

Education, Social Mobility and Religious Movements: A Theory of the Islamic Revival in Egypt*

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Abstract

Muslim societies have been reshaped in recent decades by an Islamic revival. This paper sets forth a theory of the Islamic revival in Egypt—the epicenter of the movement in the Arab world. We begin by documenting a contemporaneous decline in social mobility among educated youth, caused by a contraction in public sector employment. We then show how an unexpected decline in social mobility combined with inequality can produce a religious revival, led by the educated middle class, not the poor and illiterate. The principal idea is that religion is a coping mechanism for unfulfilled aspiration, which occurs when consumption falls below an expectations-based reference point. Religious participation by educated youth builds organizational capacity and can produce dynamic multiplier effects which lead to a popular and long-lasting religious movement. By raising aspirations, economic development may make societies more not less 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;

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1 Introduction

In the last few decades, Egypt has undergone a cultural transformation, a rise in religious participation and identification that has been mirrored across Muslim societies. This Islamic revival reversed previous trends toward secularization in Muslim societies and runs counter to the secularization thesis that once held sway among social scientists.¹ Beliefs and institutions which 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.² 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). Among other things, Islamic groups have formed government or gained substantial political power in Iran, Turkey, Pakistan, Egypt, Tunisia, Malaysia, Lebanon, Jordan and the Sudan.³

This paper develops a theory of the Islamic revival in Egypt. There is good reason to focus 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 Syria, Jordan (Islamic Action Front), Lebanon (*Jamaa Islamiya*), Algeria (Movement for the Society of Peace), Tunisia (*al-Nahda*), the Palestinian territories (Hamas) and Yemen (*al-Islah*). Parliamentary elections held a year after the revolution revealed the scale of support for Islamic political parties—the Muslim Brotherhood Freedom and Justice Party and the Salafist Al-Nour party attracted 47% and 28% of the vote, respectively. Results from the World Values Survey suggest that Egypt is one of the most religious nations in the world: 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).⁴

¹The extent of secularization in Muslim societies in the 19th century and first half of the 20th century is not entirely clear. There were certainly political moves toward secularization in countries such as Turkey, Iran, Egypt and Syria. Albert Hourani claims that by the 1930s Islam was more an inherited culture than a source of practical guidance for a large part of the educated elite in Muslim societies; among them prayers and fasting were less frequently observed, and the consumption of alcohol was rising (Hourani 2005, p.345-6).

²Voltaire, Jefferson, Marx, Comte, Muller, Spencer, Durkheim, Weber and Freud all espoused some version of this secularization thesis. See Stark (1999) and Norris & Inglehart (2004).

³There are a number of studies which document an increase in religious belief and participation in Muslim societies. See for example Mutlu (1996) on Turkey and Shadid (1988) on the Palestinian territories.

⁴The results are based on the Muslim subsample (94% of respondents). In the World Values Survey of 2008, slightly fewer Muslims (92.4%) describe themselves as a religious person. In both waves, more than 95% of Muslims state that religion is “very important” to them (on a four-point Likert scale).

In this paper, we explore the economic origins of the Islamic revival in Egypt. The argument proceeds in three steps. Firstly, we point to existing evidence that an Islamic revival began to unfold in the mid-1980s and that the educated middle class were in the vanguard of this movement. While there was a rise in militant activity in the 1970s, culminating in the assassination of President Sadat in 1981, it was only later in the 1980s that a broad-based revival started to gain momentum.⁵ Our focus in this paper is on the broader rise in Islamic piety and organizations.

Secondly, we conduct an empirical analysis of trends in Egyptian educational and social mobility drawing on nationally-representative household survey data. In the early 1960s, the Egyptian government introduced a scheme guaranteeing employment to those with intermediate or higher education who were unable to find a job. This “last resort” option encouraged household investment in education, given high pay and non-wage benefits in the public sector, leading to a rapid expansion of public sector employment (Assaad 1997, 2007, Salehi-Isfahani 2007). It also raised aspirations of upward social mobility among those from the lower social strata (e.g. Amin 1995, Wickham 2002).⁶ The scheme became increasingly untenable in the 1980s, leading to its gradual suspension and a contraction in public sector employment (Assaad 2007). Our empirical analysis compares the occupational outcomes of secondary school and university graduates born in the 1950s (i.e. 1949-1960, “old cohort”) to outcomes of graduates born in the late 1960s and 1970s (i.e. 1968-1977, “young cohort”). For university graduates, the likelihood of obtaining a professional occupation (formal job) by age 28 declined by 18 (21) percentage points. There was no such decline for graduates whose fathers had a professional occupation. That is, social mobility among the educated started to decline around the same time as Egypt began to experience an Islamic revival.

Still it is not obvious how a decline in social mobility could give rise to a religious revival. To understand this we need to go beyond the leading club-goods theories of religion (Iannaccone 1992, Berman 2000) to analyze the formation of religious beliefs and preferences (see Bisin & Verdier 2000, Iannaccone et al. 2011).⁷ The third step of our argument is to develop

⁵On the relationship between education, poverty and militancy, see Krueger & Maleckova (2003).

⁶That aspirations may affect educational choices and adult life outcomes has been recently documented empirically by Glewwe et al. (2013) who examine the impact of international child sponsorship programs (see also Wydick et al. 2013).

⁷Seminal work by Iannaccone (1990, 1992) demonstrates that puzzling forms of religious behavior, including bizarre prohibitions and stigmatizing behavior, can be rationalized without resort to psychological explanations. This is not to say that psychological and cultural factors are irrelevant to religious behavior.

a theory of religious participation that makes use of advances in behavioral economics in analyzing *reference-dependent preferences* (Bell 1985, Loomes & Sugden 1986, Kőszegi & Rabin 2007). It is by now well documented that people are loss-averse, evaluating gains and losses relative to a reference point (e.g. Kahneman & Tversky 1979). One’s reference point can in turn be endogenously determined by expected outcomes (Kőszegi & Rabin 2006). The idea introduced in this paper is that people may 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.⁸ If that occurs, religious participation gains appeal as a coping mechanism. Rather than undermining religion, widespread education and economic development can make societies more prone to religious revivals, by raising aspirations.

The argument that Egypt’s Islamic revival has been fueled by relative deprivation, viz. feelings of envy, indignation and unfulfilled aspirations, especially 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. Firstly, we are the first to present systematic evidence of a decline in social mobility among educated youth in Egypt during this time period. Prior work has relied upon anecdotal and suggestive evidence. Secondly, we are the first to develop a formal model of religious movements based on unfulfilled aspirations. This leads to a richer picture of religious dynamics. One new insight is that an increase in unfulfilled aspirations does not necessarily lead to a rise in religious participation. Instead, individuals may work harder to meet their reference point, spending less time on religion. We call this the living-up-to-expectations (*LUE*) effect. There exists a simple necessary and sufficient condition under which the coping effect of religion dominates. It turns out that inequality, social mobility and poverty cannot be viewed in isolation, but are jointly linked to religious participation. Finally, we show how standard motivations for religious participation (e.g. social service provision) can interact with psychological motivations to produce a large and long-lasting rise in religiosity in response to a small and temporary

Indeed, Iannaccone (1998) suggests that “religion would seem to be the ideal testing ground for models of value change and belief formation” [p. 1491].

⁸See also Ray (2006) on the relationship between aspirations and poverty and Genicot & Ray (2012) on the evolution of inequality. To the best of our knowledge, we are the first to model the relationship between religion and aspirations.

shock to social mobility. During the period of the shock, the rise in religious participation is driven mainly by educated and talented individuals. This can 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 for religion declines and other motivations take over, producing a broad-based religious revival.

There has been a recent flowering of research on the political economy of Islam and Muslim societies led by Kuran (2004*b,a,c*, 2010). Much of this work has focussed on how the economic development of the Middle East has been shaped by Islamic institutions (Platteau 2008, Kuran 2010, Rubin 2011, Blaydes & Chaney 2013, Chaney forthcoming, Meyersson forthcoming). 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 Qur'an study and Islamic school attendance in Indonesia following the 1997-98 financial crisis. Using variation in relative prices induced by the financial crisis, Chen finds that religious participation smooths household consumption and thus serves as a form of communal 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 shall 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) analyzes how a widespread rise in religiosity, combined with increased economic opportunities for women, can lead to an increase in religious identification among educated, urban women.⁹

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 forth our theory of religion and shows how a decline in social mobility can give rise to a widespread and long-lasting religious revival. Section 5 concludes.

⁹Patel (2012) was the first to propose a signaling theory of veiling. His explanation is based on marriage market concerns and increasing returns to adoption.

2 The Islamic Revival in Egypt

The chief obstacle to studying the Islamic revival in Egypt is the absence of time-series data on religiosity among Muslims over the second half of the twentieth century.¹⁰ This confines us, for the moment, to proposing a theory of the Islamic revival. There is, however, a voluminous historical and ethnographic literature on the resurgence in Islam.¹¹ In this section, we provide a brief overview of this literature and make two points. Firstly, beginning some time in 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). While members of *al-jihad* who were responsible for the assassination had hoped to set off a “mass uprising” similar to the Iranian revolution, this did not happen despite the unpopularity of Sadat (Kepel 2002, p. 87).¹² It took until the mid-1980s for the Islamic revival to gain momentum and it was educated youth from the lower socioeconomic strata who were in the vanguard of this movement.

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”) came into more frequent use. 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 conspicuously Islamic dress (see Patel 2012, Carvalho 2013). 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 percent of Cairene women wore some form of headcovering (Bayat 2007). Many Egyptian singers, dancers and actresses left their professions, veiled and denounced

¹⁰Ideally, we would have religiosity data linked to information about individual characteristics, including socio-economic background.

¹¹See the 111-page bibliography compiled by Esposito et al. (1991), as well as Hunter (1988), Esposito (1999), Lapidus (2002), Kepel (2003) and Bayat (2007).

¹²Kepel (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 that intellectuals at the time were not afraid to denounce the practice of veiling.

their art as shameful (van Nieuwkerk 2007).¹³

Part of the increase in religious activity was channeled through 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, with the number of beneficiaries of health services from such organizations rising 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. 2). In 2005, Muslim Brotherhood candidates won 20% of parliamentary seats, despite electoral irregularities and being banned from forming a political party.¹⁴ In the parliamentary elections following the 2011 revolution, the Muslim Brotherhood Freedom and Justice Party won 47% of the vote.¹⁵ The Salafist Al-Nour Party won a surprisingly high 28% of the vote. In June 2012, the Muslim Brotherhood candidate, Mohamed Morsi, was elected President of Egypt. The Egyptian population remains divided over his ouster in July 2013.

2.2 Economic Determinants of Revival

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 labourer but a young, upwardly mobile university student or professional, often with a scientific or technical degree” [p. 1]. These characteristics match profiles of activists in the broader Islamic movement in Jordan (Azem 1997), Tunisia (Waltz 1986, Hoffman 1995), Yemen (Clark 2004) and other Muslim societies

¹³Counter 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 World Values Survey data, Norris and Inglehart concludes 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].

¹⁴Support for Islamic parties is not a perfect indicator of individual piety.

¹⁵See Hoffman & Jamal (2013) for evidence that Tahrir square protesters exhibit higher than average levels of individual piety, as measured by Quar'an reading.

(Ayubi 1991). In the 2005 Egyptian parliamentary election, Blaydes (2011, chapter 8) finds evidence that the Muslim Brotherhood chose to run candidates in poor, but literate districts.

One reason why educated youth may have been attracted to the Islamic movement was the importance to them of deemphasizing materialistic values.¹⁶ Wickham’s interviews highlight the distinct values espoused by “committed Muslims” (*multazim*):

As a graduate, I don’t have any problems. We need very little, live life simply, don’t need fancy cars and apartments and all that. I married a woman from the university. We live very simply, but we don’t feel poor. [p. 168]

Another female graduate explained, “The ordinary Muslim needs to earn more money than the committed Muslim, because his needs for material things [*istilzamat*] are greater” [p. 168]. It was also necessary to 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 one’s values, helping an individual to cope with unfulfilled aspirations. We shall proceed to show how a temporary decline in social mobility could have led to a widespread and long-lasting religious revival led by educated youth.

¹⁶The Islamic movement appears to have benefited from several other factors. In particular, while repressing radical groups, then-president Mubarak supported the broader Islamic movement as long as it focused on moral values and culture and did not confront the regime directly [e.g., Kepel (2002, p. 87), Kepel (2003, p. 19, p. 244ff)]. The Muslim Brotherhood was barred from forming a political party and technically remained illegal. This may have had the unintended effect of providing the Muslim Brotherhood and other Islamic groups with greater freedom and thereby greater influence on youth during the first decade under Mubarak than any of the opposition parties (Wickham 2002, p. 71ff, 104).

3 Decline in Social Mobility among Educated Youth

In this section, we present the first systematic evidence of a decline in social mobility among educated youth in Egypt after the mid-1980s. Following the 1952 Egyptian revolution, there was a big push to increase educational attainment, both at lower and higher levels of education. Between 1952-3 and 1976-7, higher education enrolments grew at an average rate of 32 percent per annum (Richards & Waterbury 1996, p. 119). There was also a plan to provide employment for this new educated class. Egypt introduced a scheme guaranteeing public sector employment for secondary school and university graduates in the early 1960s. From 1962/63 to 1969/70, the number of posts in the public bureaucracy increased by 70 percent (compared to a 20 percent increase in the labour force) and average salaries increased by 128 percent (Ayubi 1989, p. 6).^{17,18} However, the scheme became increasingly untenable in the early 1980s (Wickham 2002, p. 41ff) and has since the early 1990s been essentially defunct. (Assaad 1997, 2007). As public sector job growth declined, the marginalized and highly regulated private sector was incapable of absorbing the growing ranks of educated youth (more details on changes in the educational system and the labor market are provided in the Web Appendix). We shall examine whether this deterioration in labor market conditions 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. 1949-1960, “old cohort”), who benefited from the government guaranteed employment scheme, to those born in the late 1960s and 1970s (i.e. 1968-1977, “young cohort”) who expected to benefit when entering the labor market in the mid to late 1980s and 1990s, but generally did not.¹⁹

¹⁷Many Middle Eastern governments felt responsible for providing employment to those with intermediate or higher education who were unable to find a job in the private sector, partly out of fear of political unrest among urban youth (e.g. Mazumdar 1989, Salehi-Isfahani 2007). As a consequence, the public sector was, and still is, large in many Middle Eastern countries (Richards & Waterbury 2008). A formal job guarantee scheme was also implemented in Morocco.

¹⁸The introduction of the employment guarantee scheme in Egypt was, in turn, associated with a strong increase in the demand for higher levels of education among the population, including those from the lower socioeconomic strata (see also section 3.2). This contrasts with trends in educational attainment in developing countries outside the region (e.g. Jensen 2010, Barro & Lee 2010).

¹⁹Because the scheme was gradually suspended, we leave out intermediate years. In the Web Appendix we show results for a more narrow definition of the old cohort (i.e. those born 1949-1958), which is more appropriate for the subsample of university graduates. Results are similar. Note that the old cohort was also the first to benefit from free access to education.

Our data source is the Egypt Labor Market Panel Survey of 2006 (ERF, 2006), a nationally representative household survey, which has two important features. Firstly, the ELMPS06 contains information about an individual’s employment history, including an individual’s occupation, employment status and, for wage workers, the sector of employment and the formality of the job, i.e. whether the job entailed a work contract and social security. This enables us to deal with the potential life-cycle bias in intergenerational economic mobility estimates (see e.g., Erikson et al. 1983, Nicoletti & Ermisch 2007) by comparing job outcomes across cohorts at a given age. Secondly, the dataset provides education and job-related information for an individual’s parents even if the parents were not present in the household at the time of the survey. Further details are provided in section 3.1 below.

Our results suggest the following. Firstly, there was a strong increase in educational attainment and educational mobility across cohorts. Secondly, professional jobs declined as a fraction of the educated work force, pushing more educated young people into low-skilled occupations in the informal sector. Thirdly, the decline in job opportunities—a roughly 20 percentage point decline for university graduates in the average likelihood of obtaining a professional occupation (or formal job)—was not experienced by university graduates whose fathers were professionals. On average, the job prospects of these graduates remained unchanged such that unfulfilled aspirations were concentrated among graduates from the lower socioeconomic strata. We present further suggestive evidence that the increased labor market advantage of those from high-socioeconomic backgrounds was due to superior personal connections (*wasta* in Arabic), as has been proposed elsewhere (e.g. Wickham 2002). In the interests of concision, only core results are presented here. Further empirical analyses, along with a more detailed description of changes in Egyptian educational and labor market institutions, are presented in the Web Appendix (for online publication only).

3.1 Data and Measurement Issues

The 2006 cross-section of the Egypt Labor Market Panel Survey (ELMPS06) covered 8,349 households (consisting of 37,140 individuals).²⁰ We restrict our analysis throughout to males

²⁰Among them, 3,684 households had been previously interviewed in the 1998 survey wave and 2,167 households represented splits from these. The remaining 2,498 households were new (refresher sample). Unless otherwise stated, descriptive statistics are based on the weighted data.

due to low female labor force participation in Egypt.²¹ The old cohort (men born in 1949-1960) comprises 1,860 individuals, while the young cohort (men born in 1968-1977) comprises 2,650 individuals. The increase in the sample size reflects rapid population growth in Egypt. Summary statistics for both cohorts are presented in Table 1 in the Web Appendix.

The ELMPS06 contains information about an individual’s first job, current job and up to two previous jobs. Employment-related information includes an individual’s occupation, his wage status and, for wage workers, sector of employment and whether they have a work contract and/or social security. Intensive data cleaning and consistency checks of the employment history section revealed that merely 4.13% of men aged 20-65 (N=8,977) had held more than three jobs at the time of the survey.²² For another 2.48% of men in this age group, the employment history section of their completed questionnaire contains inconsistencies or errors, or it lacks information about the year an individual started an activity and/or about his employment status. Thus, complete information is available for 93.39% of men aged 20 to 65.

In the empirical analysis, we distinguish in our main specification between professional and non-professional occupations.²³ For wage workers, we examine two further outcomes: the son’s likelihood of holding a formal job, which is defined as providing both a work contract and social insurance, and his likelihood of working in the public sector. An overview of how occupational status is related to one’s employment status, job formality and sector of employment is provided in Table 7 of the Web Appendix. Our main analysis will compare occupational status at age 28 across cohorts. The choice of 28 as a reference age is based on our expectation that most men in the two cohorts have reached their permanent occupational status, “occupational maturity” (Erikson et al. 1983), by that age. Section 2 of the Web

²¹In recent decades, female market labor force participation has risen but remained low at 21% in 1998 and 27% in 2006 (Assaad & El Hamidi 2009). With government sector employment contracting, educated women faced greater difficulty obtaining jobs perceived as appropriate for women (e.g. Assaad & El Hamidi 2009), and many women stop working after marriage (e.g. Hoodfar 1997).

²²We conduct a robustness analysis which shows that using information about an individual’s current and first job in the event of missing data does not change results qualitatively (see Web Appendix). For a small number of men, whose earliest job in the employment history section started at most one year after they took up their first job, it is assumed that they did not experience any job change between their first job and the earliest job in the employment history section.

²³As part of the robustness analysis, we use five occupational categories, namely professional, white-collar, skilled manual workers, semi-/unskilled manual workers and farmers. Details of the underlying occupational codes and construction of the five categories, including a list of the most frequent occupations within each category, are provided in the Web Appendix.

Appendix shows that men tended to experience relatively few job changes; where employment changes occurred they were usually at the beginning of an individual’s career. If we consider only job changes that resulted in an occupational change, a high share of men had a maximum of two changes. On average, men were 28 when they experienced this second occupational change.²⁴ The results are robust to comparing occupational outcomes of sons at age 30, in which case the young cohort comprises men born 1968-1975 (instead of 1968-1977).²⁵

We relate the son’s occupation to his father’s occupational status when the son was aged 15. For sons living with their fathers, this information was derived from the father’s self-reported employment history. When the father was absent from the household, the interviewee was asked about his father’s education, i.e. the highest degree obtained, as well as the father’s occupation and sector of employment when the interviewee was 15. This was the case for the majority of men in both cohorts (87.60%).²⁶ Out of all sons with valid employment history information, the father’s occupational status when the son was aged 15 and father’s years of schooling were available in 98% of cases. Missing information was most often related to the fathers’ occupation, i.e. to fathers who were living in the household at the time of the survey and who had missing entries in the employment history section.

3.2 Increasing Educational Mobility

Table 1 presents, for each cohort, the outflow percentages from father’s highest degree to son’s degree.²⁷ The bottom row reveals an increase in educational attainment across the cohorts. The share of surveyed males with secondary and post-secondary education increased significantly from 39% in the old cohort to 63% in the young cohort. The marginal distributions also indicate a rise in educational mobility. For the lowest class of paternal income (no formal degree), the distribution for the young cohort first-order stochastically dominates the

²⁴At this age, 99% of men aged 20-65 (with a valid job path) had obtained their first job. Very few men were unemployed at age 28. For these men, the occupation prior to the unemployment period is used. For further details see the Web Appendix.

²⁵The main difference is that coefficient estimates are slightly smaller in size. Results are reported in section 5 in the Web Appendix.

²⁶Less than 1% of fathers were recalled by interviewees as not working when the interviewee was 15. These fathers and sons were dropped from the empirical analysis. Note that the survey does not provide the age of fathers who are not living with their sons. However, when a son is 15, his father is typically in his 40s or older, so we expect fathers to have reached occupational maturity at the time of comparison.

²⁷The outflow percentages are calculated from the mobility table of each cohort, which are available from the Web Appendix.

Table 1: Outflow Percentages for Fathers' and Sons' Educational Attainment.

		Son's education				Total
		(1)	(2)	(3)	(4)	
Father's education	(1) No degree	51.24	18.32	18.12	12.32	100.00
	(2) Primary/preparatory degree	12.74	13.57	26.58	47.11	100.00
	(3) Secondary degree	4.72	6.58	29.14	59.56	100.00
	(4) Post-secondary degree	0.00	1.54	12.22	86.24	100.00
Total		44.07	16.79	19.09	20.05	100.00

		Son's education				Total
		(1)	(2)	(3)	(4)	
Father's education	(1) No degree	25.87	19.54	36.11	18.48	100.00
	(2) Primary/preparatory degree	6.07	13.55	41.13	39.26	100.00
	(3) Secondary degree	0.93	4.68	38.59	55.80	100.00
	(4) Post-secondary degree	0.47	1.52	10.03	87.97	100.00
Total		20.20	16.62	35.09	28.10	100.00

Source: ELMPS06.

distribution for the old cohort. Among the young cohort, 36% of men whose fathers had no formal degree achieved a secondary school degree and 18% achieved a post-secondary degree. Among the old cohort, the figures are 18% and 12% respectively. This constitutes a marked increase in educational mobility from the bottom which is most likely due to the abolition of school fees and the expansion of the Egyptian schooling system in the 1950s and 1960s. On the other hand, access to university education seems to have increased only marginally, if at all, from the old to the young cohort, the most likely reason being policy changes in the 1980s that aimed to ease pressures on the public sector by reducing the supply of university graduates.²⁸ Nevertheless, rapid population growth implies that a significant proportion of university graduates in the young cohort came from the lower socioeconomic strata.

Table 2: Outflow Percentages for Fathers' and Sons' Occupational Attainment.

		1949-1960 Cohort (N=1,617)					
		Son's occupation					
		(1)	(2)	(3)	(4)	(5)	Total
Father's occupation	(1) Farmers	51.48	10.94	9.30	12.16	16.13	100.00
	(2) Semi-/unskilled manual	5.27	22.03	21.76	21.14	29.80	100.00
	(3) Skilled manual	4.48	17.86	41.75	12.15	23.76	100.00
	(4) White collar	4.12	14.74	28.12	25.01	28.02	100.00
	(5) Professional	2.17	7.95	12.89	23.09	53.90	100.00
Total		26.35	12.95	17.28	16.71	26.70	100.00
		1968-1977 Cohort (N=2,320)					
		Son's occupation					
		(1)	(2)	(3)	(4)	(5)	Total
Father's occupation	(1) Farmers	40.26	12.75	21.97	10.25	14.78	100.00
	(2) Semi-/unskilled manual	6.46	29.35	21.08	16.94	26.17	100.00
	(3) Skilled manual	2.86	17.54	42.98	16.37	20.25	100.00
	(4) White collar	7.52	15.88	24.11	25.35	27.15	100.00
	(5) Professional	3.04	8.70	14.84	17.85	55.58	100.00
Total		17.43	15.49	23.46	16.00	27.62	100.00

Notes: Son's occupation refers to his occupation at age 28. Source: ELMPS06.

3.3 Declining Social Mobility

Table 2 reveals that rising educational mobility was not met by rising occupational mobility.²⁹ The marginal distributions indicate that the share of non-manual occupations has not changed over time. A decrease in the share of farmers has essentially been associated with an increase in the share of other manual occupations. The fact that professional and, more generally, non-manual occupations became relatively scarce is confirmed by Figure 1. Among men with secondary school degrees and above, 83% (59%) of the old cohort obtained a non-manual (professional) occupation by the age of 28 compared to 61% (41%) of the young cohort. Among men with a university education, the decline was somewhat less drastic. Similarly, the share of formal jobs out of all wage work decreased: among secondary graduates and higher, 57% of the young cohort compared to 86% of the old cohort held a

²⁸Regression results presented in the Web Appendix are consistent with increased access to secondary education and little, if any, change with regard to university education.

²⁹The corresponding mobility tables are available from the Web Appendix. They show in particular the strong decline in the share of farmers over the past century.

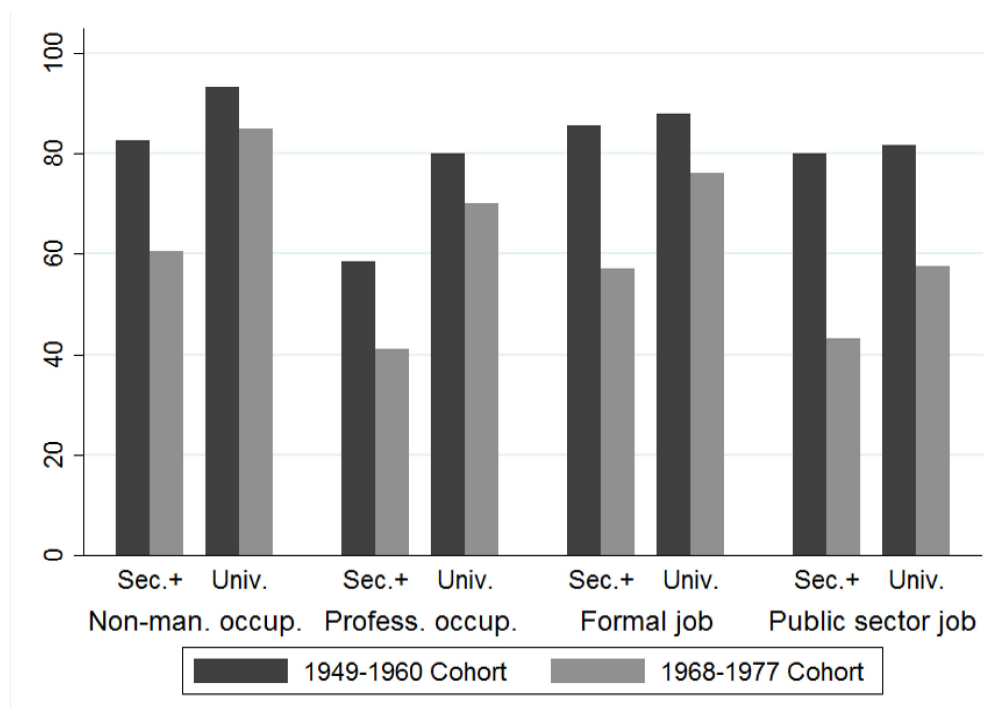


Figure 1: Changes in the Availability of Jobs across Cohorts.

Notes: This figure shows, separately for the old and the young cohort, the percentage of men with (i) secondary degrees and above (“Sec.+”) and (ii) post-secondary (university) degrees (“Univ.”), who had obtained a non-manual occupation (professional occupation / formal job / public sector job) by the age of 28. Source: ELMPS06.

formal job by the age of 28; among university graduates, the comparable figures are 76% and 88%. Public sector employment also became more scarce: among university graduates, only 58% of the young cohort worked in the government sector compared to 82% of the old cohort; for secondary school graduates and higher the figures are 43% and 80%, respectively. The decline in government sector employment was more dramatic than the decline in formal jobs, indicating that the private sector was increasingly offering non-manual, formal jobs too, especially for university graduates.

Figure 2 in the Web Appendix plots for each cohort the educational distribution of workers across occupations. While the increase in educational attainment raised the average amount of schooling within each occupation, there was also a strong 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 2 in the Web Appendix). In fact, secondary

school graduates made up by far the largest educational group of 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 did not “merely” affect the school-to-work transition but had a more permanent negative effect on the occupational outcomes of educated youth. We shall take a closer look at whether this effect was felt unequally by men from low socioeconomic backgrounds. For the sample of men of the old and the young cohort who achieved a university or a comparable degree (i.e. a post-secondary degree) and, more broadly, for those who achieved a secondary school degree or higher, we estimate the following linear probability model:

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

where $Prof_i$ is a binary variable equal to 1 if the son obtained a professional occupation by the age of 28.³⁰ $Young_i$ indicates belonging to the young cohort (i.e. sons born in 1968-1977), Fa_i^{Prof} indicates whether the father worked as a professional when the son was aged 15, and $Young_i \times Fa_i^{Prof}$ is the interaction between these two variables. Thus α_2 measures the association between father’s and son’s occupational status for the old cohort, and can be interpreted as a measure of intergenerational occupational immobility. In turn, α_3 , which is the main coefficient of interest, measures changes in this association across cohorts. Finally, $Urban$ is a binary variable indicating urban residence at birth.

For comparison, we also examine the son’s likelihood of obtaining a non-manual occupation, i.e. a professional or a white collar occupation, and—for wage workers—his likelihood of holding a formal job and a public sector job by the age of 28. Several further robustness analyses are presented in the Web Appendix.

The upper part of Table 3 shows regression results for equation (1). As hypothesized, for the old cohort, university graduates from low socioeconomic backgrounds were not disadvantaged. That is, once they achieved a university degree, they had an equal chance of obtaining a professional occupation as those whose fathers were professionals. This does not hold true, however, for university graduates from the young cohort. While graduates from low socioeconomic backgrounds experienced a decline in the likelihood of becoming a professional by

³⁰Estimating a probit instead of a linear probability model produces similar results (see Section 5 in the Web Appendix).

Table 3: Relationship between Father’s Occupation and Son’s Occupation/Job.

	Dependent variable: son’s probability of obtaining a			
	(1) non-manual occupation	(2) professional occupation	(3) formal job	(4) public sector job
<i>a. Subsample of sons with post-secondary (university) degrees:</i>				
Young cohort (d)	−0.125*** (0.033)	−0.179*** (0.042)	−0.209*** (0.038)	−0.252*** (0.043)
Father: professional (d)	0.041 (0.031)	−0.003 (0.049)	−0.068 (0.050)	0.024 (0.051)
Father: professional × young cohort	0.102** (0.041)	0.191*** (0.061)	0.238*** (0.061)	−0.012 (0.070)
R^2	0.046	0.039	0.053	0.085
N	1,002	1,002	870	870
<i>b. Subsample of sons with secondary degrees and above:</i>				
Young cohort (d)	−0.255*** (0.028)	−0.201*** (0.031)	−0.335*** (0.028)	−0.388*** (0.029)
Father: professional (d)	0.093*** (0.032)	0.148*** (0.043)	−0.057 (0.040)	0.002 (0.041)
Father: professional × young cohort	0.174*** (0.041)	0.133** (0.053)	0.241*** (0.052)	0.055 (0.055)
R^2	0.111	0.088	0.109	0.126
N	2,186	2,186	1,777	1,777

* p<0.10, ** p<0.05, *** p<0.01. (d) Dummy variable.

Notes: OLS coefficient estimates are reported with robust standard errors controlling for clustering at the household level in parentheses. The analysis is restricted to men (sons) born 1949-60 (old cohort) and to men born 1968-77 (young cohort). Son’s occupation/job refers to his occupation/job at age 28. Non-manual occupations comprise white collar and professional occupations. All specifications include a dummy for being born in an urban area and a constant.

18 percentage points and (among the sample of wage workers) of having a formal job by 20 percentage points (by the age of 28), this decline is attenuated for graduates whose fathers work as professional. Indeed, F-tests reveal that we cannot reject the null hypothesis that the sum of the coefficient estimates on the young cohort dummy and the interaction term is equal to zero.³¹ Thus, the decline in job opportunities was concentrated on graduates from the lower ranks.

The lower part of Table 3 shows that for the sample of secondary school graduates and above, a similar decline in social mobility occurred except that occupational outcomes were

³¹The corresponding p-values are 0.3308 (column 1), 0.7754 (column 2), and 0.5487 (column 3).

already less equal for the old cohort (columns (1) and (2)). Having a father working as a professional was associated with an increase in the son's likelihood of obtaining a professional occupation by 15 percentage points; this effect was even more pronounced for the young cohort (an additional increase in the likelihood of 13 percentage points). Regarding formal employment, however, the coefficient estimates are similar to those found for university graduates, in terms of both statistical significance and size. That is, parental background plays a role in obtaining a formal job only for the young cohort. Recall from Figure 1 that, for the old cohort, the share of graduates with secondary school degrees and above that had attained a professional occupation by the age of 28 was approximately 20 percentage points smaller than the corresponding share of university graduates (59% versus 80%). This gap is negligible with regard to the share of educated youth with a formal job (around 85% for both subsamples). It thus seems plausible that, already for the old cohort, parental background mattered with respect to attaining a professional occupation, but not with respect to holding a formal job. That is, overall these results suggest that as soon as employment opportunities in the private sector become limited, graduates from a high socioeconomic background have an advantage over those from a low socioeconomic background.

The results in column (4) of Table 3 indicate that the decline in mobility was associated with the way jobs were allocated in the formal private sector, rather than in the public sector. For obtaining a job in the government sector, there was on average no advantage to having a father who was a professional. This is consistent with individuals from low socioeconomic backgrounds lacking the right 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 would be the introduction of the *infitah* (open-door) policy in 1973 by the Egyptian government, which encouraged private sector growth and foreign direct investment in particular. While the dataset does not allow one to discriminate between the two sources of disadvantage, it does provide information about the main and the secondary (if there was a secondary) job search method used to obtain an individual's current primary job. Close to 40% of university graduates in the young cohort working in the private sector received help from their family or friends in obtaining their job, compared to around 10% of graduates working in the public sector.³² If personal or social connections are based on kinship ties, this suggests that the increase in economic persistence across generations may be

³²See also Figure 3 in the Web Appendix.

related, at least in part, to the increased importance of the personal connections, or “wasta”, in obtaining professional positions.

3.4 Changes in Returns to Education

We shall now focus on returns to education in Egypt (in terms of occupational outcomes).³³ Estimation results in column (1) of Table 4 show that, conditional on one’s father *not* working in a professional occupation, (occupational) returns to education declined over time: the likelihood of obtaining a professional occupation declined by 15 percentage points for secondary school graduates and by 16 percentage points for university graduates. In contrast, results in column (2) indicate that for those whose fathers worked as professionals, returns to university education remained unchanged or increased slightly. Column (3) uses the full sample and confirms that the decline in returns to education was concentrated on graduates from lower socioeconomic groups: for university graduates of the old cohort, the (occupational) returns to education were roughly the same (i.e. independent of their parental background) while for university graduates of the young cohort, those whose fathers were not working as a professional experienced a decline in the returns to education.

4 A Theory of the Islamic Revival

We have shown that there was a significant decline in social mobility among educated youth around the time of the Islamic revival in Egypt. In this section, we come to the third, and final step of our argument. We develop a theoretical model in which a temporary decline in social mobility can lead to a widespread and long-lasting rise in religious participation.

Our major departure from standard models of religion (see Iannaccone 1998) is that religious participation acts not only as a form of leisure (or social interaction) in our model, but also performs a psychological function in helping agents adjust to unfulfilled aspirations. Unfulfilled aspirations are in turn determined by social mobility, inequality and absolute income levels. We shall show how religious participation is jointly determined by these factors. We shall also analyze how the psychological function of religion introduced here interacts with standard functions of religion, including club goods production.

³³In the following, we include all men in the analysis, irrespective of their educational attainment.

Table 4: Changes in the Occupational Returns to Schooling over Time.

	Dependent variable: son's probability of obtaining a professional occupation (d)		
	(1)	(2)	(3)
	Father: non-professional	Father: professional	Full sample
Primary/preparatory degree	0.013 (0.020)	-0.048 (0.093)	0.009 (0.020)
Secondary degree	0.269*** (0.033)	0.231** (0.092)	0.266*** (0.033)
Post-secondary degree	0.752*** (0.033)	0.505*** (0.072)	0.749*** (0.033)
Young cohort (d)	-0.011 (0.012)	-0.144* (0.080)	-0.024* (0.013)
Primary/preparatory degree × young cohort	-0.013 (0.024)	0.189 (0.130)	-0.001 (0.024)
Secondary degree × young cohort	-0.153*** (0.037)	-0.047 (0.112)	-0.141*** (0.038)
Post-secondary degree × young cohort	-0.163*** (0.044)	0.160* (0.091)	-0.152*** (0.044)
Father: professional (d)			0.185*** (0.043)
Primary/preparatory degree × Father: professional			-0.011 (0.083)
Secondary degree × Father: professional			0.005 (0.085)
Post-secondary degree × Father: professional			-0.206*** (0.064)
Primary/preparatory degree × Father: professional × young cohort			0.064 (0.106)
Secondary degree × Father: professional × young cohort			-0.022 (0.086)
Post-secondary degree × Father: professional × young cohort			0.195*** (0.062)
R^2	0.370	0.261	0.402
N	3,154	855	4,009

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. (d) Dummy variable.

Reference category for the son's years of schooling: "no educational degree".

Notes: OLS coefficient estimates are reported with robust standard errors controlling for clustering at the household level in parentheses. The analysis is restricted to men (sons) born 1949-60 (old cohort) and 1968-77 (young cohort). Son's occupation refers to his occupation at age 28. All specifications include a dummy for being born in an urban area and a constant.

4.1 The Model

Consider a society composed of a continuum of agents I with typical member i . The set of agents is endowed with Lebesgue (uniform) measure λ . Agents (or their parents) choose

their level of education and subsequently enter either the low class L or high class H . Agents who end up in the L and H classes are subject to known wage rates w_L and w_H respectively, where naturally $w_H > w_L > 0$. 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 . [One can interpret membership of the high class as having a father with a professional occupation, but the model will be more general.]

Date 1. Agents each choose a level of education $e \in [0, 1]$. The cost of education is $k(e, a_i)$, where a_i is a shift parameter which we shall interpret in section 4.3. We assume that $k(0, a_i) = k_1(0, a_i) = 0$ and $k_1(e, a_i) \rightarrow \infty$ as $e \rightarrow 1$ for all a_i .³⁴ In addition, we impose the Spence-Mirrlees condition: $k_{12}(e, a_i) < 0$ for all a_i .

Date 2. Agents are assigned to either the low or high class, $c_i = L, H$, based on their education and initial class status. Denote the set of agents who are assigned to class c by I_c . The probability that $i \in I_H$ is $\mu_i \equiv \theta e_i + (1 - \theta)B_i$, where B_i is an indicator variable which equals one if i started out in the H class and zero otherwise and $\theta \in (0, 1)$ is the degree of *social mobility*. This is essentially the same reduced-form representation of the labor market used by Piketty (1995) and Bénabou & Tirole (2006). The higher is θ , the more education matters relative to parental status. For the moment, we assume that θ is known.

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). 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.³⁵ 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 $\ln(g)$.³⁶ Secondly, religion is, in part, a form of leisure in our

³⁴Numerical subscripts denote partial derivatives.

³⁵Berman (2000) makes the same assumption in a club goods model of religion.

³⁶Hence income and substitution effects of wage changes on consumption perfectly offset each other. Only the results in Section 4.4 will depend in any meaningful way on this assumption.

model. An individual receives utility from religious participation r of $F(r)$, where $F'(r) > 0$ and $F''(r) < 0$ for all $r \in [0, 1]$, $F'(r) \rightarrow \infty$ as $r \rightarrow 0$.

The third component of payoffs depends on a reference point. This is the main 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 in turn will be determined endogenously (in a manner to be specified below) as part of the equilibrium distribution of income in society. In particular, a representative agent i faces the following *reference-dependent* loss function:

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

where $\gamma > 0$,³⁷ $\delta \geq 0$, $Y_i - y_i$ 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.³⁸ (Both γ and δ are interpreted in Section 4.2.2.) 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, i.e. 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 one's reference point downward. We call this the *psychological function* of religion. This conception of religion as part of 'the psychological immune system' (Bénabou & Tirole 2002) has a long history³⁹ 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 (see Ellison 1993, Smith et al. 2003). For example,

³⁷The assumption that $\gamma > 0$ makes our formulation consistent with Clark and Oswald's concave-comparison utility (Clark & Oswald 1998).

³⁸Shalev (2000) makes the same assumption that the reference point only enters an agent's utility function when outcomes fall below the reference point.

³⁹Marx's claim that religion is "the opium of the people" is its most famous statement. Bainbridge's (1997) account of the formation of new religious sects among the poorer classes in Gaston county, North Carolina in the 1920s accords with this view. He quotes Liston Pope's theory that "an otherworldly emphasis in the newer sects affords compensation for poverty and transcendence of poor estate," adding that "[l]acking any of the symbols of happiness in the secular community, such as fine clothing and jewelry, they rejected those trifles in favor of the divinely conferred status of being sanctified or reborn in the Holy Spirit" (Bainbridge 1997, p. 34). In his classic work on religious experience, William James (1890/1974) also makes the distinction between material and religious values: "We have lost the power even of imagining what the ancient idealization of poverty could have meant: the liberation from material attachments, the unbribed soul, the manlier indifference, the paying our way by what we are or do and not by what we have... it is time for thinking men to protest against so unmanly and irreligious a state of opinion" [p. 356-7].

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:

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

Since the objective function is strictly increasing in ℓ , r and g , both constraints bind in equilibrium for all agents. Substituting the goods budget constraint and the time budget constraint into the objective function, (3) reduces 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 $i \in I_c$.

4.2 Unfulfilled Aspirations & Religion

To understand how religious participation is shaped by economic conditions, we begin by analyzing choices of labor supply ℓ and religious participation r for an exogenous profile of education choices $\mathbf{e} \equiv (e_i)_{i \in I}$. Thus, for the moment, each agent's probability of entering the H class, $\mu_i = \theta e_i + (1 - \theta) B_i$, is treated as fixed. We shall make education choice endogenous in Section 4.3.

We now have a choice to make regarding the appropriate reference point Y_i to which an agent compares his outcome. We relate the reference point to an income/consumption aspiration level, which 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_{ic} for each class $c \in \{L, H\}$. His equilibrium income in class c will be $y_{ic} = w_c(1 - r_{ic})$. Hence i 's expected income is $\mu_i y_{iH} + (1 - \mu_i) y_{iL}$. This means that an agent who, when choosing education at date 1, expects a higher probability of ending up in the H class 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 Bell (1985), Loomes & Sugden (1986), Shalev (2000), Köszegi & Rabin (2006, 2007) and

Gill & Stone (2010).⁴⁰

We employ the following solution concept, which is based upon 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 $r_i = (r_{iL}, r_{iH})$ for each agent $i \in I$ such that for all $i \in I$ and $c \in \{L, H\}$:

- (i) Treating Y_i as fixed, $r_{ic} \in \operatorname{argmax}_{r \in [0,1]} U_{ic}(r)$,
- (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 aspirations levels to income/consumption expectations and requires expectations to be consistent with equilibrium play. The third condition restricts attention to (plausible) equilibria in which an agent expects to earn more in the high-wage class than in the low-wage class. As such, only L class members experience unfulfilled aspirations.

Agents are *ex ante* identical except for their initial class status. *Ex post*, initial class status only affects religious participation choice via its effect on unfulfilled aspirations. Members of the H class do not experience unfulfilled aspirations. Hence they choose a common action, $r_{iH} = r_H$ for all $i \in I$. Members of the L class do experience unfulfilled aspirations, and to varying degrees based on their education and initial class status. We can now state the following result:

Proposition 1 *For every profile of education choices $\mathbf{e} \equiv (e_i)_{i \in I}$, there exists at least one personal equilibrium [PE]. All religious participation choices are interior: $0 < r_{ic} < 1$ in every equilibrium for all $i \in I$ and $c \in \{L, H\}$.*

⁴⁰It will be clear that a formulation in which the reference point Y_i equals the income of the high class (one could call this an ‘envy formulation’) has essentially the same mathematical structure. The only difference is that the equilibrium religious participation in the unfulfilled aspirations formulation also depends on agents’ expectations of upward social mobility, μ_i , and hence their level of education.

The proof is in the appendix.

4.2.1 Living up to Expectations

We shall now study equilibrium religious participation by agents who end up in the low class L . We are interested in the role of factors that determine their degree of unfulfilled aspirations: inequality $y_H - y_{iL}$, social mobility θ and the individual's level of education e_i . The relative deprivation literature predicts that higher inequality and expectations of upward mobility unconditionally lead to increased participation in religious movements by those who fail to meet their aspirations. However, this neglects the possibility that individuals who fall short of expectations may work harder to live up to their expectations, and thus spend *less* time on religious participation.

To make this point formally, let us abstract from the coping effect of religion by setting $\delta = 0$.⁴¹ In this case, religion does not perform a psychological function in helping individuals to cope with unfulfilled aspirations. This version of the model is merely a neoclassical model of labor supply (where religion plays the role of leisure) combined with a concern for unfulfilled aspirations.

This produces the following comparative statics results:

Proposition 2 *Fix a profile of education choices such that $0 < \mu_i < 1$ for all $i \in I$.⁴² Suppose that religion performs no psychological function ($\delta = 0$). In every PE, religious participation choices for agents who end up in the L class are:*

- (i) *strictly decreasing in the equilibrium income of H class members y_H ,*
- (ii) *strictly decreasing (resp. decreasing) in social mobility θ for agents who start out in the L (resp. H) class,*
- (iii) *strictly decreasing in the individual's level of education e_i .*

⁴¹In this case, the utility function is similar to a parameterized version of the one used by Bowles & Park (2005), except that the reference point used by Bowles and Park is y_H , the income H class members.

⁴²According to Proposition 4, $0 < \mu_i < 1$ for all $i \in I$ in every equilibrium.

The results follow from differentiation of (3) with respect to r , holding Y_i fixed, then imposing $Y_i = \mu_i y_{iH} + (1 - \mu_i) y_{iL}$ and finally differentiating the resulting expression with respect to the parameter of interest. There is one difference between agents who start out in the L class and those who start out in the H class. Higher social mobility means a greater likelihood that agents who start out in the H class end up in the L class. Hence an increase in θ reduces unfulfilled aspirations for agents who start out in the H class. The opposite holds for agents who start out in the L class.⁴³ For all agents who end up in the L class it is true that as unfulfilled aspirations rise—as a result of changes in inequality determined by y_H , social mobility θ or education e_i —they strive to live up to their expectations by working harder and devoting less time, not more, to religious activity. Due to this living-up-to-expectations [LUE] effect, it is not obvious that a concern for unfulfilled aspirations is sufficient to explain a rise in religious activity. Something else is required.

4.2.2 Coping with Unfulfilled Aspirations

The remainder of the analysis will examine the case in which $\delta > 0$. In this case, religion is not only a form of leisure, but also performs a psychological function in helping individuals to cope with unfulfilled aspirations. First differentiate (3) with respect to r , holding Y_i fixed. Then impose $Y_i = \mu_i y_{iH} + (1 - \mu_i) y_{iL}$. Finally, differentiate the resulting expression with respect to y_H to get:

$$\underbrace{(1 + \gamma)\delta(1 - r_{iL})^{\delta-1}\mu_i^{1+\gamma}(y_H - y_{iL})^\gamma}_{\text{coping effect}} - \underbrace{\gamma(1 + \gamma)w_L(1 - r_{iL})^\delta\mu_i^\gamma(y_H - y_{iL})^{\gamma-1}}_{\text{LUE effect}}. \quad (4)$$

The coping effect dominates the LUE effect if and only if:

$$y_H - y_{iL} > \frac{\gamma}{\delta} \frac{y_{iL}}{\mu_i}.$$

In other words, income inequality $y_H - y_{iL}$ must be sufficiently large for an increase in income inequality to produce a rise in religious participation among the L class. The threshold level

⁴³Recall that the likelihood of ending up in the H class is $\mu_i = \theta e_i + (1 - \theta)B_i$, where $B_i = 1$ if i started out in the H class and zero otherwise. This means that μ_i is strictly increasing in θ if i started out in the L class and strictly decreasing in θ otherwise.

of inequality for agent i depends on the curvature of reference-dependent utility determined by γ and δ , his probability of upward mobility μ_i and L class income y_{iL} .

A few remarks are in order. The parameter 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 in which L class agents work harder in order to live up to their expectations. Hence a larger ratio γ/δ implies that a higher level of income inequality is required for the coping effect to dominate. Notice also that as an agent's likelihood of upward social mobility falls to zero, the level of income inequality required for the coping effect to dominate becomes arbitrarily large. This has some intuitive appeal. While the medieval serf is at a great disadvantage relative to his lord, his inequality may be less acutely felt, because the serf cannot reasonably expect to become the lord. This suggests that economic development—in particular a rise in social mobility θ —could render economic inequality a more important determinant of behavior. As de Tocqueville (1856/1986) wrote of the French revolution, “the French found their position all the more intolerable as it became better” [quoted by Ray (2006)]. Thus, *income inequality, social mobility and poverty are not separate but intimately related* factors associated with religiosity among the L class.

The same logic applies to θ and e_i . Hence, we have the following local comparative statics results:

Proposition 3 *Fix a profile of education choices such that $0 < \mu_i(e_i) < 1$ for all $i \in I$. Suppose that religion performs a psychological function ($\delta > 0$). In every PE, religious participation choices for agents who end up in the L class are locally:*

- (i) *strictly increasing in the equilibrium income of H class members y_H ,*
- (ii) *strictly increasing (resp. decreasing) in social mobility θ for agents who start out in the L (resp. H) class,*
- (iii) *strictly increasing in the individual's level of education e_i ,*

if and only if:

$$y_H - y_{iL} > \frac{\gamma}{\delta} \frac{y_{iL}}{\mu_i}.$$

The literature on relative deprivation posits a monotonic relationship between income inequality (and other measures of unfulfilled aspirations) and the incidence of social movements, including religious movements. Developing a model of religion with reference-dependent preferences and endogenous religious values, we find that the effect of changes in inequality, social mobility and education depends crucially on their levels. Our analysis cautions against imposing a simple linear relationship between religious participation and economic variables such as inequality in future empirical work.

We can also offer an explanation for why university graduates from elite faculties, who came from the lower socioeconomic strata, have been among the most active agents of the contemporary Islamic revival. The higher an individual's level of education, the higher is his expectation of upward mobility and the greater the disappointment he faces when stuck in the L class. We suggest that religion helps to cope with such disappointment. Unfulfilled aspirations are not sufficient, however, to induce an agent to increase religious participation. An educated individual's response to unfulfilled aspirations is crucially intermediated by the level of income inequality. There is some evidence of a rise in income inequality in Egypt over this period due to trade liberalization and public sector cuts, part of which has already been reviewed.

During the 1970s oil-price boom and trade liberalization (Sadat's open-door policy), private-sector professionals benefitted 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 a staggering 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 removal of various subsidies and measures to cut the public sector wage bill. The Egyptian government lowered wages as much as possible to discourage graduates from applying to its guaranteed employment scheme. By 1987, the salaries of government employees had fallen to 55 percent of their level in 1973, forcing employees to take second and even third jobs (Wickham 2002, p. 47).⁴⁴ Many educated and once comfortable members of the middle class slid into the ranks of the urban poor. State subsidies on basic goods such as rice, sugar, cooking oil, fuel and transportation were also significantly reduced or removed

⁴⁴For example, it became increasingly common for educated civil servants to work as taxi drivers during the evenings. See also Assaad (1997).

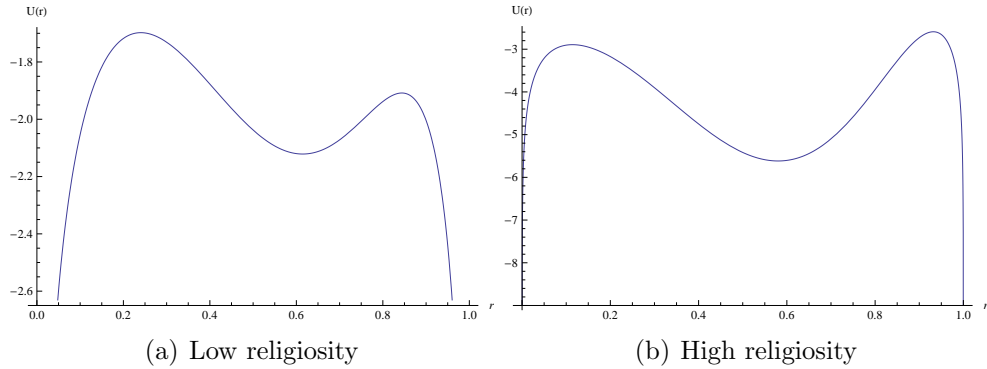


Figure 2: Utility for an L class member when μ_i equals (a) 0.7 and (b) 0.9. Throughout, $w_L = \delta = 2$, $\gamma = 5$, $y_H = 3$ and $F(r) = \ln(r)$.

altogether, leading to urban riots in Egypt in 1977 and in Morocco, Tunisia, Lebanon, Algeria and Jordan in the 1980s (Bayat 2002, p. 2). Even within the public sector, the income gap between the top bureaucratic levels and the lower levels of state officials and civil servants widened, resulting in repeated strikes and sit-ins by public sector workers in the 1980s (Ayubi 1989, p. 11).

4.2.3 Personal Multiplier Effects

Reference-dependent preferences can make an L class member's objective function non-concave. This leads to jumps in religiosity that are not captured by the local comparative statics results set out in Proposition 3. To illustrate this point we plot the payoff to an L class member as a function of religious participation r for different values of upward mobility μ_i . Figure 2(a) depicts the case in which $\mu_i = 0.7$. Notice that the objective function is maximized at a relatively low level of religiosity, but is double-peaked. As μ_i increases, the right-hand peak rises above the left-hand one, as shown in Figure 2(b), inducing a discontinuous jump to a higher level of religiosity. Hence it may only require small changes in upward social mobility to induce those stuck in the L class to break away and immerse themselves in religion.⁴⁵

⁴⁵Iannaccone (1988) develops a theory of sect formation based on a different form of non-concavity of individual objective functions.

4.3 Education & Aspirations

Let us complete the model by characterizing equilibrium education choice 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).⁴⁶

To apply this notion of equilibrium in our setting, recall that PE religious participation, conditional on education choice e , is characterized by the pair $r_i(e) = (r_{iL}(e), r_H)$ for each $i \in I$. Recall also that agent i 's probability of upward mobility is $\mu_i(e) \equiv \theta e + (1 - \theta)B_i$. We can now write the date-1 expected payoff as $U_i(\mu_i(e), r_i(e); Y_i(e)) = U_i(e)$ for agent i with education 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 $r_i(e_i) = (r_{iL}(e_i), r_H)$ for each $i \in I$,
- (ii) Optimal education choices $\mathbf{e}^* \equiv (e_i^*)_{i \in I}$ at date 1, such that $U_i(e^*) \geq U_i(e)$ for all $e \in [0, 1]$ and $i \in I$.

Following education choice e , the equilibrium continuation payoffs for agent i if he ends up in the H class and L class are respectively:

$$\begin{aligned} V_H &= \ln(w_H[1 - r_H]) + F(r_H), \\ V_{iL}(e) &= \ln(w_L[1 - r_{iL}(e)]) + F(r_{iL}(e)) \\ &\quad - (1 - r_{iL}(e))^\delta \mu_i(e)^{1+\gamma} [y_H - w_L(1 - r_{iL}(e))]^{1+\gamma}. \end{aligned} \quad (5)$$

We can then write agent i 's date-1 expected utility, from choosing e , as:

$$U_i(e) = \mu_i(e)V_H + (1 - \mu_i(e))V_{iL}(e) - k(e, a_i), \quad (6)$$

where $k(e_i, a_i)$ is the cost of education.

⁴⁶See Gill & Stone (2010) for a model of choice-acclimating reference points in tournaments.

Inspect the third term in the expression for $V_{iL}(e)$ in (5). Although a higher degree of education increases the likelihood that an individual enters the H class, this term indicates that it also raises expectations and thereby unfulfilled aspirations should the agent fail to do so. To insure against unfulfilled aspirations then, agents might depress their level of education. We call this the keeping-down-expectations [KDE] effect on education choice; we are unaware of any prior theoretical work on this effect.

Utilizing the envelope theorem when differentiating $V_{iL}(e)$, the first-order condition for education choice is:

$$\theta(V_H - V_{iL}(e)) + \underbrace{(1 - \mu_i(e)) \frac{\partial V_{iL}(e_i)}{\partial e_i} \Big|_{e_i=e}}_{KDE\ effect} = k_1(e, a_i). \quad (7)$$

The first term in (7) is a standard incentive effect. The second term is the KDE effect which is negative and can thus depress education choice relative to the benchmark in which agents do not have reference-dependent preferences. Analyzing this expression leads to the following result:

Proposition 4 *There exists at least one choice-acclimating personal equilibrium [CPE]. In every CPE, $0 < \mu_i(e_i^*) < 1$ for all $i \in I$.*

The proof of this and all remaining propositions is contained in the appendix.

Let us now examine how equilibrium education choices vary with the parameter a_i .

Proposition 5 *In every CPE, the education choice e_i^* for each agent $i \in I$ is strictly increasing in a_i .*

Let us propose two interpretations of the shift parameter a_i . Suppose that a_i represents agent i 's ability. In this case, Proposition 5 implies that the more talented individuals in society acquire higher levels of education and are more disappointed when they end up in the L class. Under certain conditions, characterized in Proposition 3, these individuals will

choose higher levels of religious participation. Suppose instead that $a_i = a$ represents the size of a common educational subsidy. (Recall from section 3 that the Egyptian government substantially increased funding for education after 1952.) According to Proposition 5, subsidizing education increases educational attainment. By Proposition 3, however, this raises unfulfilled aspirations and, under certain conditions, religious participation among those who fail to achieve upward mobility.

4.4 Social Mobility & Overall Religiosity

Thus far, we have focused on religiosity among individuals who end up in the L class. We shall now examine the determinants of average religiosity across all agents $i \in I$. When social mobility θ is known to be low (*an entrenched class-based society*), individuals who start out in the L class and remain stuck there are not very disappointed. But there are a lot of them. When θ is known to be high (*a meritocratic society*), unfulfilled aspirations are high among individuals who start out in the L class and remain stuck there, but there are relatively few of them. This nexus is, however, broken by unexpected shocks to social mobility. We shall proceed to show that, under certain conditions, an unexpected decline in social mobility can lead to a high level of unfulfilled aspirations.

Assume now that social mobility is stochastic. Let the social mobility parameter be a random variable Θ and let θ be its realization. Define $\bar{\theta} \equiv E[\Theta]$ as *expected* social mobility, where the expectation is formed at date 1, and $\Delta\theta \equiv \theta - \bar{\theta}$ as the gap between actual and expected mobility. We assume that θ is learned by agents only after all decisions are made at date 3, so that education and labor supply choices depend only upon $\bar{\theta}$. Because social mobility enters the utility function via $\mu_i = \bar{\theta}e_i + (1 - \bar{\theta})B_i$ as a point estimate, all our previous results follow through, with θ replaced by $\bar{\theta}$. To fit with our application to Egypt, we refer to $\Delta\theta < 0$ as a ‘decline’ in social mobility (even though no prior stage has yet been modeled).

Let R be *ex post* average religious activity across all agents defined as:

$$R = \int_I [(\bar{\theta} + \Delta\theta)e^*(i) + (1 - \bar{\theta} - \Delta\theta)B(i)] r_H d\lambda + \int_I \{1 - [(\bar{\theta} + \Delta\theta)e^*(i) + (1 - \bar{\theta} - \Delta\theta)B(i)]\} r_L(i) d\lambda, \quad (8)$$

where r_H , $r_L(i)$ and $e^*(i)$ are the equilibrium values characterized in Propositions 1 and 4. Since for every $i \in I$, r_H , r_{iL} and e_i^* depend on $\bar{\theta}$ only and not $\Delta\theta$, we have:

$$\frac{dR}{d\Delta\theta} = \int_I [e^*(i) - B(i)](r_H - r_{iL}) d\lambda. \quad (9)$$

Let $\mathcal{I} \equiv \{i : B_i = 1\}$. As $\lambda(\mathcal{I}) \rightarrow 0$, viz. the set of agents who start out in the H class is sufficiently small, then (9) goes to:

$$\frac{dR}{d\Delta\theta} = \int_I e^*(i)(r_H - r_{iL}) d\lambda. \quad (10)$$

For a decline in social mobility to cause an increase in overall religious activity, $dR/d\Delta\theta < 0$, it is thus sufficient that $r_{iL} > r_H$ for all $i \in I$. As we show in the appendix, this occurs if for all $i \in I$:

$$y_H - y_{iL} > \frac{1 + \gamma y_{iL}}{\delta \mu_i}. \quad (11)$$

This is the same as the now familiar condition which determines the sign of the relationship between inequality/mobility expectations and religiosity, except that $1 + \gamma$ features on the right-hand side, not γ . In other words, a decline in social mobility leads to greater overall religiosity R if income inequality is above some threshold, which depends on expected social mobility $\bar{\theta}$. When expected social mobility $\bar{\theta}$ is low, agents who end up in the L class attempt to live up to their expectations by working harder and spending less time on religious participation. This means that a decline in social mobility can reduce average religiosity under certain conditions. Hence it is the *combination* of high expectations and an unexpected decline in social mobility which generates a rise in average religiosity. Rather than undermining religious participation, our analysis suggests that economic development, by raising aspirations, can make societies more prone to religious revivals.

Proposition 6 *In every CPE, for $\lambda(\mathcal{I})$ sufficiently small, an unexpected decline in social mobility ($\Delta\theta < 0$) leads to an increase in average religiosity R if $y_H - y_{iL} > \frac{1+\gamma y_{iL}}{\delta \mu_i}$ for all $i \in I$.*

Thus, by introducing reference-dependent preferences and religious values to a neoclassical model of labor supply, we suggest that raised aspirations, a decline in social mobility, rising inequality and poverty are all intimately related causes of a religious revival and none of these factors should be viewed in isolation.

4.5 Club Goods and Social Multiplier Effects

Let us now examine how the psychological function of religion analyzed thus far interacts with standard conceptions of religion in the economics of religion literature. Firstly, following Iannaccone (1992), club goods models of religion focus on strategic complementarities in religious production. Secondly, following Iannaccone (1990), religious capital models suppose that religious participation by an individual today generates (personal) religious capital which increases the individual's future religious participation.⁴⁷ We shall now embed our model of religion in a dynamic framework that features elements of both of these approaches. We demonstrate how social multiplier effects can arise in this setting. In particular, supply-side factors could amplify the effects of a shock to religious demand.

In particular, we augment the function F , which represents the leisure utility from religious participation to $F(r, K)$ which is a function of religious participation r and a variable that we shall call *religious capacity* K . As before, we assume that $F_1(r, K) > 0$, $F_{11}(r, K) < 0$ and $F_1(r, K) \rightarrow \infty$ as $r \rightarrow 0$ 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 $F_{12}(r, K) \rightarrow 0$ as $K \rightarrow \infty$.

Religious capacity will be determined endogenously by the following dynamic process. Time is discrete and denoted by $t = 0, 1, 2, \dots$. We can conceive of a birth-death chain in which each period, with positive probability, an agent dies leaving one offspring which starts out with its 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:

$$K_{t+1} = (1 - d)K_t + G(R_t), \tag{12}$$

⁴⁷See Bisin & Verdier (2000, 2001) on the intergenerational transmission of preferences and McBride (2007) for a club goods model with religious capital formation.

where $d \in (0, 1)$ is a depreciation rate, G is a strictly increasing function with $G(\cdot) > 0$ and R_t is aggregate religious activity 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 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.

Since agents are nonatomic, they cannot individually affect R_t and hence the evolution of K . Therefore, even though they may be long lived, agents face the same problem as (3) in choosing religious participation, so that R_t is once again given by (8). Thus, there exists a severe-free-rider problem in building religious capacity to deliver social services and other benefits.

The dynamics of religious capacity are depicted in Figure 2. A steady state occurs where $G(R_t) = dK_t$. 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 $\bar{R} > 0$ as $K_t \rightarrow \infty$ because $F_{12}(r, K) \rightarrow 0$ as $K \rightarrow \infty$. Depending on the function G , 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 2(a): K^* and K^{***} are asymptotically stable, while K^{**} is not.

We have shown that if the elite is sufficiently small and inequality is sufficiently high, an unexpected decline in social mobility increases total religious participation (Proposition 6). This amounts to an upward shift of the R_t function. Figure 2(b) depicts a case in which this eliminates the low capacity steady states. As expectations of social mobility adjust in the next period, the R_t function shifts back, reintroducing the low capacity steady states. Nevertheless, the arrows in Figure 2(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 one K^{***} . In other words, a temporary shock to social mobility could lead to a large and permanent increase 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.

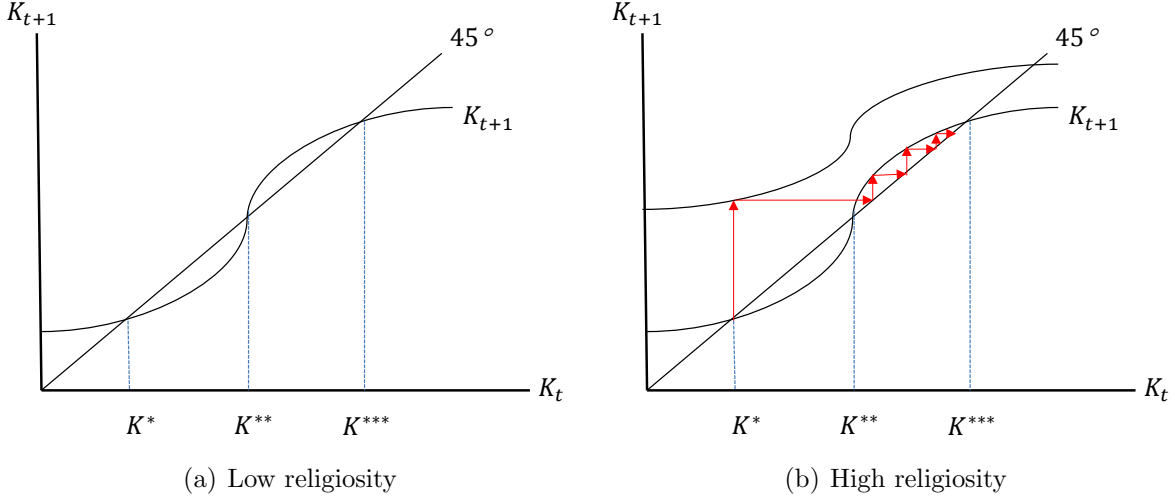


Figure 3: (a) Multiple steady-state levels of religious capacity. (b) A temporary shock to social mobility induces a large, permanent increase in religious participation/capacity.

The religious revival depicted in Figure 2(b) has a particular life cycle. During the period of the shock, the rise in religious participation is driven mainly by educated and talented individuals [see Propositions 3(iii) and 5(i)]. As religious capacity builds and expectations adjust, 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 as well as the less educated segments of the L class.

5 Conclusion

Egypt's political revolution of January 2011 was preceded by a cultural transformation. This paper links the Islamic revival in Egypt since the 1980s to an unexpected decline in social mobility. We make two contributions to the literature. Firstly, we exploit 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 in which agents have reference-dependent preferences and unfulfilled aspirations are a form of loss aversion. When religion performs a psychological function in helping to cope with loss, we derive a simple necessary

and sufficient condition for an increase in unfulfilled aspirations to produce a rise in religious participation. We proceed to show how a (once-off) decline in social mobility could give rise to a widespread and long-lasting Islamic revival, led by the educated middle class.

Why Islam? It is conceivable that socialism would have been the popular response, had (pan-Arab) socialism and capitalism not been widely viewed as causes of economic stagnation and inequality. The most plausible reason for the turn to Islam, however, is its egalitarian emphasis and effectiveness in compensating for loss, defined here in pecuniary terms. Michalopoulos et al. (2012) present evidence that Islam is a relatively egalitarian moral system that emerged and spread to deal with deep economic inequalities. In addition, Islamic organizations were less easily repressed than secular opposition groups, because government agencies could not interfere too egregiously in the sacred sphere of the mosque and because close-knit, informal networks of independent mosques, Islamic business and social organizations were already well established (e.g. Kuran 1998).

To the extent that Egyptian trends were mirrored elsewhere, our analysis may have implications for the broader Islamic revival in the Muslim world. Between 1980 and 1993, the Middle East and North African region exhibited the worst growth performance of any region in the world with average annual GNP per capita growth of -2.3 percent (Richards & Waterbury 1996, p. 64-5). In 1995, real wages and labor productivity were around the same level as in 1970 (Richards & Waterbury 1996, p. 64). Pissarides & Veganzones-Varoudakis (2005, p. 5-6) document a large decline in total factor productivity in MENA nations beginning in the 1970s, and in this respect the region compares poorly even with sub-Saharan Africa. Despite the shared experience of economic stagnation, the Islamic revival is a complex phenomenon and we do not suggest that raised aspirations combined with a decline in social mobility among the educated is the only driving force behind it, even in Egypt. Time-series data on religiosity in Muslim societies dating from the 1960s would be required to test the theory, but are as yet unavailable.

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Appendix

Mathematical Proofs

Proof of Proposition 1. By definition:

$$\begin{aligned} Y_i - y_{iH} &= \mu_i y_{iH} + (1 - \mu_i) y_{iL} - y_{iH} \\ &= -(1 - \mu_i)(y_{iH} - y_{iL}). \end{aligned} \quad (13)$$

Because $y_{iH} > y_{iL}$ for all agents in equilibrium, $Y_i - y_{iH} \leq 0$, so that $(Y_i - y_{iH})_+ = 0$. Substituting into (3), the first-order condition when $i \in I_H$ is:

$$\frac{1}{(1 - r_H)} = F'(r_H), \quad (14)$$

where we have written $r_{iH} \equiv r_H$ because all $i \in I_H$ face the same first-order condition. (It is straightforward to check that the second order-condition for a maximum is satisfied.)

We shall now show that $r_H \in (0, 1)$ in every equilibrium. By assumption, the left-hand side [LHS] of (14) increases continuously and monotonically from some positive number to ∞ and the RHS decreases continuously and monotonically from ∞ to some positive number as r_H goes through the unit interval. Hence there exists a unique solution r_H to (14) and $0 < r_H < 1$.

Notice that r_H is independent of the choices of L class members. Hence, in determining r_{iL} , $y_H = w_H(1 - r_H)$ can be treated as a parameter. Compute:

$$\begin{aligned} Y_{iL} - y_{iL} &= \mu_i y_{iH} + (1 - \mu_i) y_{iL} - y_{iL} \\ &= \mu_i (y_{iH} - y_{iL}), \end{aligned} \quad (15)$$

which is greater than or equal to zero in every equilibrium.

Holding Y_i constant and differentiating (3) with respect to r_i yields the first-order condition when $i \in I_L$:

$$\frac{1}{(1 - r_{iL})} + \delta(1 - r_{iL})^{\delta-1} (Y_i - y_{iL})^{1+\gamma} - (1 + \gamma) w_L (1 - r_{iL})^\delta (Y_i - y_{iL})^\gamma = F'(r_{iL}). \quad (16)$$

In equilibrium, $Y_i = \mu_i y_H + (1 - \mu_i) y_{iL}$. Substituting this into (16), we have the equilibrium condition:

$$\frac{1}{(1 - r_{iL})} + \delta(1 - r_{iL})^{\delta-1} [\mu_i (y_H - y_{iL})]^{1+\gamma} - (1 + \gamma) w_L (1 - r_{iL})^\delta [\mu_i (y_H - y_{iL})]^\gamma = F'(r_{iL}). \quad (17)$$

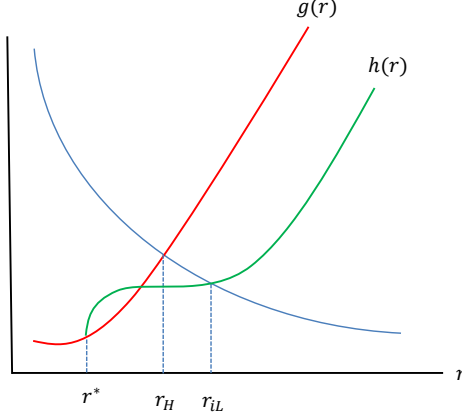


Figure 4

By assumption, the RHS of (17) goes from ∞ to some positive number as r_H goes through the unit interval. For $\delta \geq 0$, the LHS of (17) goes from some finite real number to ∞ as r_H goes through the unit interval. Both functions are continuous. Hence there exists at least one solution r_{iL} to (17) and $r_{iL} \in (0, 1)$ for all i in every equilibrium.

All that is left to show is that in the proposed equilibrium $y_H > y_{iL}$ for all $i \in I$. If $y_H > w_L$, then this is clearly true for all agents. Suppose not. Define r^* as the solution to $y_H = w_L(1 - r^*)$. Denote the LHS of (14) and (17) as $g(r)$ and $h(r)$ respectively. Observe that $g(r^*) = h(r^*)$. In addition, $r^* < r_H$ because $w_H > w_L$. By inspection of Figure 4 then, $r_{iL} > r^*$ for all $i \in I$. Hence $y_{iL} = w_L(1 - r_{iL}) < w_L(1 - r^*) = y_H$. \square

Proof of Proposition 4. By Proposition 3, 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 an optimal education choice for each agent at date 1. Calculating $\partial V_{iL}(e_i)/\partial e_i|_{e_i=e}$ from (5) and substituting into (7), we can rewrite the first-order condition as:

$$\theta(V_H - V_{iL}(e)) - (1 + \gamma)\theta(1 - \mu_i(e))(1 - r_{iL}(e))^\delta \mu_i(e)^\gamma (y_H - w_L[1 - r_{iL}(e)])^{1+\gamma} = k_1(e, a_i). \quad (18)$$

By the assumptions on k , the RHS of (18) increases monotonically from zero to infinity as e goes through the unit interval. Suppose $B_i = 0$. Then when $e = 0$, the LHS of (18) equals $V_H - V_{iL}(0) > 0$. Since V_H and $V_{iL}(e)$ are bounded, the LHS equals some finite real number when $e = 1$. Both sides of (18) are continuous functions of e . Hence, by the intermediate-value theorem, the curve represented by the LHS crosses $k_1(e, a_i)$ from above at least once and every crossing lies

in $(0, 1)$. It immediately follows that there exists at least one solution to (18), which satisfies the second-order condition for a maximum. The set of local maximizers contains the global maximizer which we denote by e_i^* . Now suppose that $B_i = 1$. The only difference is that the LHS may be negative when $e = 0$, introducing the possibility that $e_i^* = 0$ for agents who begin in the H class. This establishes the existence of a CPE.

We know that if $B_i = 0$, $e_i \in (0, 1)$. Hence for all such agents $\mu_i = \theta e_i \in (0, 1)$. If $B_i = 1$, $e_i \in [0, 1)$. Hence for all such agents $\mu_i = \theta e_i + (1 - \theta) \in (0, 1)$. This establishes the proposition. \square

Proof of Proposition 5. The result follows from $\frac{\partial^2 U_i}{\partial e \partial a} = k_{12}(e, a) < 0$. \square

Proof of Proposition 6 . We need only derive a condition that guarantees $r_{iL} > r_H$ for all $i \in I$. Write the first-order condition (14) for each $i \in I_L$ in a PE as:

$$\frac{1}{1 - r_{iL}} + d(r_{iL}) = F'(r_{iL}), \quad \text{where} \quad (19)$$

$$d(r_{iL}) = w_L(1 + \gamma)(1 - r_{iL})^\delta \mu_i^\gamma (y_H - w_L(1 - r_{iL}))^\gamma - \delta(1 - r_{iL})^{\delta-1} \mu_i^{1+\gamma} (y_H - w_L(1 - r_{iL}))^{1+\gamma}.$$

Recall that the first-order condition for each $i \in I_H$ in a PE is:

$$\frac{1}{1 - r_H} = F'(r_H). \quad (20)$$

Clearly, $r_{iL} > r_H$ if and only if $d(r_{iL}) < 0$, which in turn occurs if and only if:

$$w_L(1 + \gamma)(1 - r_{iL})^\delta \mu_i^\gamma (y_H - w_L(1 - r_{iL}))^\gamma - \delta \mu_i^{1+\gamma} (y_H - w_L(1 - r_{iL}))^{1+\gamma} < 0, \quad (21)$$

which implies that:

$$y_H - y_{iL} > \frac{1 + \gamma}{\delta} \frac{y_{iL}}{\mu_i}. \quad (22)$$

\square