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TEENAGE RELIGIOSITY AND GRADUATING WITH A STEM DEGREE: EVIDENCE OF A CURVILINEAR RELATIONSHIP

by

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A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Arts
to the Department of Economics
of the Faculty of Arts and Sciences
at the American University of Beirut

Beirut, Lebanon
June 2020

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ACKNOWLEDGMENTS

I would like to thank my committee members, Dr. Serena Canaan, Dr. Pierre Mouganie, and Dr. Hossein Radmard. The passion you exhibit towards your work and students is unparalleled and inspiring. Thank you for always welcoming me into your offices whenever I was in need for advice.

I especially would like to thank Dr. Hossein Radmard, my advisor, mentor, and the person that has always pushed me to follow my academic interests. You have guided me and encouraged me every step of the way and for that I am extremely grateful.

To my mother Danielle, you paved the way for me and supported me through everything. You taught me to never give up and to keep following my dreams. I am honored to be your daughter.

To the female role model in my life, my sister Jennifer, nothing could have been possible without you, you are my rock and my inspiration in everything I do. Thank you for always being by my side and cheering me on throughout this journey.

AN ABSTRACT OF THE THESIS OF

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Major: Economics

Title: Teenage Religiosity and Graduating with a STEM Degree: Evidence of a Curvilinear Relationship

The relationship between religiosity and educational achievement and attainment has long been researched in numerous fields; however, economics has not yet adequately joined that research, especially in studies revolving around STEM. Using the National Longitudinal Study of Adolescents to Adult Health (Add-Health) dataset, we seek to investigate the extent to which teenage religiosity has an impact on the decision to graduate with a STEM degree, assuming graduation in the sample. Results show that there is a curvilinear relationship between graduating STEM and teenage religiosity. Therefore, presenting a(n) (i) decrease in the odds of graduating with a STEM degree with a one-unit increase in low religiosity, (ii) increase in the odds of graduating with a STEM degree with a one-unit increase in moderate religiosity, and finally (iii) decrease in the odds of graduating with a STEM degree with a one-unit increase in high religiosity.

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Methodology

3.1 Data

The data that will be used comes from the National Longitudinal Study of Adolescence to Adult Health (Add Health). The data spans across four waves from 1994 to 2008 and encompasses a sample of representative High School students in the United States of America from 80 different High Schools in grades 7 through 12 (Wave I-II, 1994-1996) up until the age of 32 (Wave IV, 2008). The data includes in-school and in-home surveys with adolescences and their parents and provides information on socio-economic variables, education, peer relationship, parents and family life, and religion.

The baseline sample was chosen from Wave III with 4,781 respondents (i.e., respondents between the ages of 18 and 26) as it is the time during which students are attending or have attended and graduated college. I chose not to use Wave IV (i.e., respondents between the ages of 27 and 32) as it does not provide information on the type of field of graduation for students that have not yet graduated in Wave III. The baseline sample from Wave III was filtered to contain only respondents that have graduated college/university; all other observations were dropped, therefore giving a total number of observations of 688. The decision to look only into graduating students was not an optional step due to the limitations of the dataset. However, it is the most reliable way to determine preferences. Usually, there is an added layer of complexity of isolating preferences that comes with students that have changed majors or dropped out of college. This would have been taken into account in choosing this sample, and the focus of this study becomes purely about the choice between STEM and non-STEM majors. Therefore, underlying assumption using the sample at hand is that students have graduated;

therefore, the purpose is to identify the impact of religiosity on the odds of graduating with a STEM degree as opposed to a non-STEM degree.

Erickson & Phillips (2012) suggest, in their study on the effect of religious mentoring on educational attainment, that the Add-Health dataset is missing vital data since respondent are not asked questions around religiosity when they do not identify with a religion. Therefore, they substitute the missing values with the mean of teen religiosity taken from the National Study of Youth and Religion (NSYR) dataset.

The main struggle of this topic is to disentangle factors in the decision of students to go into STEM majors, the primary factor of influence being the effect that parents have on the decision. Although the data does provide insight into the opinion of parents of their child attending college or university, it does not explore the preferences of parents regarding the major of their child.

3.2 Measures

STEM graduation

STEM graduation is the dependent variable and was assessed using Wave III. During Wave III students are between the ages of 18-26 interviewed in 2001-2002. There were 38 categories and over 1500 subcategories for the field of studies (a full list of these 38 categories can be found in Table 6 in the appendix portion of the study). These were sorted into two major groups STEM and non-STEM, based on the basic definition of STEM being Science, Technology, Engineering, and Mathematics. Those who reported having graduated with a degree that is classified as STEM were coded 1 and those who reported having graduated with a non-STEM degree were coded as 0.

Religiosity

Teenage religiosity is the independent variable and was assessed using Wave I, where respondents are in grades 7 to 12. *Teen Religiosity*:

Religiosity was computed using five main questions asked in the questionnaire.

1. "What is your religion?", the respondent had the choice to respond with "none" or a variety of different religions listed. I have attributed the value of 1 for the people that have specified a religion and a value of 0 for those that answered with none. The people that answered "none" were not asked any additional questions regarding religion. The respondents' religion were grouped in categories based on Erickson and Phillips's (2012) procedure:
    - Conservative Protestant: Assemblies of God, Baptist, Adventist, Holiness, and Pentecostal
    - Mainline Protestant: Christian Church, Congregational, Episcopal, Friends/Quaker, Lutheran, Methodist, Presbyterian, United Church of Christ, and other Protestant
    - Catholic
    - Black Protestant: AME, AME Zion, CME, and black respondents who affiliated with Protestant denominations
    - Jewish
    - Other: Christian Science, Jehovah's Witness, Buddhist, Eastern Orthodox, Hindu, Islam, Unitarian, Latter-Day Saints (Mormon), and other religion.

2. "In the past 12 months, how often did you attend religious services?", the answer to this could be "once a week or more", "one a month or more, but less than once a week", "less than once a month", "never". Each of those answers was attributed a value from 0

for "never", to 3 for "once a week or more". Religious service is usually conducted in a designated space by the religious institution and includes the presence of religious authority.

3. "How often do you pray?", participants were given the option of answers ranging from "never" to "at least once a day" and the responses were attributed a value ranging from 0 to 4. Although attending religious service does include rituals of prayer, these instances are not included in the factor "Prayer". Prayer is to be distinguished from religious service as it is the action of conducting religious prayer outside the designated time for religious service.

4. "How important is religion to you?" participants were given the option of answers ranging from "not important at all" to "very important" and the responses were attributed a value ranging from 0 to 3.
5. "In the past 12 months, how often did you attend religiously affiliated youth activities?" participants were given the option of answers ranging from "never" to "once a week or more" and the responses were attributed a value ranging from 0 to 3.

The values were summed up in order to compute teenage religiosity giving it a value ranging from 0 to 14. The Duke University Religion Index (DUREL) finds that there are 5 main questions that if answered could provide a clear view on the religiosity of an individual. It has been deemed appropriate to test for teenage religiosity. The questions from Wave I are similar enough to be used as an index in order to determine teenage religiosity.

Parent religiosity

Parent religiosity was computed using the parent questionnaire in Wave I. It held the same 1-4 questions from teenage religiosity and was attributed a value ranging from 0 to 11.

Controls

Gender of student coded 1 for female and 0 for male. Race-ethnicity for parents and students coded 1 if marked and 0 if not marked: white, black, Hispanic, Asian, and native american. Age for parents and students: determined in years at the time of Wave III (2001-2002). Parent education coded from 1 (low education) to 4 (high education): 1: if did not complete high school, 2: if completed high school or General Educational Development (GED), 3: if went to vocational. school after high school or completed some college, and 4: if completed college/ university and/or professional training beyond four years of college.

Table 1: Descriptive Statistics

	Mean	SD	Min	Max
Dependent variable				
Graduating STEM	0.2921512	0.4550823	0	1
Independent variables				
Adolescent religious involvement				
Religious affiliation				
No religion	0.068314	0.2524674	0	1
Conservative Protestant	0.1322674	0.3390278	0	1
Mainline Protestant	0.2761628	0.4474236	0	1
Black Protestant	0.1453488	0.3527086	0	1
Catholic	0.2659884	0.4421795	0	1
Jewish	0.0232558	0.1508246	0	1
Other religion	0.0886628	0.2844632	0	1
Teen religiosity	9.177326	4.048175	0	14
Religious salience	2.178779	0.9568646	0	3
Prayer	2.002907	1.096504	0	3
Church attendance	2.892442	1.394542	0	4
Youth group participation	1.171512	1.231419	0	3
Parental influence				
Parent religiosity	8.84157	2.856523	0	11
Religious salience	2.50436	0.8323752	0	3
Prayer	3.327035	1.214551	0	4
Church attendance	2.055233	1.062735	0	3
Father disappointment	4.283154	1.023303	1	5
Mother disappointment	4.222057	1.032251	1	5
Parent education	3.122093	.8945445	1	4
Controls				
Female (adolescent)	0.6148256	0.4869905	0	1
Age (adolescent in years)	23.25291	1.269961	19	26
Race-ethnicity (adolescent)				
White	0.7616279	0.4263978	0	1

Black	0.181686	0.3858661	0	1
Native American	0.0276163	0.16399	0	1
Asian	0.0436047	0.2043624	0	1
Other	0.0348837	0.1836188	0	1
Age (parent in years)	43.64286	4.993353	30	65
Race-ethnicity (parent)				
White	0.7703488	0.4209145	0	1
Black	0.1656977	0.3720795	0	1
Native American	0.0145349	0.1197684	0	1
Asian	0.0436047	0.2043624	0	1
Other	0.0247093	0.1553507	0	1
Household income (in thousands of USD)	66.91134	81.92711	0	999
Two biological parents	0.7078488	0.4550823	0	1
Math grade	3.018838	0.9022804	1	4
Science grade	3.256536	0.8258546	1	4

Two biological parents coded 1 if the adolescent lives with both biological parents and 0 if the adolescent only lives with one or neither. Household Income: total household income, including benefits in thousands of US dollars during 1994 (Wave I). Parents' disappointment if the child does not attend college on a scale of 1 (low) to 5 (high). Science and math grade during the most recent grading period in Wave I on a scale of 1 (D or lower) to 4 (A) with the option of "didn't take the class".

Table 1 and any further reported results do not take into consideration Erickson & Phillips' (2012) suggestion regarding adding the means of religiosity to individuals that do not identify with a religious denomination. Theoretically, I thought about this change in two ways: (1) to be both unnecessary and potentially damaging to the results since the respondent could have been possibly forced into religious activity, prayer, and church attendance by family or religious schools and institutions, therefore, making the religiosity of teens unrepresentative of their "true" religiosity (2) religion and religiosity are not fully illustrative of each other, one

can identify as part of a religious denomination and not be religious and vice versa. Therefore, I have instead opted for the option of running logistic regressions for the unedited data[1].

[1] There was no perceived difference in the results of the logistic regression (Model 0-3) with or without the mean of religiosity for participants that have not identified to be part of a religious denomination. Therefore, results with these means added were not shown in any of the tables or graphs that report results.

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