Great expectations or nothing to lose? Socio-economic correlates of joining the Islamic State

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Abstract

Drawing on a new dataset of 4000 foreign fighters who joined the Islamic State from 2012 to 2014, this paper investigates the socio-economic profiles of international IS volunteers by comparing them with relevant populations in their countries of origin. Confirming previous research about Islamist radicals, we find that IS foreign fighters are more educated than their peers, albeit with considerable variation across countries. For a sub-set of countries, we use data on IS members' education, professional background, and the relationship between the two, to assess two socio-economic hypotheses of radicalization: low opportunity costs and relative deprivation, two concepts that researchers have struggled to empirically distinguish to date. We find qualified support for relative deprivation.

Introduction: the socio-economics of violent extremists

There is a wide range of literature on the socio-economic status of violent extremists, yet a clear overall picture is still to emerge. Several authors have collected data that shows above-average levels of education among Islamist extremists (Benmelech, Berrebi, and Klor 2012; Berrebi 2007; A. Krueger 2008; A. B. Krueger 2007; A. B. Krueger and Malečková 2003; Sageman 2004). Similar patterns have been evidenced for left-wing extremists (Gambetta and Hertog 2016; Russell and Miller 1977), but not for right-wing ones (Gambetta and Hertog 2016; Handler 1990; Smith and Morgan 1994). Even for Islamist extremists, some authors point to lower levels of educational attainment among Western-based individuals, indicating that the over-educated Islamist radical might be a developing world phenomenon (Hegghammer 2016).

Data on income and class background of extremists is scarcer and even more disputed. Some authors find that Islamist radicals come from relatively privileged backgrounds (Berrebi 2007; A. B. Krueger and Malečková 2003; Sageman 2004). Several polls from the Muslim world have also found support for extremism to be higher in the middle classes than in the lower classes (Bhui, Warfa, and Jones 2014; Blair et al. 2013; Mousseau 2011; Shafiq and Sinno 2010).[1]

Once again, however, there is evidence that patterns are not universal: In a meta-study of research on Western-based extremists, Hegghammer (2016) shows that these are often from disadvantaged backgrounds (see also Gambetta and Hertog 2016). Even in the Islamic world, the evidence does not unequivocally point towards relative privilege: Barrie and Ketchley (2018) find that Islamic State fighters from Tunisia are significantly more likely to come from districts with more unemployed male graduates. Using survey data from 14 Muslim countries, Mousseau reports that poverty increases support for Islamist terrorism among urban dwellers (Mousseau 2011).

In sum, even on the purely descriptive level, much remains disputed about the socio-economic background of Islamist radicals. Basic facts still need to be established. It has been all the harder to investigate causal links between socio-economic factors and individual participation in Islamist extremism. In the few cases where researchers have run individual-level statistical models on this question (Berrebi 2007; A. B. Krueger and Malečková 2003), the underlying mechanisms remain unclear.

This paper uses a uniquely large and comprehensive dataset on international volunteers for the Islamic State to test a number of core hypotheses on the individual-level link between socio-economic status and Islamist extremism. We investigate the link between extremism and (1) level education, (2) economic opportunity costs, and (3) economic grievances in terms of one's material status relative to a reference group. To our knowledge, this paper is the first to articulate and differentiate these three dimensions of socio-economic status at the same time. It is also the first to empirically investigate them together on an individual-level dataset.

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[1] The relationship between prosperity and extremism on the national or sub-national level is similarly disputed: A majority of authors have found no correlation between the two (Abadie 2006; Berman, Shapiro, and Felter 2011; Drakos and Gofas 2006; A. B. Krueger and Laitin 2008; Kurrild-Klitgaard, Justesen, and Klemmensen 2006; Piazza 2006). Freytag et al. (2011), however, find a global correlation between negative economic conditions and terrorist events; similarly, Caruso and Schneider (2011) report that reduced economic opportunities lead to increased incidence of terrorism in European countries. Focusing on sub-national units, Vadlamannati (2011) finds that poverty relative to the rest of the country explains political violence in India, and Benmelech and Klor (2016) find a positive relationship between a country's GDP per capita and the number of its nationals among Daesh fighters.

Our investigation is limited in that is looks at only one – if very important – extremist group. The dataset has a number of key advantages, however: Most other datasets primarily include individuals that have come to the attention of authorities or media, or which are hailed as "martyrs" by their organization. This can create significant biases, not least because most extremist groups admit and deploy operatives selectively (Benmelech, Berrebi, and Klor 2012; Mesquita 2005). Our dataset of volunteers who have just crossed the border to Syria allows us to largely isolate the "supply function" of extremism – a critical precondition for inferences about the causal link between individual-level variables and radicalization. With an n just above 4000, the number of cases is unusually large, the record-keeping is quite systematic and contains socio-economic variables that are typically unavailable in other datasets. Individuals hail from a wide range of countries, allowing systematic cross-regional comparisons.

Our main empirical approach follows Krueger and Malečková (2003) and Berrebi (2007) in comparing IS volunteers with the male Muslim background population in relevant age cohorts in their countries of origin. We use information on previous occupation to construct measures of economic status. The comparisons to background populations are done descriptively for the entire dataset and through logistic regressions for a sub-set of three countries with a sufficiently large case number.

We find that extremists are indeed more educated than their country peers, although the difference is much stronger outside of Western countries. Across the whole sample, IS volunteers have worse jobs than their contemporaries. The regression models find that if we introduce a variety of individual-level controls, education remains a significant predictor of extremism. "Opportunity costs" in terms of having a bad job has no systematic effect, while economic grievance in terms of having a bad job relative to one's education level does correlate with extremism.

While the nature of the data makes clean causal identification difficult, the findings survive several robustness tests, including sub-setting strategies to deal with the potential endogeneity of extremism and occupational success.

Literature review and theory

The following section reviews theoretical and empirical literature on socio-economic status and extremism, with a view to distilling a number of testable hypotheses. The primary focus is on individual-level status variables and processes.

Education and extremism

We have seen above that many authors find extremists to have above-average education, albeit not in all places and for all types of ideologies. This broadly replicates findings on education and political activism more generally.

We know that participants in the political processes, be they voters, activists or candidates, are typically better educated (Rosenstone 1993; Verba 1995). Straughn and Andriot (2011), Dauphinais et al. (1992), Norris (2004), and Campante and Chor (2012) have found education to have a politically activating effect in a variety of country and ideological contexts. Similarly, Glaeser et al. (2007) find that education and democracy are correlated and attribute the link to the role education plays in facilitating individuals' political activity.

Much of the above literature, be it on political violence or political activism in general, is not clear about the underlying causal mechanisms. When scholars of extremism propose an explanation, they usually limit themselves to deductive speculation. Krueger and Malečková speculate that

involvement in political violence requires "some minimum level of interest, expertise, commitment to issues and effort" (2003, 142), all of which can be facilitated by higher levels of education. Berrebi similarly suggests that "individuals with more education may be better equipped to understand moral and religious justifications invoked by such [extremist] groups" (2007, 8), have higher awareness of injustices and a stronger sense of social responsibility.

Explanations on education and peaceful political involvement are similar: Verba and Nie (1987) propose a "resource" approach that links socioeconomic status, including as education, with political engagement. Glaeser et al. (2007) argue that schooling teaches people to interact with others, thereby raising the benefits of political involvement. Both these arguments could also apply to involvement in clandestine, extremist organizations.

While these theories are plausible, we cannot be sure that higher levels of education really drive individuals to participate in political extremism. First, the data we have on the question are both incomplete and have shown a number of exceptions. Secondly, individuals usually end up in datasets on radical extremists both because they sought to join a radical group and because the group decided to admit and deploy them. It might well be that known extremists are more educated due to groups' demand for educated operatives rather than the higher supply of such individuals (Benmelech, Berrebi, and Klor 2012; Mesquita 2005). Most studies showing higher levels of education among extremists are, thirdly, purely descriptive and do not investigate how education correlates with other factors for which it could be a proxy, such as socio-economic background or professional skills.[2] This paper seeks to address all these shortcomings in existing studies.

We derive the following hypothesis from the above literature review:

Hypothesis 1
Net of other factors, higher levels of education increase an individual's propensity to join a militant Islamist group.

Opportunity costs

Perhaps the most prominent socio-economic hypothesis about which individuals are more likely to join radical groups is that of opportunity costs: Individuals with "less to lose" in material terms are more likely to follow their inclination to become extremists. This rational choice argument is cited particularly by economists researching political violence (Azam and Thelen 2008; Benmelech, Berrebi, and Klor 2012; Frey and Luechinger 2003; A. B. Krueger 2007; Mesquita 2005) and is inspired by the economic theory of crime (Becker 1968).

Empirical evidence for the opportunity cost mechanism is relatively scarce. In several cases, authors who find a correlation between negative economic conditions and extremism interpret it as a sign of shifting opportunity costs: Benmelech et al. (2012) for example show that Palestinian suicide bombers are better educated and more experienced when economic conditions in Palestine are worse, thereby lowering the opportunity cost of extremism. Re-analysing data from Krueger and Malečková (2003), Kavanagh (2011) finds that an interaction of poverty and higher education makes individuals most likely to join Lebanon's Hezbollah, which he reads as a sign that radical groups select operatives on education, while individuals' self-selection is shaped by opportunity costs.

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[2] Skills are often thought of as a demand-side factor, i.e. a variable that makes would-be recruits more attractive to extremist groups. It can however also be supply-side factor, as individuals anticipate having a higher impact in radical groups thanks to their skills, hence making involvement more rewarding.

Using country-level data from Europe, Caruso and Schneider (2011) find a negative correlation between economic opportunities for individuals and terrorist activity. Freytag et al. (2011) similarly report that country-level economic conditions are negatively correlated with terrorist events. Both sets of authors interpret these findings as evidence for an opportunity cost mechanism.

Altogether, however, the evidence on the opportunity cost hypothesis is mixed: As we saw in the introduction, findings on the economic status of extremists are based on weak data. Many authors, moreover, find extremists to be relatively materially privileged, putting at least a simple opportunity cost explanation into question.[3] And as is the case with data on extremists' education, most available biographical datasets reflect recruitment and deployment choices of radical organizations as much as the supply decisions of would-be radicals, making it difficult to draw direct conclusions on supply-side factors. Furthermore, as shown in the introduction, the majority of authors working with country-level data have failed to find a link between extremism and poverty or bad economic conditions.

Finally, there is a fundamental theoretical challenge to opportunity cost explanations: None of the research designs cited above can empirically distinguish a rationalist mechanism based on cost-benefit calculations from sociological or psychological grievance mechanisms. The latter focus not on how much an individual stands to lose objectively but on the dissonance between that individual's socio-economic status and his or her status expectations.

There is at least one piece of evidence that pure economic payoffs might not matter in motivating Islamist extremists: Bahney et al. (2013) find that Al Qaeda in Iraq operated a generally flat salary system, with universally low pay and no clear differentiation by the level of violence and risk operatives were involved with. If opportunity costs mattered, we would expect the organization to reward individuals for greater sacrifices.

Based on the above literature review, we propose the following hypothesis on opportunity costs:

Hypothesis 2
Net of other factors, lower economic status makes individuals more likely to join extremist groups.

Economic grievance

As indicated above, a correlation between individuals' reduced economic opportunities and militancy can be interpreted in different ways: They might have objectively less to lose – or they might experience higher levels of frustration due their diminished status relative to their expectations, triggering a violent reaction. Existing studies provide no purchase in distinguishing the two.

The link between grievances and violence has emerged as an important field of political science research in recent years, although primarily with a focus on collective grievances and civil war or insurgency (Cederman, Weidmann, and Gleditsch 2011; Østby 2008; Vadlamannati 2011). Somewhat closer to our interest, Piazza (2012) has detected a correlation between group-level economic discrimination and terrorism. Focusing on individual-level grievances, Chandra and Foster (2005) find that wage inequality drove racial violence in 1960s U.S. As far as we know, however, to date no

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[3] Advantaged material status of extremists does not disprove an opportunity costs explanation, as countervailing factors such as the mobilizing force of education could drive better-situated individuals into extremism despite facing (and considering) higher costs. Identifying such processes requires more advanced research designs, however, which are seldom deployed. Berrebi (2007) and Kavanagh (2011) are the two main exceptions we are aware of.

researcher has attempted a quantitative test on how individual-level economic grievances might drive individuals to join militant Islamist groups.

This is despite a well developed – if contested – research tradition on what social psychologists and sociologists call "relative deprivation": a situation in which individuals feel that their own status falls short of that of a salient reference group, and which has been hypothesized to lead to a wide range of behavioural outcomes, including violence and extremist political behaviour (Gurr 2011; King and Taylor 2011; Pettigrew 2015; Runciman 1966; Stewart 2006; I. Walker and Smith 2002).[4]

Findings on relative deprivation and political outcomes have been mixed, which Pettigrew (2015) and Vadlamannati (2011) attribute to the fact that individual- and group-level measures and outcomes have often been mixed. In Pettigrew's view, the concept is most promising with individual-level measurements. There is evidence from Western countries of a link between individual relative deprivation and protest (Abrams and Grant 2012; L. Walker and Mann 1987) and a correlation between fears of deprivation and support for far right-wing parties (Geishecker and Siedler 2012). A meta-analysis by Pettigrew (2016) shows a correlation between relative deprivation and collective behaviours such as rioting, readiness to join strikes and endorsement of violent politics.

Using a sample of individuals who have committed politically motivated crimes in the U.S., Jasko et al. (2017) find that experiences of economic loss of significance such as unemployment, irregular work or failed aspirations predict the use of violence by perpetrators. While not framed in terms of relative deprivation, the results are compatible with it. Similarly, drawing on a survey of young German Muslims, Hadjar et al. (2019) report that "negative status inconsistency" in terms of high education but precarious economic status acts as mediating factor that links self-interest and acceptance of violence to defend the Muslim world against Western threats. Mishra and Novakowski (2016) use Canadian data to show that self-reported relative deprivation is associated with high risk-seeking, antisocial conduct and criminal outcomes – not themselves political behaviours, yet potentially relevant in the context of the high-risk behaviour of political extremists.

Some scholars working on political violence in the Muslim world have also hinted to potential relative deprivation processes. Finding that Palestinian militants have above-average levels of education, Berrebi speculates that individuals with higher education might be "particularly frustrated by the loss of economic opportunities" (2007, 8) in times of economic crisis. According to focus group work with Tunisian, Lebanese, and Nigerian youth conducted by Norman and Mikhael (2017), not socio-economic status per se but a sense of relative deprivation makes young Muslims susceptible to radicalization. Gambetta and Hertog (2016) attribute the higher levels of education among Middle Eastern Islamist extremists compared to their Western-based peers to relative deprivation suffered by graduates on Middle Eastern labour markets.

There is also some country-level evidence supporting relative deprivation hypotheses: Brockhoff et al. (2015) show that when country-specific economic conditions are unfavourable, higher levels of education may facilitate domestic terrorism, arguing that feelings of frustration and disenfranchisement might be the underlying mechanism. Similarly, Krieger and Meierricks (2019) evidence a country-level link between inequality and terrorism which they attribute to relative deprivation.5

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[4] Runciman (1966) distinguishes individual and fraternal (collective) relative deprivation. Due to data limitations, this paper only addresses individual-level relative deprivation.
[5] Sayre (2010) claims that the geographic distribution and timing of Palestinian suicide bombings is compatible with relative deprivation in terms of Palestinians' material status relative to salient reference groups; his paper is based on a small number of observations and purely descriptive data, however.

So far, however, there are no dedicated quantitative tests of the hypothesis that relative deprivation drives individuals to join radical Islamist groups. Much of evidence reviewed above relies on self-reported attitudes or aggregate data, and much of it – even if explicitly framed in terms of relative deprivation – would be equally compatible with opportunity cost interpretations.

One challenge that has prevented rigorous testing is the difficulty of operationalizing relative deprivation. It can be measured in terms of self-reported social position, income or status relative to individuals with the same education, in the same region, or the same profession, of relative changes in such status over time (Pettigrew et al. 2008). We need to be able to distinguish it from absolute deprivation, a concept that instead is relevant for the opportunity cost mechanism.

How can we *operationalize socio-economic expectations* of jihadi volunteers? Short of a direct survey among jihadis, we believe that an individual's level of education is the best proxy for his or her expectation of material success. This is in line with a long tradition of research that identifies education as a socially mobilizing force that raises social aspirations (Huntington 2006). In his discussion of relative deprivation measures, Stewart points to the need to identify "large institutionally normative social categories" (2006, 785) as reference groups to identify relative deprivation. Level of education is a particularly large and salient social category in a wide variety of social contexts. A variety of authors have shown that level of education is a good predictor of individuals' expectations of earnings and future occupation in particular (Brown, Ortiz-Nuñez, and Taylor 2011; Croll 2008; Frick and Maihaus 2016; Wolter 2000).

There is also evidence that education can drive the frustrations of the relatively deprived: In a widely cited study, Clark and Oswald (1996) use British data to demonstrate that work satisfaction is barely influenced by absolute income but is a function of the gap between an individual's outcomes and "comparison wages" of employees in similar circumstances (including level of education). They find, critically, that education strongly raises aspiration targets (see Johnson and Johnson (2000) for a similar study based on self-perceived over-qualification).

From the above, we can derive the theoretical expectation that relative deprivation is the most intense, and the potential violent reaction to it strongest, when education raises socio-economic expectations while actual status achievements are negative. This implies hypothesis 3:

Hypothesis 3
Net of other factors, the higher the ratio of education to economic status, the higher an individual's propensity to join a militant Islamist group.

A note on observable implications:
Can we in practice distinguish the effects of education, opportunity costs and economic grievance? Not necessarily: If both education and opportunity cost effects are at work simultaneously, outcomes can look equivalent to those of the economic grievance mechanism: Individuals with the highest education and the worst economic status outcomes will be most likely to volunteer for radical groups. This is probably one reason why existing studies have pre-committed to either the opportunity cost or a grievance explanation rather than trying to adjudicate between them.

There is, however, one observable outcome that would provide clearer evidence for grievance processes: If there is an interaction effect of education and economic status that goes beyond the individual additive effects of these two factors, then this would favour the grievance explanation. Opportunity costs should be simply captured by an economic status variable, and should be constant across levels of education as the costs of giving up that status by joining a radical group should be

unaffected by education. An interaction effect of higher education and low economic status, by contrast, would suggest that individuals with higher education are more affected by having lower economic status – a sign of subjective grievance rather than rational calculation. It might be that education also captures some element of opportunity cost to the extent that it measures future earnings potential. This would however create a conservative bias against the grievance mechanism, as more educated individuals would have higher opportunity costs and hence be less likely to join radical groups.

Summary

We have provided an overview of existing theory and evidence on three socio-economic drivers of radicalization that have been proposed by sociologists, economists, psychologists and political scientists. We have derived a number of hypotheses and observable implications that will guide the first-ever joint quantitative test of the three factors. We particularly aim to differentiate the opportunity cost and grievance hypotheses, which, albeit hard to distinguish empirically, imply fundamentally different causal mechanisms. Distinguishing between them would bring us closer to answering a foundational question of political radicalization.

Context about ISIS

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The data

The data we use in this paper is based on a cache of more than 4000 registration documents on which ISIS recorded biographical details of new foreign recruits immediately after they crossed into Syria through a variety of border crossings. The forms are dated and cover all of 2013 and 2014 (for more background see Dodwell et al. (2016)). The files were leaked by an IS defector and shared with select media outlets, which in turn made them available to researchers. All cases are male and by the estimate of Dodwell et al. (2016) they constitute almost a third of all foreign fighters who entered Syria during these two years.

The forms contained a large range of identical fields in which ISIS recorded data on numerous theoretically interesting variables, including age, level of education, previous occupations, number of children, marital status, who referred a recruit recruits, which role he wanted to take (suicide bomber vs. fighter), his self-reported level of religious knowledge, and previous jihadi experience. In this paper we focus on theoretically relevant socio-economic and demographic variables.

Advantages over existing data

Once duplicates were removed, the forms yield information on 4007 individuals. The data, while not exhaustive, offer several advantages over existing biographical data about violent extremists. First, it is subject to none of the usual reporting biases: Most existing datasets build on information from news media, court proceedings and government reports. This means that datasets typically only include extremists who have been detected by authorities, often because they have been successful. As Berrebi points out, "successful terrorists are presumably abler terrorists" (2007, 14), thereby potentially creating biases in terms of the education and skills recorded.[6] In the cases where militant groups themselves present lists of "martyrs" (A. B. Krueger and Malečková 2003), operatives who have not been martyred are excluded, and the ones included might also be selected to make the

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[6] It might also be that the most successful terrorists are less likely to be detected, which would create the reverse bias.

group look more accomplished. Drakos and Gofas (2006) show that reporting on terrorist incidents is affected by levels of press freedom in the country in which they happen, thereby creating further potential biases. As our data was produced for ISIS' internal purposes and seems to include all kinds of would-be operatives, none of these conventional sampling issues apply.

Quite apart from these biases, available datasets usually are small – with case counts in the hundreds at best – and contain socio-economic information only on a limited sub-set of cases (Benmelech, Berrebi, and Klor 2012; Gambetta and Hertog 2016; A. B. Krueger 2007; Sageman 2004). While some information on education is often available, data on economic and labor market status is particularly limited. Our dataset, by contrast, contains data on 4007 individuals, with very good (albeit not exhaustive) coverage of individuals' education and professional experience. The information on the latter in particular is unique.

The data includes a wide cross-section of countries of origin, while holding constant the extremist organization that individuals join. This means that the sample makes cross-national comparisons much easier than previous international datasets, which typically had to combine very different sources and networks to construct smaller cross-national samples (Gambetta and Hertog 2016; Sageman 2004).

We know that the dataset only contains a fraction of the foreign volunteers that joined ISIS in 2013-14. The distribution of countries of origin is however quite similar to that in general estimates of the totality of foreign fighters that joined ISIS (Benmelech and Klor 2018), suggesting that there are no specific biases regarding geography. Appendix XX contains a comparison of the distribution of countries of origin (see also Abdel Jelil et al. 2018, 27).

The most important advantage of our data is that it allows us to get much closer to observing the "supply function" of extremism: Existing biographical data reflects both the supply of would-be extremists and the often quite selective personnel recruitment and deployment choices of radical organizations (Benmelech, Berrebi, and Klor 2012; Mesquita 2005). In the case of ISIS, and in distinction to cell-based clandestine groups like Al-Qaeda, the organization's recruitment drive has been unusually open, inviting essentially all Muslims to travel to Syria and join the new state. [ref] We furthermore observe ISIS volunteers at the point of joining ISIS, i.e. before they are deployed by the organization into specific functions that could create new reporting biases.

We do not want to overstate the quality of our data: There are missing observations for key variables, it does not represent the full universe if ISIS volunteers and, critically, we know very little about how the data were produced and if ISIS administrators made any attempt to verify them.[7] The absence of women from the cache also is a significant lacuna, given that ISIS is the only major radical Islamist group with a large female presence.

Yet when collecting biographies of radical extremists, there is no perfect sampling technique. Our cache of biographical data represents a clearly advance over, as well as an important complement to, existing datasets.

We are not the only researchers working with the ISIS raw data: An overview paper from the Combatting Terrorism Centre provides a descriptive overview of its main features (Dodwell, Milton, and Rassler 2016). Abdel Jelil et al. exploit the same data cache to show that unemployment by education level in countries of origin predicts the educational composition of the ISIS volunteer force

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[7] There is a possibility that volunteers exaggerated their educational and professional accomplishments. If this is the case, it might however apply to both variables. This paper's key focus is on the ratio between the two, which would remain unaffected if the bias is symmetrical.

– a finding that they interpret as consistent with both opportunity costs and grievance mechanisms (2018, 3). Ketchley and Barrie (2018) similarly show that the sub-national distribution of unemployment in Tunisia predicts the geographic origin of Tunisian ISIS volunteers. To our knowledge, however, no researchers have exploited the occupational information contained in the ISIS registration sheets.

Data clean-up and comparator data

As the raw data consist of Arabic pdf documents, we translated and manually entered all items in the registration documents into an English-language dataset, which we then used to formally code key variables of interest (these efforts were undertaken separately from those of above-mentioned researchers working with the same raw data). Our coding choices are documented in the below section on the data's descriptive features, with more details contained in online appendix YY.

There are no experimental or quasi-experimental data that would allow us to infer which features make individuals more likely to join extremist groups. The best we can do is to compare known extremists with the relevant background populations from which they hail (Benmelech, Berrebi, and Klor 2012; Berrebi 2007; A. B. Krueger and Malečková 2003). In our case, this implies a comparison with male Muslims of the same age bracket from relevant countries of origin.

We have managed to assemble micro-data that covers a wide range of countries of origin, corresponding to the vast majority IS volunteers in the dataset. We use census data from the Minnesota Population Center's Integrated Public Use Microdata Series (IPUMS), national labor market and household survey data for several Arab countries obtained from the Economic Research Forum, and poll data from the European Social Survey and World Values Survey. For a number of countries with no or incomplete survey data that represent larger contingents of volunteers in our sample, we also gathered aggregate demographic and socio-economic data from national sources. This is the case for Algeria, Azerbaijan, Bahrain, Kazakhstan, Kuwait, Lebanon, Libya, and Saudi Arabia (all of which are represented with more than 20 individuals in our sample). These data cannot be used for individual-level regressions, but are useful for global, cross-country comparisons. See appendix [ZZ] for the detailed rules we used to choose between available sources if more than one was available for a country.

We use datasets that are as proximate as possible to 2012/13, the years in which the volunteers in our dataset entered Syria, but prefer census data over survey data. Datasets are only included if they contain at least 100 male Muslims. In the case of the European Social Survey, this required combining of observations across seven survey waves from 2002 to 2014. This spread over a longer time period is not ideal, but the features of sampled Muslims across the waves are broadly similar. As the number of male European Muslims per country in our dataset remains small (usually between 100 and 300 across waves), conclusions about individual ESS countries should in any case be treated with caution.[8] We leave out Syria from our comparisons, as the 138 Syrian volunteers in our dataset are not foreign fighters and their incentives for joining might well be different.

Through the above, we cover almost all of the IS sample, although the extent varies depending on the variable at hand; several datasets e.g. do not contain useable information on occupation. There are only two larger countries of origin not included at all in the comparative data: Tajikistan (58 cases) and France (117).[9] All other countries not covered account for less than 20 cases each. The

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[8] Our survey data usually identifies religion directly, but in the case of Chinese census data obtained from IPUMS, it was not recorded. We instead treated 10 predominantly Muslim ethnicities as Muslims (the sample is dominated by Hui and Uighur, which are overwhelmingly Muslims).

[9] The French government does not allow the collection of data on religion, preventing us from identifying Muslims in available survey and census data.

below graphs always report the number of total IS cases on which we have information as well as the (smaller) number of such IS cases for which we also have relevant data on the background population.

Descriptive findings

The following section provides descriptive data of our sample, including a comparison of IS and relevant background populations for all countries where data allow. Our approach is to estimate demographic features of the male Muslim background population for each country (using survey weights as applicable) which we then aggregate to a weighted average, with weights corresponding to distribution of nationalities in the IS sample. This means that if country A has twice as many IS volunteers as country B, its background population data is accorded twice the weight in calculating the background population mean. This way we arrive at a synthetic comparison group that corresponds to the geographic composition of the IS sample. We limit direct comparisons to sets of countries where data are available, but also provide descriptives on the total IS sample.

IS volunteers are predominantly young and we want to avoid comparing them with a significantly older background population. We therefore use an age cut-off point that corresponds to the 90th percentile of the age distribution of IS volunteers for each individual country. This cut-off age ranges from 25 years (Denmark) to 42 (Tajikistan) and clusters around 35. For the same reason, we also impose a lower age cut-off, including only cases who are 20 and older. The latter restriction also limits the comparison to individuals who for the most part had an opportunity to finish education and enter the labor market. The broad descriptive results are very similar with other age cut-offs. For some variables and countries, we are also able to segment comparisons by narrower, 5-year age brackets to improve comparability (see appendix [CC]).

Basic demographics

The dataset contains information on the last country of residence for 3768 cases (the entry is missing for 239 cases) and of nationality for 3713 cases (missing for 294 cases). The entries in both categories are identical for more than 90% of the sample. We prefer the country of residence variable as is it is more likely to capture formative experiences in education and the labor market, notably for Arab citizens living in Western countries.

Graph 1 shows the distribution of the last country of residence.

**Graph 1: Last country of residence of IS foreign volunteers**
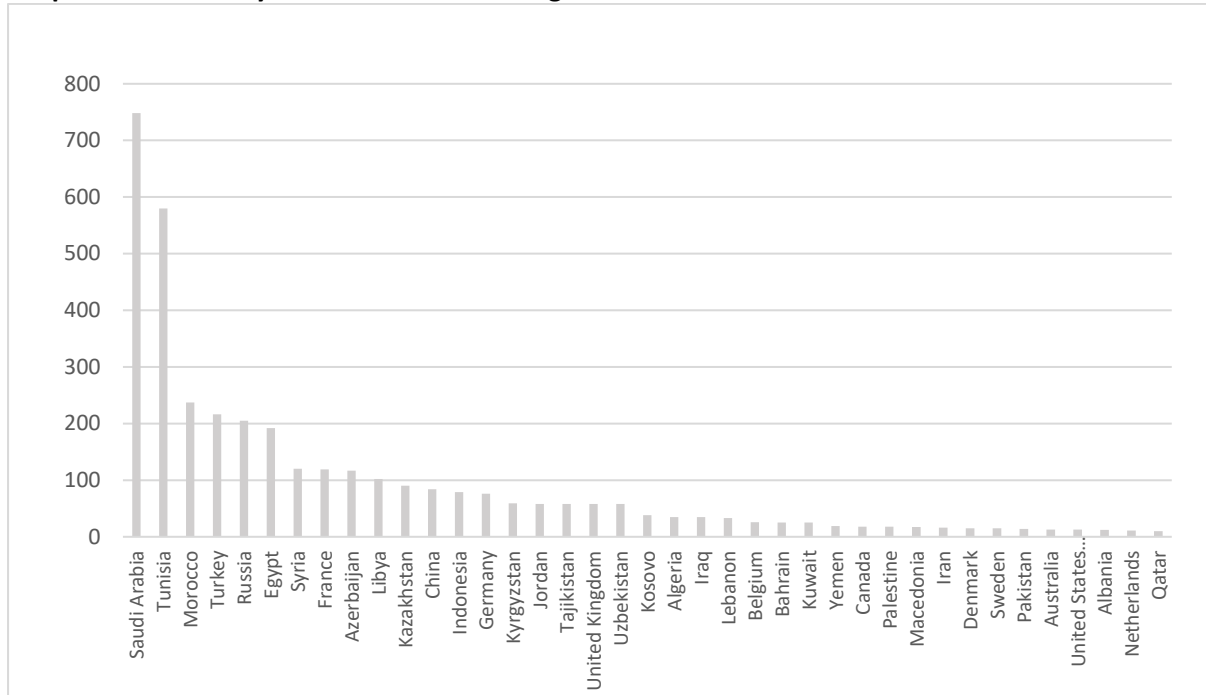
The Saudi contingent is the largest in absolute terms while Tunisia has the largest per capita share of IS volunteers among all Muslim countries. Western countries have considerably smaller absolute shares among the fighters, but in term of per capita representation of their Muslim populations, several European countries, notably France and Belgium, are close to Tunisian levels (see also Benmelech and Klor 2018).

We infer IS volunteers' age on entry from their date of birth and date of entry, which we are able to do for 3950 cases. This is the age at which the information on the recruitment sheets was recorded and also, for the majority of cases, the age when (or just after) individuals had decided to leave their societies behind and join a militant Islamist organization. Graph 2 below shows that IS volunteers are quite young and include a good share of teenagers. The median and mean ages are 24 and 25 respectively. 90% are between 17 and 34 years of age.

For all descriptive comparisons, we limit ourselves to individuals above 19 years and below the 90th percentile of the age distribution of each national IS contingent.

Graph 2: Age distribution of IS foreign volunteers
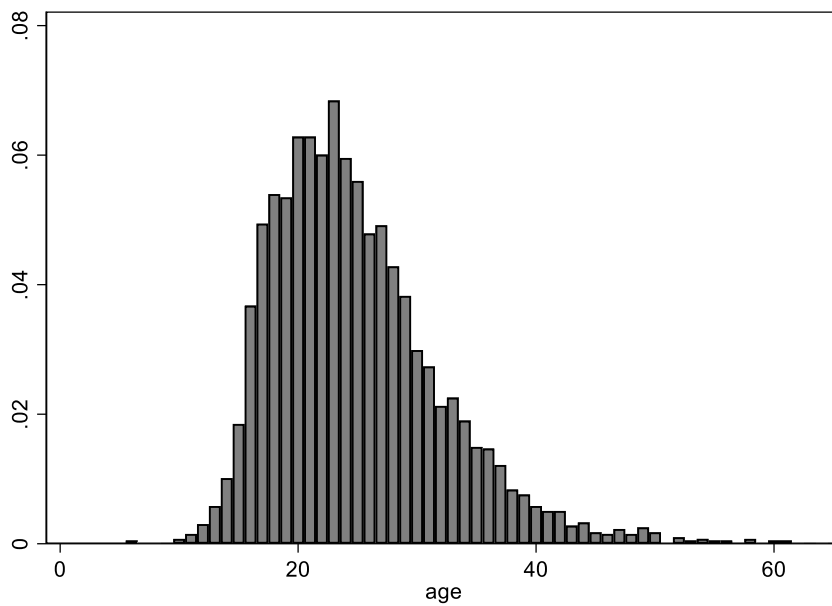
The registration sheets include information on family status. More than a third of IS volunteers in our chosen age window is married. This is surprisingly high, even in comparison with background populations: Graph 3 below shows marriage patterns in a) the total IS sample, b) in the share of the IS sample for which we have background population data, and b) in the background population itself, which extends to 29 countries (restricted to male Muslims of comparable age and sample-weighted as explained above). The incidence of marriage in the background population is barely higher than among IS volunteers.

Graph 3: Marital status of IS volunteers compared
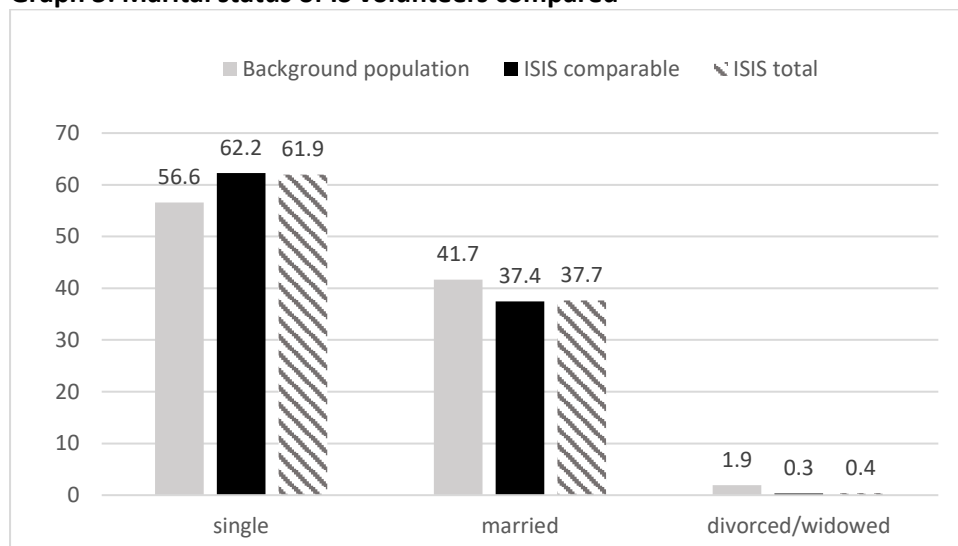
Number of IS observations: 1960 (ISIS comparable), 2454 (ISIS total)
29 countries included in comparison
NB: family status data is available for 3649 IS cases in total, but a significant share of these is excluded due to our chosen age restrictions

Some of these marriages might be shotgun arrangements undertaken just before or after entering Syria. Another fact suggests that IS volunteers were not celibate loners before joining IS, however:

While 34.7% of male Muslims in the background population for which we have data have at least one child, this is the case for 36% of IS volunteers from the same countries.[10]

Education

The registration sheets provide information on the level of education of 3031 of the 4007 cases, divided into none, basic, primary, secondary and higher. For comparative purposes, we merge the small number of "none" (57) and "basic" (78) into the primary category, resulting in the three-level classification that is most frequently used in international survey data. Where necessary, we recoded education data for the background populations into the same classification (see appendix [RR] for details).[11]

Graph 4: Education levels of IS volunteers compared
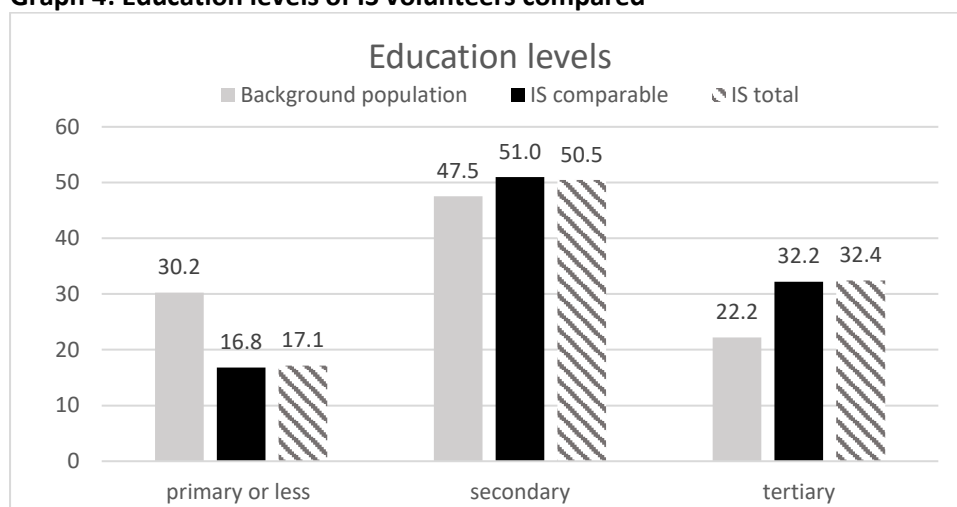
Number of IS observations: 1557 (ISIS comparable), 1950 (ISIS total)
31 countries included in comparison

Confirming previous findings about Islamist radicals, graph 4 shows that IS volunteers are considerably more educated than the background populations they are recruited from. The small number of IS cases with basic education stands out in particular.

It is conceivable that the near-quarter of cases without recorded education have obtained lower schooling than those that report. When we compare the occupational record of those with known education to those without, however, the distribution is very similar (see appendix YY); the next section discussed occupation in more detail. To the extent that education and occupation are correlated, this suggests no strong education bias among missing cases. What is more, the over-representation of better-educated individuals also obtains for national IS contingents with fewer missing observations (notably Tunisia and Saudi Arabia, where only 12.2 and 10.5% of IS cases have no education information). All this suggests that missing observations introduce no strong bias in the education variable. In any case, even if every single case with missing information had only primary or lower education, the share of IS cases with tertiary education would still reach 23.7%, slightly higher than in the background population.

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[10] The comparison is based on 20 countries corresponding to 1008 IS cases (leaving out 1655 IS cases for the countries of origin of whom we lack comparison data broken down by age). We assumed that no entry in the relevant line in IS registration forms meant absence of children. If some fathers did not declare their children as requested, the actual count for IS would be even higher.
[11] The registration sheets (like some of the international survey sources) do not state whether education on the level mentioned was completed; we assumed that it is.

Professional status

The registration sheets provide better coverage on individuals' previous profession, for which we have 3669 entries, representing 91.5% of the total sample (in 136 cases they also provide professions before the previous one). IS does not seem to have used any recognizable classification scheme for these entries, which appear largely ad hoc. In many cases, however, we have been able to recode the entries in line with a standardized scheme: the ILO's International Standard Classification of Occupations, which is widely used by economists and national statistical agencies. We specifically used the 4-digit ISCO-08 scheme, which allows the detailed classification of occupations into several hundred categories differentiated by skill level and type of activity.[12]

We only coded previous professions that clearly corresponded to an ISCO category, though we sometimes had to resort to higher-level, two- or three-digit codes where descriptions were not specific enough. Many entries were not ISCO-codeable as they did not correspond to any occupation, including 515 merchants or traders of various types, who presumably are self-employed,[13] 586 students, 235 unemployed and 189 cases with "none" as occupation entry.[14] Some other entries were either too generic or clearly outside the ISCO scheme; examples include "employee (Suez Shipyard Company)", "smuggler", and "drug and hashish dealer (may god forgive us and him)". We were, however, able to code the vast majority of cases that were clearly in an employment relationship of some kind, yielding 1685 ISCO entries.

Graph 5 below compares the distribution of occupations in the IS sample with the available (weighted) background population for the top-digit ISCO classification.

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[12] https://www.ilo.org/public/english/bureau/stat/isco/

[13] While the merchant (or trader) category is difficult to interpret, it is plausible that at least in the developing countries in our sample, this is largely a low-status activity. The share of merchants is particularly high among IS volunteers from Tunisia, Morocco and Egypt, countries where most traders operate marginal, informal businesses (Tunisian street vendor Mohamed Bouazizi, whose self-immolation triggered the Arab spring, being perhaps the best-known example). In appendix [RR] we classify the merchants in the sample as sales workers in the ISCO scheme, which does not change results materially.

[14] Estimating the total number of unemployed among IS volunteers is difficult. It is not clear, notably, if individuals of working age with the entry "none" in the previous professions category were unemployed or just did not provide information on their jobs. Other individuals might have listed professions they exercised at some point in the past but been unemployed more recently. See appendix [GG] for more detail and a lower boundary estimate of unemployment and comparison to the background population.

Graph 5: Previous occupations of IS volunteers
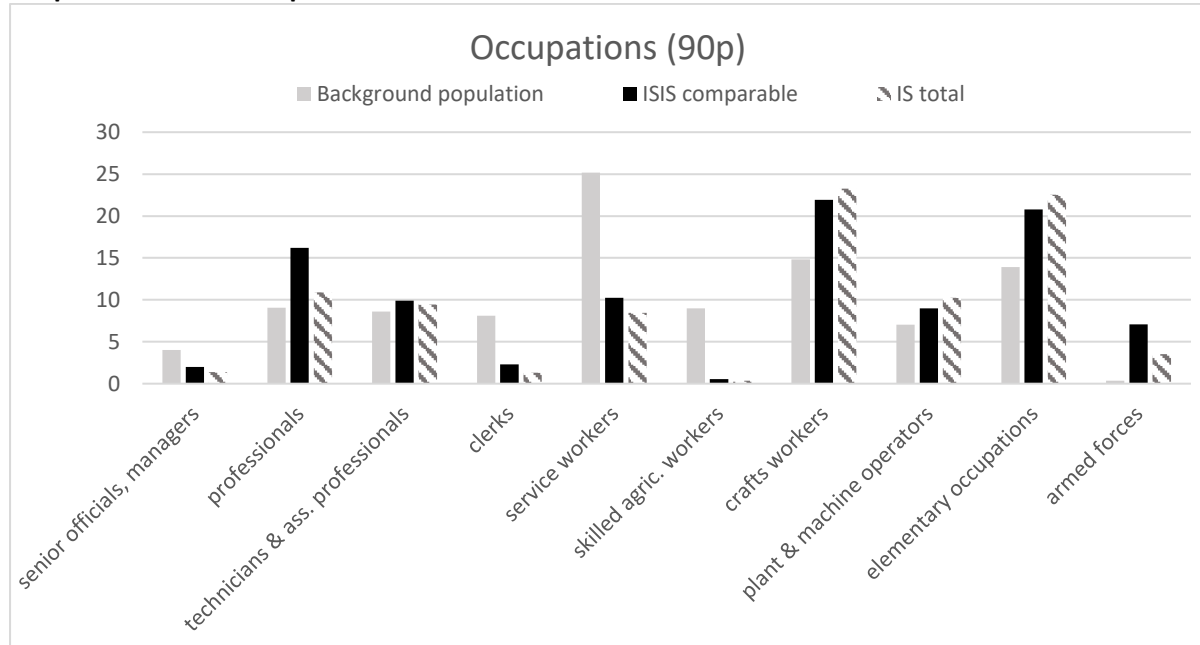
Number of IS observations: 850 (ISIS comparable), 1266 (ISIS total)
(22 countries included in comparison)

The IS sample contains more professionals, but also fewer managers and, with the exception of agricultural workers, more lower-class laborers. This breakdown of occupations does not quite correspond to the higher levels of education among IS cases.[15] This is potentially relevant because the ISCO classification is explicitly defined in terms of the education required for different jobs, suggesting that at least some IS volunteers were operating below their station.

Occupational prestige

The IS data do not contain information on earnings or wealth of the international volunteers. We can however use past occupation as a measure of socio-economic status. There is a long tradition in sociology of converting occupational data into status variables (Connelly, Gayle, and Lambert 2016). The most prominent approach arguably is the Standard International Occupational Prestige Scale or SIOPS (H. B. Ganzeboom and Treiman 2003; Treiman 2013). SIOPS is based on surveys from more than 60 countries in which respondents accord prestige scores to different occupations, and which show that variation in occupational prestige rankings across societies and over time are minimal.

Under SIOPS, every occupation in the ISCO scheme has its own prestige score. This makes it easy to assign such score both to IS cases and individuals in the background population data on whom we have occupational data. Depending on the granularity of ISCO data, the assignment is possible both for single-digit and multi-digit classifications. We were able to assign SIOPS scores to the background population in 22 of the countries of origin in our sample, corresponding to about two thirds of the

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[15] The over-representation of IS volunteers with military background is probably an artefact of the data on the background population, which often omit this category, probably on national security grounds. In any case, most of these cases (35) are from one country, Saudi Arabia. This confirms previous research that found individuals with security background among Saudi jihadists (Hegghammer 2006).

sample.[16] We usually only have top-digit ISCO information on the background population, which however captures much of the variation in status scores. [17]

The prestige values in both the background population and the IS sample range from 15 to 78. The standard deviation in the whole IS sample is of 14; it is closer to 10 for individual country contingents (see appendix VV for more country-level descriptive data on IS volunteers). The mean occupational prestige for the available background population is 38.4, that for IS volunteers from these countries is 38.8 (850 cases), and that for the whole IS sample is 36.5 (1266 cases). In other words, the average prestige of jobs previously held by IS volunteers is similar to that of the populations they hail from. Results are similar if the sample is broken into more fine-grained 5-year age brackets (see appendix KK).

The similar prestige levels obtain despite higher levels of education among IS volunteers. What if we break down prestige scores by education level? Graph 6 shows that IS volunteers have jobs with somewhat lower prestige on all levels of education, but the difference is largest for those with tertiary education.

Graph 6: Occupational prestige of IS volunteers by education level
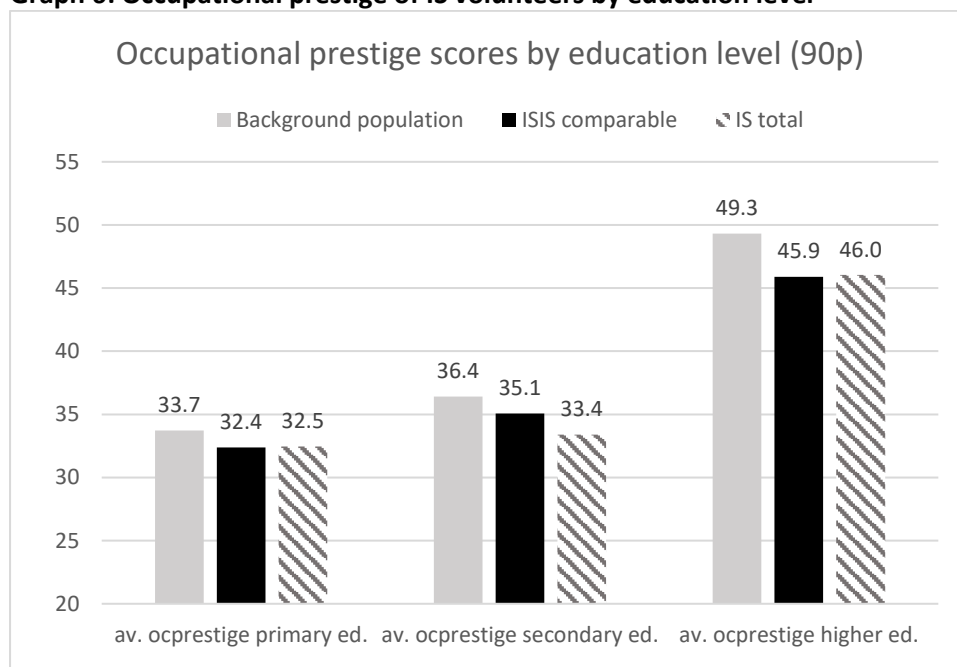
Occupational prestige scores by education level (90p)

■ Background population ■ ISIS comparable ↘ IS total

Number of IS observations: 850 (ISIS comparable), 1266 (ISIS total)
(22 countries included in comparison)

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[16] The second prominent occupational status variable is the International Socio-Economic Index or ISEI (H. B. G. Ganzeboom, De Graaf, and Treiman 1992; H. B. Ganzeboom and Treiman 2003). ISEI measures reflect the typical education and income in different professions and is closely correlated with SIOPS (H. B. Ganzeboom and Treiman 1996, 217). The ISEI classification is, however, based on data from fewer countries, most of which are Western. Education for us is also a separate independent variable, which makes it potentially problematic to use a measure of occupational status that also incorporates an education dimension. We instead attempt to measure the income aspect of occupations separately in the regression section, based on our own inferences from international income data. For our core models, SIOPS is the preferred measure as it captures one key theoretical dimension, social prestige, instead of combining several of them.

[17] The ten top digits by themselves capture a large share of the variation in occupational prestige: In both IS sample and background population data with full ISCO coding, the standard deviation of prestige scores within specific top-level categories is much smaller than across all observations, usually by two thirds or more.

The above pattern broadly applies in individual country comparisons too (see appendix [VV]), suggesting that it is systematic. There are two exceptions among countries with larger IS contingents (i.e. 100 cases and more): Egypt and Saudi Arabia, in both of which IS volunteers with tertiary education on average have higher prestige scores than the similarly educated background population. We are unable to analyse Saudi Arabia more closely as we lack reliable micro-data on this case. It should be noted, however, that the Saudi IS contingent also contains an unusually high share of unemployed among those with tertiary education (31 cases or 24.2% of all tertiary educated Saudi cases with labor market information, as opposed to 9.5% in the rest of the IS sample), which suggests lower economic status for Saudi cases without ISCO classification. That said, mobilization into IS might well work differently in Saudi Arabia, given its particular history of state-supported Salafism and tradition of exporting volunteer fighters to overseas conflicts (Hegghammer 2010).

Patterns become even clearer if more puzzling if we divide our sample into different country groups (see appendix [FF]): Developed economies (as defined by OECD membership), oil-rich countries (GCC monarchies and Libya), and poor and emerging economies (all remaining non-members of the OECD). Educated IS volunteers from both rich and poor non-oil countries hold particularly bad jobs compared to their male Muslim background population – while educated volunteers from oil economies hold unusually high-prestige jobs. We have no good explanation for this pattern but can conclude that in most conventional economies, educated IS volunteers seem to be professional underachievers.

Could the bad occupational achievements of tertiary educated IS volunteers in most of our sample be a sign of relative deprivation? H3 would suggest that individuals with higher education have higher status expectations and therefore are more likely to radicalize when failing on the job market. Lower opportunity costs (H2) might be at play too, but this hypothesis would not explain why the gap in job prestige differs across education levels. To establish how plausible this interpretation is, we now examine country-level data in more detail.

Regression models

We use regression models on data from key countries in our sample to simultaneously test our three hypotheses. We deploy a variety of control variables and robustness tests and use data selection rules that reduce potential endogeneity issues. We focus on the three countries with the largest contingents of IS volunteers for which there are reliable background population data: Tunisia, Morocco, and Turkey, each of which is represented with more than 200 volunteers in our sample. Other countries' volunteer contingents are either too small for meaningful regression models or there is no reliable micro-data available for background populations (notably for Saudi, Russian and French Muslims; see appendix VV for descriptive statistics on all countries in the sample).

Methods

We merge demographic data on IS fighters with that of relevant male background populations in countries of origin. Background data are taken from the IPUMS census database for Morocco (2004, 30,000 cases), the National Survey on Population and Employment for Tunisia (2013, 30,000 cases), and the European Social Survey for Turkey (2004 and 2008, 1,860 cases). In the cases of Morocco and Turkey, the background population data are somewhat older than the IS data, which makes our comparisons less reliable. That said, there have not been dramatic changes in the composition of male national populations in either case between the census and survey dates and the dates when the IS data were generated.[18]

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[18] One factor that has changed in the two background populations are education levels of recent cohorts of graduates. We believe that the bias this introduces is relatively limited, however, as much of the recent

We then run logistic regressions on the combined data for each of the three nationalities. The dependent variable is a dummy indicating whether an individual is an IS volunteer or not (as in Krueger and Malečková 2003). We apply weights representing the shares of IS volunteers and background sample cases in their respective populations (Manski and Lerman 1977), using Benmelech and Klor's (2018) estimates of the total numbers of foreign IS volunteers by country. The key independent variables are level of education, occupational prestige, and an interaction between the two, our measure of relative deprivation.

Control variables are marital status, number of children (left out of models for Tunisia, where the background population data does not contain such information), age and age squared. Coefficients for these are not shown in the regression tables. As in the descriptives section above, our models include individuals from age 20, assuming that younger individuals have not had the chance to acquire tertiary education or enter the labor market on a full-time basis. As important, this age restriction reduces the youth bias of the IS sample relative to the background population. For the same reason, we leave out individuals whose age exceeds that of the 90th percentile in each of the three IS samples.

Models and results

Table 1 below contains three models for each country: The first one shows only the correlation of different levels of education with the probability of being an IS volunteer, the second one includes the SIOPS measure for occupational prestige, and the third one also the interaction between education level and prestige. The full set of control variables is included in all models. The number of IS cases included in each model is shown in the bottom line. It is smaller than the total IS samples from the three countries because of our age cut-offs, missing data on education and, in the cases of the second and third models, the fact that IS cases without occupation or unclassifiable occupation drop out.

The models show that in Tunisia and Morocco, higher levels of education are strongly correlated with joining IS in all models; the effect in Turkey is mostly positive but insignificant. In models without the interaction, lower occupational prestige is a strong predictor of joining IS; a finding that is compatible with both opportunity cost and deprivation hypotheses. The picture is different when the education-prestige interaction is introduced. Occupational prestige for cases with primary education or less, our base category, does not show a systematic pattern: While lower prestige continues to predict IS participation for Turks (although only at $p<0.1$), it becomes insignificant for Tunisians and for Moroccans it makes IS participation *less* likely. This is incompatible with

increases in secondary and tertiary enrolment in Turkey and Morocco have happened after IS cases acquired their education. The median age of Moroccan IS volunteers included in our regressions is 27; they would have typically graduated from secondary school in 2003 or 2004 and from university in 2007 or 2008. The median age of Turkish volunteers in our sample is 25; they would typically have graduated from secondary school in 2005 or 2006 and from university in 2009 or 2010. The regression models compare them with background populations that were sampled several years earlier (6-7 years on average for the Turkish and 8-9 years for the Moroccan background population). In Morocco, tertiary enrolment rates have increased from 9.6% in 1999 to 11.9% in 2007, while secondary enrolment has grown from 38.0% in 1995 to 44.9% in 2003. These changes are not negligible, but the descriptive contrast between the Moroccan IS sample and the background population sample is much larger: IS cases are more than 6 times more likely to have higher education and 2.5 times more likely to have (only) secondary education. We therefore believe that the biases introduced through the mismatch of sample dates are comparatively limited for the Moroccan case. The picture is messier for Turkey: Tertiary enrolment rates increased from 30.2% in 2003 to 46.5% in 2009, while secondary enrolment grew from 71.7% in 1999 to 83.9% in 2005. The change in tertiary enrolment in particular means that the comparison of IS volunteers with the ESS sample (which in any case is small) is not very reliable. The regression results on Turkey are, in any case, insignificant, so we put less stock into them.

opportunity cost explanations. On higher levels of education, the pattern is clearer: In Tunisia and Morocco, individuals with both secondary and higher education become more likely to join IS if their occupational prestige drops; the coefficients for Turkey are insignificant,[19] possibly due to the small case count (there are only 10 cases with known profession and higher education). The stronger marginal effect of lower prestige for better-educated individuals in Tunisia and Morocco is what the relative deprivation hypothesis predicts.

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[19] We have run the same models in this section for the smaller dataset of Egyptian IS volunteers, based on a comparison with 2006 IPUMS census data. The results are even noisier than for Turkey, although some specifications show a significant negative interaction of higher education and occupational status. This is although Egyptian IS volunteers have comparatively good jobs; see appendix [FF].

Table 1: Correlates of being an IS volunteer – logistic regressions with occupational prestige

|	Tunisia			Morocco			Turkey		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education level:									
primary or less	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
secondary	0.58***	0.59**	2.12***	1.63***	2.68***	7.62***	0.042	0.024	-0.85
	(0.17)	(0.22)	(0.71)	(0.21)	(0.35)	(1.07)	(0.33)	(0.42)	(1.37)
higher	0.73***	1.81***	3.54***	2.76***	3.97***	8.58***	0.46	0.90	2.44
	(0.18)	(0.33)	(1.02)	(0.27)	(0.50)	(1.39)	(0.40)	(0.63)	(2.39)
occupational prestige		-0.049***	-0.0053		-0.035**	0.051**		-0.055***	-0.062*
		(0.011)	(0.016)		(0.014)	(0.021)		(0.017)	(0.033)
Education-prestige interaction:									
primary or less # occup. prestige			0			0			0
			(.)			(.)			(.)
secondary # occup. prestige			-0.053**			-0.15***			0.027
			(0.023)			(0.032)			(0.041)
higher # occup. prestige			-0.056**			-0.13***			-0.036
			(0.027)			(0.033)			(0.063)
Observations	7606	4532	4532	8046	6664	6664	561	561	561
Observations (IS)	317	155	155	152	91	91	99	66	66

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

Comparing individual coefficients is useful for discriminating between our hypotheses. To assess the overall predictions of our models, it is more useful to look at margins plots that incorporate both education and occupational prestige. Graphs 7-9 below show the marginal effect of changes in occupational prestige in our three countries for different levels of education, based on the full models in columns 3, 6 and 9. The range of occupational prestige on the x-axis reaches from the lowest ISCO top-digit SIOPS score (for elementary occupations) to the highest one (professionals). We provide plots with all three levels of education and, because the effect on the tertiary level usually dominates, separate plots showing effects only on the primary/tertiary and primary/secondary education levels.

Graph 7: Marginal effects of occupational prestige by education level in Tunisia
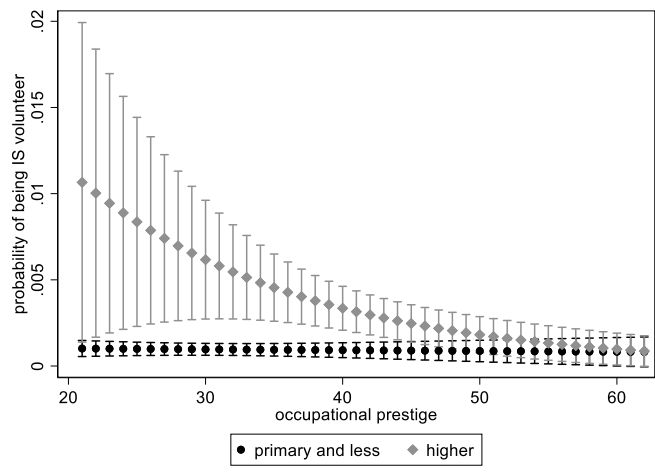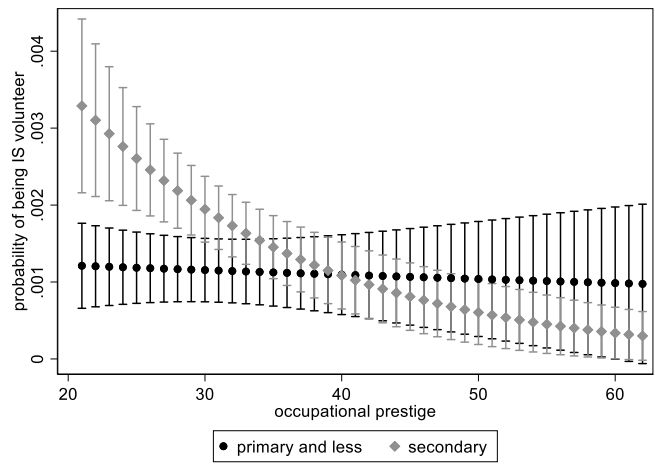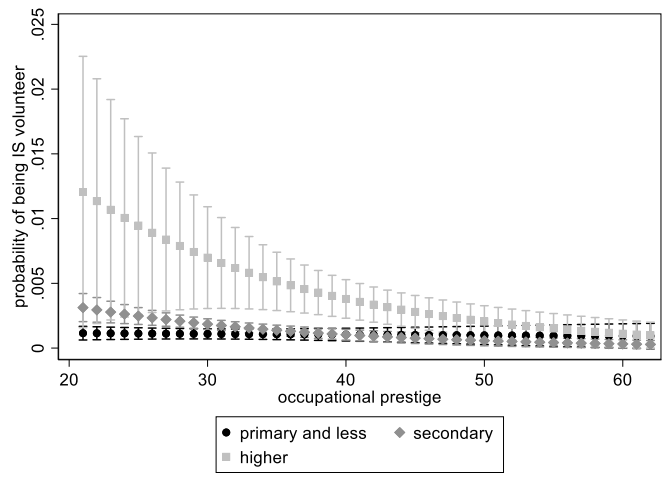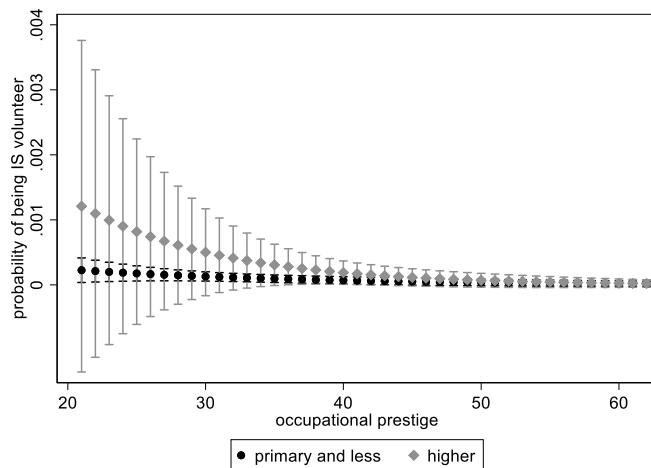
Graph 8: Marginal effects of occupational prestige by education level in Morocco
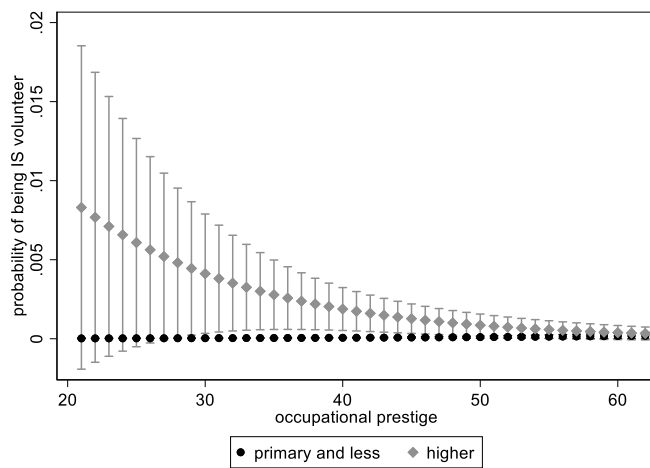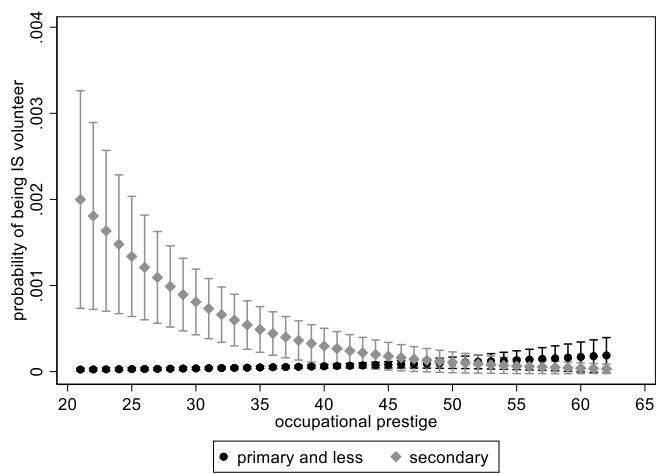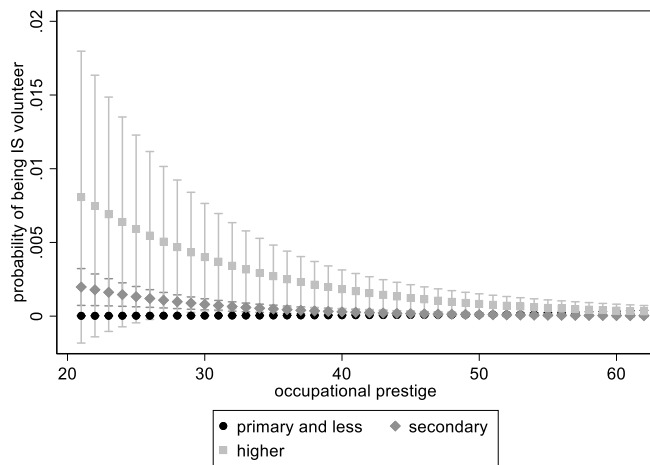
Graph 9: Marginal effects of occupational prestige by education level in Turkey
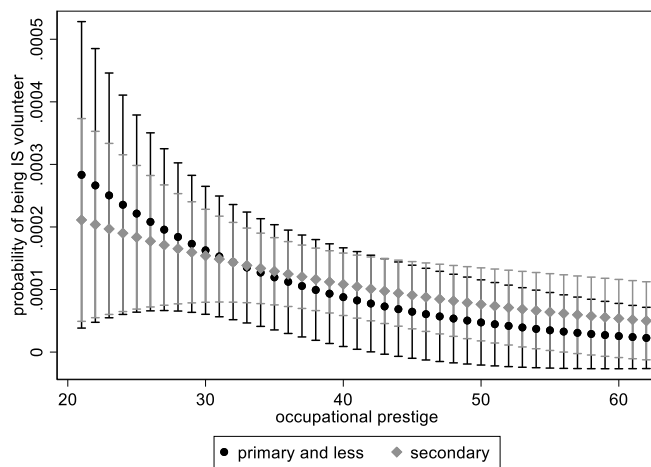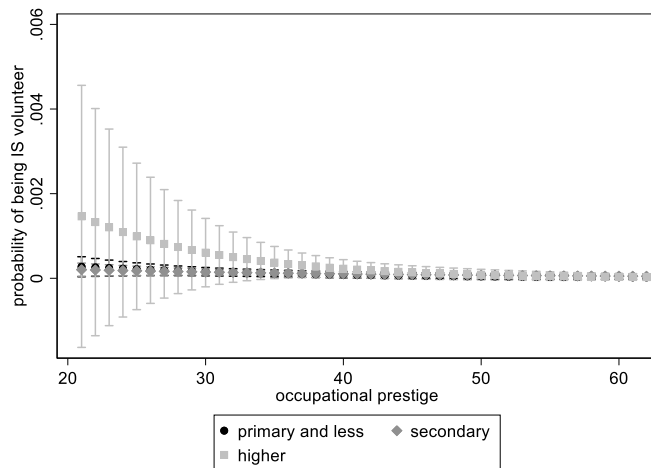
Independent of our causal interpretation, and despite various levels of noise in the estimates, the margins plots make it clear that higher education coupled with a bad job is the most lethal combination. Individuals with this mix are many times more likely to be found among IS volunteers than either less educated compatriots or similarly well educated ones with good jobs. In Tunisia, a man in his late 20s with higher education and a bad job has roughly a 1% chance of ending up in IS – a material risk in this demographic group.

Tests with imputed income instead of occupational prestige

SIOPS occupational prestige scores are a widely used yet subjective measure of economic status. Occupational prestige might be more relevant to test relative deprivation theories than for theories of opportunity cost, which in their most stripped down form are predicated purely on material wealth or income.[20] Could results be different if we measure income instead of prestige?

We have no direct information on the income of our IS cases and also lack micro-level income data for the Tunisian and Moroccan background populations. It is, however, possible to infer typical incomes by occupation on the basis of international data containing information on both.[21] We use data from the 2009 social inequality survey of the International Social Survey Programme, which was conducted in 37 (mostly developed) countries,[22] to calculate the average logged personal income for each top-digit ISCO category. After rescaling national results around the national means, we then calculate an average across all countries and use this to assign estimated incomes to both IS cases and background population.

In the few countries represented in our IS sample where we have micro-level income data from other sources such as the World Values Survey, the implied income from this procedure correlates closely with national data. This increases our confidence that the estimates are a reasonable approximation of individuals' typical incomes in different occupational categories. The SIOPS occupation prestige score also correlates fairly well with the income estimate, suggesting that it is a reasonable proxy for both prestige *and* income (see appendix HH as well as Connelly, Gayle, and Lambert 2016, 7).

Table 2 below shows the same models as above, but with implied income instead of occupational prestige scores (the education-only models are left out as they are identical).

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[20] In our preferred interpretation, the loss of intangible prestige should also be considered as part of the opportunity costs of joining IS. We include a purely monetary interpretation of opportunity costs only as robustness test.

[21] The approach is also taken by the International Socio-Economic Index of occupations, which classifies occupations based on the average income and educational status of those exercising them (H. B. G. Ganzeboom, De Graaf, and Treiman 1992; H. B. Ganzeboom and Treiman 2003). See footnote 16 for why we prefer SIOPS over ISEI for our core models.

[22] The other population datasets we use for our research either include too few countries, no information on occupation or no information on work income. For the ISSP data see: https://dbk.gesis.org/dbksearch/SDesc2.asp?ll=10&notabs=&af=&nf=&search=&search2=&db=D&no=5400

Table 2: Logistic regressions with inferred job income

	Tunisia	Morocco	Turkey			
	(1)	(2)	(3)	(4)	(5)	(6)
Education						
primary or less	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Secondary	0.48**	21.4***	2.49***	59.3***	-0.12	2.85
	(0.22)	(6.57)	(0.38)	(8.60)	(0.42)	(7.36)
Higher	1.16***	40.5***	3.50***	55.3***	0.32	13.3
	(0.34)	(6.87)	(0.50)	(10.00)	(0.58)	(11.4)
inferred income	-0.47	2.36***	-0.23	3.77***	-1.13***	-0.59
	(0.39)	(0.54)	(0.54)	(0.79)	(0.43)	(0.58)
Education-income interaction:						
primary or less # inferred income		0		0		0
		(.)		(.)		(.)
secondary # inferred income		-2.42***		-6.52***		-0.34
		(0.76)		(0.98)		(0.84)
higher # inferred income		-4.50***		-5.91***		-1.48
		(0.78)		(1.12)		(1.27)
Observations	4538	4538	6664	6664	561	561
Observations (IS)	155	155	91	91	66	66

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

The results are quite similar to the models with occupational prestige, with even higher significance levels (see appendix FF for (very similar) margins plots). The one major difference to previous models is that inferred income by itself has a positive, significant effect in both Morocco and Tunisia in the models with interactions. This is further evidence against the opportunity cost hypothesis, as higher incomes should make IS participation less likely on all levels of education. The contrasting effects on different levels of education, which support a relative deprivation interpretation, are particularly striking in this set of models.

Other robustness tests

In the appendix, we conduct a number of further robustness tests. We
- classify the numerous "merchants" in the IS dataset as sales workers and assign prestige scores accordingly
- assign SIOPS prestige scores to our IS cases on the basis of their top-digit ISCO classification instead of the detailed four-digit classification
- include unemployed individuals by assigning them the lowest top-digit occupational prestige score
- replace SIOPS scores with a simpler, categorical measure of relative deprivation based on the skills and education assumptions underlying the ISCO occupational classification
- use different age cut-offs for our code models

In all cases, the findings are materially the same as in the above tests, with significant results for Tunisia and Morocco and noisier ones for Turkey.

Is it causal?

The above regression results are fairly robust descriptively, but we cannot be sure that they are causal. Various forms of endogeneity are conceivable in the relationship between joining IS and professional success. Radicalization could notably cause lower occupational status rather than the other way around, as radicalized individuals might invest less in their labor market success. Similarly, individuals with known or visible affiliations to salafi groups and lifestyles might encounter discrimination on the labor market. The "previous profession" entry in the registration form for one American case in our dataset simply reads "doesn't work because he has a beard". This might reflect a more widespread pattern.

We would however expect such endogeneity to work across all levels of education, while it is only cases with higher levels of education where the effect of occupational prestige stands out both descriptively and in our models. Our estimate of the average effect of occupational prestige might indeed be biased by reverse causality, but it is harder to explain the different gradients of prestige across different education levels – reverse causality would have to vary systematically across levels of education to explain this. In our view, the most intuitive way this could happen would be if it obtained only for more prestigious jobs, which are more likely to be held by individuals with higher levels of education and where self-selection or discrimination might be more acute.

To account for this possibility, we rerun our core models including only cases with lower prestige scores. We use the top-digit SIOPS prestige score for the "clerks" category as cutoff point, which is the median top-digit score (at 38.54 points on a scale ranging from 20.84 to 62.42). Table 3 below shows the models resulting from this truncated sample.

Table 3: Logistic regressions for cases with lower occupational prestige

	Tunisia	Morocco	Turkey			
	(1)	(2)	(3)	(4)	(5)	(6)
Education level						
primary or less	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
secondary	0.70***	3.64***	3.28***	7.87***	0.48	-0.34
	(0.25)	(0.74)	(0.42)	(1.49)	(0.60)	(1.82)
higher	2.17***	6.50***	4.84***	9.74***	1.47	5.76
	(0.38)	(1.19)	(0.68)	(2.77)	(0.92)	(3.82)
occupational prestige	-0.089***	0.0051	-0.059**	0.018	-0.087***	-0.092*
	(0.013)	(0.020)	(0.026)	(0.029)	(0.029)	(0.055)
Education-income interaction:						
primary or less # occup. prestige		0		0		0
		(.)		(.)		(.)
secondary # occup. prestige		-0.11***		-0.16***		0.026
		(0.026)		(0.052)		(0.066)
higher # occup. prestige		-0.16***		-0.16*		-0.14
		(0.040)		(0.087)		(0.13)
Observations	3311	3311	4466	4466	324	324
Observations (IS)	116	116	53	53	42	42

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

Despite the lower observation count, the results are essentially the same as for the main model: The marginal effect of lower prestige on being an IS member is stronger for individuals with higher education levels even in the lower rungs of the occupational pecking order. This gives us confidence that our findings are not an artefact of non-linear endogeneity across the occupational prestige scale.

The data we use here are observational and there could be unobserved variables that affect professional success differently across different levels of education that we cannot control for. This means that our findings are merely suggestive. We have however attempted to address the most obvious forms of potential endogeneity, a concern that previous micro-level research with biographical data of radicals has left unaddressed.

Summary and conclusion

As incomplete as our data on international IS volunteers are, they have a number of key advantages over previous datasets: Numbers are larger and include many nationalities, sampling is not limited (and biased) by availability of public information, and the records on education and occupational background are unusually systematic, allowing us to construct several measures of socio-economic achievement. Perhaps most important, the IS sample represents the "supply function" of extremism in a much purer way than previous samples, the composition of which usually is also an outcome of recruitment and deployment decisions by extremist groups.

Given these features of the data, we are fairly confident in our core descriptive findings that IS volunteers typically are more educated, and have held worse jobs, than the populations they are recruited from. This is confirmed by both global comparisons for the whole IS sample and in regressions for three national sub-sets of volunteers. The lower occupational status in particular is a new and theoretically relevant finding.

The regression models also show that higher education levels remain positively correlated with becoming an IS volunteer even if we control for other demographic and economic status variables, confirming H1. This supports existing findings that Islamist radicals typically are more educated – and gives us confidence that this pattern is not just because radical groups tend to recruit and deploy higher-quality operatives.[23] Our data do not give us purchase on the underlying mechanisms, but the finding is consistent with broader theories that interpret education as a political resource and a mobilizing factor that increases interest in and awareness of social issues.

That said, there could be other explanations: Abdel Jelil et al. (2018) draw on the same cache of recruitment files as we do to show that the breakdown of unemployment by education level in countries of origin predicts the educational composition of national IS contingents. Most of the key countries in our sample – including our three core cases – have particularly high levels of graduate unemployment, which could explain the large representation of better educated IS volunteers. Unfortunately it is not possible to construct a reliable measure of unemployment for the IS dataset itself,[24] so we cannot adjudicate between these rival explanations here.

Our second key finding that bad jobs – and low incomes linked to these jobs – predict IS membership is particularly important in its own right as data on the socio-economic status of extremists has been scarce and fundamental questions about its role in radicalization remain unresolved. Our descriptive results suggest that even if absolute poverty is not linked to extremism, lower economic status compared to the general population seems to be.

While this result by itself constitutes an important step forward, it raises the question of what the underlying mechanisms might be. Our research design has allowed us the first-ever simultaneous test of two rival socio-economic hypotheses about the link between economic status and radicalization: opportunity costs (H2) and economic grievance (H3). Both global descriptive data and country-level regressions lend more support to a grievance explanation: Lower occupational prestige compared to the background population is particularly frequent among IS volunteers with higher levels of education, suggesting that bad jobs might have a particular radicalizing effect among individuals whose educational background gives them higher socio-economic expectations.

These findings are complementary to those of Abdel Jelil et al.'s above-mentioned study about the radicalizing effects of unemployment in countries of origin (2018). They end their paper with an agnostic note about the role of opportunity costs vs. grievances. Our own, micro-level findings on occupational status make an economic grievance interpretation of their results more plausible.[25]

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[23] Following its broad-brush recruitment, IS might of course assign operatives to specific tasks based on skill. As a result, those operatives who subsequently come to the attention of authorities as a result of high-profile activities might be (even) higher calibre than the general sample in our study.

[24] See footnote 14 above.

[25] One can argue that the findings of Abdel Jelil et al. by themselves are more compatible with a relative deprivation-type interpretation: When graduates have higher unemployment levels, this is typically not because they cannot find any jobs at all (i.e. having lower opportunity costs) but because they refuse the menial jobs taken by individuals of lower education (a result of their higher expectations).

The same is true about Ketchley and Barrie's finding that the sub-national distribution of unemployment in Tunisia predicts the presence of IS volunteers from different locales (2018).[26]

There is, by contrast, little evidence for opportunity costs: The generally negative correlation between occupational prestige and being an IS volunteer mostly disappears once the interaction between prestige and education is included. Instead, occupational prestige and inferred income for less educated individuals actually have a positive correlation with being an IS volunteer in some of our models, which is a puzzle. It might reflect the ability of foreign volunteers to travel to Syria, which is predicated on a minimal level of material resources.[27] This might explain why the effect of occupational prestige remains negative in the case of (neighboring) Turkey even in the interaction model. The estimates for Turkey are very noisy, however, so this remains speculation.

Distinguishing opportunity cost and grievance explanations is of fundamental importance for understanding radicalization processes. This paper has taken a first systematic if still tentative step towards resolving this debate. Doing so is not only theoretically important but has important policy implications: If opportunity costs are the key factor, then improving the objective economic status of individuals is the paramount policy prescription. If instead relative deprivation is the main driver, policies also need to focus on managing expectations, notably by avoiding the over-production of graduates in labor markets that are ill-equipped to absorb them.

Our findings on mechanisms are suggestive rather than conclusive: Although we have tried to reduce the risk of endogeneity, our data do not allow watertight causal identification strategies. Our core regression models are moreover are limited to only three countries, all of which lie in the Middle East,. Although much of the rest of the IS sample looks descriptively similar, either background population data are lacking or numbers of IS volunteers are too small to run further tests with full controls. The findings might also be specific to the Islamic State, which differs from other extremist groups in many regards.

If we are tentative on mechanisms, we are more confident in the descriptive findings on education levels and labor market experiences of foreign IS volunteers. Both global descriptive data and various country-level regression models show that individuals with higher education and bad jobs are many times more likely to end up as Da'esh volunteers than the general population. Socio-economic status matters, even if we are only beginning to understand how and why.

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[26] It also puts Kavanagh's (2011) finding that an interaction between education level and poverty predicts being a Hizballah martyr in a new light. She reads this as a combination of selection on skills by the organization and self-selection due lower opportunity costs. It might as well be due to stronger subjective grievance felt by the educated poor.

[27] If this is the case, then the relative deprivation effect for higher educated individuals is in fact underestimated by our models.

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