) - log(P_{ce})$$

We then subtract schooling and country averages as in a "within" transformation, to obtain the relative supply of Daesh recruits for each country and schooling level combination. In this context, "relative" means in comparison to the average number of fighters in a given country across schooling levels and in comparison to the average number of fighters in a schooling level across countries.

$$\begin{aligned}
\overline{\widetilde{n}}_{ce} &= \widetilde{n}_{ce} - \frac{1}{E}\sum_{e} \widetilde{n}_{ce} \\
\overline{\overline{\widetilde{n}}}_{ce} &= \overline{\widetilde{n}}_{ce} - \frac{1}{C}\sum_{c} \overline{\widetilde{n}}_{ce}
\end{aligned}$$

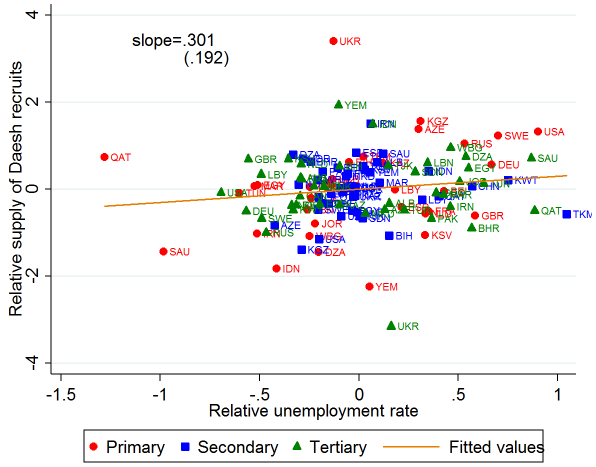
where E and C are the number of schooling levels and countries, respectively. Similarly, we take out schooling and country averages from log unemployment to obtain a relative unemployment

rate:

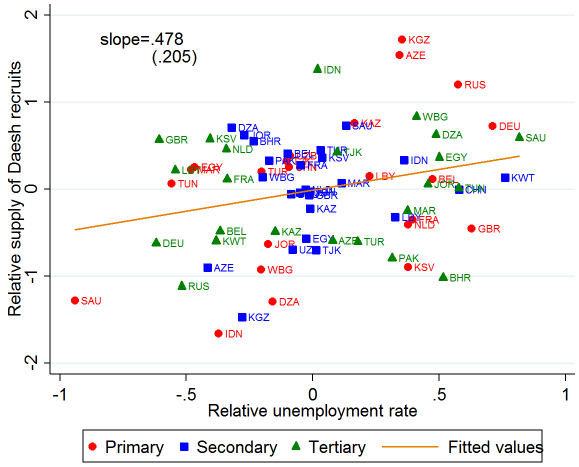
$$\begin{aligned}
\widetilde{u}_{ce} &= log(U_{ce}) \\
\widetilde{\widetilde{u}}_{ce} &= \widetilde{u}_{ce} - \frac{1}{E}\sum_{e}\widetilde{u}_{ce} \\
\widetilde{\widetilde{\widetilde{u}}}_{ce} &= \widetilde{\widetilde{u}}_{ce} - \frac{1}{C}\sum_{c}\widetilde{\widetilde{u}}_{ce}
\end{aligned}$$

Figure 2: Relative Supply of Daesh Recruits and Relative Unemployment Rate

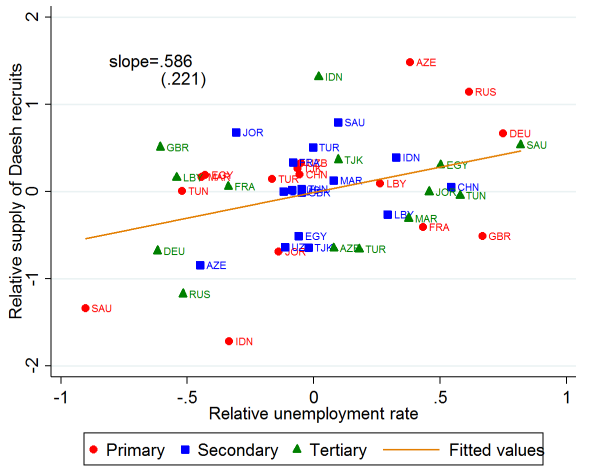
(a) Countries With More Than 0 Recruits



(b) Countries With More Than 20 Recruits



(c) Countries With More Than 40 Recruits



(d) Countries With More Than 80 Recruits

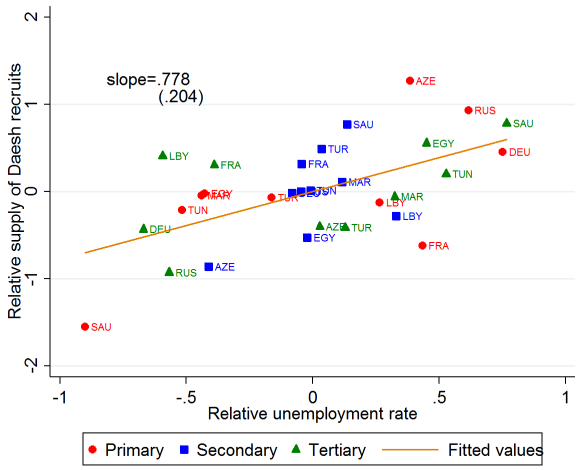


Figure 2 plots the resulting relative supply of Daesh fighters against the relative unemployment rate. The first panel shows all countries and schooling levels for which these numbers can

be calculated.[6] Panels 2b, 2c and 2d restrict the sample to larger Daesh-supplier countries to reduce the noise inherent to small cells. The graphs show a positive association between the two variables, which becomes larger and more strongly statistically significant as we focus on countries supplying more than 20 Daesh recruits. This association means that countries where unemployment is particularly high among, say, primary educated workers will send relatively more primary educated fighters.

It is interesting to note that the slopes we obtain are informed both by cross-country variation within one schooling level, and by cross-schooling levels within a country. Notably, these two sources of variation appear to identify similar slopes. This is easier to see in Panel 2d, which has fewer points: each one of three education-level-specific clouds of points (triangles, squares and circles) line up individually along the same slope. Similarly, the within-country variation also identifies a similar slope, as can be seen by looking at the alignment of the three points for specific countries such as Saudi Arabia, Germany or the Russian Federation.

3.3 Regression Results

The regression equivalent of Figure 2 is obtained from the estimation of equation (4). Table 5 reports the regression results. Since the left-hand side of the equation is the logarithm of the number of Daesh recruits, it is only defined when such number is strictly positive. We thus have a sample of 44 countries and a regression that consists of 105 observations (column 3). Cells that do not have at least one foreign recruit are dropped from the regressions. Given the small number of observations, we apply Moulton's parametric correction to re-compute the standard errors when cluster size is less than 40 (Moulton 1986).

Before estimating the full version of equation (4), we start with an estimation that omits fixed effects and the interaction with distance, and focus on the unemployment variable only. Column 1 displays the bivariate relationship which does not exhibit any correlation between unemployment and Daesh recruits cohort size. When controlling for the size of the labor force at the country-education level and for country-level characteristics such as distance to Syria, its wealth, population size or Muslim population size, and some measures of the quality of its institutions, we do not find any correlation between unemployment and Daesh enrollment either (column 2). Similarly, column 3 adds country fixed effects and education dummies, and the relationship between

[6] We use the full sample of countries with Daesh recruits, except 13 countries with fighters in only one schooling category (for a total of 22 fighters), to which the de-meaning procedure cannot be applied.

unemployment and enrollment remains flat.

Table 5: Determinants of Foreign Enrollment in Daesh

VARIABLES	(1) $logN_{ce}$	(2) $logN_{ce}$	(3) $logN_{ce}$	(4) $logN_{ce}$	(5) $logN_{ce}$	(6) $logN_{ce}$	(7) $logN_{ce}$	(8) $logNF_{ce}$	(9) $logNS_{ce}$	(10) $logNA_{ce}$
Main effects										
Unemployment rate	-0.024	0.001	0.000	0.803***	0.782*	0.782*	0.812*	0.585*	1.181***	0.810
	(0.016)	(0.020)	(0.024)	(0.150)	(0.401)	(0.378)	(0.399)	(0.292)	(0.324)	(1.253)
Total Labor force (log)		0.243*	0.083	-0.038	-0.083	-0.082	-0.066	0.353	0.584**	0.060
		(0.138)	(0.122)	(0.088)	(0.118)	(0.108)	(0.114)	(0.238)	(0.220)	(0.757)
Distance to Syria (log)		-0.066								
		(0.252)								
Per capita GDP (log)		0.026								
		(0.273)								
Muslim population (log)		0.482**								
		(0.199)								
Total population (log)		-0.226								
		(0.214)								
Index of political rights		0.345**								
		(0.154)								
Corruption Index		0.030*								
		(0.016)								
Median wage (log)					0.003					
					(0.485)					
Median wage among 18-36 old (log)							-0.192			
							(0.263)			
Interaction between Unemployment and										
Distance to Syria (log)				-0.107***	-0.090*	-0.090*	-0.095*	-0.070*	-0.123***	-0.081
				(0.020)	(0.048)	(0.046)	(0.048)	(0.035)	(0.043)	(0.185)
Secondary education				-0.008	-0.034	-0.034	-0.019	-0.030	-0.208***	-0.092
				(0.028)	(0.087)	(0.081)	(0.085)	(0.107)	(0.070)	(0.253)
Tertiary education				-0.041	-0.153	-0.153*	-0.130	-0.004	-0.300***	-0.164
				(0.026)	(0.088)	(0.079)	(0.080)	(0.096)	(0.055)	(0.214)
Observations	114	102	105	105	28	28	29	62	45	22
Country FE	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Number of countries	47	43	44	44	12	12	12	32	24	13
Education Dummies	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Mean(N_{ce})	23.9	26	25.5	25.5	6.6	6.6	6.4			
Mean(NF_{ce})								7.9		
Mean(NS_{ce})									7.6	
Mean(NA_{ce})										2.9
Adj. R-squared	-0.004	0.263	0.801	0.835	0.723	0.754	0.717	0.761	0.662	0.219

Note: Dependent variable in columns 1-7 is log of number of foreign recruits to Daesh by country and education category (primary, secondary, tertiary). For columns 8, 9 and 10, the dependent variable is log of number of recruits who aspire to be fighters for Daesh, log of number of recruits who aspire to be suicide attacker for Daesh and log of number of people who aspire to be administrators for Daesh by country-education category respectively. Standard errors in parentheses, clustered at the country level and corrected for small number of clusters (when N_c <40) using Moulton correction factor. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Column 5, 6 and 7 include only those country-education categories for which data on wages, unemployment and at least one Daesh fighter was available.

As discussed in the methodology section, the lack of an association between economic opportunities and enrollment might hide significant heterogeneity across countries as the physical cost of joining Daesh depends on the geographic distance. For far-away countries, radicalized individuals might prefer local activism rather than traveling all the way to Iraq and Syria. We thus expect the elasticity of enrollment with respect to unemployment to be heterogeneous and to be larger

for nearby countries. In column 4, we explore whether the effect of unemployment on Daesh enrollment differs by education levels and by whether a country is far from or close to Syria. The coefficient on unemployment is now positive and highly statistically significant.

Taking into account the coefficients on unemployment and on the interaction between unemployment and distance, we find that for countries at the minimum distance from Syria (174 miles = 5.163 log miles, e.g. West Bank and Gaza), the elasticity of recruitment with respect to the unemployment rate is equal to 0.25. Given the negative coefficient on the interaction, the elasticity decreases as one moves further away from the Levant. This finding is robust to including additional interaction terms between distance and any of a country's characteristics such as per capita GDP, corruption index, or index of political rights (results available upon request). The combined coefficients on unemployment and on the interaction between unemployment and distance for countries close to Syria mean that an increase in unemployment for a specific education category by 1 percentage point leads to a 28-percent increase in Daesh enrollment. Given the mean of 29.7 Daesh recruits per country-education category among countries at a below-average distance from Syria, and the fact that the data we use in these regressions represent approximately 20 percent of the total population of Daesh foreign recruits, this implies an increase of 42 recruits to a total of roughly 15,000 Daesh fighters.[7] The effect dissipates as distance increases. As we reach the average log-distance (columns 1-3), the coefficient is neither statistically nor economically significant; the inferred elasticity drops to 0.02.

As discussed earlier, a theoretically important omitted variable in the regressions presented so far is wage levels. To the extent that wages are correlated with unemployment (Blanchflower and Oswald 1994), the coefficient on unemployment would capture the effects of unemployment and of wages. In column 5, we add wages (log) by country and education level as additional regressors. The coefficient on the wage variable itself is not significant, and the impact of unemployment on Daesh enrollment remains similar. The differences between columns 4 and 5 are mostly due to changes in the underlying sample given that the availability of country*education-level information on wages limits the number of observations at hand. We are indeed left with 28 observations in 12 countries. However, running the same specification as in column 4 on the restricted sample yields almost identical estimates (see column 6). In column 7, we use an alternative wage variable that takes the median value of wages for males aged 18-36, which is the appropriate comparison group for Daesh foreign recruits. Here again, the results are consistent with column 4.

[7] Dodwell et al. (2016) estimate the total number of foreign fighters arriving during our sample period to be 15,000.

Finally, we use information on desired occupation within Daesh — fighter, suicide attacker, or administrator — to look at whether the elasticities differ across stated occupation and find some degree of heterogeneity. It is possible to apply our theoretical framework to each role separately, where an individual decides to become, say, a Daesh fighter or not. In that case, the outside option includes staying in the home country or joining Daesh in a different role. Columns 8, 9 and 10 in Table 5 report the results of our main regression specification applied separately to the contingents of fighters, suicide attackers and administrators. The point estimates and the levels of significance differ, but the patterns obtained for the whole sample largely carry through for each separate role. The effect of unemployment is positive, the interaction with distance is negative, and both coefficients are of the same order of magnitudes for all three roles and for the whole sample. For fighters, the effect of unemployment is relatively lower than for the other categories, while it is higher and highly significant for suicide attacker. The point estimates for administrators are not significant (the number of observations is markedly lower, leading to large standard errors), but very similar to those obtained for the full sample.

3.4 Robustness

To check the robustness of our results, we replicate our preferred specification (column 4 from Table 5) for different sub-samples of countries in Table 6. First, we tackle the issue of selection, arising from the fact that our main specification sample is mechanically censored at 0 fighters. To address this, we restrict our estimation to countries with more than 33 recruits overall. This threshold is the lowest country-level threshold such that no country-education cell is empty. Because this cut-off is applied at the country level, rather than the country-education level, and because we have country fixed effects, bias cannot arise from that censoring. This restriction, however, lowers the number of countries under consideration to 12 and the total number of observations to 36. The result is displayed in column 1 of Table 6, and is very similar to our main result in Table 5 column 4: the effect of unemployment is slightly higher (the point estimate is equal to 1.1) and statistically significant, and so is the interaction between unemployment and distance.

We also decrease the cutoff by restricting to countries that have at least 10 Daesh recruits. This increases the sample to 28 countries. Column 2 shows results consistent with earlier findings. In column 3, we instead consider countries that have at least one fighter in each of the three education levels being considered. This selection leads to a regression based on 25 countries. Once again, the results seem not to depend on the inclusion criteria.

Table 6: Determinants of Foreign Enrollment in Daesh - Robustness Checks

VARIABLES	(1) $logN_{ce}$	(2) $logN_{ce}$	(3) $logN_{ce}$	(4) $logN_{ce}$	(5) $logN_{ce}$	(6) $logN_{ce}$
	All countries $N_c > 33$	All countries $N_c > 10$	All countries $N_{ce} > 0$	Muslim majority	OECD	Non-OECD
Main effects						
Unemployment rate	1.090**	0.717***	0.734***	0.683**	-0.082	0.808***
	(0.445)	(0.247)	(0.238)	(0.305)	(0.617)	(0.256)
Total Labor force (log)	0.072	0.051	-0.009	-0.017	0.555	-0.064
	(0.244)	(0.157)	(0.112)	(0.195)	(0.487)	(0.113)
Interaction between Unemployment and						
Distance to Syria (log)	-0.148**	-0.096***	-0.099***	-0.087**	0.010	-0.105***
	(0.059)	(0.033)	(0.032)	(0.042)	(0.084)	(0.035)
Secondary education	-0.080	0.011	-0.011	-0.028	0.045	-0.022
	(0.093)	(0.035)	(0.030)	(0.041)	(0.070)	(0.036)
Tertiary education	-0.031	-0.032	-0.031	-0.029	-0.031	-0.046
	(0.082)	(0.035)	(0.032)	(0.043)	(0.108)	(0.038)
Observations	36	76	75	55	40	65
Country FE	Y	Y	Y	Y	Y	Y
Number of countries	12	28	25	21	17	27
Education Dummies	Y	Y	Y	Y	Y	Y
Mean (N_{ce})	65.7	34.4	33.7	39.8	12	33.8
Adj. R-squared	0.716	0.796	0.834	0.832	0.733	0.859

Note: The dependent variable is log of number of foreign fighters to Daesh by country and education category (primary, secondary, tertiary). Standard errors in parentheses, clustered at the country level and corrected for small number of clusters (when N_c <40) using Moulton correction factor. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. In column 1, $N_c > 33$ represents the lowest threshold for Daesh fighters ensuring that all countries above it have fighters of all three schooling levels.

In columns 4-6, we look at additional sources of heterogeneity. For the sake of clarity, instead of interacting independent variables, we cut the sample along several dimensions. In column 4, we restrict to countries with a majority of Muslims and find similar patterns for that sample, which now consists of 21 countries. [8] Finally, it could be argued that the drivers are likely different between OECD and non-OECD countries. One reason might be that OECD countries benefit from better social safety nets to mitigate the effect on unemployment. Another reason could be that there are much fewer individuals with only primary education in OECD countries, such that the unemployment rate for this education category is measured more imprecisely and less relevant. Columns 5 and 6 show the regression results for OECD and non-OECD countries, respectively. In the former group, which comprises 40 countries, we indeed do not find the overall patterns

[8] A similar result holds if we instead restrict to countries such that Muslims account for at least 1 percent of their entire population. There are 41 such countries in our sample (results available upon request).

found for the entire sample. Unemployment does not seem to have any explanatory power: the coefficient of the main effect is both smaller (and the sign flips) and is measured with a lot of noise. Column 6 suggests that non-OECD countries (65 countries in our sample) are driving the effect documented in Table 5. This could in part be due to distance in that OECD countries are further away from Syria and Iraq, and we saw earlier that the impact of unemployment on Daesh enrollment is negligible past the mean sample distance.

In the Appendix, we also present and discuss results from an analysis of the extensive margin, i.e. the propensity of a country to have at least one resident joining Daesh. We look at country characteristics that explain why some countries might send more or fewer fighters *overall*. That exercise is in all respects similar to earlier analyses (Abadie 2006, Krueger and Malečková 2003, Krueger and Laitin 2008). In particular, this section can be viewed as a replication of Benmelech and Klor (2016), who similarly look at the extensive margin of Daesh recruitment across countries. Their analysis differs from the one conducted here only by the source of the data used to construct the left-hand side variable. We use a sub-sample of personnel records on Daesh foreign recruits, while Benmelech and Klor (2016) rely on expert opinions.

4 Conclusion

This paper has studied the relationship between unemployment and participation in violent extremism, exploiting unique personnel data on Daesh foreign recruits. Beyond information on the country of residence for each individual, the data record self-reported education information, knowledge of Sharia, desired occupation in the group, among others. That unique feature allows us to provide suggestive evidence for why education might have an ambiguous effect on radicalization and to construct a disaggregated dataset measuring Daesh recruits cohort sizes by country of residence and level of education. Compared to previous studies, we can thus go a step further towards identifying a causal effect by estimating the conditional correlation between (relative) unemployment levels and Daesh enrollment both *between* and *within* countries. Our findings suggest that a lack of economic opportunities in the form of unemployment is a driver of radicalization. Whether the unemployment channel functions primarily by lowering the opportunity cost of violent extremism or by exacerbating feelings of exclusion leading to radicalization remains to be determined.

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A Extensive Margin Analysis

For the purpose of this analysis, the outcome is a dummy variable that takes value 1 if country c provides at least 1 foreign recruit to Daesh and 0 otherwise. Our right-hand side variables include a set of socio-economic characteristics (unemployment, per capita GDP, population, Muslim population, HDI), distance to the Syrian Arab Republic, indexes of institutional quality (corruption index, political rights index and fractionalization indices), as well as some measures of religious freedom (self-reported religiosity from Gallup World Poll, Government Restrictions Index and Social Hostilities Index form Pew). All regressions include a set of regional variables where a region is a set of countries as defined by the World Bank. Table 2 shows descriptive statistics for the variables used for the analysis.

The results shown in each of the 6 columns in Table A1 differ by the independent variables used in the regressions. Overall, some patterns are robust across all specifications. First, as expected, the proportion of Muslims in a given country is a positive predictor of the probability a country sends a Daesh recruit to Iraq or Syria. Moreover, although weak, a country's wealth – whether measured by its per capita GDP or using the Human Development Index in column 2 – is *positively* correlated with the likelihood of being the country of residence of a Daesh recruit. We also find, like other studies earlier, that political rights are negatively associated with Daesh participation (columns 3-4); note that a larger Political Rights index indicates worse conditions. Finally and worth noting since it is a newly constructed variable, columns 5-6 point at interesting patterns, the underlying mechanisms of which deserve to be further analyzed with micro data: when more individuals in a country report that religion takes a large place in their life, such country is *less* likely to be the residence of a Daesh recruit. The coefficient is however measured with too much noise to offer a conclusive verdict. However, if we turn to a variable measuring the extent of government regulation of religion, column 6 suggests that heavier government involvement is associated with a higher probability of sending a recruit for Daesh.

Our cross-sectional results are broadly consistent with earlier results in the literature (Abadie 2004, Krueger and Malečková 2003) and especially the more recent Benmelech and Klor (2016) who use a different source of information on Daesh foreign recruits and nonetheless find similar patterns of significance among the independent variables.

Table A1: Determinants of Foreign Enrollment in Daesh, Extensive Margin

VARIABLES	(1) $\mathbb{1}_{N_c>1}$	(2) $\mathbb{1}_{N_c>1}$	(3) $\mathbb{1}_{N_c>1}$	(4) $\mathbb{1}_{N_c>1}$	(5) $\mathbb{1}_{N_c>1}$	(6) $\mathbb{1}_{N_c>1}$
Total population (log)	0.043	0.042	0.023	0.040	0.033	0.037
	(0.029)	(0.029)	(0.032)	(0.030)	(0.032)	(0.035)
Muslim population (log)	0.142***	0.138***	0.157***	0.145***	0.146***	0.118***
	(0.034)	(0.035)	(0.040)	(0.035)	(0.036)	(0.038)
Unemployment rate	0.919*	0.857	0.905	0.996*	0.980*	1.020*
	(0.505)	(0.555)	(0.581)	(0.559)	(0.557)	(0.541)
Distance to Syria (log)	0.034	0.043	0.045	0.024	0.027	0.049
	(0.066)	(0.065)	(0.075)	(0.072)	(0.072)	(0.075)
Per capita GDP (log)	0.055**		0.077**	0.066*	0.068*	0.064
	(0.028)		(0.031)	(0.034)	(0.041)	(0.040)
Human Development Index		0.549*				
		(0.280)				
Index of political rights			0.027	0.036*	0.038*	0.004
			(0.017)	(0.020)	(0.021)	(0.026)
Ethnic fractionalization			0.351*			
			(0.187)			
Linguistic fractionalization			-0.271			
			(0.194)			
Religious fractionalization			0.232			
			(0.152)			
Corruption Index				0.002	0.002	0.001
				(0.003)	(0.003)	(0.004)
Average religiosity (self-reported)					-0.180	-0.178
					(0.194)	(0.192)
Government Restrictions Index						0.054**
						(0.024)
Social Hostilities Index						-0.011
						(0.022)
Observations	162	159	149	157	151	151
Adjusted R-squared	0.451	0.452	0.451	0.449	0.448	0.458
Dependent variable mean	.364	.358	.362	.363	.371	.371
Region FE	Y	Y	Y	Y	Y	Y

Note: Dependent variable is a dummy taking the value of 1 when a country sends at least 1 Daesh recruit and 0 otherwise. Heteroskedasticity robust standard errors in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.".

B Supplementary Figures and Tables

Figure B1: Comparison Between Leaked Data and Expert Opinions

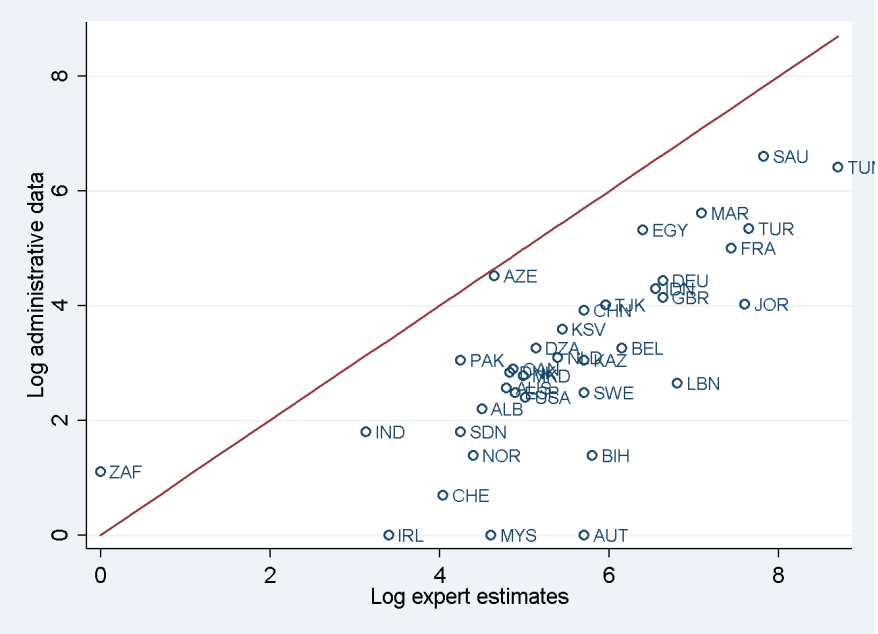

Figure B2: Wage vs. Unemployment Correlation

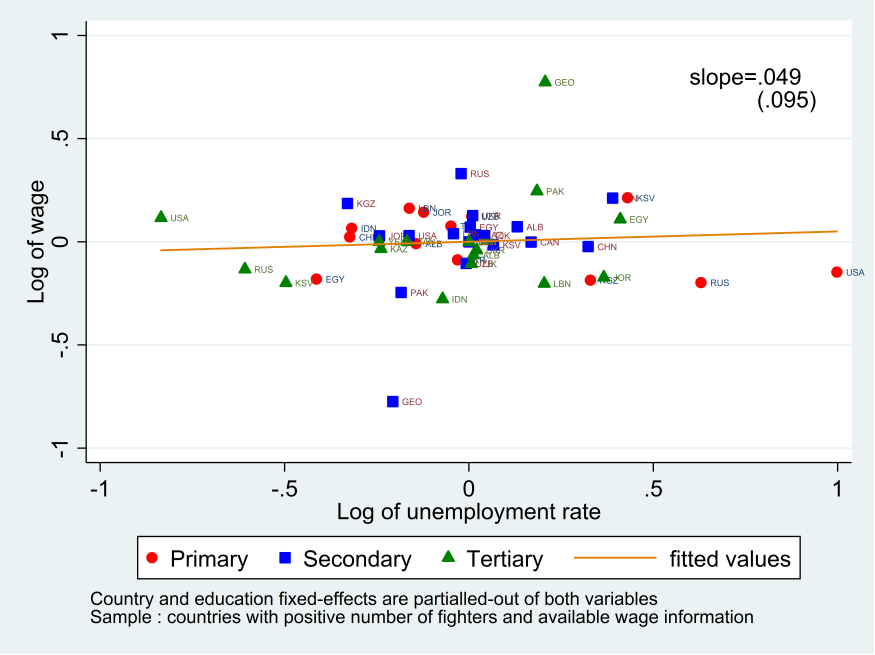

Table B1: Former Occupation of Daesh Recruits

	Aspiration		
	Administrators	**Fighters**	**Suicide fighters**
Employer/firm manager	7.0	0.9	1.1
Professional worker	21.1	16.6	15.9
Manual worker	0.0	6.8	7.5
Agricultural worker	1.8	1.7	1.7
Military	1.8	2.3	3.6
Owner of a shop	1.8	4.9	3.6
Government employee	3.5	5.3	5.0
Private sector employee	40.4	28.1	22.1
Craftsperson	5.3	9.8	10.3
Illegal work	0.0	0.4	0.3
Student	14.0	16.8	17.6
No work	3.5	6.4	11.2
Total	100.0	100.0	100.0

Table B2: Daesh Recruits by Country of Origin

Country of Residence	Number	Percentage	Number of recruits/million Muslims
Saudi Arabia	717	21	28
Tunisia	605	18	54
Morocco	269	8	8
Turkey	205	6	3
Egypt	201	6	3
Russia	170	5	18
France	151	4	30
Libya	121	4	19
Azerbaijan	92	3	11
Germany	84	2	53
Indonesia	74	2	0
United Kingdom	62	2	20
Jordan	56	2	9
Tajikistan	55	2	8
Uzbekistan	41	1	2
Kyrgyzstan	37	1	8
Kosovo	36	1	23
Kuwait	34	1	13
Algeria	26	1	1
Belgium	26	1	40
Bahrain	24	1	28
Netherlands	22	1	27
Kazakhstan	21	1	2
Pakistan	21	1	0
Palestine	20	1	5
Canada	20	1	17
China	18	1	1
Denmark	17	1	74
Macedonia	16	0	32
Yemen	16	0	1
Lebanon	14	0	6
Iran, Islamic Rep. of	13	0	0
Australia	13	0	27
Sweden	12	0	27
Spain	12	0	6
United States	11	0	4
Albania	9	0	5
Qatar	9	0	8
Sudan	6	0	0
Turkmenistan	5	0	1
India	5		0
Norway	4	0	25
Bosnia	4	0	2
Ukraine	3	0	8
Trinidad	3	0	39
South Africa	3	0	5
Kenya	3	0	1
Georgia	3	0	7
Cameroon	2	0	0
Switzerland	2	0	5
Somalia	1	0	0
Serbia	1	0	4
Poland	1	0	50
Mauritania	1	0	0
Malaysia	1	0	0
Ireland	1	0	14
Bulgaria	1	0	1733
Austria	1	0	2
Afghanistan	1	0	0

Table B3: Wages, Unemployment and Daesh Recruit Data Overlap

	Wages	Unemployment	ISIS fighters
AFG	□	■	■
ALB	■	■	■
ARM	■	■	□
AUS	□	□	■
AUT	□	□	■
AZE	□	■	■
BEL	□	□	■
BEN	■	■	□
BFA	■	■	□
BGD	■	■	□
BGR	□	□	■
BHR	□	□	■
BHS	■	■	□
BIH	□	■	■
BWA	■	■	□
CAF	■	■	□
CAN	■	■	■
CHE	□	□	■
CHL	■	■	□
CHN	■	■	■
CIV	■	■	□
CMR	■	■	■
COM	■	■	□
DEU	□	□	■
DJI	■	■	□
DNK	□	□	■
DZA	□	□	■
EGY	■	■	■
ESP	□	□	■
ETH	■	■	□
FRA	□	□	■
FSM	■	■	□
GAB	■	■	□
GBR	□	□	■
GEO	■	■	■
GHA	■	■	□
GIN	■	■	□
GMB	■	■	□
IDN	■	■	■
IND	■	■	■
IRL	□	□	■
IRN	□	■	■
IRQ	■	■	■
JOR	■	■	■
KAZ	■	■	■
KEN	■	■	■
KGZ	■	■	■
KHM	■	■	□
KSV	■	■	□
KWT	□	□	■
LAO	■	■	□
LBN	■	□	■
LBR	■	■	□
LBY	□	□	■
LKA	■	■	□
MAR	□	■	■
MDG	■	■	□
MDV	■	■	□
MKD	□	■	■
MLI	■	■	□
MNE	■	■	□
MOZ	■	■	□
MRT	■	■	■
MUS	■	■	□
MWI	■	■	□
MYS	□	□	■
NER	■	■	□
NGA	■	■	□
NLD	□	□	■
NOR	□	□	■
NPL	■	■	□
PAK	■	■	■
PHL	■	■	□
PNG	■	■	□
POL	□	□	■
PRI	■	■	□
PSE	□	□	■
QAT	□	□	■
RUS	■	■	■
RWA	■	■	□
SAU	□	□	■
SDN	□	■	■
SEN	■	■	□
SLE	■	■	□
SOM	□	□	■
SRB	■	■	■
STP	■	■	□
SWE	□	□	■
SYC	■	■	□
SYR	■	■	■
TCD	■	■	□
TGO	■	■	□
THA	■	■	□
TJK	■	■	■
TKM	□	□	■
TMP	■	■	□
TTO	■	■	■
TUN	□	■	■
TUR	□	■	■
TZA	■	■	□
UGA	■	■	□
UKR	■	■	■
UNK	□	□	■
URY	■	■	□
USA	■	■	■
UZB	■	■	■
VNM	■	■	□
YEM	■	■	■
ZAF	■	■	■
ZAR	■	■	□
ZWE	■	■	□

C Data Sources

Name	Description	Source
Country-education level Variables		
$LogN_{ce}$	Log of number of fighters to Daesh from country *c* by education categories: No education/Primary, Secondary and Tertiary level. Authors calculation.	Daesh fighter database
Unemployment rate	Number of unemployed persons as a percentage of the total number of persons in the labour force by education categories: No education/Primary, Secondary and Tertiary level. Missing values were replaced from World Bank data.	ILOSTAT
Total Labor force (log)	Log of sum of the number of persons employed and the number of persons unemployed. Source	ILOSTAT
Wages (log)	Median wages for men of all age groups and men for the age group 18-36	International Income Distribution Data Set (I2D2)
Country level Variables		
N(1=yes)	Dummy variable which is one when a country sends at least one Daesh recruit and zero otherwise.	Daesh fighter database
Distance to Syria (log)	Log of air (flying) distance between centroid of a country and centroid of Syria in miles.	DistanceCalculator.net
Per capita GDP (log)	Log of Gross Domestic Product divided by midyear population. Data are in current U.S. dollars.	The World Bank Database
Muslim Population (log)	Log of Muslim population in a country divided by (1+1000000). Year: 2010.	Pew Research Center's The future of global Muslim population, January 2011
Total Population (log)	Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values are midyear estimates and are logged.	The World Bank Database
Human Development Index	The index is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.	The World Bank Database
Index of political rights	Political rights enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate. The specific list of rights considered varies over the years.	Freedom House

	Countries are graded between 1 (most free) and 7 (least free).	
Corruption Index	The corruption perception index focuses on corruption in the public sector and defines corruption as the abuse of public office for private gain. The surveys used in compiling the CPI tend to ask questions in line with the misuse of public power for private benefit, with a focus, for example, on bribe-taking by public officials in public procurement. The sources do not distinguish between administrative and political corruption. The CPI Score relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public and ranges between 100 (highly clean) and 0 (highly corrupt).	Transparency International
Ethnic fractionalization	Probability that two randomly selected people from a given country will not share a certain ethnicity, the higher the number the less probability of the two sharing that ethnicity. The definition of ethnicity involves a combination of racial and linguistic characteristics. The higher the number, the more fractionalized society.	Alesina et al., 2003
Linguistic fractionalization	Reflects probability that two randomly selected people from a given country will not belong to the same linguistic group. The higher the number, the more fractionalized society.	Alesina et al., 2003
Religious fractionalization	Reflects probability that two randomly selected people from a given country will not belong to the same religious group. The higher the number, the more fractionalized society.	Alesina et al., 2003
Average religiosity (self-reported)	Proportion of people who agree that religion is an important part of their daily life.	Gallup World Poll
Government Restrictions Index	The Government Restrictions Index (GRI) measures - on a 10-point scale - government laws, policies and actions that restrict religious beliefs or practices. The GRI is comprised of 20 measures of restrictions, including efforts by governments to ban particular faiths, prohibit conversions, limit preaching or give preferential treatment to one or more religious groups.	Pew Research Center's Global Restrictions on Religion study
Social Hostilities Index	The Social Hostilities Index (SHI) measures - on a 10-point scale - acts of religious hostility by private individuals, organizations and social groups. This includes mob or sectarian violence, harassment over attire for religious reasons and other religion-related intimidation or abuse. The SHI includes 13 measures of social hostilities.	Pew Research Center's Global Restrictions on Religion study