Education, Social Mobility and Religious Movements: The Islamic Revival in Egypt[*]

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Abstract

Muslim societies have been reshaped in recent decades by an Islamic revival. We document a contemporaneous decline in social mobility among educated youth in Egypt, the epicenter of the movement in the Arab world. We then develop a model to show how an unexpected decline in social mobility combined with inequality can produce a religious revival led by the educated middle class. The principal idea is that religion helps individuals to cope with unfulfilled aspirations by adjusting their expectations-based reference point. By raising aspirations, economic development may make societies more prone to religious revivals.

Key words: Islamic revival, education, social mobility, inequality, social movements, Egypt

JEL classification: D10; D63; I24; J24; J62; O10; Z12; Z13

1 Introduction

In the last few decades, Muslim societies have undergone a cultural transformation marked by a rise in religious participation and identification. This Islamic revival reversed previous trends toward secularization in Muslim societies and runs counter to the secularization thesis once predominant among social scientists. Beliefs and institutions that emerged in largely illiterate pre-industrial societies were supposed to be maladapted to and readily abandoned in a world of science, industrialization, and improving standards of living, that is to say the modern world (Norris & Inglehart 2004). Yet there has been "an impressive revival of emphatically religious commitments... of vast geographical scope, affecting every single Muslim country from North Africa to South-East Asia" (Berger 1999, p. 7).

This paper focuses on Egypt. Egypt is the epicenter of the Arab world's various Islamic movements (e.g. Kepel 2002, 2003). The Egyptian Muslim Brotherhood set up or inspired Islamic organizations in Algeria (Movement for the Society of Peace), Jordan (Islamic Action Front), Lebanon (*Jamaa Islamiya*), the Palestinian territories (Hamas), Syria, Tunisia (*al-Nahda*), and Yemen (*al-Islah*). Egypt is also one of the most religious nations in the world: according to the World Values Survey (WVS), 98.4% of Egyptians surveyed in 2000 describe themselves as a religious person and 99.7% report drawing comfort and strength from religion (WVS, 2009).[1]

We examine the economic factors behind the rise in Islamic piety and participation in Egypt from the mid-1980s, a movement led by the educated middle class. Drawing on nationally representative household survey data, we conduct an empirical analysis of educational and social mobility in Egypt. Following the 1952 Egyptian revolution, there was a big push to increase educational attainment both at lower and higher levels of education. There was also a plan to provide employment for the new educated class. In the early 1960s, Egypt introduced a scheme guaranteeing public sector employment to those with intermediate or higher education who were unable to find a job. This "last resort" option encouraged household investment in education and raised aspirations of upward social mobility among those from the lower social strata (e.g. Amin 1995, Assaad 1997, Wickham 2002). In the early 1980s, however, the scheme became increasingly untenable. When Mubarak took power in 1981, instead of abolishing the scheme, a number of changes were introduced to reduce the supply

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[1]The results are based on the Muslim subsample (94% of respondents).

of graduates. The changes included limiting university enrollment, reducing real wages, and increasing the waiting period for a government job (Assaad 1997) (see also Wickham 2002, p. 41ff). Since the early 1990s, the scheme has essentially been defunct. As public sector employment declined, the marginalized and highly regulated private sector was incapable of absorbing the growing ranks of educated youth, leading to an overall decline in formal employment.

We document a large increase in educational attainment and intergenerational educational mobility over time. We then compare the occupational outcomes of secondary school and university graduates who benefited from the guaranteed employment scheme (i.e. graduates born between 1949 and 1960, "old cohort") to those who expected to benefit but generally did not (i.e. graduates born between 1968 and 1977, "young cohort"). For university graduates, the likelihood of obtaining a professional occupation (formal sector job) by age 28 declined by 18 (21) percentage points from the old to the young cohort. There was no such decline, however, for graduates whose fathers had a professional occupation. Thus, social mobility among the educated declined at approximately the same time as Egypt began to experience an Islamic revival.[2] This occurred in the context of rising income inequality and poverty.

We then develop a model of religion to analyze the connection between shocks to social mobility and religious revivals. We make use of advances in behavioral economics in analyzing reference-dependent preferences (Loomes & Sugden 1986, Kőszegi & Rabin 2007). In particular, an individual's reference point can be endogenously determined by expected outcomes (Kőszegi & Rabin 2006). We develop the idea that people attempt to cope with economic loss by adjusting their reference point or shifting attention to other (non-material) dimensions of comparison. Religion is one such coping mechanism. When acquiring education, individuals form expectations about their future consumption. Unfulfilled aspirations are experienced if consumption turns out to be lower than an expectations-based reference point. If this occurs, due for example to a sudden decline in social mobility, the appeal of religious participation as a coping mechanism increases.

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[2]Clemens et al. (2009) and Campante & Chor (2012), among others, have also documented that over the past decades increases in education have not been matched with increases in economic opportunities in Egypt and the Middle East more generally. Campante & Chor (2012) link political protest during the Arab spring to these factors. To our knowledge, none of these studies examined changes in social mobility among the educated. We also focus on a different time period, during which major changes took place both in the Egyptian labor market and in society at large.

The argument that Egypt's Islamic revival has been fueled by relative deprivation—feelings of envy, indignation, and unfulfilled aspirations—particularly among educated youth, has been made by several authors, most notably Ayubi (1991), Amin (1995) and Wickham (2002). We make two contributions to this literature. First, we present systematic evidence of a decline in social mobility among educated youth in Egypt during this time period. Prior work has relied on anecdotal and suggestive evidence. Second, we develop a formal model of religious movements based on unfulfilled aspirations. The canonical club goods model of religion (e.g. Iannaccone 1992, Berman 2000) focuses on the social rather than the psychological functions of religion. We contribute to this literature by treating religious participation not only as a form of leisure or group participation, but also as a psychological coping mechanism. This leads to a richer picture of religious dynamics.

In contrast to the relative deprivation literature, even when religion is a coping mechanism, a rise in unfulfilled aspirations may not lead to a rise in religious participation. Instead, individuals could work harder to meet their reference point, spending less time on religious activity. We call this the living-up-to-expectations effect. We derive a simple necessary and sufficient condition under which the coping effect of religion dominates. This condition is satisfied when expected social mobility and income inequality are high. In addition, standard motivations for religious participation (e.g. social service provision) can interact with psychological motivations to produce a large, long-lasting, and widespread rise in religiosity in response to a small and temporary shock to social mobility. At the time of the shock, the rise in religious participation is driven mainly by educated and talented individuals. Their participation builds organizational capacity and can produce dynamic multiplier effects that tip society into the basin of attraction of a high-religiosity steady state. As the capacity of religious organizations grows and expectations adjust, the psychological role of religion declines and other motivations take over, producing a broad-based religious revival.

There has been a recent surge in research on the political economy of Islam and Muslim societies led by Kuran (2004, 2010). Much of this work has focused on how the economic development of the Middle East has been shaped by Islamic institutions (e.g. Rubin 2011, Blaydes & Chaney 2013). There are relatively few studies that examine how religious belief and participation among Muslims are shaped by economic development. One notable exception is Chen (2010), who documents an increase in communal Quar'an study and Islamic

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school attendance in Indonesia following the 1997-98 financial crisis.[3] In Chen's work, religion is primarily a form of social insurance. In countries such as Egypt, Turkey, Lebanon and Jordan, religious organizations provide social services by drawing on volunteers from the educated middle class, e.g. doctors, lawyers, administrators (Clark 2004, Wickham 2002). We provide an explanation for this pattern of religious participation and show how the psychological function of religion can help to attenuate the free-rider problem in providing social services. In a related study of veiling among Muslim women, Carvalho (2013) shows how rising religiosity, combined with greater economic opportunities for women, can lead to an increase in religious identification among educated, urban women.

The remainder of this paper is structured as follows: In section 2, we review existing survey, ethnographic and historical evidence on the Islamic revival. In section 3, we present quantitative evidence of a decline in social mobility among educated youth in Egypt. Section 4 sets out our theory of religion and shows how a decline in social mobility can create a widespread and long-lasting religious revival. Section 5 concludes. In an Online Appendix, we provide details of Egyptian education and labor market institutions, further information on our data source, and additional empirical analyses.

2   The Islamic Revival in Egypt

The chief obstacle to the study of the Islamic revival in Egypt is the absence of data on religiosity among Muslims over the second half of the twentieth century.[4] There is, however, a voluminous historical and ethnographic literature on the Islamic resurgence. See, for example, the 111-page bibliography compiled by Esposito et al. (1991). This literature suggests two things. Firstly, from the mid-1980s and continuing through the 1990s, Egypt witnessed a widespread Islamic revival—a rise in religious participation, values and identification. In the 1970s, radical groups had become increasingly active, culminating in the assassination of Anwar Sadat in 1981 (Kepel 2002, 2003). The group responsible, *al-jihad*, had hoped to provoke a "mass uprising" similar to the Iranian revolution. This did not occur despite the

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[3]See also Chaney (2013) on how deviant Nile flooding historically led to greater power of religious authorities in Egypt.

[4]There are some studies that document an increase in religious belief and participation, see for example Mutlu (1996) on Turkey and Shadid (1988) on the Palestinian territories. Ideally, we would be able to link religiosity data to information on individual characteristics including socioeconomic background.

unpopularity of Sadat (Kepel 2002, p. 87), and it was not until the mid to late 1980s that the Islamic revival gained momentum.[5] Secondly, educated youth from the lower socioeconomic strata were the vanguard of this movement. We provide a brief review of some of this literature.

2.1 Evidence of a Broad-based Revival

The broader Islamic revival became apparent in many ways. There was a widely perceived increase in religious observance including mosque attendance, prayer and fasting (Esposito 1999, p. 10). Islamic greetings and expressions (such as *Mashallah*—"whatever God wills") were more frequently used. Islamic books and journals (Wickham 2002, p. 101-2) and sermons recorded on cassette (Hirschkind 2006) became increasingly popular. There is evidence of an increase in Islamic dress (see Patel 2012). Beginning with the deveiling movement launched by Huda Shaarawi in Cairo in 1923, the practice of veiling among women—concealing the hair and face in particular—disappeared from sight. Yet by 2000, around 80% of Cairene women wore some form of headcovering (Bayat 2007). Many Egyptian singers, dancers, and actresses left their professions, veiled, and denounced their art as shameful (van Nieuwkerk 2007).[6]

Part of the increase in religious activity was coordinated by Islamic organizations. Social organizations providing healthcare, education, and financial aid, often centered around private mosques, proliferated in the 1980s and 1990s (see Wickham 2002, p. 99-102). In Egypt, Islamic organizations accounted for at least half of all welfare organizations in the 1990s, and the number of beneficiaries of health services from such organizations rose from 4.5 million in 1980 to 15 million in 1992 (Bayat 2002, p. 12).

By the early 1990s, the Muslim Brotherhood had gained control of many of Egypt's professional associations including the engineers', doctors', pharmacists', scientists', and lawyers' associations (Wickham 2002, p. 176ff). In 2005, Muslim Brotherhood candidates won 20%

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[5]Kepel (2003, p. 248) also reports, for instance, that the decision of Egypt's national airline to forbid alcoholic beverages on flights in 1984 was ridiculed by newspapers, and intellectuals were not afraid to denounce the practice of veiling at that time.

[6]Counter to global trends, traditional values regarding women's rights and sexual mores appear to have strengthened in Muslim societies (e.g. Norris & Inglehart 2004). Based on their analysis of WVS data, Norris and Inglehart conclude that "the basic cultural fault line between the West and Islam does not concern democracy—it involves issues of gender equality and sexual liberalization" [p. 155].

of the parliamentary seats, despite electoral irregularities and a ban on the Brotherhood forming a political party. In the parliamentary elections following the 2011 revolution, the Muslim Brotherhood Freedom and Justice Party won 47% of the vote. In June 2012, the Muslim Brotherhood candidate, Mohamed Morsi, was elected President of Egypt before being ousted in July 2013.

2.2 Educated Youth at the Vanguard of the Movement

There is a broad consensus in the literature that the Islamic movement was driven by educated youth. For instance, the leaders of the Muslim Brotherhood as well as a substantial part of its rank-and-file membership were drawn from the educated middle or lower-middle classes (e.g. Mitchell 1993, Kepel 2003). According to Wickham (2002), "the prototypical Islamic activist is not an illiterate peasant or laborer but a young, upwardly mobile university student or professional, often with a scientific or technical degree" [p. 1]. These characteristics match activists' profiles in the broader Islamic movement in other Muslim countries (Waltz 1986, Ayubi 1991, Clark 2004).

One reason why educated youth, particularly from the lower socioeconomic strata, may have been attracted to the Islamic movement was the importance they placed on deemphasizing materialistic values.[7] Wickham's interviews highlight the distinct values espoused by "committed Muslims" (*multazim*). According to one female graduate, "The ordinary Muslim needs to earn more money than the committed Muslim, because his needs for material things [*istilzamatu*] are greater" [p. 168]. Religious groups also helped remove the social stigma associated with manual work, as white-collar jobs became increasingly unattainable for graduates:

> Why does the ordinary youth want to wait for a government job? For the social status. But now even he is forced to find work elsewhere. In Islam, work is obligatory. But it can be any work, as long as it is honest. My cousin is a law graduate, but he sells perfume at a kiosk on the street. There's no shame in that. The important thing is not how much prestige is involved or how much he earns. The important thing is to earn a living legitimately, not earn it through stealing, drugs, or other illegal activities. [p. 167]

Accordingly, we develop a theory of religion in which religious participation shapes an indi-

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[7]The Islamic movement benefited from several other factors, which we discuss in section 5.1.

vidual's values, helping him to cope with unfulfilled aspirations. We show how a temporary decline in social mobility can create a widespread and long-lasting religious revival led by educated youth. We now turn to our empirical analysis of trends in social mobility among the educated.

3 The Decline in Social Mobility Among Educated Youth

In this section, we examine changes in intergenerational educational and social mobility, drawing on the cross-section of the Egypt Labor Market Panel Survey of 2006 (ELMPS06). In particular, we examine whether the deterioration in labor market conditions starting in the early/mid 1980s disproportionately affected educated youth from the lower socioeconomic strata, as suggested by Wickham (2002), Bayat (2002), and others. We do so by comparing social mobility for graduates—both university graduates and, more broadly, secondary school graduates and above—born in the 1950s (i.e. 1949 to 1960, "old cohort") who benefited from free access to education and the government guarantee of employment to those born in the late 1960s and 1970s (i.e. 1968 to 1977, "young cohort") who expected to benefit from the scheme but, when entering the labor market in the late 1980s and 1990s, generally did not.[8]

Our main findings are as follows. Firstly, there was a substantial increase in educational attainment and intergenerational educational mobility across cohorts. Secondly, the share of professionals as a fraction of the educated work force declined, as did the share of educated men with a formal job. Hence, educated young people were increasingly pushed into low-skilled occupations in the informal sector. Thirdly, the decline in job opportunities—a roughly 20 percentage point decline in the likelihood of obtaining a professional occupation (or formal sector job) for university graduates—was not experienced by university graduates whose fathers were professionals. On average, the job prospects of graduates with fathers holding a professional occupation remained unchanged. Thus, social mobility among the educated declined, leading to unfulfilled aspirations among those from the lower socioeconomic strata. Finally, we present suggestive evidence that the increased labor market advantage of

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[8]Because the scheme was gradually suspended, we omit intermediate years. Table S7 of the Online Appendix presents regression results retaining the intermediate cohort in the sample. While the middle cohort also experienced a decline in job opportunities (albeit to a somewhat lesser extent than the young cohort), this decline was not yet concentrated among those from the lower socioeconomic strata, something that changed significantly for the young cohort. We provide a detailed discussion of the cohort definitions and further analyses in section 4.1 of the Online Appendix.

those from high socioeconomic backgrounds was due to superior personal connections in the private sector, as has been proposed elsewhere (e.g. Wickham 2002).

The core results are presented here. Further details and empirical analyses are provided in the Online Appendix.[9]

3.1 Data

Our data source is the ELMPS06, a nationally representative household survey with several important features (ERF 2006). Firstly, the ELMPS06 contains information on an individual's employment history. Information about previous jobs includes an individual's occupation, employment status and, for wage workers, the sector of employment and the formality of the job, that is, whether the job entailed a work contract and social insurance. This allows us, for both cohorts, to determine an individual's occupational status at a given age. By comparing job outcomes across cohorts at a given age—instead of at a given time (year)—we reduce potential lifecycle bias in intergenerational economic mobility estimates (e.g. Erikson et al. 1983, Jenkins 1987). Secondly, for individuals whose parents do not live in the household, the survey asks about their parents' education and work when they were young. (For individuals whose parents live in the same household, we obtain this information directly from the questionnaire.) Finally, by drawing from a single data source, education and occupation-related information is consistent across cohorts.

The ELMPS06 covered 8,349 households with 37,140 individuals. We restrict our analysis throughout to males because of low female labor force participation rates in Egypt. In addition, we focus on men born between the years 1949 and 1960 (old cohort) and between the years 1968 and 1977 (young cohort). The increase in the sample size across cohorts from 1,860 to 2,650 reflects rapid population growth in Egypt.

In our main specification, we compare a university graduate's likelihood of obtaining a professional occupation by the age of 28 across cohorts.[10] To determine a graduate's occupation

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[9]In this section, we focus on regression results to illustrate changes in mobility across cohorts. Additionally, in section 5 of the Online Appendix, we present mobility tables for fathers' and sons' educational and occupational attainment and compute key odds ratios for each cohort. The odds ratios point to similar trends in mobility as the regression results presented here.

[10]For men, the most common 1988 ILO International Standard Classification of Occupations (ISCO) titles for professional occupations are [Large Enterprise] Department Managers, Primary and Pre-Primary Education Teaching Professionals, and Physical and Engineering Science Technicians. Details of the construction

at a given age, we draw on the employment history section of the ELMPS06. After intensive data cleaning and consistency checks, complete and consistent information is available for 93% of men aged from 20 to 65, that is, we observe their entire job history. The vast majority of men had no more than two occupational changes in their careers and, among those with two or more occupational changes, most men had transitioned to their second occupation by the age of 28 (Table S4, Online Appendix). Therefore, we take 28 to be the age of 'occupational maturity' (Erikson et al. 1983). Our results are robust to comparing occupational outcomes of graduates in both cohorts at age 30 (Table S9, Online Appendix).

We relate a graduate's (son's) occupation to his father's occupation when he was aged 15. The reason is that for sons *not* living with their father (87% of men in both cohorts), the son was asked about his father's occupation and sector of employment at age 15 (as well as his father's highest educational degree). For sons living with their father, this information was derived from the father's self-reported employment history. Of all men in both cohorts, the father's occupational status was available in 98% of cases.

3.2 Increasing Educational Attainment and Educational Mobility

We first document changes in educational attainment and intergenerational educational mobility across cohorts. The summary statistics, presented in Appendix Table A1, demonstrate a strong overall increase in educational attainment, with men in the old cohort achieving an average of 6.62 years of schooling and men in the young cohort achieving an average of 9.78 years of schooling. The share of men with at least a secondary education increased from 39% to 63% across cohorts, and the share of men with post-secondary (university) education rose from 20% to 28%. It should be noted that men in the old cohort, who were the first beneficiaries of the expansion in schooling following the 1952 revolution, had already experienced a dramatic improvement in educational outcomes. Their fathers had achieved an average of only 1.66 years of schooling (Appendix Table A1).

To examine changes in intergenerational educational mobility across cohorts, we regress individuals' (sons') years of schooling on their fathers' years of schooling, a dummy for sons belonging to the young cohort, an interaction term between these two variables, and a dummy for sons born in an urban area. The results are shown in Table 1. They indicate

of occupational categories are provided in section 2 of the Online Appendix.

Table 1: Relationship Between Father's Years of Schooling and Son's Educational Attainment

	Dependent variable:				
	Son's years of schooling			Son's educational attainment	
	(1)	(2)	(3)	(4)	(5)
	Full sample	Rural	Urban	Secondary+	University
Father's years of schooling	0.626***	0.877***	0.526***	0.044***	0.042***
	(0.026)	(0.064)	(0.029)	(0.002)	(0.003)
Father's years of schooling	−0.247***	−0.377***	−0.169***	−0.018***	−0.007**
× young cohort	(0.030)	(0.071)	(0.034)	(0.002)	(0.003)
Young cohort	3.166***	3.724***	2.277***	0.241***	0.055***
	(0.214)	(0.292)	(0.300)	(0.017)	(0.013)
R^2	0.247	0.177	0.219	0.190	0.202
N (not weighted)	4,544	2,100	2,444	4,544	4,544

* $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Notes: OLS results are reported with standard errors clustered at the household level in parentheses. In the last two columns, the dependent variable is a binary variable equal to one if the individual (son) attained a secondary or post-secondary degree (column 4) or a post-secondary (university) degree (column 5). Specifications (1), (4), and (5) include a dummy for sons born in an urban area, and all specifications include a constant. The analysis is restricted to men (sons) born during the period from 1949 to 1960 (old cohort) and from 1968 to 1977 (young cohort). "Rural" and "urban" refer to the son's place of residence at birth.

that for men in the old cohort, one additional year of schooling for the father is associated with an increase of 0.63 years of schooling for the son (column 1). This association decreases significantly by 0.25 years for men in the young cohort.[11] Columns (2) and (3) present results from separate estimations based on the son's residence at birth. They suggest that there was less intergenerational mobility in rural areas compared to urban areas for the old cohort, though some gains were made by the rural young cohort.

The last two columns of Table 1 examine the relationship between a father's years of schooling and a son's attainment of higher levels of education, i.e. a secondary degree or above (column 4) and a post-secondary degree (column 5). The results in column (4) indicate that for the old cohort, one additional year of schooling for the father is associated with a 4.4 percentage point increase in the likelihood of achieving a secondary or post-secondary degree for the son. For the young cohort, we observe a statistically significant decline in this association by 1.8 percentage points. For university education, the decline in the association between

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[11]For greater comparability with other studies of intergenerational educational mobility, we provide estimates for both sons and daughters aged 20 to 65 as well as for those aged 20 to 35 and 50 to 65 in section 3 of the Online Appendix.

fathers' and sons' education is less pronounced (column 5). This is probably a result of policy changes in the 1980s that aimed to lessen pressure on the public sector by limiting access to universities. Because of high fertility rates, however, the number of university graduates with a father who has either no education or primary/preparatory education increased by 181% from the old to the young cohort.

3.3 Declining Social Mobility Among the Educated

While the share of educated individuals in the workforce increased substantially across the two cohorts, the share of professional occupations remained essentially constant at 27 to 28% (Appendix Table A1). Figure 1 shows the increased scarcity of professional occupations. Among university graduates, 80% of the old cohort obtained a professional occupation by the age of 28 compared to 70% of the young cohort. For secondary school graduates and above, the comparable figures are 59% and 41%. Similarly, of all wage work, the share of formal jobs, and particularly public sector jobs, declined. Among university graduates, 80% of the old cohort were working in the public sector compared to only 57% of the young cohort. The fact that the decline in public sector employment was stronger than the overall decline in formal employment means that formal employment became increasingly concentrated in the private sector.

Figure S2 of the Online Appendix plots the educational distribution of workers across occupations for each cohort. While the average level of schooling increased within each occupational category, there was a large increase in the share of men with a secondary degree who appear to have been "stuck" in semi-/unskilled manual work. Based on the available ISCO codes in the survey, the most common occupations in this group were taxi driver and security guard (see Table S1, Online Appendix). In fact, secondary school graduates were by far the largest educational group among all semi-/unskilled workers. While relatively few university graduates held a manual occupation, their share increased across cohorts as did their share among white-collar occupations.

Overall, the descriptive analysis suggests that changes in the Egyptian labor market affected not only the school-to-work transition of educated youth, but had a permanent negative effect on their occupational outcomes.
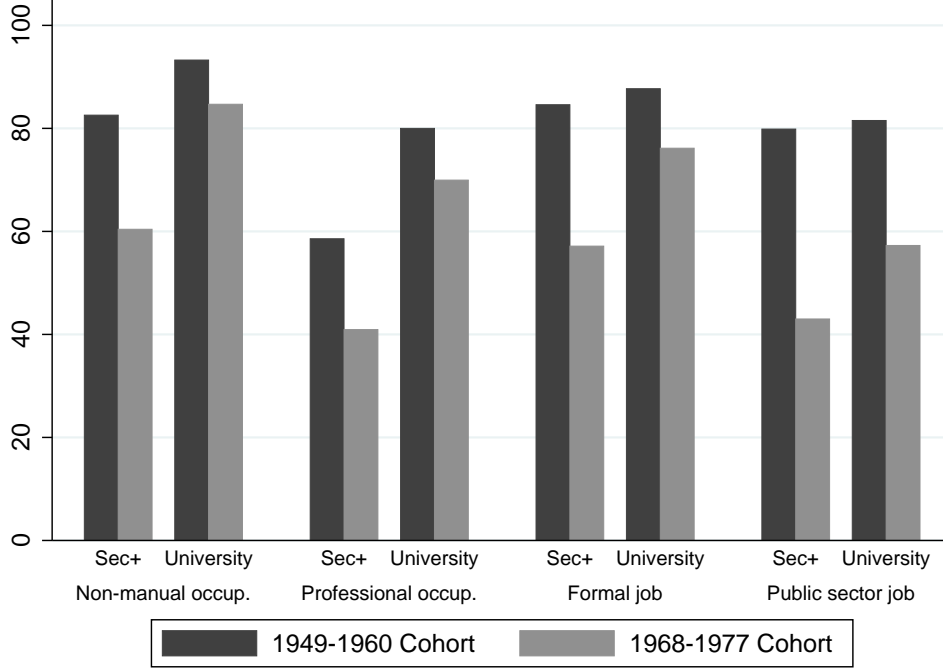
Figure 1: Changes in the Availability of Jobs Across Cohorts.

Notes: Figure 1 shows separately, for the old and the young cohort, the percentage of men with (i) secondary degrees and above ("Secondary+") and (ii) post-secondary (university) degrees ("University"), who had obtained a professional occupation/formal sector job/public sector job by the age of 28. Source: ELMPS06.

3.3.1 Main Results

We next examine whether the decline in job prospects was felt unequally by men from a low socioeconomic background. To do so, we estimate the following linear probability model for the sample of post-secondary (university) graduates of the old and young cohort:

$$Y_i \;=\; \alpha_0 \;+\; \alpha_1 Fa_i^{Prof} \;+\; \alpha_2 Fa_i^{Prof} \;\times\; Young_i \;+\; \alpha_3 Young_i \;+\; \alpha_4 Urban_i \;+\; \nu_i \quad (1)$$

where Y_i is a binary variable equal to 1 if the graduate attained a professional occupation by the age of 28 and zero otherwise. For wage workers, we additionally examine the likelihood of holding a formal job and a public sector job by the age of 28. Fa_i^{Prof} is a binary variable indicating whether the graduate's father worked as a professional, Yng is a binary variable indicating whether the graduate belongs to the young cohort (i.e. born between 1968 and 1977), $Fa_i^{Prof} \times Young_i$ is the interaction between these two variables, and $Urban$ is a binary

Table 2: Relationship Between Father's and Son's Occupational Status.

	professional occupation (1)	formal sector job (2)	public sector job (3)	professional occupation (4)	formal sector job (5)	public sector job (6)
	Dependent variable: son's probability of obtaining a					
	A. Subsample of university graduates:			B. Subsample of secondary school graduates and above:		
Father: professional	−0.004	−0.065	0.025	0.147***	−0.055	0.003
	(0.049)	(0.050)	(0.051)	(0.044)	(0.040)	(0.041)
Father: professional	0.190***	0.239***	−0.017	0.131**	0.241***	0.052
× young cohort	(0.062)	(0.061)	(0.070)	(0.053)	(0.053)	(0.055)
Young cohort	−0.179***	−0.207***	−0.249***	−0.201***	−0.334***	−0.387***
	(0.042)	(0.038)	(0.043)	(0.031)	(0.028)	(0.029)
R^2	0.0387	0.0532	0.0833	0.0873	0.108	0.126
N (not weighted)	999	868	868	2,183	1,775	1,775

* p<0.10, ** p<0.05, *** p<0.01.

Notes: OLS coefficient estimates are reported with robust standard errors clustered at the household level in parentheses. The analysis is restricted to men (sons) born between the years 1949 and 1960 (old cohort) and the years 1968 and 1977 (young cohort), and in columns (2), (3), (5), and (6) additionally to wage workers. The son's occupation/job refers to the occupation/job he had obtained by the age of 28. All specifications include a dummy for sons born in an urban area and a constant.

variable indicating whether the graduate was born in an urban area.[12] Thus, α_1 measures the association between fathers' and sons' occupational status for the old cohort and can be interpreted as a measure of intergenerational occupational immobility. Our main coefficient of interest is α_2, which measures how this association changes across cohorts.

The results are presented in Panel A of Table 2. For the old cohort, we do not observe any disadvantage for university graduates from low socioeconomic backgrounds in obtaining a professional occupation (column 1). That is, once they achieved a university degree, they had, on average, an equal chance of obtaining a professional occupation as those whose fathers were professionals. This was not true, however, for university graduates of the young

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[12]Note that the survey does not provide the age of fathers who are not living with their sons. Hence it is not possible to reweight the data using the father's age. However, this should not be a major concern. Firstly, when a son is 15, his father is typically 40 or older. As noted earlier, occupational mobility is low and usually occurs early in life, well before the age of 30. Secondly, we are not aware of changes in the timing of first marriage for men during the first half of the 20th century. Thirdly, while there is evidence of a significant delay of approximately three years in the median age at first marriage for men born 1940 to 1975 (see Online Appendix, section 1.3), even such a strong delay in marriage is unlikely to affect the father's occupational status when the son is aged 15 given low occupational mobility later in life. Changes in marriage patterns are, thus, unlikely to alter our results significantly.

cohort: those with professional fathers were 19 percentage points more likely to become a professional. Indeed, the large decline in job opportunities across cohorts—that is, an 18 percentage point decline in the likelihood of becoming a professional—was entirely concentrated among graduates from a lower socioeconomic class.

We next examine, for the subsample of wage workers, a graduate's likelihood of obtaining a formal sector job (column 2) and a public sector job (column 3). The results in column (2) are consistent with those in column (1): in the old cohort, graduates with and without professional fathers were equally likely to obtain a formal sector job. While the probability of obtaining such a job declined by 21 percentage points on average across cohorts, this decline was not experienced by graduates whose fathers had a professional occupation. In contrast, column (3) indicates that the subsample with professional fathers had no advantage in obtaining a public sector job in either the old or the young cohort. Hence, the decline in social mobility was associated with the allocation of jobs in the formal private sector, not the public sector. This is consistent with individuals from low socioeconomic backgrounds lacking the required skills (e.g. English language skills) and/or personal connections to obtain a professional position in the private sector. One likely contributing factor to both sources of disadvantage is the introduction of the *infitah* (open-door) policy in 1973 by the Egyptian government, which encouraged private sector growth and particularly foreign direct investment.

While the dataset does not allow us to distinguish between the two sources of disadvantage (i.e. skills versus personal connections), it does provide information on the primary and secondary job search methods that individuals used to obtain their current primary job. Of university graduates from the old cohort working in the public sector, only 7% received help from their family or friends in obtaining their job compared to 32% of graduates working in the private sector (Figure 2). For the young cohort, the comparable figures are 13% and 41%. Given the shift in employment from the public to the private sector, social networks seem to have gained in importance in determining labor market outcomes.[13] Consequently, if personal or social connections are based on kinship ties, these figures suggest that the increase in economic persistence across educated cohorts may be related, at least in part, to the increased importance of personal connections in obtaining professional positions.

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[13]One caveat is that we have to rely on information on the *current* primary job for both cohorts. Also, few men in the old cohort work in the private sector.
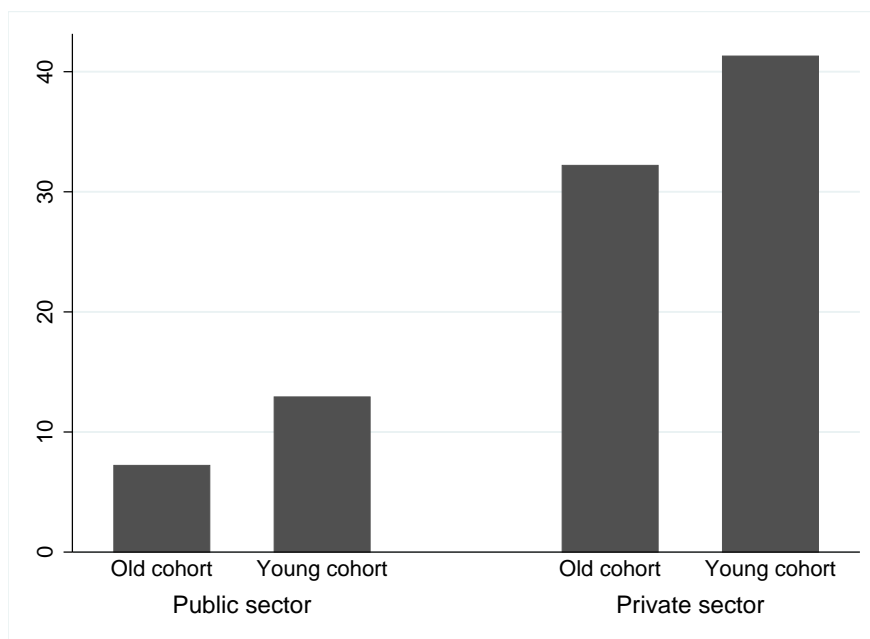
Figure 2: University Graduates of Both Cohorts who Found their Current Primary Job through Relatives or Friends

Notes: Figure 2 shows the percentage of post-secondary graduates who report receiving help from relatives or friends as their primary or secondary job search method in obtaining their current primary job. Results are differentiated according to whether the current job is in the public or private sector. Source: ELMPS06.

3.3.2 Alternative Specifications

Various robustness checks on our main results from Panel A of Table 2 are presented in the Online Appendix (Table S9). In this section, we do two things. Firstly, we present the results for the subsamples of secondary and post-secondary school graduates; so far, we have concentrated on university graduates. Secondly, we draw on the full sample of men of both cohorts, not just graduates, and estimate changes in the returns to education (in terms of occupational outcomes) across cohorts.

Panel B of Table 2 shows the social mobility results for the subsample of graduates with at least a secondary school education. Column (4) shows that even for the old cohort, a professionally employed father was associated with an increase in the likelihood that the son would assume a professional occupation (by 15 percentage points). Recall from Figure 1 that in the old cohort, only 59% of secondary school graduates and above worked as a professional by the age of 28. The association between fathers' and sons' occupational status

became even more pronounced in the young cohort (an additional increase of 13 percentage points in the likelihood). The results for formal and public sector employment in columns (5) and (6) confirm our earlier results for university graduates. Overall, the results suggest that as labor market conditions deteriorated in Egypt, jobs were rationed in favor of those from high socioeconomic backgrounds.

An alternative approach to studying changes in social mobility is to draw on the full sample of men from both cohorts, irrespective of their educational attainment, and to examine the returns to education in terms of occupational outcomes. That is, we regress the probability of a son obtaining a professional occupation (by age 28) on dummy variables for the highest educational degree, the young cohort dummy, a dummy variable for the father being a professional, and interaction terms between these variables. Appendix Table A2 shows the results, which confirm our main results in Panel A of Table 2. In particular, for university graduates, having a professionally employed father is associated with an increase in the likelihood of obtaining a professional occupation in the young cohort only (column 3).

3.3.3   Rising Income Inequality and Poverty

The decline in social mobility among the educated occurred in the context of rising income inequality and poverty. During the oil-price boom of the 1970s and trade liberalization (Sadat's open-door policy), private sector professionals benefited from lucrative jobs in the petroleum, banking, and construction industries. Wickham (2002, p. 52-3) estimates that entry-level positions for graduates in joint ventures and foreign firms paid twelve times more than those in local government administration and around four times more than those in elite government departments such as the Ministries of Justice, Finance, and Petroleum. The economic crisis of the 1980s also saw the reduction and removal of various subsidies on basic goods such as rice, sugar, cooking oil, fuel and transportation, and measures to cut the public sector wage bill. At the same time, the Egyptian government lowered wages to discourage graduates from applying to its guaranteed employment scheme. Assaad (1997) reports that although real government wages had been rising up to the year 1981, by 1986 they had fallen to almost 60% of their level in 1981. Similar figures are reported by Wickham (2002, p. 47). Government sector employees were forced to take second and even third typically manual jobs, such as working as an electrician or a taxi driver. Others tried to migrate temporarily to the Gulf countries, although this became increasingly difficult. Even though

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public schools did not charge tuition fees, there is ample evidence that private costs to education, in particular for private lessons, had been rising during the 1980s and 1990s. The costs for marriage also increased sharply. (For more details on these developments including references, see section 1 of the Online Appendix.) The fact that income inequality and poverty increased at the same time as social mobility among the educated declined is an important part of the narrative we develop in the following section.

4   A Theory of the Islamic Revival

We develop a model in which a temporary decline in social mobility can lead to a widespread and long-lasting rise in religious participation. Our main departure from standard models of religion is that religious participation is not only a form of leisure (or social interaction), but also performs a psychological function in adjusting to unfulfilled aspirations. In a dynamic extension, we show how this psychological function interacts with standard functions of religion including club goods production.

4.1   The Model

Consider a society composed of a continuum of agents I with typical member i. Agents are born into a class, choose their level of education and, subsequently, enter either the low class L or high class H (e.g. non-professional or professional class) with known wage rates w_L and w_H, respectively. We assume $w_H > w_L > 0$. Once an agent's class status is realized, he divides his time between work and religious activity.

The precise structure of the model is as follows:

Date 0. Each agent starts out in one of two classes, the low class L or the high class H. We denote individual i's initial class status by $b_i \in \{L, H\}$.

Date 1. Each agent chooses his level of education $e_i \in \{0, 1\}$ (e.g. no university or university education). For convenience, we refer to an individual as educated if $e_i = 1$ and uneducated otherwise (although $e_i = 0$ could represent a positive level of education). The marginal cost of education $e = 1$ for individual i is k_i, which is an independent draw from the distribution

G. We assume that G is strictly increasing on $\mathbb{R}$.[14]

Date 2. Agents are assigned to either the L or H class based on their education and initial class status. Agent i's final class status is denoted by $c_i \in \{L, H\}$. The set of agents assigned to class c is denoted by I_c.

The probability that agent i who begins in class b ends up in class H is $\theta_b e_i$.[15] The return to education for agents from class b, $\theta_b \in (0,1)$, is the realization of a random variable Θ_b with mean $\bar{\theta}_b$.[16] Agents know the distribution of Θ_b but only learn the realization θ_b after all decisions are made at date 3. The expected likelihood of agent i entering the H class is thus $\mu_i \equiv \bar{\theta}_{b_i} e_i$. In the Egyptian context, we are particularly concerned with θ_L, which we refer to as the degree of *social mobility* in the economy.

Date 3. After observing his class status and corresponding wage, each agent has one unit of time to divide between work and religious activity (e.g. prayer, communal worship, religious education, volunteer work). Following standard models in the economics of religion, we assume there exists a tradeoff between work and religious activity (e.g. Iannaccone 1992, Berman 2000). Evidence supporting this assumption can be found in Azzi & Ehrenberg (1975) and Iannaccone (1998). Labor supply is denoted by ℓ_i and religious activity by r_i. We assume that the price of religious activity is zero, so that agents spend their entire income on a composite consumption good. The price of this composite good is normalized to one. Final payoffs consisting of three components are then received.

Firstly, agents receive utility from consumption. We assume that consuming g units of the composite good yields utility of $\ln(g)$. Secondly, religion is, in part, a form of leisure in our model. An individual receives utility from religious participation r of $F(r)$, where $F'(r) > 0$ and $F''(r) < 0$ for all $r \in [0,1]$, $F'(r) \to \infty$ as $r \to 0$.

The third component of payoffs depends on a reference point. This is the main point of departure of our model. Each agent compares his income $y_i = w_{c_i} \ell_i$, which is also the number of units of the composite good that he consumes, to his reference point (or target income) Y_i. This is determined endogenously (in a manner specified below) as part of the

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[14]The cost can take on negative values, which implies that some individuals derive a benefit from education in and of itself. This assumption is largely for expositional convenience and the results hold for arbitrarily small values of $G(0)$.

[15]This is similar to the reduced-form representation of the labor market used by Piketty (1995).

[16]One would expect that $\bar{\theta}_H \geq \bar{\theta}_L$, but this assumption is not necessary here.

equilibrium distribution of income in society. In particular, a representative agent i faces the following *reference-dependent* loss function:

$$(1 - r_i)^\delta (Y_i - y_i)_+^\gamma, \tag{2}$$

where $\gamma > 1$, $\delta \geq 1$, $Y_i - y_i$ is the gap between target income and actual income, and $(Y_i - y_i)_+ \equiv \max\{Y_i - y_i, 0\}$ so that agents are only concerned with negative comparisons. (γ and δ are interpreted in section 4.2.) That is, an agent's reference-dependent utility is decreasing in the gap between his target income and actual income (when the gap is positive). However, the more an agent devotes himself to religious activity, the less he cares about falling short of his reference point, as the coefficient $(1 - r_i)^\delta$ is lower.

Religious activity thus produces religious values that deemphasize failure to exceed one's reference point and/or adjusts the reference point downward. This is what we mean by the *psychological function* of religion. This concept of religion as part of 'the psychological immune system' (Bénabou & Tirole 2002) has a long history[17] and is consistent with empirical evidence that religious beliefs and participation enhance self-esteem, life satisfaction and a person's ability to withstand traumatic experiences (e.g. Smith et al. 2003). For example, Dehejia et al. (2007) find that weekly religious attendance by African Americans fully offsets the impact of income declines on happiness.

Therefore, at date 3, a representative agent $i \in I_c$ solves the following problem:

$$\max_{(\ell, r, g)} U_{ic} = \max_{(\ell, r, g)} \ \ln(g) + F(r) - (1 - r)^\delta (Y_i - w_c \ell)_+^\gamma$$
$$s.t. \quad \ell + r \leq 1 \tag{3}$$
$$g \leq w_c \ell.$$

Substituting the goods and time budget constraints into the objective function reduces (3) to an unconstrained optimization problem with a single choice variable ℓ or, equivalently, $r = 1 - \ell$. We can then write the utility function as $U_{ic}(r)$ for agent $i \in I_c$.

We must now choose an appropriate reference point Y_i, to which an agent compares his outcome. We relate the reference point to an income/consumption aspiration level, which

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[17]Marx's claim that religion is "the opium of the people" is only its most famous statement. See, for example, James (1890/1974, p. 356-7) and Bainbridge (1997, p. 34).

depends, in turn, on an agent's expectations. Before learning the class to which he will finally be assigned, each agent i forms an expectation of his income. His strategy specifies a religious participation choice $r_c(e_i, b_i)$ for each class $c \in \{L, H\}$ as a function of his education and initial class status. His equilibrium income in class c will be $y_{ic} = w_c\big(1 - r_c(e_i, b_i)\big)$. Hence, i's expected income is $\mu_i y_{iH} + (1 - \mu_i) y_{iL}$. This implies that an agent who expects to have a higher likelihood of ending up in class H will have a higher aspiration level Y_i. In tying reference points to expectations, we follow work on endogenous reference points and disappointment aversion by Loomes & Sugden (1986), Kőszegi & Rabin (2006, 2007), and Gill & Stone (2010).[18],[19]

4.2 Equilibrium: Education, Aspirations and Religion

Our equilibrium concept draws on advances in behavioral economics and is introduced in two steps. The first part of the equilibrium involves (co-determined) religious participation choices and aspiration levels, based on the notion of personal equilibrium introduced by Kőszegi & Rabin (2006):

Definition 1. Fix a profile of education choices $\mathbf{e} \equiv (e_i)_{i \in I}$. A *personal equilibrium* [PE] consists of (1) an aspiration level Y_i and (2) a pair of religious participation choices $r_i = \big(r_L(e_i, b_i), r_H(e_i, b_i)\big)$ for each agent $i \in I$ such that:

(i) Treating Y_i as fixed, $r_c(e_i, b_i) \in argmax_{r \in [0,1]} \ U_{ic}(r)$ for each $c \in \{L, H\}$,

(ii) $Y_i = \mu_i y_{iH} + (1 - \mu_i) y_{iL}$,

(iii) $y_{iH} > y_{iL}$.

The first condition requires that for fixed aspiration levels $(Y_i)_{i \in I}$, religious participation choices maximize utility for each player. The second condition relates aspiration levels to

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[18]It will be clear that a formulation in which the reference point Y_i equals the income of the high class (an 'envy formulation') has essentially the same mathematical structure. See Bowles & Park (2005) for a similar formulation (with $\delta = 0$). The only difference is that religious participation here also depends on agents' expectations of upward social mobility, μ_i, and, hence, their level of education.

[19]Downward mobility may matter more explicitly in a different formulation of the model. Suppose the reference point of individuals who start out in the L class is a function of their realized rate of upward mobility minus the realized rate of downward mobility among H class members (one could call this the 'indignation formulation'). In this case, a decline in downward mobility could raise religiosity.

income/consumption expectations and requires expectations to be consistent with equilibrium play. The third condition restricts attention to (plausible) equilibria in which an agent earns more in the high-wage class than in the low-wage class.

The full equilibrium concept incorporates equilibrium education choices at date 1. An agent's education choice affects both his wage lottery and his reference point. Hence we employ the concept of choice-acclimating personal equilibrium introduced by Kőszegi & Rabin (2007).

To apply this to our setting, write an agent's date-1 expected payoff as a function of his education e, $U_i\big(\mu_i(e), r_i(e); Y_i(e)\big) = U_i(e)$.

Definition 2. A choice-acclimating personal equilibrium [CPE] of the economy consists of:

(i) For every $\mathbf{e}$, a PE characterized by a pair of religious participation choices $r_i(e_i) = \big(r_L(e_i, b_i), r_H(e_i, b_i)\big)$ for each $i \in I$,

(ii) Optimal education choices $\mathbf{e}^* \equiv (e_i^*)_{i \in I}$ at date 1, such that $U_i\big(e_i^*\big) \geq U_i\big(e_i\big)$ for each $e_i \in \{0, 1\}$ and all $i \in I$.

We state the following result:

Proposition 1 *There exists a choice-acclimating personal equilibrium [CPE]. In every CPE:*

(i) *An individual acquires education, $e_i^* = 1$, if and only if his cost of education k_i is less than a unique real-valued threshold $\overline{k}_b$, which depends on his initial class b.*

(ii) *Religious participation by individuals who end up in class H is independent of their education and initial class: $r_H(e, b) = r_H$ for all $(e, b) \in \{0, 1\} \times \{L, H\}$. Hence equilibrium H class income is $y_H = w_H(1 - r_H)$.*

(iii) *For uneducated individuals, religious participation is independent of their initial class. Specifically, $r_L(0, b) = r_H$ for $b = L, H$.*

(iv) *For educated individuals, religious participation is higher when they end up in class L, that is $r_L(1, b_i) > r_H$, if and only if:*

$$y_H - y_{iL} > \frac{\gamma}{\delta} \frac{y_{iL}}{\overline{\theta}_{b_i}}. \tag{4}$$

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The proof is in Appendix B.

If we treat an individual's cost of education as a product of his ability, Proposition 1(i) implies that it is high ability types who acquire education and who experience unfulfilled aspirations when ending up in the L class. As such, these individuals are distinct in terms of their religious participation [Proposition 1(ii)-(iv)].[20] Their experience of unfulfilled aspirations, however, does not imply that their religious participation is greater. For this to occur, (4) must be satisfied.

The reason is that educated individuals who fail to enter class H may attempt to realize their expectations by working harder and devoting less time, not more, to religious activity. Due to this living-up-to-expectations [LUE] effect, a concern for unfulfilled aspirations alone is not sufficient to explain a rise in religious participation. A psychological role for religion in coping with unfulfilled aspirations is required. To see this, note that δ measures the intensity of the coping effect: the rate at which religious activity generates religious values. The parameter γ measures the intensity of the countervailing LUE effect. As γ/δ goes to infinity, condition (4) becomes virtually impossible to satisfy.

For (4) to hold, income inequality—in particular the difference between the incomes of educated individuals in the H and L classes—must be high relative to the ratio of L class income y_{iL} to the likelihood of upward mobility $\bar{\theta}_{b_i}$. As an agent's expected likelihood of upward mobility $\bar{\theta}_{b_i}$ goes to zero, the level of inequality required to satisfy (4) becomes arbitrarily large. This has some intuitive appeal. While the medieval serf is at a great disadvantage relative to his lord, his sense of inequality may be less acute, because the serf cannot reasonably expect to become the lord. Thus, income inequality, expectations of upward mobility, and poverty are not separate but related factors determining the relationship between unfulfilled aspirations and religiosity.

4.3   Decline in Social Mobility and Religious Participation

We now turn to the relationship between social mobility and religious participation. The literature on relative deprivation posits a monotonic relationship between shocks to social mobility and the incidence of social movements including religious movements. We show that

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[20]Other agents either exceed their aspirations or have no aspirations of entering class H.

the relationship is more complex, depending on expected social mobility, income inequality, and absolute income levels.

Define $\Delta\theta_b \equiv \theta_b - \bar{\theta}_b$ as the gap between actual and expected mobility for members of initial class $b = L, H$. Consistent with our findings on Egyptian trends in social mobility, we examine the effect on religious participation of $\Delta\theta_L < 0$, which we refer to as a 'decline' in social mobility (although no prior stage has yet been modeled). Let R be *ex post* aggregate religious activity computed as follows:

$$R = \sum_{b \in \{L,H\}} m_b \left\{ G(\bar{k}_b)\big(\bar{\theta}_b + \Delta\theta_b\big)r_H + G(\bar{k}_b)\big(1 - \bar{\theta}_b - \Delta\theta_b\big)r_L(1,b) + \big(1 - G(\bar{k}_b)\big)r_L(0,b) \right\}. \quad (5)$$

where r_H and $r_L(e_i, b)$ are the equilibrium values from Proposition 1. Since these values depend on $\bar{\theta}_b$ only and not $\Delta\theta_b$, we have:

$$\frac{dR}{d\Delta\theta_L} = G(\bar{k}_L)\big[r_H - r_L(1, L)\big]. \quad (6)$$

Note that $G(\bar{k}_L) > 0$ because $\bar{k}_L$ is real-valued by Proposition 1(i), and G is strictly increasing on the real line. Hence, $dR/d\Delta\theta_L < 0$ if and only if $r_L(1, L) > r_H$. We established in Proposition 1(iii) that this is satisfied if and only if (4) holds for i, such that $(e_i, b_i) = (1, L)$. Hence, we have derived a simple necessary and sufficient condition under which an unexpected decline in social mobility leads to a rise in religious participation.

Proposition 2 *In every CPE, an unexpected decline in social mobility ($\Delta\theta_L < 0$) leads to an increase in aggregate religiosity R if and only if*

$$y_H - y_{iL} > \frac{\gamma}{\delta}\frac{y_{iL}}{\bar{\theta}_L}$$

for i such that $(e_i, b_i) = (1, L)$.

Therefore, a decline in social mobility produces a rise in religiosity, when it occurs in the context of high income inequality and high expected social mobility. These were the prevailing conditions in Egypt around the time of the Islamic revival, as established in section 3.

Income inequality was rising due to trade liberalization and public sector cuts and expected social mobility was high due to the government guaranteed employment scheme.

In addition, the rise in religiosity in our model is driven by talented, educated individuals from the L class. This too is consistent with the Egyptian experience, where the contemporary Islamic revival was led by individuals who had graduated from elite university faculties and originated from the lower socioeconomic classes (see section 2.2).

The Egyptian government substantially increased funding for education after 1952 prior to the decline in social mobility. We now investigate how educational policy may have amplified the religious response to declining social mobility. Subsidizing education can be modeled as a shift in the distribution of education costs, G. Consider two distributions G' and G'' with the original properties. We state the following result.

Proposition 3 *Suppose G'' dominates G' in the sense of first-order stochastic dominance. Whenever nonzero:*

$$\left| \frac{dR}{d\Delta\theta_L}(G'') \right| > \left| \frac{dR}{d\Delta\theta_L}(G') \right|.$$

The result follows immediately from (6). A downward shift in the cost of education increases the rate of education and thereby raises aspirations. A decline in social mobility implies that high aspirations among those from the L class are unfulfilled. Hence, subsidizing education amplifies the religious response one way or the other depending on expected social mobility and inequality. Taken together, Propositions 2 and 3 imply that if expected social mobility and inequality are high, then $\frac{dR}{d\Delta\theta_L}(G'') < \frac{dR}{d\Delta\theta_L}(G') < 0$. That is, government policy aimed at promoting education amplifies the rise in religiosity in response to a decline in social mobility.

Our analysis has implications beyond the Egyptian case suggesting that economic development, by raising aspirations, can make societies more prone to religious revivals. The findings also caution against imposing a simple linear relationship between religious participation and economic variables, such as shocks to social mobility and inequality, in future empirical work.

4.4   Club Goods and Propagation of Religious Revival

The psychological function of religion that we have introduced is distinct from standard conceptions of religion in the economics of religion literature. Club goods models of religion focus on the role of sacrifice in mitigating free-rider problems in collective production (Iannaccone 1992, Berman 2000). Religious capital models study how religious participation generates (personal) appreciation capital, which increases an individual's future religious participation (Iannaccone 1990).[21] We now embed our model of religion in a dynamic framework that encompasses both of these standard approaches. Beginning with equal returns to education across classes $\overline{\theta}_H = \overline{\theta}_L$, we examine the dynamic consequences of a decline in social mobility $\Delta\theta_L < 0$. In particular, we demonstrate how social multiplier effects can arise, as supply-side factors amplify the impact of a shock to religious demand.

For the dynamic model, we alter the function F, which represents the leisure utility from religious participation, to $F(r, K)$. This is a function of religious participation r and a variable that we shall call *religious capacity* K. K is a societal-level state variable and is thus the same for each agent. As before, we assume that $F_1(r, K) > 0$, $F_{11}(r, K) < 0$ and $F_1(r, K) \to \infty$ as $r \to 0$ for all K. Now let $F_{12}(r, K) > 0$, so that religious capacity increases equilibrium religious participation for all agents. In addition, assume that $F_2(r, K) > 0$ for all K and $F_{12}(r, K) \to 0$ as $K \to \infty$.

Religious capacity will be determined endogenously by the following dynamic process. Time is discrete and denoted by $t = 0, 1, 2, \ldots$ We can conceive of a birth-death chain in which each period, with positive probability, an agent dies leaving one offspring who begins with his parent's class status. Let K_t be religious capacity at time t and K_0 be an arbitrary initial capacity. The law of motion for capacity is:

$$K_{t+1} = (1 - d)K_t + S(R_t), \tag{7}$$

where $d \in (0, 1)$ is a depreciation rate, S is a strictly increasing function with $S(R_t) > 0$ and R_t is aggregate religious participation in period t. Current religious participation thus affects future participation via increased religious capacity. Hence we can interpret religious capacity as both the capacity of religious organizations (for example, to deliver social services) and

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[21]See Bisin & Verdier (2000) on the intergenerational transmission of preferences and McBride (2015) for a club goods model with religious capital formation.

$$K_{t+1} \quad 45° \quad K_{t+1}$$

$$K_t$$

$$K^* \quad K^{**} \quad K^{***}$$

(a) Low religiosity

$$K_{t+1} \quad 45° \quad K_{t+1}$$

$$K_t$$

$$K^* \quad K^{**} \quad K^{***}$$
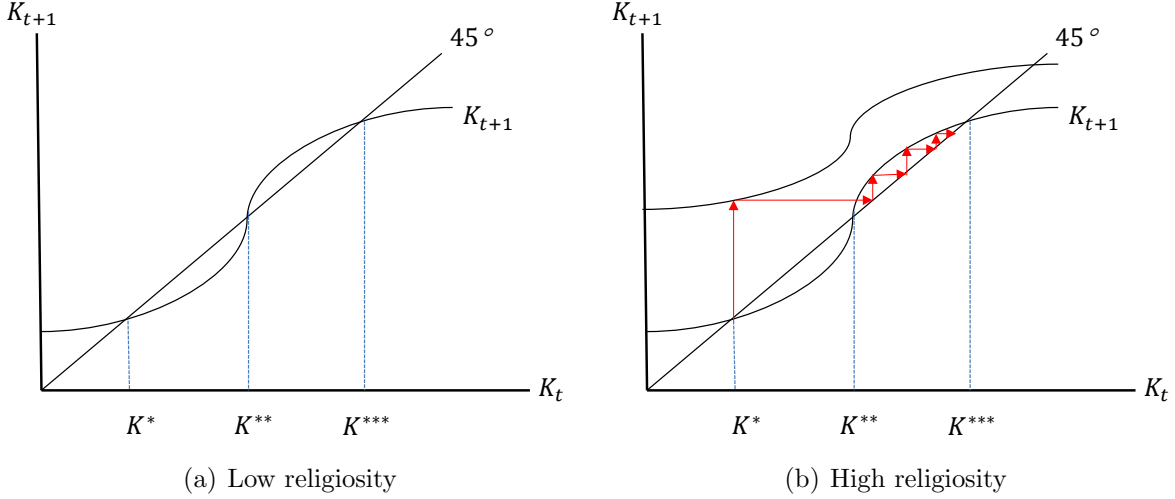
(b) High religiosity

Figure 3: (a) Multiple steady-state levels of religious capacity. (b) A temporary shock to social mobility induces a large, permanent increase in religious participation/capacity.

a form of religious capital that is socially produced. In this way, our dynamic extension integrates features of a club goods and religious capital model and explores how they interact with reference-dependent preferences.

Because agents are non-atomic, they cannot individually affect R_t and hence the evolution of K. Therefore, although they may be long lived, agents face the same problem as in (3) in choosing religious participation, so that R_t is still given by (5). Consequently, there is a severe free-rider problem in building religious capacity to deliver social services and other public/club goods.

Figure 3 depicts the dynamics of religious capacity. A steady state occurs where $S(R_t) = dK_t$. R_t is strictly increasing in K_t because $F_{12}(r, K_t) > 0$. In addition, R_t is greater than zero when $K_t = 0$ because $F_1(r, 0) > 0$ and R_t approaches some limit $\overline{R} > 0$ as $K_t \to \infty$ because $F_{12}(r, K) \to 0$ as $K \to \infty$. Depending on the function S, there could be multiple steady states. From any initial state K_0, the process converges to a steady state with probability one. The social multiplier effects that can be produced by multiple steady states will be the focus of our remaining analysis. There are precisely three steady states in the example in Figure 3(a): K^* and K^{***} are asymptotically stable while K^{**} is not.

We have shown that if expected social mobility and inequality are sufficiently high, an

unexpected decline in social mobility increases total religious participation (Proposition 2). This amounts to an upward shift of the R_t function. Figure 3(b) depicts a case in which this eliminates the low capacity steady states. As social mobility returns to its expected level in the next period, the R_t function shifts back, reintroducing the low capacity steady states. Nevertheless, the arrows in Figure 3(b) indicate that even this one-period decline in social mobility could shock the economy out of the lowest capacity steady state K^* into the basin of attraction of the highest steady state K^{***}. In other words, a temporary shock to social mobility could lead to a large and permanent rise in religious participation and capacity. In this way, the psychological function of religion can help to attenuate the free-rider problem in the provision of religious capacity.

The religious revival depicted in Figure 3(b) has a particular life cycle. During the period of the shock, the increase in religious participation is driven mainly by talented and educated individuals (Propositions 1(i) and 2). As religious capacity builds and social mobility readjusts to its original level, the psychological role for religion declines and other motivations take over. The religious revival thus becomes a widespread phenomenon affecting religious participation among the H class and less educated segments of the L class.

5   Conclusion and Discussion

This paper links the Islamic revival in Egypt to an unexpected decline in social mobility. We make two main contributions to the existing literature. Firstly, we use nationally representative household survey data to present the first microeconomic evidence of a decline in social mobility among educated Egyptian youth, which we link to a contraction in public sector employment. Secondly, we develop a formal model of religion that considers the psychological functions of religion. Modeling unfulfilled aspirations as deviations from endogenous (expectations-based) reference points, we derive a simple necessary and sufficient condition under which an unexpected decline in social mobility produces a rise in religious participation. We then show how a (one-time) decline in social mobility can cause a widespread and long-lasting religious revival led by the educated middle class.

Our analysis raises two questions that we discuss briefly below and that we believe should be the subject of future work: (1) Why was Islamic belief and participation the main response to economic shocks in Egypt during this period, and not other belief systems and forms of

collective participation? (2) Apart from Egypt, do religious revivals in other parts of the Middle East and elsewhere have similar economic origins?

5.1 Why Islam?

Why not socialism, for example? We suggest two reasons. Firstly, religious elites in Egypt have for centuries held a near monopoly over social expression and organization (see Chaney 2013). Hence, the mosque was the traditional focal point for social interaction and Islam the common basis of reference in shaping beliefs. Secular modes of expression and organization, including science (e.g. Chaney 2011), were easily repressed by political and religious elites (Rubin 2011). Islamic organizations were less repressed, because government agencies could not interfere too egregiously in the sacred sphere of the mosque and because close-knit, informal networks of independent mosques, and Islamic business and social organizations were already well established.

Secondly, Islam's egalitarian emphasis provides a natural means of coping with unfulfilled aspirations (see section 2.2). Michalopoulos et al. (2012) present evidence that Islam is a fundamentally egalitarian moral system that emerged and spread to manage severe economic inequalities. More recently, economic stagnation has shielded Islamic organizations such as the Muslim Brotherhood from the usual brain-drain and free-rider problems that afflict egalitarian groups (Abramitzky 2011).

5.2 General Applicability

Our discussion in this paper is confined to Egypt, but the analysis may have broader implications. Many Middle Eastern countries shared Egypt's economic experience. An expansion of education and public sector employment were part of state-led modernization efforts, which date back to concerns over the decline of the Ottoman empire. Campante & Chor (2012) find that from 1980 to 2010, increases in schooling in Middle Eastern countries were among the highest in the world. At the same time, many governments in the region felt responsible for unemployed individuals with intermediate or higher education (e.g. Salehi-Isfahani 2007).[22]

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[22]Part of the patron-client relationship, or "social contract," between the state and its citizens was for the state to provide jobs and welfare benefits (including a wide range of subsidies) in return for political support. As a consequence, the public sector was, and still is, large in many Middle Eastern countries while

The government's role as an employer of last resort had to be scaled back in many Middle Eastern and North African countries in the 1980s due to negative real GDP and total factor productivity growth (Richards & Waterbury 2008, Pissarides & Veganzones-Varoudakis 2007). Combined with the highest rate of labor force growth in the world (World Bank 2004, p. 56-57), this sharply raised youth unemployment levels, particularly among the educated (e.g. Assaad 1997, Richards & Waterbury 2008, Campante & Chor 2012).

Despite this shared economic experience, the Islamic revival is a complex phenomenon and we do not suggest that the combination of raised aspirations and a decline in social mobility is the only driving force, even in Egypt. Alternative explanations that link religiosity to economic conditions in Muslim countries treat religious participation as a form of *ex post* social insurance (Chen 2010) or political opposition (e.g. Ayubi 1991). Our behavioral theory is complementary, explaining how religious groups are better able to overcome free-rider problems in collective action and why educated youth from the lower socioeconomic classes were in the vanguard of the Islamic revival.

It would be interesting to study other examples of religious revivals amid deteriorating economic conditions to ascertain whether the mechanisms analyzed in this paper are at play. Fogel (2000) describes the history of four great Christian awakenings in the United States. The most recent example, during the 1980s and 1990s, occurred amid a background of declining social mobility and rising income inequality. In addition, Latin America—once uniformly Catholic—experienced "an explosion of conservative evangelical religion, a shift toward Pentecostalism, a rejection of ecumenism" (Martin 1990, p. 54) coinciding with a reversal in economic growth in the region. We hope future research will test the behavioral theory of religion developed in this paper in these and other settings.

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the private sector remains highly regulated (World Bank 2004, Richards & Waterbury 2008).

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Appendix

A Summary Statistics and Further Empirical Results

Table A1: Summary Statistics.

	Old cohort (Men Born 1949-60)			Young cohort (Men Born 1968-77)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Years of schooling	1,858	6.62	6.48	2,633	9.78	5.72
No degree	1,858	0.44	0.50	2,633	0.20	0.40
Primary/preparatory degree	1,858	0.17	0.37	2,633	0.17	0.37
Secondary degree	1,858	0.19	0.39	2,633	0.35	0.48
Post-secondary degree	1,858	0.20	0.40	2,633	0.28	0.45
Father: years of schooling	1,860	1.66	4.05	2,648	2.70	5.07
Father: No degree	1,860	0.84	0.37	2,648	0.75	0.43
Father: Primary/preparatory degree	1,860	0.09	0.28	2,648	0.11	0.32
Father: Secondary degree	1,860	0.04	0.20	2,648	0.07	0.26
Father: Post-secondary degree	1,860	0.04	0.19	2,648	0.07	0.25
Farmers	1,624	0.26	0.44	2,386	0.18	0.38
Semi-/Unskilled manual	1,624	0.13	0.34	2,386	0.15	0.36
Skilled manual	1,624	0.17	0.38	2,386	0.23	0.42
White collar	1,624	0.17	0.37	2,386	0.16	0.37
Professional	1,624	0.27	0.44	2,386	0.28	0.45
Wage workers: formal sector job	1,167	0.60	0.49	1,750	0.45	0.50
Wage workers: public sector job	1,167	0.57	0.49	1,750	0.34	0.47
Father: farmers	1,849	0.47	0.50	2,571	0.35	0.48
Father: semi-/unskilled manual	1,849	0.12	0.32	2,571	0.15	0.36
Father: skilled manual	1,849	0.11	0.31	2,571	0.13	0.34
Father: white collar	1,849	0.12	0.32	2,571	0.16	0.37
Father: professional	1,849	0.19	0.39	2,571	0.21	0.41
Urban residence	1,860	0.47	0.50	2,650	0.46	0.50
Urban residence at birth	1,860	0.44	0.50	2,645	0.45	0.50

Notes: An individual's years of schooling is based on the highest educational degree obtained. Employment-related information refers to the occupation at age 28. For wage workers, information is available on whether the job is "formal", i.e. it entails both a work contract and social insurance, and whether it is based in the public sector. Based on the ELMPS06 (weighted).

Table A2: Changes in the Occupational Returns to Schooling over Time.

	Dependent variable: son's probability of obtaining a professional occupation		
	(1) Father: non-professional	(2) Father: professional	(3) Full sample
Primary/preparatory degree[1]	0.013	−0.049	0.002
	(0.020)	(0.093)	(0.020)
Secondary degree[1]	0.269***	0.228**	0.266***
	(0.033)	(0.092)	(0.034)
Post-secondary degree[1]	0.752***	0.502***	0.749***
	(0.033)	(0.073)	(0.030)
Young cohort	−0.011	−0.145*	−0.024*
	(0.012)	(0.080)	(0.014)
Primary/preparatory degree	−0.013	0.189	−0.001
× young cohort	(0.024)	(0.131)	(0.024)
Secondary degree	−0.153***	−0.046	−0.141***
× young cohort	(0.037)	(0.112)	(0.038)
Post-secondary degree	−0.164***	0.160*	−0.152***
× young cohort	(0.044)	(0.091)	(0.044)
Father: professional			0.184***
			(0.043)
Primary/preparatory degree			−0.011
× Father: professional			(0.083)
Secondary degree			0.005
× Father: professional			(0.085)
Post-secondary degree			−0.206***
× Father: professional			(0.064)
Primary/preparatory degree			0.064
× Father: professional × young cohort			(0.106)
Secondary degree			−0.022
× Father: professional × young cohort			(0.086)
Post-secondary degree			0.193***
× Father: professional × young cohort			(0.062)
R^2	0.370	0.260	0.401
N (not weighted)	3,155	852	4,007

* $p<0.10$, ** $p<0.05$, *** $p<0.01$. [1] reference category: no educational degree.
Notes: OLS coefficient estimates are reported with robust standard errors clustered at the household level in parentheses. The analysis is restricted to men (sons) born between the years 1949 and 1960 (old cohort) and the years 1968 and 1977 (young cohort). Son's occupation refers to the occupation he had obtained by the age of 28. All specifications include a dummy for sons born in an urban area and a constant.

B   Proof of Proposition 1

Let us first characterize the PE religious participation choices at date 3 for a given education level. Suppose for the moment that $y_{iH} > y_{iL}$ for all $i \in I$. Then $Y_i - y_{iH} \leq 0$, so that $(Y_i - y_{iH})_+ = 0$. Substituting into (3), the first-order condition when $i \in I_H$ is

$$\frac{1}{(1 - r_H)} = F'(r_H), \tag{8}$$

where we have written $r_H(e_i, b_i) = r_H$ because all $i \in I_H$ face the same first-order condition. Under the assumptions on F, this yields a unique interior solution, which satisfies the second order-condition for a maximum. This establishes part (ii) of the proposition.

Notice that r_H is independent of the choices of L class members. Define r^* as the solution to $y_H = w_L(1 - r^*)$. Note that $r^* < r_H$ because $w_H > w_L$. In the proposed equilibrium $y_H > y_{iL}$ for all $i \in I$. Hence $r_L(e_i, b_i) > r^*$ for all $(e_i, b_i) \in \{0, 1\} \times \{L, H\}$.

For the moment, write $r_L(e_i, b_i)$ as r_{iL}. For $i \in I_L$, hold Y_i constant and differentiate (3) with respect to r_i on $\big[\max\{0, r^*\}, 1\big]$ to get the first-order condition:

$$\frac{1}{(1 - r_{iL})} - \delta(1 - r_{iL})^{\delta-1}(Y_i - y_{iL})^{\gamma} + \gamma w_L(1 - r_{iL})^{\delta}(Y_i - y_{iL})^{\gamma-1} = F'(r_{iL}). \tag{9}$$

In equilibrium, $Y_i = \mu_i y_H + (1 - \mu_i) y_{iL}$. Substituting this into (9), we have the equilibrium condition:

$$\frac{1}{(1 - r_{iL})} - \delta(1 - r_{iL})^{\delta-1}[\mu_i(y_H - y_{iL})]^{\gamma} + \gamma w_L(1 - r_{iL})^{\delta}[\mu_i(y_H - y_{iL})]^{\gamma-1} = F'(r_{iL}). \tag{10}$$

By assumption, the RHS of (10) decreases monotonically from $F'(\max\{0, r^*\})$ to some positive real number as r_{iL} goes through $\big[\max\{0, r^*\}, 1\big]$. As $\delta \geq 1$, the LHS of (10) goes from $1/(1 - \max\{0, r^*\})$ to ∞ as r_{iL} goes through $\big[\max\{0, r^*\}, 1\big]$. Both functions are continuous. Suppose $r^* < 0$. Then $F'(\max\{0, r^*\}) = \infty$. Alternatively, if $r^* \geq 0$, $F'(\max\{0, r^*\}) = F'(r^*)$. This is greater than $1/(1 - r^*)$, because $r^* < r_H$ and r_H solves (8). Taken together, this implies that there exists at least one solution r_{iL} to (10) and $r_{iL} \in (\max\{0, r^*\}, 1)$ for all i in every equilibrium. In addition, because $r_{iL} > r^*$, $y_H > y_{iL}$ for all i as conjectured.

Hence for each $\mathbf{e} \equiv (e_i)_{i \in I}$, there exists at least one PE. For each $\mathbf{e}$, fix a PE. We shall now show that there exists a unique optimal education choice for each agent at date 1.

Following education choice e, equilibrium continuation payoffs for agent i if he ends up in the H

class and L class are respectively:

$$
\begin{aligned}
V_H &= \ln\big(w_H[1 - r_H]\big) + F(r_H), \\
V_L(e, b_i) &= \ln\big(w_L[1 - r_L(e, b_i)]\big) + F(r_L(e, b_i)) \\
&\quad - (1 - r_L(e, b_i))^\delta (\bar\theta_{b_i} e)^\gamma \big[y_H - w_L(1 - r_L(e, b_i))\big]^\gamma.
\end{aligned}
\tag{11}
$$

We can then write i's date-1 expected utility, from choosing $e \in \{0, 1\}$, as

$$
U_i(e) = \bar\theta_{b_i} e V_H + (1 - \bar\theta_{b_i} e) V_L(e, b_i) - e k_i.
\tag{12}
$$

Suppose i's initial class is b. Education is strictly preferred if and only if

$$
\underbrace{\bar\theta_b[V_H - V_L(1, b)] + [V_L(1, b) - V_L(0, b)]}_{\bar k_b} > k_i.
\tag{13}
$$

The LHS of (13) is finite and independent of k_i. Hence there exists a unique real-valued threshold $\bar k_b$ such that $e_i^* = 1$ if and only if $k_i < \bar k_b$. This establishes existence of a CPE as well as part (i).

To establish part (iii), recognize that when $e_i = 0$, $\mu_i = 0$. In this case, (8) is the same as (10) for $b_i = L, H$. Hence these equations must have the same (unique) solution: $r(0, b_i) = r_H$.

To establish part (iv), write the first-order condition (10) for $(e_i, c_i) = (1, L)$ in a PE as

$$
\frac{1}{1 - r_{iL}} + B(r_{iL}) = F'(r_{iL}),
\tag{14}
$$

where

$$
B(r_{iL}) = w_L \gamma (1 - r_{iL})^\delta \bar\theta_{b_i}^{\gamma - 1} \big(y_H - w_L(1 - r_{iL})\big)^{\gamma - 1} - \delta(1 - r_{iL})^{\delta - 1} \bar\theta_{b_i}^\gamma \big(y_H - w_L(1 - r_{iL})\big)^\gamma.
$$

Comparing this to (8), $r_{iL} > r_H$ if and only if $B(r_{iL}) < 0$, which in turn occurs if and only if

$$
w_L \gamma (1 - r_{iL}) - \delta \bar\theta_{b_i} \big(y_H - w_L(1 - r_{iL})\big) < 0,
\tag{15}
$$

which implies that

$$
y_H - y_{iL} > \frac{\gamma}{\delta} \frac{y_{iL}}{\bar\theta_{b_i}}.
\tag{16}
$$

$\square$