Economics and Human Biology 52 (2024) 101344

Contents lists available at ScienceDirect

Economics and Human Biology

journal homepage: www.elsevier.com/locate/ehb

Full length article

Exposure to Islamophobia: The impacts of an increased risk of bullying victimization on human capital☆

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ARTICLE INFO

JEL classification:
C21
I24
J15
J24

Keywords:
Islamophobia
Identity-based-bullying victimization
Human capital accumulation
Labor market outcomes

ABSTRACT

We use the shock caused by terrorist attacks on the US on September 11, 2001, to study the short- and long-term consequences of exposure to Islamophobia in high-school-aged youths. Our estimates show an immediate sharp increase in rates of identity-based bullying against Arab/Muslim youths relative to youths of other ethnic groups during the years 2001-2003. We also find exposure to Islamophobia increased school dropout rates by 4.11% among US-born male youths of Arab-Muslim origin, which is a large effect from a baseline of 4.6% of school dropout rate in the affected population. In the long term, however, we find no significant effect on educational attainment among the affected population. The data suggest Arab-Muslim male youths born in 1989 were 8.34% more likely to resort to GED tests as a means of obtaining high school credentials after the attacks. We find full-time male workers born in 1984 earn 12.8% less than similar workers who were unexposed to Islamophobia. Moreover, full-time male Arab-Muslim workers born between 1983 and 1985 are between 9% and 12.5% more likely to be in the first quintile of the state-of-residence-year-wage distribution than similar workers who were not exposed to Islamophobia.

1. Introduction

Bullying and xenophobia have far-reaching implications for mental health and cognition (Takizawa et al., 2014; Klomek et al., 2015; Sarzosa, 2021 and Greene et al., 2006), which are important inputs to producing human capital. Identity-based bullying (IBB) is a form of bullying that involves physical or verbal offenses rooted in discrimination (Price et al., 2019). A plausible hypothesis is that exposure to increased xenophobia in high-school-aged youths, which may increase the likelihood of IBB victimization, affects child educational attainment and adult earnings.

We exploit the unexpected nature of the terrorist attacks on the US on September 11, 2001, and use it as an exogenous source of an increased risk of IBB victimization. The terrorist attacks fueled Islamophobic sentiment nationwide, and that situation was particularly difficult for youths with Arab-Muslim heritage, because they were the victims of IBB in school (Panagopoulos, 2006; DeRosier, 2004; Bonet, 2011).

We first assess the short-term effects of exposure to Islamophobia on school dropout rates among US-born youths with Arab-Muslim heritage. We then study whether such exposure has long-lasting consequences on educational attainment and labor market outcomes.

For the short-term analysis, we use data from the 2000 US Census and the 2000–2004 waves of the American Community Survey (ACS) to explore the impact of exposure to Islamophobia on school dropout rates. The US Census and the ACS provide information on respondents' national origin, level of education, and labor market outcome. Our target group, called "Arab-Muslim", is made up of US-born individuals with family ancestry linked to a Muslim-majority country (MMC). We define a country as an MMC if more than 50% of its population is Muslim. Our comparison group is made up of white US-born individuals, because white youths were not subject to the same increased likelihood of experiencing religious or ethnic bullying after the terrorist attacks of September 11.

We focus on the US-born population ages 15 to 24 and compare changes in the decision to drop out between Arab-Muslim youths and white youths before and after the attacks. Because the terrorist attacks of September 11 were unexpected and cohorts of US-born youths of Arab-Muslim origin were randomly allocated between exposed and non-exposed cohorts, we assume exposure to Islamophobia is exogenous to the characteristics of the youths that could affect

☆ We thank Marisa Hidalgo-Hidalgo, Dunia López-Pintado, Lari Viianto, as well as audience in Valencia (SAEe 2022) for helpful comments; all errors are our own. J. Gabriel Romero-Ciavatto acknowledges financial support from Grant PID2020-118585GB-I00 funded by MCIN/AEI/10.13039/501100011033.

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https://doi.org/10.1016/j.ehb.2023.101344
Received 25 March 2023; Received in revised form 4 October 2023; Accepted 9 December 2023
Available online 21 December 2023

educational outcomes.[1] However, that comparison might be problematic for several reasons.

First, after the terrorist attacks, some Arab-Muslim households faced negative resource shocks due to a decline in their wages and earnings (Kaushal et al., 2007), which could affect their children's educational outcomes. To address this problem, we restrict our sample to households with annual earnings higher than 10,000 USD. Selective migration is the second problem. Households might migrate in response to Islamophobia, and households' characteristics related to migration could be correlated with youths' educational outcomes. We provide evidence that shows endogeneity of household location is not an issue in our analysis. Finally, a mechanical correlation exists between students' academic skills and the probability of having been exposed to Islamophobia in high school. To avoid related measurement errors, we require that an individual's completed level of education complies with the mandated level of educational attainment for that person's age in a given school year.

To assess the long-term consequences of exposure to Islamophobia, we make use of repeated cross-sectional surveys of the 1976-89 birth cohorts of US-born individuals and consider data from the 2016-19 waves of ACS. We focus exclusively on these cohorts of individuals because they were 15 to 24 years old during the 2000–2004 period, and by 2016-19, these cohorts had largely completed their education. The degree of exposure to Islamophobia varies across cohorts, and this variation can lead to heterogeneous treatment effects. In our long-term analysis we compare changes in educational outcomes and labor market outcomes between given cohorts of US-born individuals of Arab-Muslim origin that were exposed to Islamophobia and other unexposed US-born Arab-Muslim individuals relative to the same changes between white US-born individuals.

In this paper, we document the short- and long-term effects of exposure to Islamophobia on educational attainment and labor market outcomes, which is an important contribution to the literature. In support for the validity of our identification strategies, our results survive several robustness and falsification tests.

The rest of the paper is organized as follows. In Section 2, we briefly discuss the literature most closely related to our work. Section 3 presents evidence on IBB against Arab-Muslim youths during the years before and after the terrorist attacks. In Section 4, we describe the data for our short-term analysis, and in Section 5, we present our empirical approach and short-term results. Section 6 discusses the data for the long-term analysis, and Section 7 describes our empirical approach and presents the results of the long-term analysis. In Section 8, we discuss general results, and in Section 9, we conclude.

2. Related research

In this section, we provide a brief review of the research on the consequences of bullying. Identifying the causal relationship between bullying behavior and health and socioeconomic outcomes is difficult, because there is a selection into this behavioral type. Individuals' unobserved characteristics could be correlated with bullying behaviors, health, and/or socioeconomic outcomes. Recently, the works of Eriksen et al. (2014) and Sarzosa and Urzua (2021) have addressed this endogeneity problem. Using data from the region of Aarhus (Denmark) during 1990-92, Eriksen et al. instrument the victim status with the proportion of classroom peers from troubled families and find bullying victimization in school reduces ninth grade GPA. Sarzosa and Urzua use school data from the Korean Youth Panel Survey and find factors such as non-cognitive skills and classroom gender composition determine the probability of bullying victimization. They also report evidence that shows bullying victimization causes important mental health problems at age 18.[2]

Our work contributes to economic research on the socioeconomic consequences of bullying victimization. We use a quasi-experimental design to study the short- and long-term consequences of being exposed to an unexpected event that increases the vulnerability to IBB victimization in high school. This approach allows us to deal with endogeneity in bullying behavior, and hence, assess the causal relationship between exposure to Islamophobia and both educational and labor market outcomes.

The present paper also relates to the literature on racial and ethnic discrimination and xenophobia. In this literature, some authors are concerned with identifying whether ethnic discrimination or increased xenophobia affects health at birth (Bravo and Castello, 2021), mental health (Greene et al., 2006) or general health (Johnston and Lordan, 2012). Other authors study the causal effects of increased Islamophobia on the assimilation rates of Muslim immigrants in the US (Gould and Klor, 2016) and on labor market outcomes of individuals of Arab-Muslim origin. In particular, the works of Davila and Mora (2005) and Kaushal et al. (2007) focus their attention on adult US population during the years before and after the terrorist attacks. They do find exposure to the terrorist attacks reduced the labor market earnings of the Arab-Muslim population in the US. We complement this literature by studying the short- and long-term consequences, with regard to human capital accumulation, of exposure to Islamophobia in high-school-aged youths.

3. Evidence on identity-based-bullying victimization

In this section, we report evidence that shows Islamophobia increased the risk of bullying victimization among youths of Arab-Muslim origin after the terrorist attacks of September 11, 2001.

The dataset for hate crimes and IBB was obtained from the Hate Crime Statistics Program of the FBI Uniform Crime Reporting (UCR) Program.[3,4] The data include information on the source of bias—ethnicity, sexual orientation, religion, and so on—, the location where a hate crime was committed, the state, and year. We use data on hate crimes, committed at schools or colleges and observed during the period 1991–2009, to assess to what extent Arab-Muslim people experienced much higher rates of bullying in schools after the attacks.

We collapse IBB data on the state-year-type-of-bias cell and consider two groups of type-of-bias: (i) bias against Arab or Muslim youths and (ii) cases of bullying with bias against other ethnic groups, which include white, Asian, Latino, black, American-native, and multiple-race youths. We have a panel of $s(k)$ state type of bias observed over the years 1991–2009.

Our outcome variable, $IBB_{s(k),t}$, measures the number of IBB incidents per 100,000 population ages 5 to 24 (100K hereafter), reported in state s, with bias k, in year t, with $k = \{Arab - Muslim, Other\}$. Let $I_{s(k),t}(B = k)$ be an indicator variable that equals one if the number of IBB cases reported in state s in year t has bias k. We assign a value of zero to those state-year-group cells where hate crimes were not reported or did not occur.

We seek to estimate the impact of the terrorist attacks of September 11, 2001, on the number of IBB incidents against Arab-Muslim youths in each state. We use the number of IBB cases against "Other" ethnic

[1] We use the expression "Arab-Muslim youths" and "Arab-Muslim individuals" to refer to young US-born individuals of Arab-Muslim origin.

[2] Other studies find bullying is negatively associated with educational outcomes and wages (Brown and Taylor, 2008) and bullying victimization reduces cognitive and non-cognitive skill levels, which in turn increases the probability of being bullied again Sarzosa (2021).

[3] Data from the FBI only report IBB cases that are hate crimes. An incident of IBB is a hate crime when a student assaults another student based on their actual or perceived race (see Development Services Group, Inc., 2022).

[4] Hate Crime Statistics (2020) accessed September 2021 at Federal Bureau of Investigation—Crime Data Explorer.

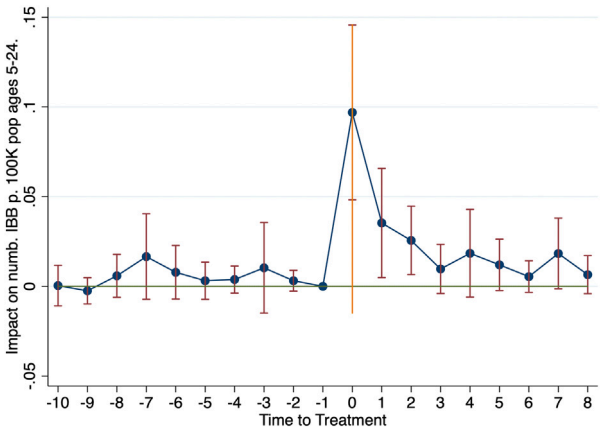


Fig. 1. Impact on identity-based-bullying rates.
Notes: This figure reports the results of an event study analysis of the impact of Islamophobia on IBB incidents against Arab-Muslim youths. The variable IBB measures the number of incidents per 100,000 population ages 5 to 24. The year 2000, $j = -1$, is the omitted year. Controls include state and years fixed effects. Data covers the period 1991–2009 and hate crimes are restricted to those crimes committed in school or colleges. The figure plots the 95% confidence intervals. Standard errors are robust to heteroskedasticity and estimations are based on the FBI Hate Crime Statistics.

groups in each state as counterfactuals, because such ethnic groups were not subject to the same increased likelihood of suffering IBB after the terrorist attacks. We estimate the following model:

$$IBB_{s(k),t} = \alpha + \sum_{\substack{j=-10 \\ j\neq -1}}^{8} \beta_j (L_{s(k),t} = j) \times I_{s(k),t}(B = Arab - Muslim) + \mu_s + \lambda_t + \epsilon_{s(k),t}, \quad (1)$$

where variable $L_{s(k),t}$ is a dummy variable that takes the value of one if the state s was a number of j periods away from the year of the event, 2001, in the respective period t. For $L_{s(k),t}$, j runs from −10 to 8. The year 2000, before the terrorist attacks, is the omitted year. μ_s and λ_t are state and year fixed effects, and $\epsilon_{s(k),t}$ is the error term.

Fig. 1 shows the estimated impacts of Islamophobia on the number of IBB incidents against Arab-Muslim youths (standard errors are robust to heteroskedasticity). On the horizontal axis, time zero corresponds to year 2001. We observe that the number of IBB incidents against Arab-Muslim youths exhibits a sharp increment in 2001 compared with 2000 relative to such incidents against other ethnic groups. During the years 2002 and 2003, the estimated impacts are statistically distinguishable from zero at 95% significance levels, but they are decreasing and are not significantly different from zero after 2004.[5] Our estimates also show that before 2001, Arab-Muslim youths were not significantly more exposed to IBB incidents than youths of other ethnic origins. Summing up, the results suggest that after the terrorist attacks, exposure to Islamophobia significantly increased the risk of bullying victimization in the Arab-Muslim population.

4. Short-term analysis: Data

In this section, we present datasets and variables that we use in our short-term analysis. A more detailed description of how we construct the target and comparison groups, and the outcome variable can be found in Section B.3 of the Supplementary Material.

We assess the impact of exposure to Islamophobic sentiment on school dropout rates in high-school-aged youths over the 2000–2004 period.[6] Our source of data is the Integrated Public Use Microdata Series sample of the 2000 US Census and the 2000–2004 waves of the American Community Survey (Ruggles et al., 2021). The US census and the ACS have detailed information on the socioeconomic, demographic, and housing-related characteristics of the US population. We weight observations using the personal weights (variable "perwt") available in these databases. Our target population includes US-born individuals ages 15-24.[7] This restriction on age implies we observe individuals in cohorts from 1976 to 1989. We perform the analysis separately for men and women. We have repeated cross-sectional data of 873,061 observations for the male sample and 886,432 for the female sample.[8]

To identify MMCs, our data on religious affiliation by country come from the June 2021 edition of the CIA's World Factbook, which provides socio-demographic information, among other data, on 262 countries. For each country, the Factbook lists the religions with the largest share of adherents in the country.[9] Table A5 in the Supplementary Material lists the MMCs; it also shows the official or spoken language in each country, whether a country was included in the registration list of the National Security Entry–Exit Registration System, and whether our data contain observations for persons from such countries.

Ethnicity. To construct our target group, called "Arab-Muslim", we consider youths' ethnic heritage. The group is made up of individuals with family ancestry linked to a country where more than 50% of its population is Muslim. We combine the information on religious affiliation by country with information on individuals' ethnic heritage, as reported in the census and the ACS, where individuals are asked to report up to two ethnic origins, if any.

The comparison group, named "White", includes white US-born individuals and excludes US-born white Hispanic and white Arab-Muslim individuals. To assess the extent to which Arab-Muslim youths respond differently to exposure to Islamophobia, in our analysis we include individuals from other ethnic minority groups. We construct four more ethnic categories, which, in all cases, exclude the Arab-Muslim observations. The first is the "Asian" group, which includes persons of Asian origin. Next, the "Latino" group includes all persons of Hispanic origin. Black and American-Indian individuals make up the third ethnic control group (called "Black/AI"); it includes black and African American people, American Indians, and Alaska natives. The fourth control group ("Mixed-Race") is a residual group including the mixed-race population.

The percentage of Arab-Muslim individuals among US-born individuals ages 15 to 24 is equal to 0.62%. The Asian group is the second-smallest ethnic minority group, making up 1.73% of the sample. They are followed by the Latino group at 11% of the sample, and the

[5] These results are robust to state-type-of-bias specific linear trends.

[6] We choose this time period to reduce the possibility of measurement errors in our variables of interest, due to a change in the timing of data collection in the ACS. That survey provides a detailed snapshot of the US population every year since 2000. The 2000 decennial census and the 2000–2004 waves of the ACS provide data collected as of April 1, and that data correspond to the prior 12-month period. Since 2005, the ACS survey collects information over a 12-month period. In Subsection B.7.2 of the Supplementary Material, we provide additional estimates to assess the robustness of our results when we consider a longer time period, such as 2000–2007.

[7] We exclude immigrant people from our analysis to close the door to potential confounder factors, such as cultural shocks and/or English proficiency, which could bias our estimates.

[8] Subsection C.1 of the Supplementary Material presents a detailed description of the observations that we exclude from the analysis.

[9] In the aftermath of the September 11 terrorist attacks, the US government implemented some security policies, such as the Patriot Act and the National Security Entry–Exit Registration System. The latter recorded the arrival, stay, and departure of non-US citizens from 25 countries considered to represent national security threats. North Korea was the only country on the list that was not predominantly Arab or Muslim. The other 24 countries are included in our definition of MMCs.

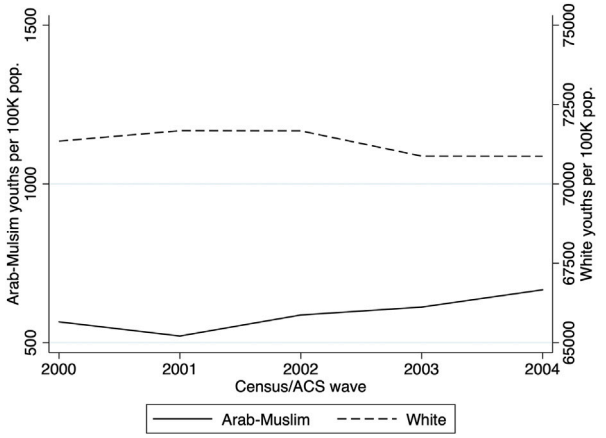


Fig. 2. Evolution of Arab-Muslim group and white group during the period 2000–2004. Notes: Rates are expressed per 100,000 population ages 15 to 24 years old. All means are population weighted. Data come from the 2000 US Census and the 2000–2004 waves of the ACS.

black/American-Indian group at 14.82%. The white group represents 69.79% of the sample.[10]

Fig. 2 shows the annual evolution of the Arab-Muslim (target) and the white (control) groups for the population ages 15 to 24 years old during the 2000–2004 period. Rates are expressed per 100K 15- to 24-year-olds. The values on the left vertical axis correspond to the Arab-Muslim group. On the right vertical axis, the figure shows the values for the white group. The size of the Arab-Muslim group (the solid black curve) exhibits a slightly upward trend. On average, we observed approximately 574 Arab-Muslim people per 100K. The white group remains relatively constant over time, staying around its average value of 71,324 white people per 100K, decreasing slightly during the last two years of the period considered.

Education. We construct the variable for school dropout (called "Dropout"), which is our main outcome variable. "Dropout" is a dummy variable that takes a value of one if the individual has left school and does not have a high school diploma or a General Educational Development certificate (GED).

Fig. 3 plots the yearly averages of school dropout rates by birth cohort, gender, and for the Arab-Muslim and white groups. The dashed gray curve corresponds to the white group, the solid black curve corresponds to the Arab-Muslim group, and the vertical line denotes the 1982 birth cohort. The majority of individuals born in 1982 or before had finished high school before the terrorist attacks. For both genders and ethnic groups, school dropout rates exhibit upward trends until the 1981 birth cohort, and since 1982, these rates display downward trends. School dropout rates are always higher for the white group, but we see convergence in these rates. After the 1982 birth cohort, the white group exhibits a rapid reduction in the number of youths out of school.

For the other ethnic groups (not shown in the figure), data show Latino and black/Native American individuals have the highest school dropout rates of any group. US-born individuals of Asian origin (both male and female) are less likely to drop out of school than white individuals. The Asian and Arab-Muslim groups have the lowest school dropout rates of all groups.

Table 1 presents descriptive statistics by gender for Arab-Muslim and white US-born individuals ages 15 to 24, during the 2000–2004 period. Columns 1 and 2 report the summary statistics for observations of both white and Arab-Muslim females, and columns 3 and 4 report the descriptive statistics for observations of white and Arab-Muslim males. Columns labeled "Difference" report the p-value of the test on the equality of means.

Three important differences exist between the Arab-Muslim and white groups. First, the school dropout rate for white individuals (both genders) is almost double that of Arab-Muslim individuals. The difference in mean values is highly significant (p-value = 0.000). Second, Arab-Muslim households are relatively richer than white households. The difference in mean values of total annual family income (at real 2004 values) is highly significant (p-value = 0.000). Third, the level of education is relatively higher for Arab-Muslim households. In both samples, the proportion of Arab-Muslim parents with higher levels of education is significantly higher than it is in white households (p-value = 0.000).

5. Short-term analysis: Empirical approach

Our variable of exposure to Islamophobia in high-school-aged youths links respondents' academic outcomes with their age and corresponding school year. In our database, we cannot observe the exact moment a youth drops out of school.[11] Therefore, we have to make an assumption about how exposure to Islamophobia affects the decision to continue education.

In a given school year, we assume exposure to Islamophobia affects the decision to continue education the next academic year. Under this assumption, we can assess whether exposure to Islamophobia affects education decisions in the 2002–2003 and 2003–2004 school years (observed in the 2003 and 2004 waves, respectively). A consequence of this assumption is that individuals observed in the 2002 wave of the ACS and that left school after September 2001 are treated as "unexposed". This approach may lead us to underestimate the impact of exposure to Islamophobia on school dropout rates.[12]

Let $EIHS$ be a dummy variable that measures exposure to Islamophobia in high-school-aged youths after the terrorist attacks of September 11, 2001. Hereafter, we discuss when $EIHS$ is equal to zero and when it takes a value of one.

The length of time an individual takes to complete high school depends on academic skills. Students with lower academic competence, that is, those who fall behind at school are automatically more likely to be exposed to Islamophobia at some point during high school. In turn, these students are more likely to drop out of school when they reach the maximum compulsory school age. On the other hand, students with more academic competence are less likely to drop out of school. Some highly skilled students may skip grades to advance in the education process, and hence, they are less likely to be exposed to Islamophobia.

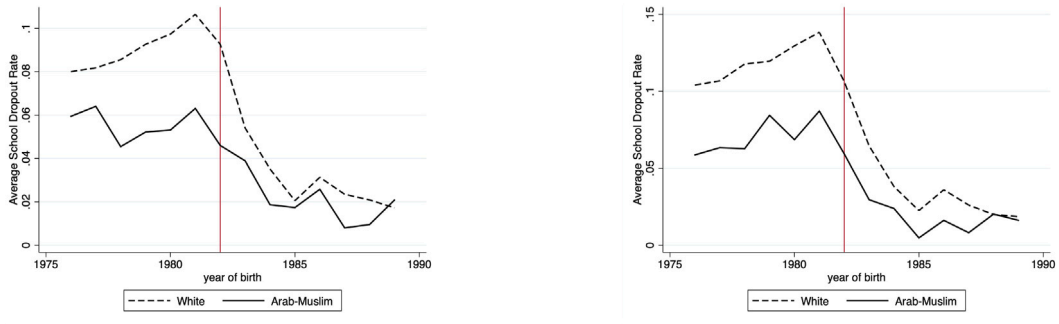
To reduce the possibility of measurement error in the assignment, our variable $EIHS$ ensures individual i's completed level of education complies with the required level of education for his/her age in a given school year. Because we focus on the population ages 15 to 24 years old during the 2000–2004 period, we have observations for cohorts born from 1976 to 1989. All individuals born in 1982 and before were 20 or older in 2002. They should have completed their high school educations before the 2001–2002 school year. We make $EIHS$ equal zero for all individuals born between 1976 and 1982 and refer to them as "unexposed", whereas individuals born in 1983 and after may have been exposed to Islamophobia at some point during high school.

For each cohort of individuals born between 1983 and 1989, and for the 2003 and 2004 waves, Table 2 presents the educational-attainment

[10] The residual category, mixed-race, represents 2.04% of the sample.

[11] For more information about this point, see Section B.3 in the Supplementary Material.

[12] An alternative assumption is that exposure to Islamophobia could affect the decision to continue education at any moment during the school year. Under this assumption, we might misallocate unexposed youths observed in 2002 and who left school before September 2001 into the exposed group. This misallocation may lead us to overestimate the impact of Islamophobia on school dropout rates.



(a) Female sample (b) Male sample

Fig. 3. Raw trends in school dropout rates.
Notes: Figures show the yearly averages of school dropout rates by birth cohort, gender, and for the Arab-Muslim and white groups. Rates are expressed in percentages. Vertical lines denote the 1982 birth cohort. Figure on the left shows the evolution of school dropout rates for female individuals and figure on the right corresponds to male individuals. Data come from the 2000 US Census and the 2000–2004 waves of the ACS.

Table 1
Short-term analysis, descriptive statistics.

	Female white (1)	Female Arab-Muslim (2)	Difference	Male white (3)	Male Arab-Muslim (4)	Difference
Dropout	0.068	0.040	0.028***	0.084	0.046	0.039***
Age	19.257	19.002	0.255***	19.129	18.848	0.281***
Family earnings (2004 value)	65 510.368	83 868.496	−18358.128***	70 931.237	90 415.800	−19484.562***
Basic educ. (Mother)	0.252	0.231	0.021***	0.288	0.255	0.033***
Tertiary educ. or above (Mother)	0.345	0.458	−0.112***	0.384	0.502	−0.118***
Missing educ. mother	0.402	0.311	0.091***	0.328	0.243	0.085***
Basic educ. (Father)	0.216	0.151	0.065***	0.260	0.182	0.078***
Tertiary educ. or above (Father)	0.304	0.445	−0.141***	0.348	0.489	−0.141***
Missing educ. father	0.480	0.403	0.076***	0.392	0.329	0.063***
Both parents present	0.476	0.557	−0.081***	0.547	0.625	−0.078***
Missing Parents Marital Status	0.508	0.432	0.076***	0.435	0.365	0.070***
Parents cognitive diff.	0.027	0.029	−0.002	0.033	0.033	−0.000
Missing parents' cog. dif.	0.508	0.432	0.076***	0.435	0.365	0.070***
Employment mother (yes)	0.453	0.436	0.017*	0.507	0.489	0.018*
Missing employment mother	0.402	0.311	0.091***	0.328	0.243	0.085***
Employment father (yes)	0.467	0.505	−0.039***	0.541	0.577	−0.036***
Missing employment father	0.480	0.403	0.076***	0.392	0.329	0.063***
I(SSA>=5)=1	0.321	0.227	0.094***	0.322	0.220	0.102***
Missing SSA	0.130	0.156	−0.026***	0.129	0.154	−0.025***
Observations	646 427	4916		651 044	4914	

Notes: Data come from the 2000 US census and the 2000–2004 waves of the ACS. Population means are weighted by sample weights. Male and female samples include US-born individuals ages 15 to 24 years old during the 2000–2004 period. For the male sample, the number of observations in the Asian group is 14,094, Latino group 78,396, black/American-native 105,421, and in the mixed-race group 17,713. The female sample also contains Asian (13,479), Latino (81,727), black/American-native (120,092) and mixed-race individuals (18,345). The total size of the male sample is equal to 873,061 observations and the total size female sample is 886,432 observations. Columns labeled "Difference" report the p-value of the test on the equality of means.
Significance level at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

conditions for which $EIHS$ equals one. This table presents the level of school in which these cohorts of youths should have been placed during the 2000–2001 school year (before the attacks). It also shows the minimum and maximum levels of completed education that these cohorts should have in a given school year in order to have $EIHS$ equal to one. For instance, in the 2000–2001 school year, individuals born in 1986 should have been in grade 9. According to schools' preestablished age levels, in the 2002–2003 school year, this cohort of individuals should have been, at most, in grade 11. If, in 2003, an individual in this cohort had a completed level of education between grade 9 and grade 10, $EIHS$ is equal to one. In 2004, this cohort of individuals was 18. In this case, $EIHS$ is equal to one if their completed level of education is between grade 9 and grade 11. We proceed in this way for all the other cohorts, with some exceptions for the cohorts from 1989, 1987, and 1983.[13]

To sum up, $EIHS$ is equal to zero for individuals born between 1976 and 1982, and it can take a value of one for cohorts of youths born between 1983 and 1989.

A last remark is related to our variable $EIHS$. One might be worried that measurement errors, related to individuals' age and school year, drive our results. We are aware that $EIHS$ may have such errors. But we adopt a conservative approach to construct it, and if such errors exist, our estimates are downward biased. Furthermore, the distribution of such errors should not be systematically different across ethnic groups. Because, in each birth-cohort-ethnic-group cell, the number of observations is higher than 200 for the Arab-Muslim group and for all birth years (with the exception of birth cohort 1989, with 110 observations), measurement errors should not be an issue for this ethnic group. Finally, in Section 5.2, we conduct a falsification test to assess to what extent these measurement errors affect our results.

Let $I_{i,s,t}(EG)$ be an ethnic indicator variable. $I_{i,s,t}(EG = r)$ equals one if the ethnic group of individual i, who lives in state s and is observed in year t, is equal to r, where $r \in \{Arab-Muslim, Asian, Black/AI, Latino, Mixed-Race\} = \{AM, AS, BL, LA, MR\}$. In all regressions, "White" is our comparison group. We estimate the following baseline

[13] For more information about birth cohorts 1989, 1987, and 1983, see Table 2 and Section B.4 of the Supplementary Material.

Table 2
Exposure to Islamophobia: Required level of education by age and school year.

Birth	Grade in	School-year 2002–2003 Observed in April 1, 2003			School-year 2003–2004 Observed in April 1, 2004		
Cohort	school-year 2000–2001	Age	Minimum Grade	Maximum Grade	Age	Minimum Grade	Maximum Grade
1989	6	14	–	–	15	7[(a)]	8
1988	7	15	7	8	16	7	9
1987	8	16	9[(b)]	9	17	9[(b)]	10
1986	9	17	9	10	18	9	11
1985	10	18	10	11	19	10	X
1984	11	19	11	X	20	11	X
1983[(c)]	11	20	11	X	21	11	X

Notes: Cells with "X" indicate that individuals are older than 19 year olds and cells with "-" correspond to individuals born in 1989 who were not observed in the 2003 wave.
(a) Because the 2000 US census and the 2000–2004 waves of the ACS group responses from grades 5 and 6 into one category, grade 7 is the minimum level of completed education for the 1989 birth cohort.
(b) Because the 2000 US census and the 2000–2004 waves of the ACS group responses from grades 7 and 8 into one category, grade 9 is the minimum level of completed education for the 1987 birth cohort.
(c) Some individuals born in the fourth quarter of 1983 who lived in states with September 1/October 1 school-entry cutoff date were exposed to Islamophobia. For these individuals, grade 11 is the minimum level of completed education.

equation:

$$\begin{aligned} y_{i,s,t} = \beta_0 + \beta_1 EIHS_{i,s,t} + \sum_{r \neq White} \beta_r (EIHS_{i,s,t} \times I_{i,s,t}(EG = r)) \\ + \sum_{r \neq White} \omega_r I_{i,s,t}(EG = r) + \\ X'_{i,s,t}\gamma + \sum_{r \neq White} (I_{i,s,t}(EG = r) \times X'_{i,s,t})\tilde{\gamma} + SR'_{s,t}A + W'_{i,t}\Gamma + \\ \pi time_t + \sum_{r \neq White} \pi_r (time_t \times I_{i,s,t}(EG = r)) + e_{i,s,t}. \end{aligned} \quad (2)$$

The variable $y_{i,s,t}$ (Dropout) is our variable of interest. The variable $EIHS$ compares the behavior of "exposed" youths with the behavior of "unexposed" youths. The coefficient β_1 measures a common response to exposure to Islamophobic sentiment across races after September 11. Our coefficient of interest is β_{AM}, which measures the difference in the probability of school dropout between Arab-Muslim individuals exposed to Islamophobia and Arab-Muslims not exposed to Islamophobia, relative to the same difference in white individuals. The other coefficients β_r, with $r = \{AS, BL, LA, MR\}$, allow us to assess the extent to which Arab-Muslim individuals responded differently than other ethnic minority groups to Islamophobia.

Coefficients ω_r, for $r = \{AM, AS, BL, LA, MR\}$, measure any systematic differences in school dropout rates between US-born individuals of ethnic origin r and white US-born individuals. The vector $X_{i,s,t}$ includes individual i's characteristics (dummies for age) and parent characteristics (dummies for cognitive difficulties, missing values for parents' cognitive difficulties, educational attainment, missing values for educational attainment). School-entry policies vary across states, and these policies can affect human-capital accumulation (see D. Angrist and Krueger, 1992 and Bedard and Dhuey, 2012). So, we control for this situation. The vector $X_{i,s,t}$ includes two dummy variables, $SSA_{s,t}$ and $MISSA_{s,t}$, where $SSA_{s,t}$ is a dummy variable that equals one if, in state s, the minimum age that children, observed in year t, were eligible to start school is higher than 5, and $MISSA_{s,t}$ is another dummy equaling one if state s has no school-entry laws or local education authorities set school-entry requirements. The reference group consists of states in which the minimum age for children to be eligible to start school is lower than or equal to 5.[14,15] The interaction terms $I(EG)\times X'$ aim to capture differential responses by race and observable characteristics. Because ethnic groups are unequally distributed across the US, and unobserved and observed factors may affect the probability of school dropout, we include a vector of state of residence indicators, SR.

Our identification strategy compares race and school-age cohorts to measure the individual impact of exposure to Islamophobia. Identification faces three potential threats: (i) that pre-trends in the outcomes variables differ between the Arab-Muslim and white groups, (ii) that resource shocks after the attacks confound the impact of exposure to Islamophobia, and (iii) that households choose to migrate in response to the terrorist attacks.

In the absence of the terrorist attacks, changes in school dropout rates would not have been systematically different between Arab-Muslim and white individuals. Fig. 3 provides some graphic evidence on this possibility. For the male and female samples, pre-trends in school dropout rates between Arab-Muslim and white youths look similar. In all cases, school dropout rates exhibit upward trends until 1981 birth cohort. Since this is not a formal test for the parallel trend assumption, to deal with possible differential pre-trends in the outcome variable, we allow trends in the school dropout rate to vary across ethnic groups (see Wolfers, 2006). The variable $time_t$ models a birth-cohort time trend, and we allow differential birth-cohort linear trends across ethnic groups. We also use a specification that controls for unobserved year effects, and the vector $W_{i,t}$ includes year indicator variables. The coefficients π_r capture the different linear birth-cohort time trends by race, and the coefficients of vector Γ capture year effects. $e_{i,s,t}$ is the error term.

One may be worried that confounder factors, such as job and/or earning losses after the terrorist attacks, bias our estimates. In Subsection B.5 of the Supplementary Material, we test for this possibility. We find that, in the male sample, exposure to Islamophobia reduces annual income earned of Arab-Muslim households by approximately 15%, and it reduces their probability of being a nuclear family (−5.07%). Results also show Arab-Muslim households are 4.81% more likely to report missing values for parents' marital status (see Panel A of Table A7, in the Supplementary Material). To reduce the possibility that these confounder factors bias our estimates, we cut the sample at those households with an annual income higher than 10,000 USD (at 2004 real values).[16]

We also check whether, with this sample selection, the treatment and control groups are compositional equivalent. Results, reported in

[14] Bedard and Dhuey (2012) provide data on cutoff dates for the 1976-88 period. To construct the variables SSA and MISSA, we extend their information to the year 2000.

[15] The estimated coefficients of the variables SSA and MISSA are not comparable to those reported in Bedard and Dhuey (2012) Bedard and Dhuey measure the impacts on educational outcomes and labor market outcomes of moving school cutoff dates earlier in school year.

[16] In Subsection B.7.2 of the Supplementary Material, we check whether our results are sensitive to the chosen threshold value for total family income. The estimated impacts are similar to those of our benchmark model.

Panel B of Table A7, suggest no economic and marital-status composition differences exist between exposed and unexposed Arab-Muslim households.

Selective migration is the third identification problem. We formally test whether Arab-Muslim households changed their state of residence after the terrorist attacks (see Subsection B.5 of the Supplementary Material). We find evidence of different migration patterns by race and observed characteristics for the Asian, Latino, black/AI, and mixed-race ethnic groups. But endogenous migration is not an issue for the Arab-Muslim group (see Table A8 in the Supplementary Material); hence, the benchmark estimations that we present assume Arab-Muslim households do not move in response to Islamophobia.[17]

5.1. Results: Impacts on school dropout rates

We start this section presenting empirical evidence of the association between IBB incidents and school dropout rates. We merge IBB data, described in Section 3, with the 2000 US census and the 2000–2004 waves of the ACS survey. We regress statewide school dropout rates for ethnic group r, with $r = \{white, AM, AS, BL, LA, MR\}$, on the annual change in the number of statewide IBB incidents against ethnic group r.[18] In Section A of the Supplementary Material, we write down the equation that we estimate and present the results.

We find that after the terrorist attacks, for the Arab-Muslim group only, a positive significant statistically association exists between statewide school dropout rates and annual change in IBB at the state level (see Panel A of Table A4).

We offer a word of caution about the interpretation of these results, because hate crimes, and therefore identity-based bullying, are often underreported crimes. Moreover, in the dataset, we are not capturing bullying incidents that are not criminal offenses, such as derogatory slurs. Nevertheless, if the distribution of non-reported IBB incidents across ethnic groups was the same before and after the attacks, these results would not change. If, however, such distribution did change, in a context of Islamophobic sentiment, we can think Arab-Muslim people tended to under-report incidents more often than other ethnic groups. In this case, the impacts and correlations shown in Fig. 1 and in Table A4, respectively, are underestimated.

We now study the impacts of exposure to Islamophobia on school dropout rates. In all regressions, we include the set of controls described in the previous section, "White" is the reference group, standard errors are clustered at the state-of-residence-specific race, and samples are restricted to observations with total household income higher than 10,000 USD (at 2004 real values).[19]

Figs. 4(a) and 4(b) present the results for the female and male samples, respectively. In all cases, the vertical axis shows the estimated impact on the probability of school dropout, whereas the horizontal axis presents the estimated coefficient $\widehat{\beta}_1$ and the estimated coefficients $\widehat{\beta}_r$ for the Arab-Muslim, Asian, black/AI, Latino, and mixed-race groups. All figures show 90% confidence intervals. In both samples, we find that after the 2001–2002 school year, a highly significant fall occurs in the probability of school dropout, and this effect is common to all races. The negative value of the estimated coefficient $\widehat{\beta}_1$ captures a dramatic change in school dropout trends. For both target and control groups, school dropout rates exhibit upward trends until the 1981 birth cohort, and since 1982, these rates display downward trends (see Fig. 3). Female youths exposed to Islamophobia are 2.8% less likely to drop out of school than unexposed female youths. This impact is −4.27% for exposed male youths. In both cases, the estimated impacts are statistically significant at the 1% level of confidence. For the female sample, the estimates suggest exposure to Islamophobia does not affect the behavior of female youths of Arab-Muslim origin. The estimated impact is close to zero, and it is not significant at any level of confidence. For the other ethnic groups, we do not find any significant impact on the probability of school dropout (see Fig. 4(a)). For the male sample, our estimates suggest exposure to Islamophobia increases the probability of school dropout by 4.11% among young males of Arab-Muslim origin. For the other ethnic groups, we do not find evidence that exposure to Islamophobia significantly increases the probability of school dropout. For male youths of Latino and black/American Indian origins, we observe an additional fall in that probability of roughly 2% (see Fig. 4(b)).

Our estimates suggest a gender difference in responses to exposure to Islamophobia in high-school-aged youths. To explain this result, we conjecture that Islamophobia increased Arab-Muslim male youths' vulnerability to bullying victimization, because male students are significantly more exposed than female students to overt forms of bullying, such as hate-related words based on ethnicity (Pontes et al., 2018; DeVoe et al., 2004). Unfortunately, our data do not allow us to test the mechanism that explains the gender difference in responses to exposure to Islamophobia.

The degree of exposure to increased Islamophobia varies across Arab-Muslim youths in high-school-aged youths. Some youths were exposed to a sharp increase in Islamophobia in the immediate aftermath of the terrorist attacks when they were in the final years of high school. Younger students suffered such exposure in middle school, and when they reached grades 11 and 12, after the year 2003, Islamophobia had stabilized to its pre-2001 levels (see Fig. 1). Hence, one might wonder who is driving the effect on the probability of school dropout. To address this point, we slightly modify Eq. (2). We construct seven exposure variables $EIHS^{c}_{i,s,t}$, with c running from 1983 to 1989. $EIHS^{c}_{i,s,t}$ is equal to one if individual i was born in year c and $EIHS_{i,s,t}$ is equal to one. We regress the variable Dropout on these seven cohort-exposure variables and on the interaction between each of these seven dummy variables and our ethnic indicator variable. We also control for the same elements described in our baseline model. Standard errors are clustered at the state-of-residence-specific race and samples are restricted to observations with total household income higher than 10,000 USD (at 2004 real values).

Figs. 4(c) and 4(d) show the estimated impacts of exposure to Islamophobia on the probability of school dropout for female and male youths of Arab-Muslim origin by cohort, respectively.[20] For Arab-Muslim female youths born during the years 1983-89, the estimated impacts are not statistically significant at any level of confidence, with one exception. For female Arab-Muslim youths born in 1987, the estimated impact is equal to −3.31% and is significant at 10% level of confidence. In the male sample, we observe that Arab-Muslim male youths born between 1983 and 1985—who were in grades 12 and 11, when Islamophobia reached its peak—are driving the observed impacts on the probability of school dropout. But the estimated impact for birth cohort 1985 is not significantly different from zero. For male Arab-Muslim youths born between 1986 and 1989, who were in middle school during the school-year 2001–2002, the estimated impacts are positive but are not statistically significant, with the exception of birth cohort 1988. For this birth cohort, we find a negative and statistically significant effect on school dropout (−2.24%).

[17] In Subsection B.7. of the Supplementary Material, as a robustness check, we present additional estimates in which we use an instrumental-variable approach inspired by that of Currie and Rossin-Slater (2013) to correct for endogeneity of household location. For the Arab-Muslim group, the estimated impacts, under this specification, are virtually the same as those presented in Section 5.1.

[18] The FBI Hate Crime Statistics do not report the gender of the victim; hence, our measure of IBB includes incidents against men and women.

[19] In Section B.6 of the Supplementary Material, we assess to what extent our results are sensitive to different specification choices. Table A9 reports these results.

[20] In Section B.6 of the Supplementary Material, Table A10 reports the estimated coefficients and standard errors.

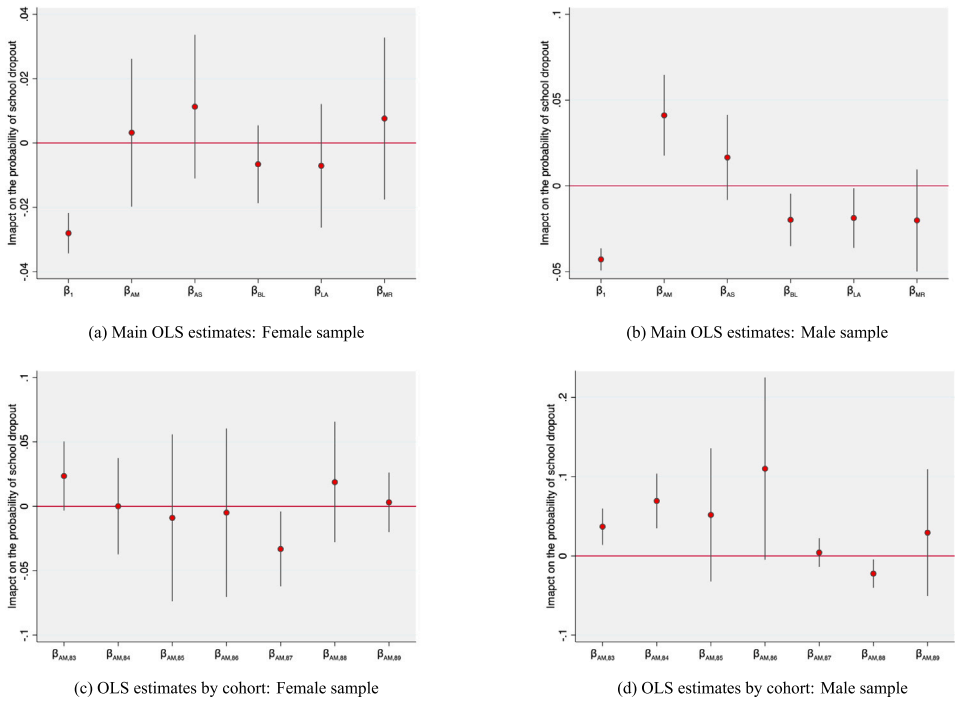


Fig. 4. Impact on the probability of school dropout.
Notes: Each figure corresponds to a different OLS regression, for women (on the left) and men (on the right). Figures in the first row present the results for the benchmark model and figures on the second row present the estimated impacts of exposure to Islamophobia on school dropout rates by cohort of birth, for Arab-Muslim youths. Male and female samples are restricted to observations with total household annual income higher than 10,000 USD (at 2004 values). Standard errors are clustered at state-of-residence-specific race and estimations are based on the 2000 US Census and the 2000–2004 waves of the ACS. The figures show the 90% confidence intervals.

We open this subsection by presenting evidence of a positive and significant correlation between statewide school dropout rates and annual changes in statewide IBB incidents for Arab-Muslim youths. This result leads us to think the sharp increment in the number of IBB incidents against the Arab-Muslim group could explain a great deal of the observed increment in the probability of school dropout.

5.2. Falsification tests

In support of our identification strategy, we perform two falsification tests. For reasons of space, in this section, we discuss the results, and we report the estimates in Subsection B.7.3 of the Supplementary Material. Because we only find a significant impact on school dropout rates for male youths of Arab-Muslim origin, we perform these tests for the male sample only.

In our first falsification test, we use the 2000 US census and the 2000–2004 waves of the ACS and restrict the sample to individuals born between 1965 and 1975 who were not exposed to Islamophobia in high school. We construct a fictitious measure of exposure to Islamophobia. The dummy variable $EIHSFT_{i,s,t}$ is equal to one if individual i was born between 1971 and 1975, and zero otherwise. We interact the variable $EIHSFT_{i,s,t}$ with our ethnic-indicator variable and estimate model (2). If school dropout trends are leading our results, we would find spurious impacts on school dropout rates. But the impact of the fictitious measure of exposure to Islamophobia is not statistically significant at any confidence level (see column 1, Panel B, of Table A13).

In the second falsification test, we also use the 2000 US census and the 2000–2004 waves of the ACS. We randomly distribute ethnic origin to different observations, maintaining the distribution of ethnic groups observed in the data. The variable $EIHS$ is computed in the same way we describe in Section 5. We re-estimate our baseline model 1,000 times, for the male sample, and record how often such random distribution of exposure reproduces our results. If something related to school-age measurement errors is leading our results, for a significance level of 5%, the rate of rejection of the null hypothesis that β_{AM} is different from zero should be much higher than the chosen value of the significance level. Our test shows that 7.3% of the time, we reject the null hypothesis and the average value of $\widehat{\beta}_{AM}$ is negative and virtually equal to zero (see column 2, Panel B, of Table A13).

Summing up, our falsification tests suggest our results are relatively unlikely to be accidental or driven by things related to cohort trends or measurement error in our variable of exposure to Islamophobia.

6. Long-term analysis: Data

Our second objective is to assess the long-term consequences of exposure to Islamophobia in high-school-aged youths. We use the 2016-19 waves of the ACS and restrict our attention to US-born individuals during the period from 1976 to 1989. We focus on the same cohort of individuals that we study in Section 5, and we analyze the 2016-19 period, because during this time, these cohorts of individuals had largely completed their educations. We have a repeated cross-sectional data of 708,101 observations in the male sample and 752,592 observations in the female sample.[21]

Educational outcomes. "Eleven" is a dummy variable that takes a value of one if the number of years of completed schooling is equal to or lower than 11, and zero otherwise. A value of one means the respondent dropped out of high school. To construct this variable, we use the EDUC variable from the ACS.

Labor market outcomes. We construct a dummy variable (called ILF) that takes a value of one if an individual is in the labor force, and zero otherwise. "Employed" is a dummy variable that equals one if an individual is in the labor force and is currently employed and zero if

[21] Subsection B.2 of the Supplementary Material presents a detailed description of the observations that we exclude from the analysis.

the individual is currently unemployed. To construct this variable, we use the EMPSTAT variable from the ACS.

We also consider whether a person is a full-time worker. We use the definition of full-time worker provided by US Census Bureau. Full-time workers include individuals, 16 years old and over, who usually worked more than 35 h per week for 50 to 52 weeks over the 12 months preceding the interview. Our full-time worker (FTW) variable is equal to one if a respondent satisfies this definition, and zero otherwise. To construct FTW, we use the variables UHRSWORK (number of weekly worked hours) and WKSWORK2 (weeks worked for profit during the previous year) from the ACS.

We use two measures of labor income: the log of hourly wage (Log-Wage) and an indicator variable for individuals who are in the lowest 20% of the state-of-residence-year-wage distribution (WFQ). To construct the variable for hourly wage, which is expressed in real 2016 values, we use the variables INCWAGE (which measures a respondent's total pre-tax wage and salary income), UHRSWORK, and WKSWORK2 from the ACS. Then, for individual i living in state s observed in year t, $WFQ_{i,s,t}$ takes a value of one if i's wage is in the first quintile of the wage distribution of state s in year t.

The distribution of ethnic groups resembles that of the short-term analysis. The percentage of Arab-Muslim individuals is equal to 0.72%. The Asian group is the second-smallest minority group with 1.88%, followed by Latinos, representing 11.88% of the sample, and black/American-Indian people, representing 14.09%. The white group makes up 69% of the sample.[22]

Summary statistics by gender for the Arab-Muslim and white groups are provided in Table 3. The percentage of school dropout varies between white and Arab-Muslim individuals. Whereas 3.5% of white women and 5.1% of white men have 11 or fewer years of completed education, for Arab-Muslim individuals, these percentages are 2% (women) and 2.5% (men). Participation in the labor force is similar between these race groups but varies by gender. Approximately 93% of white male and Arab-Muslim male individuals are in the labor force, whereas approximately 81%–82% of women are in the labor force. Conditional on being in the labor force, employment status is similar between genders and race groups; roughly 96% of individuals are employed. Among workers, 80%–83% of Arab-Muslim and white men are full-time workers; this figure falls to 67%–69% for females. Hourly wages are relatively higher for Arab-Muslim workers (both male and female) than white workers. For each gender, the difference in hourly wages is highly significant between white and Arab-Muslim workers (p-value = 0.000). Finally, note that as in the short-term samples, Arab-Muslim parents are relatively more educated than white parents.

Raw trends of educational and labor market outcomes are shown in Fig. 5. In all figures, vertical lines denote the cohort of individuals born in 1982.

Figs. 5(a) and 5(b) present raw trends of educational outcomes. For female Arab-Muslim individuals, the raw trends of variable Eleven seem to show a downward trend. For Arab-Muslim men, we observe a jump between the birth cohorts 1981 and 1983, and then, Eleven decreases over time. For the female white group, and regardless of cohort, Fig. 5(a) shows the percentage of people with 11 years of completed education or less remain relatively stable and around the mean, 3.5%. For white men, variable Eleven exhibits a downward trend.

As for labor market outcomes, shown in the second and third rows of Fig. 5, for both genders and for the Arab-Muslim and white groups, the raw trends in employment status and average hourly wage exhibit downward trends. The downward trends in wage are a consequence of younger individuals having less work experience.

[22] Individuals in the "mixed-race" category represent 2.43% of the sample.

7. Long-term analysis: Empirical approach

Individuals born between 1976 and 1982 were not exposed to Islamophobia, whereas some individuals born between 1983 and 1989 were indeed exposed (see Section 5). However, the degree of exposure varies across these cohorts. This variation leads to heterogeneous treatment effects stemming from the length of exposure to Islamophobia.

In our empirical approach, we measure a time dimension of exposure to Islamophobia with seven birth-cohort dummy variables, $EIHS^b$, one for each birth cohort b that was exposed to Islamophobia, with $b = \{1983, \dots, 1989\}$. To assess a differential response in exposure to Islamophobia across ethnic groups, we interact the $EIHS^b$ variables with our ethnic indicator variable $I_{i,s,t}(EG)$. "White" individuals born in the US between 1976 and 1982 make up our reference group. We estimate the following baseline equation separately for men and women:

$$\begin{aligned} y_{i,s,t} = \beta_0 &+ \sum_b \beta_b EIHS^b_{i,s,t} + \sum_{r \neq White} \sum_b \beta_{r,b}(EIHS^b_{i,s,t} \times I_{i,s,t}(EG = r)) \\ &+ \sum_{r \neq White} \omega_r I_{i,s,t}(EG = r) + X'_{i,s,t}\gamma \\ &+ \sum_{r \neq White} (I_{i,s,t}(EG = r) \times X'_{i,s,t})\gamma + Z'_{i,s,t}\alpha + \pi Trend_t + \\ &\sum_{r \neq White} \pi_r Trend_t \times I_{i,s,t}(EG = r) + u_{i,s,t}, \end{aligned} \tag{3}$$

where $y_{i,s,t}$ is the outcome of interest (educational attainment or labor market outcomes) for an individual i who lives in state s and is observed in ACS wave t. With regard to educational outcomes, Z is a vector that includes state-of-birth indicators. For labor market outcomes, it includes state-of-residence indicators interacted with ethnic-group indicators. For all outcome variables, Z includes dummies for years and the log of cohort size by race. $Trend$ is a variable accounting for birth-cohort trends, and π_r captures differences in trends in the outcome variable between ethnic group r and the reference group "White". Coefficients ω_r, for $r = \{AM, AS, BL, LA, MR\}$, measure any systematic difference in the outcome variable between ethnic group r and the reference group "White". $X_{i,b,s,t}$ is a vector that includes age indicators, a dummy variable for school starting age, another for educational attainment of individual i's parents (basic education is the reference group), and another dummy for missing values for parents' educational attainment. We interact vector X with the ethnic-group indicator $I_{i,s,t}(EG)$ to allow for differential responses across ethnic groups. $u_{i,s,t}$ is the error term.

Exposure to Islamophobia can affect labor market outcomes either by reducing educational attainment or by affecting non-cognitive skills (such as perseverance, motivation or self-esteem) in youths.[23] For this reason, in Eq. (3), and for labor market outcomes, we do not keep educational attainment constant (similar to Bedard and Dhuey, 2012).

Coefficients $\beta_{AM,b}$, for $b = \{1983, \dots, 1989\}$, are our parameters of interest. Each coefficient $\beta_{AM,b}$ is a difference-in-differences estimator. $\beta_{AM,b}$ measures the average of the differences in the outcome variable between Arab-Muslim individuals born in year b and unexposed Arab-Muslim individuals, minus the same average of differences for white individuals.[24] Selective migration is a potential identification problem.

[23] Waddell (2006) and Heckman (2008) document non-cognitive skills are important determinants of socioeconomic success. Dotterer and Lowe (2015) document increased ethnic discrimination is associated with lower levels of youths' school self-esteem, and Brown and Taylor (2008) and Eriksen et al. (2014) explain how bullying may affect labor market outcomes through changes in non-cognitive skills.

[24] Coefficients $\beta_{r,b}$, for $r = \{AS, BL, LA, MR\}$ and $b = \{1983, \dots, 1989\}$, measure the same impact on the outcome variables for each ethnic control group and birth cohort b.

Table 3
Long-term analysis, descriptive statistics.

	Female			Male		
	White (1)	Arab-Muslim (2)	Difference *p*-value	White (3)	Arab-Muslim (4)	Difference *p*-value
Eleven	0.035	0.020	0.014***	0.051	0.025	0.026***
GED	0.030	0.012	0.018***	0.049	0.021	0.027***
Labor force	0.808	0.828	−0.020***	0.930	0.932	−0.002
Employed	0.968	0.962	0.006*	0.967	0.959	0.007*
Full time worker	0.670	0.687	−0.017*	0.834	0.805	0.029***
Wage and salary (val. 2016)	36 573.973	50 505.007	−13931.034***	58 586.287	75 945.577	−17359.290***
(Log of) Hourly wage (val. 2016)	2.9639	3.1933	−0.2293***	3.1464	3.3222	−0.1758***
First quintile (WFQ)	0.086	0.055	0.031***	0.113	0.079	0.033***
Age	34.960	34.043	0.916***	34.953	34.114	0.839***
Basic educ. (Mother)	0.034	0.041	−0.007*	0.044	0.060	−0.016***
Tertiary educ. or above (Mother)	0.045	0.077	−0.032***	0.058	0.094	−0.036***
Missing educ. (Mother)	0.921	0.882	0.038***	0.898	0.846	0.052***
Basic educ. (Father)	0.024	0.021	0.003	0.034	0.035	−0.000
Tertiary educ. or above (Father)	0.032	0.063	−0.031***	0.045	0.090	−0.044***
Missing educ. (Father)	0.943	0.915	0.028***	0.921	0.876	0.045***
Spouse absent	0.130	0.095	0.036***	0.096	0.080	0.016***
Single	0.230	0.342	−0.112***	0.308	0.407	−0.098***
Divorced (within past year)	0.015	0.008	0.007***	0.012	0.009	0.003*
Have a child (within past year)	0.081	0.092	−0.011**	0.000	0.000	0.000
$I(SSA \geq 5) = 1$	0.053	0.025	0.027***	0.052	0.025	0.027***
Missing SSA	0.463	0.598	−0.135***	0.463	0.595	−0.132***
Observations	555,622	5,153		542,890	4,858	

Notes: Data come from the 2016–19 waves of the ACS. Population means are weighted by sample weights. Male and female samples include US-born individuals born between 1976 and 1989 who were observed during the period 2016–19. For the male sample, the number of observations in the Asian group is 13,604, Latino group 67,965, black/American-native 62,938, and in the mixed-race group 15,846. The female sample also contains Asian (13,631), Latino (77,188), black/American-native (83,344) and mixed-race individuals (17,654). The total size of the male sample is equal to 708,101 observations and the total size female sample is 752,592 observations. Columns labeled "Difference" report the *p*-value of the test on the equality of means.
Significance level at $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

To cope with this problem, we control for migration choices by including region-of-birth-specific and region-of-residence-specific interaction terms (see Heckman et al., 1995 and Bedard and Dhuey, 2012). These terms are included in vector Z from Eq. (3).

Our key identification assumption for parameters $\beta_{AM,b}$ is that, in the absence of the terrorist attacks, changes in educational and labor market outcomes would not have been systematically different between the Arab-Muslim group and the white group. Because the terrorist attacks of September 11 were not expected, we argue the timing of these events was uncorrelated with any prior trends in educational or labor market outcomes across cohorts and races.[25]

Finally, another potential problem is that during the 1980s and 1990s, some policies, such as the Earned Income Tax Credit, School Finance Reforms, and Duty to Bargain Laws, affected educational outcomes. These policies led to increases in educational outcomes (see Lovenheim and Willén, 2019) and had impacts that worked in the opposite direction of the expected results of exposure to Islamophobic sentiment. If these policies bias our results, we obtain a lower bound of the impact of exposure to Islamophobia on educational and labor market outcomes.

7.1. Results

In this section, we provide the results of our long-term analysis. We first study the impacts on educational outcomes. Then, we analyze whether exposure to Islamophobia affects labor market outcomes.

7.1.1. Impacts on educational outcomes

In the short term, exposure to Islamophobia may reduce school dropout rates not only through the bullying channel but also via households' economic losses. For the long-term analysis, in our data, we cannot distinguish which of these two channels may affect individuals' educational attainment. Therefore, the estimated impacts on educational attainment that we report here are determined by the increased risk of bullying victimization and by the economic shock the affected population was exposed to in the aftermath of the terrorist attacks.

Figs. 6(a) and 6(b) show the estimated effects of exposure to Islamophobia on the variable Eleven for female and male Arab-Muslim individuals, respectively.[26] Standard errors are clustered at state-of-birth-specific race. For both men and women of Arab-Muslim origin, estimates suggest Arab-Muslim individuals exposed to Islamophobia are not more likely to have 11 or fewer years of completed education than unexposed cohorts of Arab-Muslim individuals.

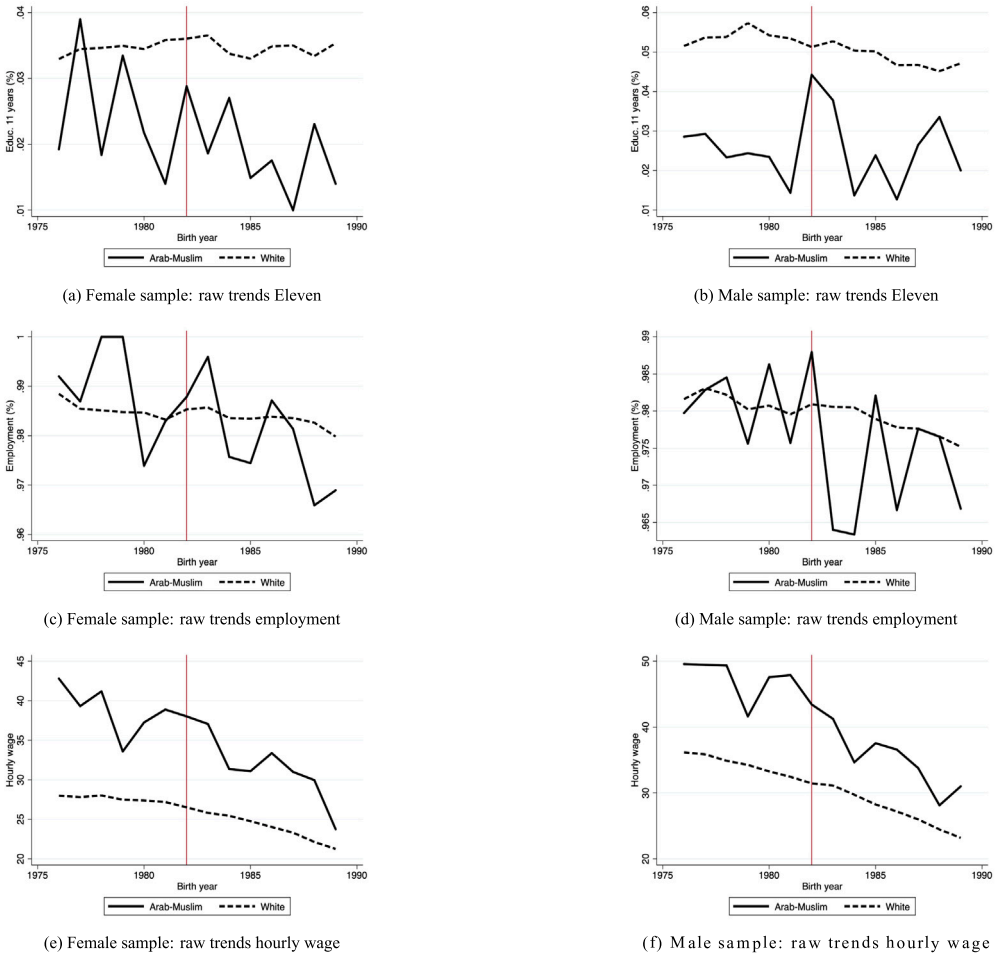
For the female sample, these results are consistent with those obtained in Section 5, but not for the male sample. This finding has two possible explanations (which are not mutually exclusive) that bring together the short- and long-term results.

The first explanation is that in the short term, the fall in the probability of school dropout, common to all races and equal to −4.27%, is offset by the differential response to exposure to Islamophobia in male individuals of Arab-Muslim origin (4.11%). We test for this possibility, and we cannot reject the null hypothesis that $H_0 : \beta_1 + \beta_{AM} = 0$, because the *p*-value is greater than 0.9 (see Table A9).

The second possible explanation is that affected individuals of Arab-Muslim origin might have completed their high school education after they were 18. The GED tests offer individuals older than 18 and without high school diplomas a way to obtain credentials equivalent to a high school diploma. We use the variable EDUC to create a dummy variable

[25] Changes in the composition of parents' educational attainment across cohorts and for the Arab-Muslim group could also affect our estimates. In Section C.7 of the Supplementary material, we provide graphical evidence that shows parents' educational level increases with birth cohorts. Hence, if these changes affect our estimates, the effects work in the opposite direction of the expected results of exposure to Islamophobia on educational and labor market outcomes.

[26] In Section C.3 of the Supplementary Material, Table A15 shows the estimated coefficients and standard errors for the Arab-Muslim group.



(a) Female sample: raw trends Eleven

(b) Male sample: raw trends Eleven

(c) Female sample: raw trends employment

(d) Male sample: raw trends employment

(e) Female sample: raw trends hourly wage

(f) Male sample: raw trends hourly wage

Fig. 5. Raw trends in educational and labor market outcomes.
Notes: Figures show the yearly averages of variables Eleven (first row), Employment (second row), and hourly wages (third row) by birth cohort, gender, and for the Arab-Muslim and white groups. For variables Eleven and Employment, rates are expressed in percentages. Vertical lines denote the 1982 birth cohort. Figures on the left correspond to the female sample and figures on the right correspond to the male sample. Data come from the 2016-19 waves of the ACS.

(called "GED") that equals one if an individual has completed 12 years of education and holds a GED credential.

We restrict our attention to the population with 12 or more completed years of education and analyze whether Arab-Muslim individuals exposed to Islamophobia are more likely to hold a GED credential than unexposed Arab-Muslim individuals. For both the male and female samples, we estimate Eq. (3), in which the outcome variable is the GED dummy. These estimates provide a lower bound on the probability of holding a GED credential, because for individuals with a college education (or some college education), we cannot observe whether they have a high school diploma or a GED credential.

Figs. 6(c) and 6(d) report the estimated effects for the female and male samples, respectively. For women of Arab-Muslim origin with 12 or more years of completed education, we do not find any significant impact, and Fig. 6(c) does not show any systematic pattern in the probability of holding a GED credential. For the male sample, we find that among individuals with 12 or more years of completed education, those of Arab-Muslim origin who were born in 1989 are 8.34% more likely to hold a GED credential than unexposed Arab-Muslim individuals. The estimated impact is significant at a 10% level of confidence. We also observe an increasing trend in estimated impacts, though they are not significantly different from zero for the 1983-88 cohorts.

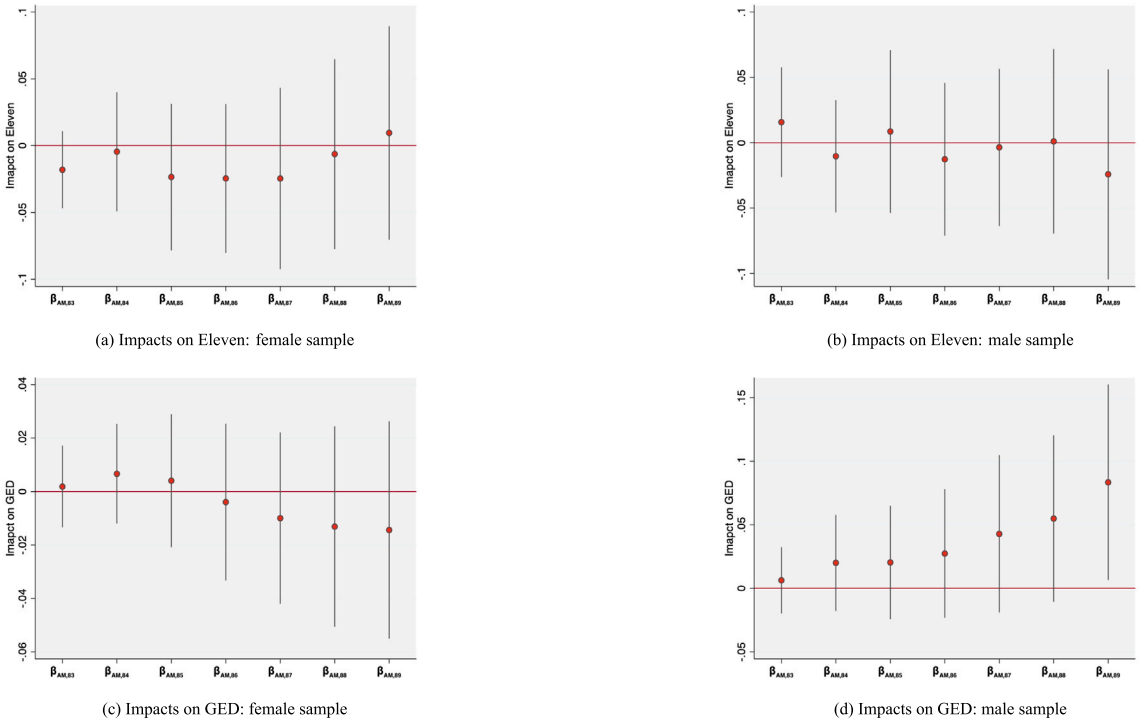
In sum, in the long term, we do not find evidence that exposed Arab-Muslim youths are more likely to be school dropouts than their non-exposed counterpart. In the next section, we study whether exposure to Islamophobia affects labor market outcomes.

7.1.2. Impacts on labor market outcomes

First, we study the effects of exposure to Islamophobia on labor market participation, and then, we analyze its impact on labor market earnings.

Labor market participation. We study the impact of exposure to Islamophobia on the probability of being in the labor force (the outcome variable is ILF), on the probability of being employed (Employed), and on the probability of being a full-time worker (FTW). In these regressions we restrict observations to those individuals who are not in school, and for variables Employed and FTW, we exclude individuals who are not in the labor force and individuals who are self-employed. Figs. 7(a)–7(f) show the results of estimates of Eq. (3) for the female (left column) and male samples (right column) for the Arab-Muslim group.[27] On the vertical axis, each figure plots the estimated impact on the outcome variable, whereas the horizontal axis shows the estimated coefficients $\widehat{\beta}_{AM,b}$, for $b = \{1983, \ldots, 1989\}$. Standard errors are clustered at state-of-residence-specific race. These regressions expand the set of control variables and add log of state-specific GDP and percentage change in wage and salary employment, marital status, and an indicator variable for whether an individual was divorced or widowed during the last year.

[27] In Subsection C.4 of the Supplementary Material, we present a table with the estimated coefficients and standard errors.



(a) Impacts on Eleven: female sample

(b) Impacts on Eleven: male sample

(c) Impacts on GED: female sample

(d) Impacts on GED: male sample

Fig. 6. Exposure to Islamophobia and educational outcomes.
Notes: Figures show the estimated impacts of exposure to Islamophobia on variables Eleven (first row) and GED (second row). Each figure corresponds to a different OLS regression, for women (on the left) and men (on the right). In all cases, white individuals born between 1976 and 1982 make up the reference group. For the GED case, male and female samples are restricted to the population with 12 or more completed years of education. The figures show the 90% confidence intervals. Standard errors are clustered at state-of-birth-specific race and estimations are based on the 2016-19 waves of the ACS.

Estimates suggest exposure to Islamophobia does not affect labor force participation, employment rates, or the probability of being a full-time worker for male or female individuals of Arab-Muslim origin.

Labor market earnings. To assess whether exposure to Islamophobia affects labor market earnings, we restrict our attention to individuals who are in the labor force, are not in school, are not self-employed, earn annual wages over 2,000 USD, and are full-time workers. Our main outcome variables are the log of hourly wage (Log-Wage) and the probability of being in the first quintile of the state-year-wage distribution (WFQ) specific for full-time workers.

Figs. 7(g) and 7(j) show the estimated impacts on the outcome variables of the Arab-Muslim group.[28] In the female sample, we do not find any significant impact of exposure to Islamophobia on labor market earnings. For the male sample, estimates show full-time Arab-Muslim workers born in year 1984, on average, earn 12.8% less than full-time Arab-Muslim workers who were unexposed to Islamophobia. The impact is significant at a 10% level of confidence. For full-time Arab-Muslim workers born in 1983, 1985 and 1986, the estimated impacts on wages are negative but not statistically significant (see Fig. 7(h)). Finally, Fig. 7(j) shows full-time male Arab-Muslim workers born between 1983 and 1985 are between 9% and 12.5% more likely to be in the first quintile of the state-of-residence-year-wage distribution for full-time workers than similar workers who were not exposed to Islamophobia. The estimated effects are significant at a 10% level of confidence. These results are in line with those of Section 5.1 that show male Arab-Muslim youths born in 1983 and 1984 were more affected by Islamophobia in high school.

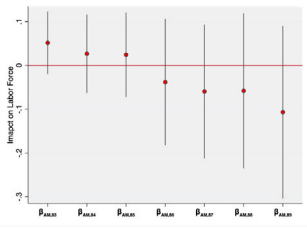
Recall that exposure to Islamophobia can affect wages through educational attainment and/or by increasing the risk of IBB victimization, which in turn reduces non-cognitive skills. Because in the long term, our results suggest Arab-Muslim youths are not more likely to be high school dropouts, and because we find evidence that Islamophobia affects wages, we check whether our data contain evidence of the IBB channel.

In the Supplementary Material, Panel B of Table A4 reports empirical evidence of a negative and statistically significant correlation between average values of changes in IBB incidents against Arab-Muslim youths—during the period 2001-2004—and (log of) average hourly wages earned by individuals born between 1976 and 1989 and that were observed during the period 2016-19. That is, changes in IBB against Arab-Muslim individuals explain part of the variation in hourly wages in the affected population.[29]

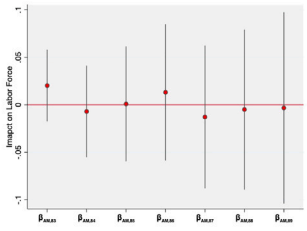
Finally, the absence of significant impacts on educational attainment and labor market outcomes in the female sample is consistent with the results of the short-term analysis. Because exposure to Islamophobia in high school did not affect decisions regarding school dropout in the female population of Arab-Muslim origin, in the long

[28] In Subsection C.5 of the Supplementary Material, we present a table with the estimated coefficients and standard errors.

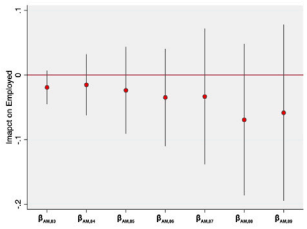
[29] We have run additional estimates on the impacts on wages conditioning on a given educational attainment (high school graduates, some college with no degree, and college graduates). In general, the impacts on hourly wage are negative, and the impacts on WFQ are positive for birth cohorts 1983, 1984, and 1985 of Arab-Muslim male full-time workers with a high school diploma or some college education. Because of the smaller number of Arab-Muslim observations in each birth-cohort cell for a given educational category, most of the impacts are less precisely estimated and are not statistically different from zero. These results are available in Table A18 in the Supplementary Material.



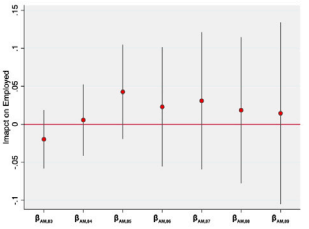
(a) Labor force participation: female sample



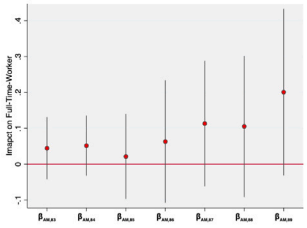
(b) Labor force participation: male sample



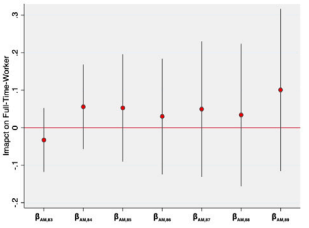
(c) Employment: female sample



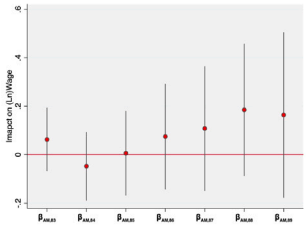
(d) Employment: male sample



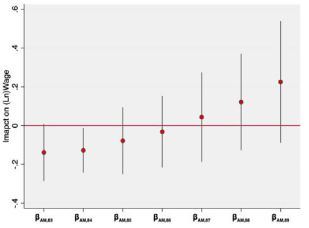
(e) Full time worker: female sample



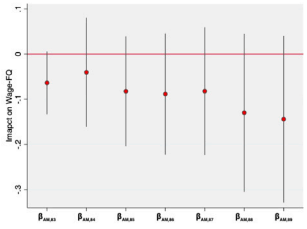
(f) Full time worker: male sample



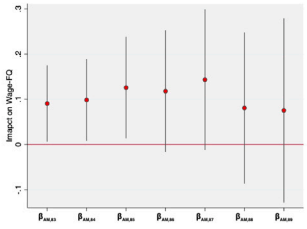
(g) (Log of) hourly wage: female sample



(h) (Log of) hourly wage: male sample



(i) First quintile: female sample



(j) First quintile: male sample

Fig. 7. Exposure to Islamophobia and labor market outcomes.
Notes: Figures show the estimated impacts of exposure to Islamophobia on variables LFP (first row), Employment (second row), FTW (third row), Log-Wage (fourth row), and WFQ (fifth row). Each figure corresponds to a different OLS regression, for women (on the left) and men (on the right). In all cases, white individuals born between 1976 and 1982 make up the reference group and male and female samples exclude individuals who are in the school. Regressions for variables Employed, FTW, Log-Wage and WFQ exclude individuals who are not in the labor force and are self-employed, and regressions for outcome variables Log-Wage and WFQ additionally exclude individuals who are not full-time workers and earn less than 2,000 USD in annual earnings. The figures show the 90% confidence intervals. Standard errors are clustered at state-of-residence-specific race and estimations are based on the 2016-19 waves of the ACS.

term, there should not be statistically significant differences in educational attainment and labor market outcomes between exposed and unexposed female individuals with Arab-Muslim heritage.

7.2. Falsification tests

We perform two additional falsification tests for the long-term results. For reasons of space, in this section, we discuss the results, and we report the estimates in Section C.8 of the Supplementary Material. Because we only find a significant impact on wages for male workers of Arab-Muslim origin, we perform the falsification tests for labor market earnings and the male sample only.

In the first falsification test, we use the 2016-19 waves of the ACS and restrict the sample to US male citizens born between 1965 and 1975, not exposed to Islamophobia in high school, who are not in school, are in the labor force, are self-employed, and earn a wage income higher than 2,000 USD. We assume individuals born between

1971 and 1975 were "exposed" to Islamophobia and construct five birth-cohort dummy variables $EIHSFT^{b}_{i,s,t}$, with $b = \{1971, \ldots, 1975\}$. We interact these dummy variables with our ethnic-indicator variable, and white individuals born between 1965 and 1970 are our reference group. We estimate model (3), and our main outcome variables are Log-Wage and WFQ. If trends in our outcome variables are leading our results, we would find spurious impacts on wages and WFQ. But in both cases, the impacts of the fictitious measures of exposure to Islamophobia are very small and are not statistically significant at any confidence level (see Panel A of Table A19 in the Supplementary Material).

In the second falsification test, we use the male sample described in Section 6. We aim to assess whether we are capturing the effects on wages by pure chance. To this end, we randomly assign observations into an ethnic category, maintaining the distribution of ethnic groups observed in the data. Exposure variables are computed in the same way we describe in Section 7. We re-estimate our baseline model 1,000 times for the male sample and record how often such random distribution of exposure reproduces our results. If something not related to exposure to Islamophobia is leading our results, for a significance level of 5%, the rate of rejection of the null hypothesis that $\beta_{b,AM}$ is different from zero should be much higher than the chosen value of the significance level. For both outcome variables, our tests show less than 8.1% of the time, we reject the null hypothesis that $\beta_{b,AM}$, with $b = \{1983, \ldots, 1989\}$, is equal to zero, and the average values of $\widehat{\beta}_{b,AM}$ are close to zero (see Panel B of Table A19 in the Supplementary Material).

Summing up, our falsification tests suggest our results are relatively unlikely to be accidental or driven by things related to cohorts trends.

8. Discussion

A growing number of papers report the long-lasting consequences of bullying and ethnic discrimination on victims' mental health. Our findings offer new evidence, showing the short- and long-term effects of an increased risk of identity-based-bullying victimization on socioeconomic outcomes. Our work is subject to a number of caveats, though. It may only capture the socioeconomic consequences of exposure to overt forms of bullying, like the use of hate words, which mainly affect male students. The socioeconomic consequences of exposure to more subtle forms of bullying, more frequent among female students, might go undetected in the present work. Because recent studies report an increasing trend of bullying victimization among female students in the US, current school policies, such as reporting bullying, disciplinary actions for bullies, and training school staff, may not be effective when it comes to detecting other less overt forms of bullying (Pontes et al., 2018; Kennedy, 2021). In consequence, ceteris paribus, we could expect important negative effects on non-cognitive skill and labor market wages for female victims of bullying.

Another caveat is that our empirical strategy rests on the assumption that there are no other factors that influence skill accumulation and school dropout other than exposure to Islamophobia. It is well documented that alternative pathways of influence, like schools' fiscal policy reforms and the Earned Tax Credit policy active during the 1980s and 1990s, improved educational outcomes. Furthermore, in our work we do not really know who is or is not a victim of bullying. Despite these caveats, we still find a significant loss in wages and a higher probability of being in the first quintile of state-wage-distribution for full-time workers among male workers of Arab-Muslim origin exposed to Islamophobia. These findings, together with the well-documented impacts on both bullies' and victims' mental health, highlight the relevance and need for effective school policies that prevent all types of bullying and help victims and perpetrators overcome the trauma that these students may experience.

9. Conclusion

We estimate the effects of exposure to Islamophobia on educational outcomes, finding gender differences in responses to an exogenous increase in the risk of IBB victimization. Exposure to Islamophobia significantly increases school dropout rates among US-born male youths of Arab-Muslim origin, while it does not seem to affect school dropout rates among their female counterparts. Our estimates control for a mechanical correlation between students' academic skills and the probability of having been exposed to Islamophobia, as well as endogenous mobility in response to Islamophobia and compositional changes in treatment and control groups. As for the long-term effects, we do not observe any significant impact on educational attainment in affected male or female populations. We provide, and test, two possible explanations that bring together the short- and long-term effects of exposure to Islamophobia. Our first hypothesis is that the fall in the school dropout rate, common to all ethnic groups, was, for male youths of Arab-Muslim origin, offset by the effects of exposure to Islamophobia. Our second hypothesis is that the hostile environment of high school might lead some Arab-Muslim male youths to drop out of school and use the GED as a means to obtain high school credentials. Our data provides evidence that supports both hypotheses.

With regard to long-term consequences on labor market outcomes, for both male and female US-born workers of Arab-Muslim origin, we do not find any significant impact on any measure of labor market participation: labor force, employment, or the probability of being a full-time worker. But we do find that male Arab-Muslim full-time workers exposed to Islamophobia earn significantly lower wages and are more likely to fall in the lower tail of the state-wage-distribution for full-time workers. Because we do not find any significant impact on educational attainment and since there is no selection of male workers out of the labor force, the impacts of exposure to Islamophobia on wages might be driven by the impacts of such exposure on students' non-cognitive skills.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The US Census and the ACS are available freely online. However, they are not available to non-registered users. To access these datasets, researchers must create an account at the IPUMS site.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.ehb.2023.101344.

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