

On the Road to Heaven: Self-Selection, Religion, and Socioeconomic Status

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Abstract

The correlation between religion and socioeconomic status is observed throughout the world. In the Middle East, local non-Muslims are, on average, better off than the Muslim majority. I trace the origins of the phenomenon in Egypt to a historical process of self-selection across religions, which was induced by an economic incentive: the imposition of the poll tax on non-Muslims upon the Islamic Conquest of the then-Coptic Christian Egypt in 640. The tax, which remained until 1856, led to the conversion of poor Copts to Islam to avoid paying the tax, and to the shrinking of Copts to a better off minority. Using a sample of men of rural origin from the 1848-68 census manuscripts, I find that districts with historically stricter poll tax enforcement (measured by Arab immigration to Egypt in 640-900), and/or lower attachment to Coptic Christianity before 640 (measured by the legendary route of the Holy Family), have fewer, yet better off, Copts in 1848-68. Combining historical narratives with a dataset on occupations and religion in 640-1517 from the Arabic Papyrology Database, and a dataset on Coptic churches and monasteries in 1200 and 1500 from medieval sources, I demonstrate that the cross-district findings reflect the persistence of the Copts' initial occupational shift, towards white-collar jobs, and spatial shift, towards the Nile Valley. Both shifts occurred in 640-900, where most conversions to Islam took place, and where the poll tax burden peaked. Occupational barriers to entry and the religiously segregated schools both led occupations to persist in 900-1848.

Keywords: religion; poll tax; persistence; conversion; Middle East

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1. Introduction

Scribes in the Levant and Egypt are Christians.

Al-Muqaddasi, Muslim historian and geographer, tenth century¹

The correlation between religion and socioeconomic status (henceforth, SES) is observed throughout the world. Protestants in Western Europe are traditionally better off than Catholics. Similar gaps exist between Hindus and Muslims in India, and Jews and non-Jews in the United States. In the Middle East, where religion is the major source of social segmentation, local non-Muslims are traditionally better off than the Muslim majority (Issawi 1981; Courbage and Fargues 1997, pp. 174-209). In 1996 Egypt, one of the largest countries in the region, the percentage of adult active men working in a white-collar job stood at 43 percent among Egyptian Christians (Copts), who comprised 6 percent of the population, compared to 30 percent among Muslims.² The gap was even higher in the nineteenth century, prior to the expansion of secular schooling and the out-migration of high-skilled Copts. New data from Egypt's censuses of 1848 and 1868 reveal that among adult active men 33 percent of Copts worked in white-collar jobs compared to only 14 percent among Muslims.^{3 4}

Why do we observe correlation between religion and SES? Weber (1930 [1905]) explained the Protestant-Catholic SES gap by a causal impact of religion that operates through the Protestant work ethic. Recently, the economics of religion literature, while acknowledging

¹ Al-Muqaddasi (1877), p. 183.

² Author's calculations from the 1996 10-percent census sample on IPUMS International. Sample is restricted to Egyptian Christian and Muslim active males aged 35 to 65 who are born in Egypt, with non-missing age, occupational title, and province of birth.

³ Author's calculations from the 1848 and 1868 census samples (Saleh 2013). Sample is restricted to Egyptian local free Coptic and Muslim active males who are at least 15 years old with non-missing age, occupational title, and district of origin (see section 5.1).

⁴ Also, Copts had better education. In 1848 Cairo, 51 percent of Coptic male children of 5 to 14 years of age were enrolled in Coptic elementary religious schools (*kuttabs*), whereas Muslim schools enrolled only 34 percent.

the endogeneity of religion, attempted to disentangle the causal impact of religion either in cross-country studies (La Porta et al. 1997; Barro and McCleary 2003 and 2006; McCleary and Barro 2006; Guiso, Sapienza, and Zingales 2006), or in single-country/religion studies that emphasized the impact of religion on human capital (Botticini and Eckstein 2005; Boorooah and Iyer 2005; Boppart et al. 2008; Becker and Woessmann 2009; Chaudhary and Rubin 2011).

This paper contributes to this literature. It presents a concrete historical case study that endogenizes religious adherence, as an outcome of economic institutions, in understanding the Islamization of Egypt, a major historical milestone in the spread of Islam. Drawing on the Coptic-Muslim socioeconomic gap in Egypt, I explain the relative success of the Coptic minority by a process of *self-selection* across religions, which was induced by an *economic* incentive: the imposition of the poll tax (*jizya*) on non-Muslims upon the Islamic Conquest of the then-Coptic Christian Egypt in 640. The *regressive* tax, which remained until 1856, led to the conversion of poor Copts to Islam to avoid the tax, and to the shrinking of Copts to a better off minority.⁵

The first piece of evidence on the hypothesis exploits the cross-district variation in the historical cost of conversion. As shown in figure I, holding the distribution of income constant across districts, the stricter the poll tax enforcement, or the lower the religiosity (or attachment to Coptic Christianity), the lower the probability of remaining Copt, and the greater the mean income for both Copts and converts (Muslims). The last result holds because if the cost of remaining Copt increases, the threshold income level of conversion moves rightwards, leading those who are just above the threshold to convert to Islam. This should raise the (conditional) mean income for *both* Copts and converts (Muslims).

⁵ I focus on the Coptic-Muslim gap because Copts constituted 94 percent of non-Muslims in 1848-68. Other non-Muslim minorities included Jews (1 percent) and non-Coptic Christians (5 percent), such as *Ruum* (Ottoman Greeks), Armenians, Greeks, and Levantines. These groups were better off than both Copts and Muslims.

An empirical test of these predictions requires observing poll tax enforcement and religiosity, as well as the two outcomes of interest, religion and SES, *by district*. Moreover, given that Copts shrank into a minority by 900 (Bulliet 1979; Courbage and Fargues 1997, pp. 27-8), these variables should ideally be observed in 640-900. I draw on various sources in order to meet these data requirements. I use district-level Arab immigration waves to Egypt in 640-900, according to Al-Barri (1992), as a proxy for poll tax enforcement. Arabs were the local elites in the districts they immigrated to, and, because local elites played a key role in enforcing taxation, Arab elites were more likely than Copts to enforce the poll tax on Coptic taxpayers. And as a proxy for religiosity before 640, I use the legendary route of the Holy Family in their biblical flight to Egypt (Anba-Bishoy 1999; Gabra 2001).⁶

However, I am unable to observe religion and SES by district in 640-900. Instead, I observe the two outcomes using an individual-level sample of the 1848 and 1868 censuses that I digitized from the original manuscripts. In fact, these are one of the *earliest* census microdata in the Middle East, and are thus preferable to the twentieth century data where the expansion of education, urbanization, and out-migration of high-skilled Copts may have altered the SES for Copts and Muslims differentially. Similarly, I control for the cross-district variation in income using population and the percentage of males who are able to read and write in 1897.

I find that within Egyptian local free adult active men of rural origin in 1848-68, those originating from districts that received an Arab immigration wave in 640-900, or that lie off the legendary path of the Holy Family, are less likely to be Coptic, and that Copts and converts (Muslims) from these districts are better off than their coreligionists from elsewhere.

⁶ See section 5.4 for a discussion of the alternative interpretations of the historical proxies and the possible threats to their exogeneity.

Importantly, the results for Copts, but not for Muslims, are robust to using the distance to the Islamic capital (Fustat) as an instrumental variable for Arab immigration.

I interpret the findings as a reflection of the self-selection of converts in 640-900, and the subsequent *persistence* of the occupational and spatial outcomes of each group between 900 and 1848-68.⁷ Yet, given that a millennium elapsed between the historical proxies and the observed outcomes, two counter interpretations would be that the findings reflect differential shifts in the occupational, and/or spatial, distributions for Copts and Muslims that occurred *after* conversions took place, because, for example, of differential investment in human capital and/or migration.

To tackle these counter interpretations, I introduce the second piece of evidence: the time series of the occupational and spatial distributions by religious group. The evidence combines historical narratives with quantitative evidence: (a) an individual-level dataset on occupational titles and religion in 640-1517, which I compiled from the Arabic Papyrology Database (henceforth, APD),⁸ and (b) a district-level dataset on Coptic churches and monasteries circa 1200 and 1500, which I constructed from two independent medieval sources, Abul-Makarim (1984) and Al-Maqrizi (2002). The evidence demonstrates that Copts witnessed two shifts, occupationally, towards white-collar jobs, and, spatially, towards the Nile Valley. It appears that both shifts occurred in 640-900, where most conversions to Islam took place, and where the poll tax burden was at its peak, and then persisted between 900 and 1848-68. Overall, the evidence suggests that the high tax burden in 640-900 led Copts to shrink to a better off minority, which then preserved or even improved its economic privilege since 900.

⁷ Three Islamic laws ensured the persistence of *religious* adherence across generations, after the first Coptic generations made their conversion decisions in 640-900: a) the offspring of a Muslim father is Muslim, b) a Muslim female is not permitted to marry a non-Muslim male, and c) reverse conversion or apostasy is punishable by death.

⁸ The dataset, however, does not include location, and, thus, I am only able to follow the occupational distribution for each religious group over time at the national-level, rather than the district-level.

But why did the occupational and spatial outcomes persist between 900 and 1848-68? Historical evidence suggests that barriers to entry into occupations and the religiously segregated schools, with Coptic schools being more inclined towards secular knowledge, both ensured the intergenerational transmission of occupations within each religious group. Historical evidence also suggests that the state controlled spatial mobility throughout Egypt's history.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 discusses the Islamization of Egypt in 640-1848. Section 4 highlights key elements in the historiography of the poll tax. Section 5 introduces the cross-district evidence, and, section 6, the time series evidence. Section 7 discusses the mechanisms of persistence of the occupational and spatial outcomes. Finally, section 8 concludes.

2. Contribution to the Literature

The paper contributes to the growing literature on the economics of religion (Weber 1930 [1905]; La Porta et al. 1997; Barro and McCleary 2003 and 2006; Botticini and Eckstein 2005; Boorooah and Iyer 2005; McCleary and Barro 2006; Guiso, Sapienza, and Zingales 2006; Boppart et al. 2008; Becker and Woessmann 2009; Chaudhary and Rubin 2011). There are three distinguishing features of the paper. First, it explains the correlation between religion and SES via self-selection, instead of presuming a causal impact of religion on SES. Self-selection of converts is an often-overlooked hypothesis in understanding the origins of the current socioeconomic differentials between religious groups in the world. Second, self-selection is primarily driven here by an economic incentive, the poll tax, and not by religious incentives, such as the requirement to read the scripts, as in Botticini and Eckstein (2005). Finally, the paper perhaps provides the first microeconomic test of the selection of conversions. It thus goes

beyond both the country-level analysis in Barro, Hwang, and McCleary (2010) and the historical evidence in Botticini and Eckstein (2005). Given that major conversions, which shaped the current religious adherence map of the world, took place long ago, they are often challenging to study. Perhaps, this paper is a first step in this direction.

Also, while the economics of religion literature offers a number of explanations of the inter-religious socioeconomic differentials that were primarily put forward in the Protestant or Jewish contexts, the poll tax hypothesis is perhaps more consistent with the historical facts on Egypt. In his seminal work, Weber (1930 [1905]) explained the Protestants' economic advantage by their work ethic. There is no evidence, however, that the medieval Coptic culture was any different from the Egyptian Muslim culture, and, in fact, both cultures were mystical in nature.⁹ Kuznets (1960) explained Jews' superior SES by their attempt, as a minority, to preserve their religious identity by specializing in occupations in which they had built a tradition. Although this hypothesis may be appealing in explaining the preservation of Copts' domination of the bureaucracy *after* they became a minority (section 7), it does not explain why Copts, who initially constituted the vast majority, made the occupational transition towards white-collar jobs. The Jewish socioeconomic premium is also often explained by the ban on Jews from practicing specific occupations such as farming (Abrahams 1896, pp. 211-50). Yet, Copts were not banned from farming and, unlike Jews, were not an urban population. In 1848-68, 33 percent of adult active male Copts were farmers, while Jews had none. Finally, Botticini and Eckstein (2005) argued that the literacy requirement under Rabbinic Judaism led, via positive selection, to Jew's

⁹ Both medieval Coptic and Muslim (predominantly, Sufi) cultures in Egypt were characterized by mystic beliefs in saints, martyrs, miracles, and apparitions. For long, Copts and Muslims celebrated together various festivals for Coptic or Muslim icons (Hoffman 1995, pp. 428-56; Mayeur-Jaouen 2012, pp. 157-173).

higher human capital. Yet, no literacy requirement existed under Coptic Christianity, and illiteracy among adult male Copts in 1986 was as high as 34 percent.

The paper is also linked to the literature on the persistent impact of critical institutional changes on economic outcomes (Acemoglu, Johnson, and Robinson 2001; Nunn 2008; Dell 2010; Acemoglu et al. 2011). I show that the poll tax institution, which was exported by the Islamic Conquest, shaped religious choices and created socioeconomic inequalities that persisted for over a millennium. The persistence of Copts as a quasi-elite for over a millennium provides a striking example of the persistence of elites (Acemoglu and Robinson 2008; Clark et al. 2012).

The socioeconomic privilege of the non-Muslim minorities is an intriguing phenomenon in the Middle Eastern economic history literature. One strand of this literature argues that the phenomenon did not exist before the nineteenth century, and, hence, explains it by the rise of modern European influence that favored local non-Muslims (Issawi 1981), or by the latter's adoption of European legal structures (Kuran 2004). Documenting that the Coptic-Muslim socioeconomic gap long predates the rise of Europe, this paper offers an alternative explanation: the selection effect of the poll tax. It is important here to notice that: (a) this explanation was first suggested by Courbage and Fargues (1997, pp. 22-3), and (b) since the poll tax was implemented in all Muslim-ruled regions, the explanation may well hold beyond Egypt.

The Islamic Conquest of Egypt was a major milestone in the spread of Islam and thus received much attention in history. This paper makes three contributions to the historical literature. First, by examining the selection effect of the poll tax on conversions to Islam, the paper links two lines of literature: (a) the effect of the poll tax on the *systematic* conversion of Copts to Islam (Wellhausen 1927 [1902]; Becker 1903; Dennett 1950; Morimoto 1981), and (b)

the quasi-monopoly of Copts over medieval bureaucracy (Tagher 1998 [1951]; Sheikho 1987; Samir 1996; Amer 2000). Second, the paper perhaps sheds a new light on the long-lasting debate on the causes of Islamization of Egypt.¹⁰ Instead of identifying the causes of Islamization *per se*, among which the poll tax may, or may not, be the *main* cause, the paper attempts to identify the causes of the Coptic-Muslim socioeconomic gap, where the poll tax appears to be the *initial* cause that is most consistent with historical facts. Third, the dataset that I constructed on Coptic churches and monasteries circa 1200 and 1500 contributes to another long-standing debate on the timing of Islamization (sections 3.1 and 6.2).

3. Islamization of the Coptic Egypt: Timing and Demographic Causes

3.1 Timing of Islamization

Christianity has a long history in Egypt reaching back to the first century, and the Church of Alexandria was a major theological center since the second century (Roberts 1979, pp. 1-26; Bowman 1989, pp. 191-202). The last pocket of paganism was Christianized in the mid-sixth century (Bowman 1989, p. 192). The Church of Alexandria, followed by the Coptic (Egyptian) masses, separated from the Roman and Byzantine on the grounds of a theological debate in 451 (Tagher 1998 [1951], pp. 1-7; Atiya 2005, pp. 71-6). Greeks and Hellenized Egyptians remained loyal to the Roman and Byzantine churches forming a *parallel* church, the Melkite Church of Alexandria. Condemned as *heretics*, Copts suffered from persecution under the Byzantines until the Islamic Conquest (Bowman 1989, p. 198; Atiya 2005, pp. 87-99).

When Muslims conquered Egypt in 640, Copts constituted the vast majority of the population, with Melkites and Jews forming two small minorities (Lane-Poole 1969, p. 2; Tagher

¹⁰ Many historians reject that the poll tax was the main cause of Islamization of Egypt, although they admit that the tax did have an effect on conversions (Amer 2000; El-Leithy 2005).

1998 [1951], p. 4; Wilfong 1998, p. 175).¹¹ In the absence of statistics, Wilfong (1998) points out that it is not possible to identify the point at which Copts shrank into a minority. One historical tradition (Al-Maqrizi 2002; Dennett 1950; Lane-Poole 1969; Mikhail 2004) argued that Egypt was Islamized after the suppression of the eighth and ninth century Coptic tax revolts. Another tradition (Wiet 1927; Little 1976; El-Leithy 2005; Werthmuller 2010) argued that the *deathblow* to Christianity occurred in 1250-1517, as pressures by the Mamluk state triggered a wave of mass conversions to Islam among Copts.

A quantitative approach found that most conversions took place in 640-900. Bulliet (1979) used lineages of prominent individuals in medieval narratives in order to identify the point at which an individual's ancestors converted to Islam and thus adopted an Arabic name. He found that conversions peaked in the ninth century. Courbage and Fargues (1997, pp. 27-8) used the time series of total land and poll tax revenues from Russell (1966), in order to estimate the non-Muslim population share over time. They found a sharp decline in the revenues before 800, thus suggesting that Copts became a minority by then (figure II).

3.2 Demographic Causes of Islamization

As Fargues (2001) pointed out, four demographic processes may account for the Islamization of Egypt in 640-1848 that is depicted in figure II: (1) conversion of Copts to Islam, (2) replacement of Copts by Muslims via migration, (3) different birth and death rates between Copts and Muslims, and (4) intermarriage between Muslim males and Coptic females (opposite scenario is prohibited), which results, by Islamic law, in a Muslim offspring.

Historical and demographic evidence suggests, however, that the Islamization of Egypt was driven primarily by conversion, in particular, *voluntary* conversion. Arab immigration, the

¹¹ Other minor Christian factions were later assimilated into the Coptic or Melkite Churches (Mikhail 2004, p. 46).

largest Muslim immigration wave to Egypt, was perhaps insignificant compared to the Coptic population.¹² On the Eve of the Conquest (600), the population of Egypt (2.7 millions) was about three times that of the Arab peninsula (1 million) (Russell 1958, p. 89). Kennedy (1998, p. 62) states that the Arab invading army was small, around 20,000, whereas Russell (1966) estimates the total number of Arab immigrants in 650 by 100,000. Although there were successive Arab immigration waves that arrived between 640 and 1171, the time series estimates of the population of medieval Egypt constructed by Russell (1966, p. 81) (figure III) do not show any surge over this period.¹³ One must add that there was no significant Coptic emigration from Egypt in 640-1848. Copts, because of their denomination that differed from both the Roman and Byzantine Churches, were a highly isolated group that was first *discovered* by Europeans in the fifteenth century (Hamilton 2006, pp. 1-5).

Yet, Muslims might have had higher birth and/or lower death rates than Copts, and, thus, gradually replaced Copts in 640-1848. Evidence here is scanty because of the absence of vital statistics and/or population censuses. However, because the 1848-68 census samples predate the demographic transition, they could provide a glimpse of the demographics of medieval Egypt. The samples suggest two points: (a) within male heads of households, Copts have, on average, *more* children than Muslims (1.48 versus 1.35),¹⁴ reflecting Copts' higher fertility and/or lower child mortality, and (b) estimates of adult mortality suggest that Muslims have lower mortality at younger ages (10-49), but not at older ages (50-79).¹⁵

¹² Non-Arab Muslim immigrants (e.g. Turks) were smaller in size and, unlike Arabs, never settled in rural Egypt.

¹³ In 833, the Islamic state stopped paying pensions to Arab immigrants, who lost their aristocracy status as a result (Morimoto 1981, p. 167). Consequently, Arab immigration to Egypt subsided after the ninth century.

¹⁴ This is the average number of children who are 10 years old or younger and currently residing with the household head (at least 25 years old). The difference between Copts and Muslims is statistically significant (p-value = 0.003).

¹⁵ Estimation of adult mortality is described in appendix A. Vital statistics from the twentieth century reveal that Copts witnessed the demographic transition *before* Muslims (Courbage and Fargues 1997, p. 199-200).

Also, judging from the scanty evidence that reached our hands, cross-marriages between Muslims and Copts were perhaps very limited. Although Mikhail (2004, pp. 63-5) speculates that cross-marriages might have been on the rise in 750-900 compared to 640-750, he notes that extant cross-marriage contracts are “notoriously few.” This observation does not seem to be limited to the early period, since the 1848-68 census samples record only *two* cross-marriages.

Two final remarks to make: First, conversion to Islam was mostly by choice. Historians document three episodes of forced conversions under Al-Mutawakkil (847-61), Al-Hakim (996-1021), and the Mamluks (1250-1517). Only the first episode occurred in 640-900. Second, conversion was a one-way process as apostasy was punishable by death.

4. Historiography of the Poll Tax Institution

This paper hypothesizes that the poll tax generated a process of self-selected conversions to Islam among Copts. In this section, I highlight key elements in the historiography of the poll tax institution that lend support to the underlying assumptions of the hypothesis.

4.1 The Islamic Poll Tax: Individual Tax on Non-Muslims

The Islamic poll tax, an institution dictated by the Quran, resembled the Byzantine poll tax, yet, with a crucial innovation: exempting converts from it, and, hence, turning it into a tax on religion.¹⁶ This principle was endorsed by Islamic jurisprudence since its emergence around 750 (Abu-Youssef 1979, p. 122). Although there were a few viceroys in 640-750, who imposed the tax on converts, perhaps to compensate for the falling tax revenues, which, in turn, resulted from widespread conversions (Morimoto 1981, pp. 66-91), exempting converts was restored in 720.

¹⁶ Quran (9:29): “*Fight those who believe not in Allah, nor the Last Day, nor hold that forbidden which hath been forbidden by Allah and His Messenger, nor acknowledge the religion of Truth, (even if they are) of the People of the Book (Christians and Jews), until they pay the poll tax with willing submission, and feel themselves subdued.*”

The poll tax was an *individual* tax. From 750 onwards, Islamic jurists, distinguished the poll tax (*jizya*), imposed on adult free non-Muslim males on the individual basis, from the land tax (*kharaj*) imposed on land acreage regardless of the religion of the landholder (Abu-Youssef 1979, pp. 122-4). Even though the first Muslim chronicler of Egypt, Ibn-Abdul-Hakam (1974, pp. 64-6), stated that the poll tax from 640 onwards was *per head*, there is a controversy among historians on whether the tax was *in practice* an individual tax in 640-750.¹⁷

4.2 Declining Poll Tax Burden in 640-1856

The poll tax was payable in money, and not in kind, which perhaps made it a heavier burden given the relative scarcity of precious metals coinage. The *de jure* annual poll tax in 640 was fixed at two (gold) dinars. With the emergence of Islamic jurisprudence around 750, two viewpoints prevailed: the first dictated that the poll tax is a lump-sum tax of one dinar, while the other, adopted by the state in most of Egypt's history, imposed the tax according to three income brackets: one dinar on manual workers, two dinars on the middle-income, and four dinars on the rich.^{18 19} Although there were slight changes in the nominal poll tax in 1101-1856, as shown in

¹⁷ Wellhausen (1927 [1902], pp. 477-82) and Becker (1903, pp. 81-112) argue that the tax in 640-750 was, following the Byzantine system, a fixed tribute imposed at the village-level, with no distinction made between land and poll taxes, and that the distinction emerged only later on with the fiscal reform of 720. Dennett (1950, pp. 62-103) argues, to the contrary, that the poll tax was at the individual-level from the outset. Morimoto (1981, pp. 53-144) suggests that the individual principle was applied in 640-750 in order to estimate each village's tribute and that the poll tax became fully institutionalized as an individual tax with the fiscal reform of 720.

¹⁸ Both the Hanafi Sunni School (official under the Abbasids in 750-969 and the Ottomans in 1517-1856) and the Ismaili Shiite School (official under the Fatimids in 969-1171) endorsed the three-bracket formula (Hanafi: Abu-Youssef 1979, pp. 122-4; Ismaili: Al-Qadi Al-Nu'man 1963, pp. 379-381), whereas the Shafi'i Sunni School adopted the fixed tax formula (Al-Shafi'i 2001, pp. 423-30). Although the Ayyubids (1171-1250) and the Mamluks (1250-1517) officially endorsed the Shafi'i School, they often adhered to the three-bracket system (Mahmoud 2009a; pp. 32-7). The Hanbali and Maliki Sunni Schools both asserted that the poll tax should be assessed according to the individual's economic means (Hanbali: Abul-Fadl Saleh 1999, p. 344; Maliki: Malik Ibn-Anas 1985, pp. 278-80; Al-Baji 1999, pp. 275-9). The latter schools, however, were not adopted by the state in Egypt.

¹⁹ Muslim jurists disagreed as to the exemption of the poor from the poll tax. While the Hanafi, Hanbali, and Maliki Sunni schools dictated that the poor are exempt from the tax, both the Ismaili Shiite and the Shafi'i Sunni schools did not grant such exemption. For example, using evidence from the Cairo Geniza on destitute Jews who paid the poll tax, Goitein (1963) and Alshech (2003) argued that the Ayyubids applied the Shafi'i viewpoint. Importantly, under both viewpoints, any *active* adult male is considered non-poor, and is thus *not* exempt from the poll tax.

figure IV.1, real poll tax fell over time because of inflation (figure IV.2). Moreover, figure IV.3 depicts the poll tax lower bound as a percentage of laborers' wages in 701-1500. The poll tax burden was highest in the eighth century (14 percent), but because nominal wages grew at a greater rate than the tax, the tax burden fell to only 1 percent in the fifteenth century.²⁰

4.3 Spatial Variation in the Enforcement of the Poll Tax

The enforcement of the poll tax was subject to the discretion of local elites, who controlled tax assessment and collection, whether they were accountable, directly, to state officials in 640-900, or, indirectly, to tax farmers in 900-1856 (Morimoto 1981, pp. 175-81; Ismail 1998, pp. 164-7; Mahmoud 2009a, pp. 147-81).²¹ Extant papyri poll tax registers and receipts in 703-930, from the APD and Morimoto (1981, pp. 67-79), show that the poll tax varied both within and across districts, exhibiting amounts that differed from those dictated by jurists and official handbooks, with the *de jure* amounts serving only as guiding principles.^{22 23}

4.4 Regressive Tax

There is evidence that both the *de jure* and *de facto* poll tax were regressive, i.e. the average poll tax rate was decreasing in income. I first use Ashtor (1969) in order to obtain

²⁰ Perhaps, Muslim rulers did not adjust the poll tax to account for inflation and/or rising nominal wages because of their need to abide by Islamic jurisprudence in order to sustain their legitimacy.

²¹ In 640-750, Arabs kept the Byzantine tax system, which relied on local elites who were directly accountable to the state, mostly intact. Village headmen assessed the individual tax amounts, which were then aggregated to estimate the tribute of the village (Morimoto 1981, pp. 66-91; Bagnall 1996, p. 318; Frantz-Murphy 1999). The state attempted to tighten its control over taxation in 720. However, in response to a series of tax revolts that were ignited by strict enforcement in the eighth and ninth centuries, the state resorted to tax farming in the ninth century (Sijpesteijn 2009), which remained in effect until the nineteenth century (Cuno 1992, pp. 17-32). Under this system, the state contracted out, through auctions, the tax collection of each district to individuals (Morimoto 1981, pp. 231-3). Under the Ayyubids and the Mamluks in 1171-1517, tax farming took the form of feudalism, whereby high-ranked military officers were granted large landholdings and control over tax collection of entire regions. Importantly, tax farmers continued to rely on local elites in taxation.

²² I found 391 poll taxpayers, from 13 poll tax lists and 3 poll tax receipts in 703-930. The poll tax amounts range between 0 and 7 dinars, with an average of 1.19 dinar and a standard deviation of 1.26 dinar.

²³ Using private letters from the Cairo Geniza in 1171-1250, Goitein (1963, p. 286) concludes that, "the data given by the Muslim handbooks of administration, although hardly reflecting the realities in full, are basically correct."

information on occupation-based wages in medieval Egypt, where I classify each occupation into one of the three income brackets according to the criteria in Abu-Youssef (1979, p. 122). Figure V depicts the scatter plot of wages and the average (de jure) poll tax rate under the three-bracket system in 660-1517. The figure shows a negatively sloping average poll tax rate.

How about the enforced poll tax? Extant individual-level papyri tax registers from three sub-districts in the Nile Valley in 703-4 (Morimoto 1981, pp. 67-79), allow me to examine the relationship between the de facto poll tax and land tax, as a proxy for income, which I show in table I. There is an important caveat, however. The tax lists may not be representative of the relationship between income and the poll tax across time and space. Bearing this caveat in mind, I find that the poll tax *amount*, not only the average rate, is decreasing in the land tax.

4.5 Poll Tax Captures the Coptic-Muslim Net Tax Differential

The other taxes/benefits that were in place did *not* differ across Muslims and Copts, and thus, the poll tax captures the Coptic-Muslim difference in net taxes. First, the land tax (*kharaj*), in Islamic jurisprudence, was not different across Copts and Muslims. Second, Muslims were subject to Islamic alms (*zakat*), transfers from rich to poor Muslims, or a progressive tax on Muslims. However, Coptic monasteries and churches, perhaps funded by rich Copts, on their part, gave transfers to poor Copts, perhaps compensating for the *zakat* incentive.²⁴ Third, Muslims, unlike Copts, were subject to military conscription, which can be thought of as a non-pecuniary regressive tax on Muslims (poor Muslims were more likely to be drafted). However, I argue that military conscription did not offset the poll tax incentive to convert to Islam for two

²⁴ Similar to the evidence in the Cairo Geniza in 1171-1250 on the aids provided by Jewish institutions to help poor Jews pay the poll tax (Alshech 2003), Coptic Monasteries provided financial and physical aid to Coptic taxpayers. They leased out their landholdings to farmers (Richter 2009), and provided Copts with loans and grants to help pay the poll and land taxes, and in exchange for future services (Markiewicz 2009). Also, Copts often took refuge in monasteries to avoid paying the poll tax (Morimoto 1981, p. 118).

reasons: (a) as a non-pecuniary tax, it was affordable by the poor, and, (b) unlike the poll tax which was paid annually until death, conscription was a one-time tax. Finally, in 640-900, converts were treated as second-class Muslims, another non-pecuniary regressive tax on converts. However, I argue that this too perhaps did not offset the poll tax incentive for the same reasons mentioned above.²⁵

5. Empirical Evidence I: Cross-District Evidence

5.1 Data

I use two proxies for poll tax enforcement and religiosity, the two components of the cost of conversion: (a) a dummy variable that takes the value of one if the district received an Arab immigration wave in 640-900 (see appendix B), and (b) a dummy variable that takes the value of one if the district is believed to be visited by the Holy Family in their biblical flight to Egypt. Figure VI depicts the spatial variation in the two proxies and the Coptic population share in 1897. While Arab immigration penetrated all regions, it was relatively less destined to the Middle and Southern Nile Valley. By contrast, the legendary route of the Holy Family did not extend beyond the Middle Valley. Interestingly, in 1897 Copts were relatively more concentrated in the Middle Valley.²⁶

The data on the two outcomes, religion and SES, come from two samples of the 1848 and 1868 Egyptian censuses (8-10 percent in Cairo and Alexandria and 1 percent in other provinces),

²⁵ Practically, conversion to Islam involved citing the *shahada* in front of the Islamic authorities. An important papyri list of converts from 700-900 in Morimoto (1981, p. 131) also suggests that a convert had to be registered in the Arab army upon conversion where he had to be a client (*mawla*) of the clan of an Arab patron.

²⁶ The Nile Delta is the Northern triangle on the map, and includes in 1897 the provinces of Al-Buhayra, Al-Gharbiya, Al-Minufiya, Al-Qalyubiya, Al-Daqahliya, Al-Sharqiya, and the districts of Shubra and Al-Wayli wal Matariya. The Nile Valley, extending from the south of the Delta to the Southern borders, is divided into three regions: The Northern Valley includes Al-Giza, Al-Fayyum, Bani Soueif, and the district of Hulwan; the Middle Valley includes Al-Minya, Asyut, and Girga; the Southern Valley includes Qina and Al-Nuba.

and two oversamples of non-Muslims in Cairo in 1848 and 1868 (25 percent). I digitized these samples from the original manuscripts at the National Archives of Egypt, where the sampling strategy is described in Saleh (2013). I pooled the samples from both years and restricted the analysis to Egyptian local free Coptic and Muslim active men of rural origin who are at least 15 years old with non-missing age, religion, occupational title, and district of origin. Three notes on the sample restrictions are in order. First, Egyptians are those recorded as *dakhil al-hukuma*, or under the government's control. Second, *locals* further exclude Bedouins, Turks, Levantines, Nubians, and blacks. These exclusions aim at restricting the sample to the potential descendants of the pre-640 Coptic population of Egypt. Third, restricting the sample to those of rural origin, i.e. from the Nile Delta or Valley, is to mitigate concerns about possible migration of an individual's ancestors across districts between 900 and 1848-68. Arguably, ancestors of individuals of rural origin are less likely to have migrated across districts, under the presumption that most migration was from rural to urban districts.²⁷

In the absence of data on income, I define SES in terms of occupational title. I construct three dummy variables for white-collar jobs. SES1 takes the value of one for professionals,²⁸ administrative and managerial workers, and clerical and related workers. SES2 further includes judiciary-related workers,²⁹ higher education teachers, military officers, policemen, village headmen, major landowners, and ministers of religion. SES3 includes, in addition, merchants and traders. Table II shows the descriptive statistics at both the individual- and district-levels.

²⁷ The district of origin is the district that the individual's family originated from. Children in the 1848 census inherit the district of origin of their father (Saleh 2013). I excluded individuals from urban provinces (Cairo, Alexandria, Rosetta, and Damietta), or border provinces (Al-Arish, Al-Qusayr, and the oases of the Western Desert).

²⁸ Professionals include engineers, physicians, pharmacists, veterinarians, ship's masters, medical assistants, accountants, translators, and interpreters.

²⁹ Judiciary-related workers include judges, lawyers, legal delegates (*wakeel*), and petition writers (*'ard'halgi*).

5.2 Empirical Strategy

The poll tax hypothesis argues that the cross-district variation in the historical cost of conversion predicts both religion and group-mean SES. I run the following OLS regressions:

$$(1) \text{copt}_{ij} = \alpha_1 + \alpha_2 \text{arabimm}_j + \alpha_3 \text{holylfamily}_j + \alpha_4 X_j + \varepsilon_{ij}$$

$$(2) \text{SES}_{ij} | \text{copt}_{ij} = \beta_1 + \beta_2 \text{arabimm}_j + \beta_3 \text{holylfamily}_j + \beta_4 X_j + u_{ij}$$

Where *copt* is a dummy variable that takes the value of one if individual *i* from rural district of origin *j* is a Copt; *arabimm* is the Arab immigration dummy variable; *holylfamily* is the legendary route of the Holy Family dummy variable; *X* includes log (population) and the percentage of males who are able to read and write in 1897; SES is one of the three white-collar jobs dummy variables. I estimate equation 2 for Copts and converts (Muslims) separately.

The regressions tackle two questions: Are individuals from rural districts of origin with higher cost of remaining Coptic in 640-900 less likely to be Coptic in 1848-68? Are Copts and Muslims from these districts better off than their coreligionists elsewhere? The hypothesis predicts that (1) $\alpha_2 < 0$ and $\alpha_3 > 0$, and (2) $\beta_2 > 0$ and $\beta_3 < 0$ for both Copts and Muslims.

5.3 Results

The results are shown in tables III and IV. The standard errors are clustered at the district of origin level. Table III shows that, controlling for the cross-district variation in population size and male literacy rate in 1897, individuals from rural districts of origin that received an Arab immigration wave in 640-900 are less likely to be Coptic in 1848-68. Although the dummy for the route of the Holy Family has the predicted sign, it is not statistically significant, perhaps because of the sampling error of the 1848-68 samples, which do not have the full population count in each district. Hence, I re-estimate equation 1 at the district-level using the percentage of

Copts in the 1897 census, which has the full counts, as the dependent variable. I find that the impacts of Arab immigration and the route of the Holy Family are both statistically significant.

Table IV shows that both Copts and Muslims from districts of origin that received an Arab immigration wave in 640-900 or that lie off the legendary route of the Holy Family are more likely to be in a white-collar job than their coreligionists from elsewhere. However, the result does not hold for all measures of SES. In particular, when I use SES3 as the dependent variable for Copts or SES1 for Muslims, I find that the impact of Arab immigration and/or the legendary route of the Holy Family are not statistically significant. This may reflect the domination of each religious group over specific white-collar occupations, Copts as bureaucrats, and Muslims as judges, officers, and merchants. Overall, the results are supportive of the hypothesis. Controlling for the cross-district variation in income, districts where the poll tax was more strictly enforced, or where Coptic Christianity was less deeply rooted, witnessed wider conversions among poor Copts to Islam, and, thus, to the survival of the richest Copts.

5.4 Historical Proxies: Interpretations and Threats to Exogeneity

Do the historical proxies reflect poll tax enforcement and religiosity or they rather admit of other interpretations? Are they exogenous, controlling for the cross-district variation in income, or they are rather correlated with other omitted variables that are perhaps driving the results? This subsection addresses these two concerns.

Using Arab immigration to Egypt in 640-900 as a proxy for the local enforcement of the poll tax is supported by historical evidence. Arab settlers, who increased in numbers in the eighth and ninth centuries, formed the new local elites by owning large landholdings in the districts they immigrated to (Sijpesteijn 2009). Arab settlers contributed to the Arabization of the fiscal

administration, where local elites played a central role. But this process entailed high costs on Coptic taxpayers in those districts. Arab elites were more likely to strictly enforce the poll tax on Coptic taxpayers compared to districts where Coptic elites remained in power. According to Sijpesteijn (2009), the Coptic tax revolts in 726-68 resulted, to some extent, from the increased Arab settlement. Basically, the revolts were fueled by frustrated Coptic taxpayers and were led by disenfranchised Coptic rural elites, who had previously controlled the fiscal administration, against the strict tax enforcement by the Arabs.

Similarly, the route of the Holy Family appears to be a valid proxy for the attachment to Coptic Christianity. As a route of *miraculous* sites that Jesus and/or Mary are believed to have created, such as handprints, footprints, trees, and wells, the path reflected local beliefs, and formed a major pillar of Coptic Christianity and its major source of pride until today.

However, the proxies may also admit of other interpretations. First, Arab immigration has a mechanical negative impact on the Coptic population share in equation 1. Yet, according to the evidence in section 3.2, the relative size of the immigration was negligible, and so, most of the observed impact may be attributed to the enforcement of the poll tax. Second, the legendary path of the Holy Family was also a pilgrimage destination and a source of income for local Copts.

Concerns may also arise regarding the possible endogeneity of the proxies. The destination of the Arab tribes in Egypt was an endogenous choice. Al-Barri (1992, p. 63-7) points out several reasons why Arab tribes chose specific districts for their settlement, including proximity to the capital (Fustat), fertile soil, favorable weather, and availability of minerals. I address this concern in two ways: (a) Controlling for population and male literacy rate in 1897, mitigates the concern about possible correlation of Arab immigration with district income, and

(b) I re-estimate equations 1 and 2 using the distance to Fustat as an instrument for Arab immigration. The results in table V are qualitatively similar for Copts, but not for Muslims.

Finally, although the route of the Holy Family may have been altered after the Islamic Conquest, the original local traditions that invented it date back to before 640.³⁰

6. Empirical Evidence II: Time Series Evidence

The cross-district evidence suggests that poll tax enforcement, conditional on religiosity and income, generated a process of self-selected conversions to Islam among Copts. Since most conversions occurred in 640-900, the findings suggest the persistence of the spatial and occupational distribution for both Copts and converts (Muslims) in 900-1848. Nonetheless, one may argue that the findings stem, not from self-selected conversions per se, but rather from inter-religious differential time trends of spatial and/or occupational mobility in 900-1848. In this section, I introduce both historical and quantitative evidence on the evolution of the spatial and occupational distributions for Copts and Muslims, which I compare to the time trends of the poll tax burden (figure IV.3) and conversion of Copts to Islam (figure II).

6.1 Poll Tax Burden and Conversion to Islam in 640-1500

The declining trend of the poll tax burden in figure IV.3 coincides with that of the conversion of Copts to Islam in figure II, hence suggesting that the relatively high tax burden in 640-900 caused widespread conversions among Copts to Islam, but that the tax incentive faded

³⁰ The legendary route is based on Matthew 13: “*When they had gone, an angel of the Lord appeared to Joseph in a dream. “Get up,” he said, “take the child and his mother and escape to Egypt. Stay there until I tell you, for Herod is going to search for the child to kill him.”*” The specific path that is endorsed by the Coptic Church is based on an apocryphal book, *Vision of Theophilus*. Although the book is attributed to Theophilus, the Patriarch of Alexandria in 385-412, it was perhaps written by Cyriacus, a Coptic bishop in the fifteenth century (Mingana 1931, pp. 3-4). Nevertheless, Cyriacus, in his work, recorded local traditions that perhaps emerged before Islam, because there is large pre-640 evidence on the existence of local beliefs surrounding the path of the Holy Family. The earliest post-biblical record of the flight of the Holy Family dates back to the third century, and the event was also recorded in various accounts by historians and theologians in both the Roman and Byzantine periods. Yet, whether the route was totally invented before Islam or was rather altered throughout the centuries is impossible to tell.

away after 900. Indeed, this speculation is supported by historical evidence. Medieval narratives on the impact of the tax on conversions are found in 640-800, but not afterwards.

The ninth century Coptic chronicle of Sawirus Ibn-Al-Muqaffa' (1910, pp. 116-7) described that, in 701-50, the Arab governor, "*proclaimed that all those, who would give up their own religion and become Muslims, should be exempted from the poll tax for that was an impost due from all of them. By means of this procedure Satan did much harm to many people who gave up their religion... For we have counted those who have seceded to the religion of Islam from among our brethren, the baptized Christians, in Misr [Cairo] and its neighbourhood, through the persuasions of this governor, and they amount to twenty-four thousand persons.*" In another event in 744-68 (p. 189), "*Abd Allah, the prince, sent letters over the whole of his empire, declaring that everyone who would adopt his religion, and pray according to his prayer, should be exempted from the poll-tax. So in consequence of the cruel extortions and burdens imposed upon them, many of the rich and poor denied the faith of Christ, and followed Abd Allah.*"³¹

6.2 Copts' Spatial Shift in 640-1848

Do inter-religious differential trends of spatial mobility in 900-1848 explain the observed cross-district correlation between the historical proxies and the Coptic population share? It could be, for example, that Copts moved over time to districts with lower cost of keeping the Coptic faith. There are two pieces of evidence here. First, there is historical evidence that the region-

³¹ Also, the seventh century Coptic chronicle of John of Nikiu (1916, p. 201), described the consequences (?) of increasing the poll-tax by Menas, the governor of Alexandria, beyond what was dictated by 'Amr Ibn-Al-'As, the first Muslim viceroy of Egypt (642-4): "*Now this Menas had increased the taxes of the city, which 'Amr had fixed at 22,000 gold dinars, and the sum which the apostate Menas got together was 32,057 gold dinars - he appointed for the Moslem. And none could recount the mourning and lamentation, which took place in that city: they even gave their children in exchange for the great sums, which they had to pay monthly. And they had none to help them, and God destroyed their hopes, and delivered the Christians into the hands of their enemies... And now many of the Egyptians who had been false Christians denied the holy orthodox faith and lifegiving baptism, and embraced the religion of the Moslem, the enemies of God, and accepted the detestable doctrine of the beast, this is, Mohammed, and they erred together with those idolaters, and took arms in their hands and fought against the Christians.*"

level religious map of Egypt (figure VI.4), with the relative concentration of Copts in the Nile Valley, first emerged in 640-900, the period of conversions. A Coptic liturgical text dating back to 701-1000 stated that, “*the remaining (Copts) in Upper Egypt (Nile Valley) who know the Coptic language and speak it are mocked and insulted by their Christian brethren who speak the Arabic language.*” The text may be interpreted as evidence that both Arabization (switching from Coptic to Arabic language) and Islamization were *slower* in the Nile Valley than in the Nile Delta.³² Furthermore, it appears that this pattern was correlated with the variation in the enforcement of the poll tax, which was stricter in the Nile Delta. In 726-68, five Coptic revolts erupted because of strict tax enforcement (Morimoto 1981, pp. 145-72; Mikhail 2004, pp. 195-211). Table VI shows that out of the five revolts, four erupted in the Nile Delta. Perhaps because of its proximity to Fustat, and its consequent receipt of more Arab immigration waves, the Nile Delta witnessed stricter tax enforcement, and thus more conversions among Copts.^{33 34}

The second piece of evidence is quantitative and is based on a dataset on Coptic churches and monasteries in 1200 and 1500, which I compiled from Abul-Makarim (1984) and Al-Maqrizi (2002) (see appendix B). The dataset sheds a new light on both the timing of Islamization and the spatial distribution of Copts over time. First, in 1200, only 15 percent of the villages had at least one Coptic church or monastery, suggesting that Copts were already a minority by then, but between 1200 and 1500, the percentage further declined to 3 percent, suggesting further

³² The text is an excerpt from the apocalypse of Samuel, Bishop of the Monastery of Qalamun in the province of Al-Fayyum (Ziadeh 1915-17, p. 380). It is suggested that the document dates from the eighth to tenth centuries, and a French historian used the document in understanding the timing of Islamization (Papaconstantinou 2007).

³³ I excluded ten tax revolts that erupted in 783-866 (nine of them were in the Nile Delta) because both Arabs and Copts participated in them and, thus, they may have been motivated by other reasons.

³⁴ Also, the violent suppression of the tax revolts may have demoralized Copts in the Nile Delta and caused their mass conversion to Islam (Al-Maqrizi 2002; Dennett 1950; Lane-Poole 1969; Mikhail 2004).

conversions to Islam.³⁵ Second, figure VII depicts the spatial variation in the number of Coptic churches and monasteries (per 1,000 individuals in 1897) in 1200 and 1500, as a proxy for the Coptic population share. Copts were relatively *slightly* more concentrated in the Northern Valley (0.14 Coptic churches and monasteries per 1,000 individuals) and the Middle Valley (0.13) than in the Nile Delta (0.10) or the Southern Valley (0.07). Yet, Copts' relative concentration in the Middle Valley became even more pronounced by 1500. While the number of churches and monasteries per 1,000 individuals fell to 0.04 in the Middle Valley in 1500, they declined even further to 0.01 in the Northern and Southern Valley, and almost disappeared from the Delta. Finally, table VII shows that using Coptic churches and monasteries as the dependent variable in equation 1 yields qualitatively similar results to table III (although the coefficients are statistically insignificant in 1200), hence suggesting that the impact of poll tax enforcement and religiosity on conversion was manifested since at least 1200 and persisted in 1500 and 1848-68.

6.3 Copts' Occupational Shift in 640-1848

Does the cross-district correlation between the historical proxies and the group-mean SES that is observed in 1848-68 reflect the self-selection feature of the conversion process in 640-900, or is driven instead by inter-religious differential trends of occupational mobility?

That Copts *persistently* dominated the bureaucracy in 640-1848 is well documented (Tagher 1998 [1951]; Sheikho 1987; Samir 1996; Amer 2000). Before the Conquest, Copts were, on average, worse off than the two minorities, Melkites and Jews. Melkites, who spoke only Greek (Mikhail 2004, p. 133), the language of the Byzantine bureaucracy, held a privilege in this domain. Copts, on their part, were mostly farmers with a small elite working in the

³⁵ The population is the *old* villages in the 1897 census that existed before 1477, according to Ramzi (1994 [1954]). Compare to the debate on the timing of Islamization in section 3.1.

bureaucracy.^{36 37} Upon the Conquest, Arabs left the bureaucracy in the hands of the local population (Butler 1996, p. 465), but by the end of the seventh century, Copts, favored by Arabs, replaced Melkites in the bureaucracy,³⁸ which they dominated until the late nineteenth century.³⁹ While Copts' quasi-monopoly over the bureaucracy was normal in 700 given that they constituted the vast majority of the population, the persistence of this phenomenon beyond 900 is intriguing because Copts shrank into a minority by then. Tagher (1998 [1951], p. 142) states that, "*the condition of the Copt did not change during the six centuries preceding (the nineteenth century)... His work, tax collecting, was the basis of his existence and his only hope to accumulate wealth.*" In this regard, two similar quotations are striking: Circa 1000, Al-Muaqqadasi (1877, p. 183) noticed that, "*scribes in the Levant and Egypt are Christians.*" A millennium later, Lord Cromer, the British Consul of Egypt (1883-1908), mentioned that, "*when the English took Egyptian affairs in hand, the accountants in the employment of the Egyptian government were almost exclusively Copts*" (Tagher 1998 [1951], p. 213).

But did Copts' quasi-monopoly of the bureaucracy reflect an occupational *premium* over Muslims? It could be, for example, that Muslims dominated other white-collar occupations, which declined, for some reason, in 900-1848. Traditionally, Muslims dominated five white-collar domains: top state positions, the military, the judiciary, the police, and the *ulama* (Muslim

³⁶ Unlike Melkites and Jews, Copts were mostly rural: Only 2 percent of Christian churches and monasteries in 1200 were Melkite, of which 89 percent were in the Nile Delta and urban centers. This evidence is consistent with Mikhail (2004, p. 134), who states that there is no literary or documentary evidence on Melkite presence in the Nile Valley in the post-Conquest period. The Melkites' situation before the Conquest was not much different. In the early seventh century, there were only 7 Melkite churches in Egypt (Mikhail 2004, p. 48).

³⁷ Many Copts learned Greek in order to have access to the bureaucracy, and a large part of the ancient Coptic literature and theology was composed in Greek (Mikhail 2004, pp. 135-48). The Coptic bilingual elite invented the Coptic script in the third century to express Egyptian phonetics with Greek alphabets (Bagnall 1996, pp. 230-65).

³⁸ This occurred because of the animosity between Arabs and Melkites (Byzantines), and the latter's consequent increased emigration from Egypt (Lane-Poole 1969, p. 26; Mikhail 2004, pp. 105-6).

³⁹ Coptic domination of the bureaucracy reached its height under the Fatimids (969-1171), where Copts, Melkites, Jews, and Armenians, assumed high-ranked, and not only middle- or low-ranked, bureaucracy. The state's attempts to Islamize the bureaucracy under the Ayyubids and the Mamluks (1171-1517) were not successful.

clergy). Because the nineteenth century was a century of unprecedented state-led modernization, there is no reason to believe that the relative size of these occupations was smaller in 1848-68 than in 900. Moreover, starting from Al-Mu'tasim's reign (833-42), officers' ranks in the army were taken by Turks, i.e. non-Egyptian Muslims (Morimoto 1981, p. 160). In fact, the hostility that Muslims expressed towards the quasi-monopoly of Copts over the bureaucracy perhaps indicates that it was not compensated for by other white-collar venues for Muslims.⁴⁰

I complement the historical narratives with quantitative evidence. I compiled an individual-level dataset on occupations and religion from the APD in 640-1517,⁴¹ which I then augmented from two sources: (a) an individual-level dataset on occupations of the pre-Islamic Egyptian (i.e. Coptic) population from the surviving census returns of Roman Egypt in 11-243 (Bagnall and Frier 1994, pp. 72-4), and, (b) the 1848-68 census samples.⁴² The resulting time series of the occupational distributions for Copts and Muslims are depicted in figure VIII. There are two caveats here: (a) Although I used all the APD documents, the sample sizes are small before 1848, and (b) Arab immigrants are over-represented in the APD. Since these were primarily Arab elites working in top government positions, the occupational distribution for Muslims in 640-1517 is perhaps non-representative of the *converts*' population.

⁴⁰ Muslim jurists in the fourteenth century issued fatwas prohibiting non-Muslims from working in the bureaucracy. Two books are relevant here: Ibn Al-Naqqash's *Reprehensibility of Hiring Ahl-Al-Dhimma* (Christians and Jews), and Ibn Al-Durayhim's *The Right Way to Explain the Ugliness of Hiring the People of the Book* (Christians and Jews) (Tagher 1998 [1951], p. 36). A tenth century Muslim poet, Al-Hassan Ibn Bishr Al-Dimashqi, mocked three Christian top state officials in Egypt at the time: "*Convert to Christianity for Christianity is the true religion! This is proved in our era! Believe in three who achieved lordliness and glory! Do not believe in others who are idle! The Father is Jacob the minister, Aziz is the Son, and the Holy Spirit is Fadl,*" (Sheikho 1987, p. 20).

⁴¹ The APD is an ongoing project aiming at digitizing all the *published* Arabic papyri documents. Out of more than 150,000 Arabic papyri documents that were discovered (mostly from Egypt), there are only 2,500 documents (less than 2 percent) that were published since 1900. The APD, which was launched in 2011, has, as of August 2013, digitized 1,520 out of the 2,500 published documents (61 percent). I used all the APD documents from Egypt in my dataset. There are various types of documents: protocols, legal texts (e.g. marriage contracts, sale contracts), administrative texts (e.g. official letters, lists, accounts), and private texts (e.g. private letters, business letters).

⁴² Roman citizens, likely non-Egyptians (i.e. non-Copts), are not included in the dataset.

If I focus on Copts only, the figure shows that the percentage of Coptic adult males working in white-collar jobs more than doubled after the Islamic Conquest, from 9 percent in 11-243 to 23 percent in 640-900. It then further increased to 31 percent in 901-1517, and to 33 percent in 1848-68. I interpret this trend as evidence on the gradual self-selection on occupations that characterized the conversion process among Copts that mainly took place in 640-900. Because of the high poll tax burden Copts in non-white-collar jobs were more likely to convert to Islam, leaving behind a shrinking, yet *increasingly* better off, Coptic minority.

7. Mechanisms of Persistence

Why did the spatial and occupational distributions for Copts and Muslims persist for over a millennium? Historical evidence suggests that there were institutional/structural features of the labor market that limited both spatial and occupational mobility. The state controlled spatial mobility of individuals since antiquity, since taxation was tied to the village of residence. Morimoto (1981, pp. 113-24) mentions the problem of fugitives in the seventh to tenth centuries, who fled their villages in order to avoid taxation, and how the state undertook measures to send them back to their home villages. Mahmoud (2009a, pp. 159-60), Cuno (1992, pp. 121-4), and the 1848-68 census samples, all indicate that the fugitives' problem persisted in both Ottoman and nineteenth century Egypt. As a permission to travel across villages, the state issued tickets to individuals certifying that they paid the taxes.

Similarly, several institutional factors limited occupational mobility and ensured the hereditary transmission of occupations. First, apprenticeship, the sole route for skill-acquisition and accession to mastership in almost every occupation, was usually limited to the master's network of family and friends. Occupational barriers to entry allowed the *remaining* Copts, i.e.

those who were self-selected, because of the poll tax, in better-paid, white-collar or artisanal, jobs, to preserve the know-how of these occupations within the community. For example, Tagher (1998 [1951], pp. 212-3) and Samir (1996) describe the barriers to entry set up by Copts in order to maintain their quasi-monopoly of the bureaucracy. In the words of Lord Cromer, the Coptic accounting system was “*archaic*” and “*incomprehensible to anyone but themselves.*” And Copts resisted all attempts at reform or simplification of the system (Tagher 1998 [1951], p. 213). They insisted, for example, on using the fraction system, instead of the easier-to-use decimals, in accounting.⁴³ Dor Bey, the Swiss inspector of education in nineteenth century Egypt, argued that, “*the Coptic children have acquired a skill in arithmetic through practical exercises when accompanying their fathers to government offices, sitting by their side or at their feet, and beginning to practice those methods. Later, they entered the government service, [initially] without pay,*” (Tagher 1998 [1951], p. 213). Strikingly, Lev makes a very similar observation on the Fatimid period (969-1171) (Samir 1996, p. 190).⁴⁴

Second, the medieval religiously segregated education system did not serve as an alternative upward occupational mobility device for Muslims. Religious institutions were the

⁴³ Duke d’Harcourt mentioned that Copts’ “*unique calculating genius made them use figures according to methods that they had learned since childhood, making very complex calculations based on 1/24, 1/3, 1/4, 1/2, 1/24 out of 1/24. It is difficult for us to follow their method of calculation because they conduct it with great speed, using certain ambiguous abbreviations, which are recorded on paper. Undoubtedly we can reach the accurate solution faster than they do by using the methods of calculation followed in Europe. But because their methods are based on measurements in use in the country and because they do not use the decimal fraction system, their speed in calculations exceeds ours. Due to these complex methods of calculation known to them alone, the Arabs [Muslims] have become dependent on them. Although the Copts have had to acknowledge the supremacy of the Europeans, they continue to have the upper hand in the eyes of the Muslim nationals,*” (Tagher 1998 [1951], p. 212).

⁴⁴ Lev argues that “*the persistence of Coptic administrative personnel*” under the Fatimids (969-1171) was because “*the agrarian administration was very complex and not easily mastered. In it the Copts played an important role at the local level as well as at the central offices in the capital... The administrative knowledge was passed on by the officials in their families when fathers employed their sons, thus maintaining the hold of the family over posts.*” Interestingly, Lev seems to endorse the idea of selected conversion of Copts to Islam, as he mentions that, “*the large number of Christians in the administration also reflected the partial Islamization of Egypt. It was a situation that prevailed prior to the Fatimid rule and did not change under the Fatimids,*” (Samir 1996, p. 190).

sole providers of education until 1800 (Heyworth-Dunne 1938, pp. 2-7, 84-92). Coptic schools in the Roman and Byzantine periods were purely religious (Nasim 1991), but they witnessed a *shift* towards teaching secular subjects at some point in the Middle Ages. According to a European traveler in 1693, Coptic schools taught secular sciences (arithmetic and geometry).⁴⁵ By contrast, Muslim schools focused only on learning Arabic orthography through memorizing Quran.^{46 47}

Although these mechanisms are consistent with the historical evidence, it is not possible to distinguish between two scenarios: (a) that Copts *actively* sought to preserve or even improve their economic advantage over converts (Muslims) after they shrank into a minority, perhaps via differential investment in raising occupational barriers to entry and/or secular education in 900-1848,⁴⁸ or that (b) conversion of Copts to Islam involved the survival of white-collar occupations with higher barriers to entry, and/or of schools with secular curricula, in the hands of the shrinking Coptic community, with Copts being *passive* in the process. Put differently, while the first scenario implies that there were other factors, besides the poll tax, that contributed to the observed Coptic-Muslim gap in 1848-68, the second scenario presumes, to the contrary, that the poll tax is the only factor that explains the phenomenon. Thus, it has to be emphasized here that the evidence that I introduced in this paper suggests that the poll tax institution was, conditional

⁴⁵ Heyworth-Dunne (1938, p. 85) mentions the following passage as the earliest account on Coptic schools written by Sadlier (1693): "... the children were taught religion, good manners, to read and write Arabic *and Coptic*... and were taught geometry and arithmetic because *these two sciences are very useful and necessary on account of the overflowing of the Nile, whereby the limits are lost; so that it becomes necessary for them to measure out their land, and by the benefit of the first of these sciences they compute the yearly increase.*" Italics are mine to identify the words of Sadlier (1693).

⁴⁶ Moreover, 20 percent of the teachers in Muslim elementary schools in the 1848-68 census samples were blind, and thus unable to teach reading and writing, unlike teachers in Coptic schools.

⁴⁷ The limited cross-marriage between Copts and Muslims may have also contributed to the persistence of the inter-religious occupational segregation structure in 900-1848. This is consistent with Clark's (2012) explanation of the persistence of the Hindu-Muslim socioeconomic difference in India.

⁴⁸ A third possible mechanism for the *active* persistence of Copts, as a religious minority, in the bureaucracy is that Muslim rulers perhaps found it beneficial in 900-1848 to recruit Copts as scribes, accountants, secretaries, and tax collectors in order to mitigate the principal-agent problem in fiscal administration. In particular, Copts were less likely to collude with Muslim taxpayers, who became the majority since 900.

on religiosity and income, the *initial* cause, and not necessarily the *sole* cause, of the socioeconomic gap between Copts and Muslims.

8. Conclusion

Drawing on both quantitative and qualitative evidence, I traced the origins of the superior economic status of the Coptic Christian minority in Egypt to the imposition of the Islamic poll tax upon the Islamic Conquest of Egypt in 640. The tax, which remained in effect until 1856, led to the conversion of poor Copts to Islam to avoid paying the tax, and the shrinking of Copts to a better off minority. State controls on internal migration, the barriers to entry into occupations, and the religiously segregated education system, which reduced both spatial and occupational mobility, perpetuated the socioeconomic gap between Copts and Muslims.

The paper introduced two complementary pieces of evidence. First, the cross-district evidence showed that districts with stricter enforcement of the poll tax, measured by Arab immigration in the seventh to ninth centuries, and/or lower pre-640 attachment to Coptic Christianity, measured by the legendary route of the Holy Family, have fewer, yet better off, Copts in 1848-68. Second, the time series evidence suggested that Copts shifted spatially, towards the Nile Valley, and occupationally, towards white-collar jobs. Both these shifts occurred in 640-900, the period of conversions to Islam, where the poll tax burden was relatively high before it gradually declined. Also, both shifts persisted or increased in 900-1848.

The main contribution of the paper is in endogenizing religion via an economic institution. The poll tax, which was exported by a military conquest, is used as an exogenous factor to explain the observed correlation between religion and socioeconomic success, because it created an economic incentive to self-select religion based on income. The findings raise new,

and perhaps more challenging, questions: Did the Islamic poll tax institution that operated in other countries in the Middle East, and the European parts of the Ottoman Empire, generate similar inter-religious socioeconomic differentials? Are we able to explain the Christian-Muslim socioeconomic gaps that are observed in Lebanon and Syria for example by the poll tax? Why did Christianity survive, in varying degrees, in Egypt, Lebanon, Syria, and Iraq, but was completely wiped out from North Africa? Can this be explained by cross-country variation in the Islamic poll tax institution or is it due to other factors?

There are new data sources that may shed light on some of these questions: The tax registers (*Tahrir Defterleri*) from sixteenth century Ottoman Syria, Palestine, and Transjordan (Hütteroth and Abdulfattah 1977) include information on poll tax amount and religious composition at the village-level. Also, the recently discovered cadastral survey from Ottoman Egypt in 1528 described in Mahmoud (2009b) includes similar information. These sources could perhaps be combined with the Ottoman individual-level censuses from Lebanon, Syria, and Palestine in 1881-92 (Karpas 1978) and the 1848-68 Egyptian census samples. Overall, these data sources may deepen our understanding of the historical process of Islamization of the Middle East, and of the role of institutions in shaping religious and socioeconomic outcomes.

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APPENDIX A

Estimating Adult Mortality from the 1848-68 Census Samples

The handbook of the UN Population Division (2002, pp. 5-20) outlines a method for estimating adult mortality from any two consecutive censuses, with an interval of x years, where x is a multiple of 5. The method uses the relative sizes of age cohorts (defined in groups of 5-year intervals) in the two censuses in order to estimate the probability of survival to an age $y + x$, conditional on being of age y in the first census. A slightly different method, the synthetic survival ratio, calculates the growth rate of each age cohort in order to make the method applicable to any census interval, i.e. not necessarily multiple of 5. I apply these methods to the census samples of 1848 and 1868. A few caveats arise here: (a) the time interval separating the two Egyptian censuses (20 years) is too long to apply these estimation methods (ideally, the interval should be 5 or 10 years), (b) I do not have the full census returns, and hence, there is a sampling error in estimating the size of age cohorts, and (c) there is a problem of age misreporting (e.g. age heaping and age exaggeration) which is typical in historical censuses. Hence, I defined age groups in intervals of 10 instead of 5 years. The estimation results are shown in table A.1.

TABLE A.1
Estimating Adult Mortality from the 1848-68 Census Samples

	Age Group	Size in 1848	Size in 1868	Estimated Life Expectancy (Method 1)	Estimated Life Expectancy (Method 2)
Copts	0-9	90,740	117,801	NA	NA
	10-19	32,981	51,600	41.45	42.90
	20-29	33,290	52,466	44.59	44.59
	30-39	40,100	36,657	30.44	32.20
	40-49	27,031	26,187	25.46	24.72
	50-59	15,325	25,345	22.61	21.02
	60-69	11,406	12,595	17.67	16.10
	70-79	7,849	10,899	11.52	9.03
	80+	7,094	5,107	NA	NA
Muslims	0-9	1,148,827	1,458,614	NA	NA
	10-19	377,685	603,264	43.44	44.82
	20-29	406,293	622,071	49.08	48.73
	30-39	457,208	481,535	32.97	32.65
	40-49	348,101	360,926	25.90	23.79
	50-59	243,063	288,588	21.83	19.98
	60-69	171,180	195,387	16.88	13.53
	70-79	99,442	111,561	12.26	8.68
	80+	125,336	78,559	NA	NA

APPENDIX B

Arab Immigration and Coptic Churches and Monasteries in Medieval Egypt

I. Arab Immigration Waves in Egypt in 640-900: The information is based on Al-Barri's (1992) *Arab Tribes in Egypt in the First Three Hijri Centuries*, who draws on Arabic medieval narratives, in order to trace the destination of the immigrant Arab tribes in Egypt between 640 and 900, mostly at the *kura*-level, the administrative division in 640-1036. I focus on permanent immigrants, and I thus exclude seasonal immigration waves (*Irtiba'*) from the dataset.⁴⁹ Drawing on Ramzi's (1994 [1954]) *Geographic Dictionary of Egyptian Localities from the Time of Ancient Egyptians to 1945* and Tousson's (1926) *La Géographie de l'Egypte à l'Epoque Arabe*, I matched the *kuras* to the districts in the 1897 census, which is the administrative division that I implemented in digitizing the 1848-68 census samples. I carried out the matching based on the location of the chef-lieu of each *kura*. Although no information on the borders of the *kuras* survived, the average surface area of rural *kuras* was perhaps comparable to that of the 1897 census rural districts.⁵⁰

II. Coptic Churches and Monasteries in 1200 and 1500: I draw on two medieval sources:

- a) Abul-Makarim's (1984) *History of Churches and Monasteries* provides a comprehensive list of Christian religious establishments (Coptic, Melkite, and Armenian), which existed in Egypt at the end of the twelfth century. There are two versions of the book. The first is *The Churches and Monasteries of Egypt and Some Neighboring Countries* that was edited by Evetts and was first published in an English translation from the original Arabic manuscript in 1895 where it was attributed *wrongly* to Abu-Saleh the Armenian. This version included only the institutions in the Nile Valley. The second is the version by Anba-Samuel, who edited a two-volume version of the book in both Arabic and English in 1984. The first volume included the missing part about the Nile Delta, while the second was a re-publication of Evetts' version on the Nile Valley. The book is now widely believed to belong to the twelfth century Coptic chronicler Abul-Makarim.
- b) Al-Maqrizi's (2002) *Sermons and Considerations in Examining Plans and Monuments* includes another list of churches and monasteries (both Coptic and Melkite) in the fifteenth century.

Both lists are organized on a geographic basis at the urban street- and rural village-levels. I matched the locations in both sources to the districts in the 1897 census. In the matching procedure, I focused on Coptic churches and monasteries.

⁴⁹ *Irtiba'* is derived from the Arabic word for "spring," and refers to the post- Islamic Conquest tradition that Arab tribes were allowed to move in the spring to any village of their choice for grazing their animals. Egyptians (Copts) were required to provide them with food and shelter (Al-Barri 1992, pp. 56-60).

⁵⁰ The number of *kuras* in the Nile Delta and Valley in the seventh to ninth centuries (76) (Ramzi 1994 [1954], p. 31) was almost the same as the number of rural districts in 1897 (79). In fact, Egypt's inhabited area, the Nile Delta and Valley, has hardly changed since ancient times.

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TABLE I
Was the De Facto Poll Tax Regressive?
Dependent Variable: Poll Tax Amount

	(1)	(2)
Land tax	-0.077*** (0.009)	-0.015 (0.036)
Constant	1.232*** (0.488)	1.119*** (0.067)
Sub-district fixed effects?	N	Y
Adjusted R-Squared	0.019	0.309
N	281	281

Clustered standard errors at the sub-district level are in parentheses. Individual-level data come from the papyri tax registers of three sub-districts in the pagarchy of Aphrodito in the Nile Valley in 703-4 (Morimoto 1981, pp. 67-79). * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.

TABLE II
Descriptive Statistics from the 1848-68 Census Samples

	Individual-Level Statistics				District-Level Statistics	
	Rural Origin Sample		Full Sample		Rural Districts	All
	Copts	Muslims	Copts	Muslims		
<i>Individual-Level Variables</i>						
SES1	0.181 (0.386)	0.017 (0.130)	0.337 (0.473)	0.034 (0.182)	0.029 (0.023)	0.031 (0.026)
SES2	0.204 (0.403)	0.073 (0.260)	0.356 (0.479)	0.074 (0.262)	0.083 (0.059)	0.080 (0.058)
SES3	0.225 (0.418)	0.098 (0.297)	0.396 (0.489)	0.139 (0.346)	0.118 (0.066)	0.119 (0.070)
<i>District-Level Variables</i>						
Arab immigration in 640-900 dummy	0.398 (0.490)	0.580 (0.494)	0.733 (0.443)	0.774 (0.418)	0.570 (0.498)	0.580 (0.496)
Route of the Holy Family dummy	0.285 (0.452)	0.315 (0.465)	0.662 (0.473)	0.477 (0.499)	0.278 (0.451)	0.273 (0.448)
Log (population) in 1897	11.660 (0.267)	11.708 (0.490)	12.457 (0.740)	12.260 (0.730)	11.429 (0.954)	11.215 (1.377)
% Males who are able to read and write in 1897	0.064 (0.019)	0.074 (0.024)	0.162 (0.088)	0.147 (0.084)	0.074 (0.038)	0.077 (0.045)
N	1,124	15,618	2,533	29,271	79	88

Standard deviations are in parentheses. Statistics are computed from the 1848-68 pooled census samples and the 25-percent oversample of non-Muslims in Cairo. Sample is restricted to Egyptian local free Coptic and Muslim active men of rural district of origin who are at least 15 years old and with non-missing age, religion, occupational title, and district of origin.

TABLE III
Historical Origins of Copts' Conversion to Islam in 640-1848
(Dependent Variable is Indicated on Top of Each Column)

	(1) Coptic Dummy in 1848-68	(2) Coptic Population Share in 1897
Arab immigration in 640- 900 dummy	-0.061*** (0.021)	-0.047** (0.018)
Route of the Holy Family dummy	0.024 (0.019)	0.038* (0.021)
Log (population) in 1897	-0.002 (0.015)	0.006 (0.007)
% Males who are able to read and write in 1897	-1.087*** (0.360)	-0.444** (0.191)
Constant	0.200 (0.173)	0.045 (0.084)
R-squared	0.020	0.160
N	16,742	79

Robust standard errors are in parentheses. They are clustered at the district of origin level (79 districts) in column 1, and are Huber-White standard errors in column 2. Regression is restricted, in column 1, to Egyptian local free Coptic and Muslim active men of rural district of origin who are at least 15 years old and with non-missing age, religion, occupational title, and district of origin. Regression is restricted to rural districts only (i.e. those in the Nile Delta and Valley, excluding urban and border provinces) in column 2. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.

TABLE IV
Cost of Conversion in 640-900 and Socioeconomic Status in 1848-68
(Dependent Variable is Indicated on Top of Each Column)

	Copts			Muslims		
	SES1	SES2	SES3	SES1	SES2	SES3
Arab immigration in 640-900 dummy	0.074* (0.043)	0.076* (0.044)	0.059 (0.044)	0.004 (0.003)	0.024* (0.013)	0.032** (0.015)
Route of the Holy Family dummy	-0.121*** (0.040)	-0.114*** (0.041)	-0.120*** (0.039)	-0.001 (0.004)	-0.021* (0.012)	-0.020 (0.015)
Log (population) in 1897	0.116 (0.089)	0.116 (0.098)	0.132 (0.087)	-0.000 (0.002)	-0.011 (0.014)	-0.018 (0.015)
% Males who are able to read and write in 1897	4.194*** (1.467)	4.269** (1.632)	4.430*** (1.196)	0.119* (0.069)	0.068 (0.300)	0.243 (0.291)
Constant	-1.440 (1.004)	-1.430 (1.108)	-1.597 (0.991)	0.011 (0.024)	0.186 (0.148)	0.273** (0.170)
R-squared	0.072	0.066	0.069	0.001	0.003	0.003
N	1,124	1,124	1,124	15,618	15,618	15,618

Robust standard errors, clustered at the district of origin level, are in parentheses. Regression is restricted to Egyptian local free Coptic and Muslim active men of rural district of origin who are at least 15 years old and with non-missing age, religion, occupational title, and district of origin. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.

TABLE V
Instrumenting for Arab Immigration in 640-900 by Distance to Fustat
(Two-Stage Least Squares Regressions-
Dependent Variable is Indicated on Top of Each Column)

	(1) Copt in 1848-68	Copts			Muslims		
		(2) SES1	(3) SES2	(4) SES3	(5) SES1	(6) SES2	(7) SES3
Arab immigration in 640-900 dummy	-0.232** (0.102)	0.512** (0.222)	-0.524** (0.231)	0.443** (0.198)	-0.001 (0.010)	-0.137 (0.108)	-0.132 (0.109)
Route of the Holy Family dummy	0.105* (0.060)	-0.324* (0.167)	-0.321* (0.167)	-0.297* (0.152)	0.001 (0.007)	-0.056 (0.059)	0.058 (0.060)
Log (population) in 1897	-0.009 (0.029)	0.133 (0.229)	0.134 (0.242)	0.148 (0.210)	-0.001 (0.002)	-0.017 (0.029)	-0.024 (0.031)
% Males who are able to read and write in 1897	-1.461** (0.637)	6.487*** (2.353)	6.615** (2.452)	6.441*** (2.015)	0.108 (0.077)	-0.292 (0.446)	-0.123 (0.451)
Constant	0.383 (0.351)	-1.905 (2.652)	-1.906 (2.809)	-2.006 (2.457)	0.016 (0.027)	0.360 (0.355)	0.450 (0.372)
N	16,742	1,124	1,124	1,124	15,618	15,618	15,618

Robust standard errors, clustered at the district of origin level, are in parentheses. Regression is restricted to Egyptian local free Coptic and Muslim active men of rural district of origin who are at least 15 years old and with non-missing age, religion, occupational title, and district of origin. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.

TABLE VI
Coptic Tax Revolts in the Eighth Century

Year	Region	Reason(s) Cited	Parties Revolting
726	Nile Delta	Tightening state control over the tax system	Copts
740	Nile Valley	Higher tax enforcement, collecting poll tax from fugitives, higher tax rate, uniform tax regardless of income	Copts
750	Nile Delta	Heavy taxation and general suffering	Copts; Arabs also revolted to overthrow the Umayyads
753	Nile Delta	Reorganizing the tax system under the Abbasids and heavy taxation	Copts
768	Nile Delta	Abbasids' fiscal reforms	Copts

Sources: Morimoto (1981, pp. 145-72) and Mikhail (2004, pp. 195-211).

TABLE VII
Historical Origins of Coptic Conversion to Islam in 640-1200 and 640-1500
(Dependent Variable is Indicated on Top of Each Column)

	(1) Number of Coptic Churches and Monasteries in 1200 (per 1,000 Individuals in 1897)	(1) Number of Coptic Churches and Monasteries in 1500 (per 1,000 Individuals in 1897)	(3) Coptic Population Share (1897)
Arab immigration in 640-900 dummy	-0.030 (0.028)	-0.017** (0.007)	-0.047** (0.018)
Route of the Holy Family dummy	0.056 (0.034)	0.019** (0.007)	0.038* (0.021)
Log (population) in 1897	-0.010* (0.006)	0.001 (0.002)	0.006 (0.007)
% Males who are able to read and write in 1897	-0.050 (0.297)	0.047 (0.082)	-0.444** (0.191)
Constant	0.237*** (0.072)	-0.002 (0.023)	0.045 (0.084)
R-squared	0.052	0.148	0.160
N	79	79	79

Robust standard errors are in parentheses. Regression is restricted to rural districts. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.

FIGURE I
Income, Poll Tax Enforcement, Religiosity, and Conversion to Islam

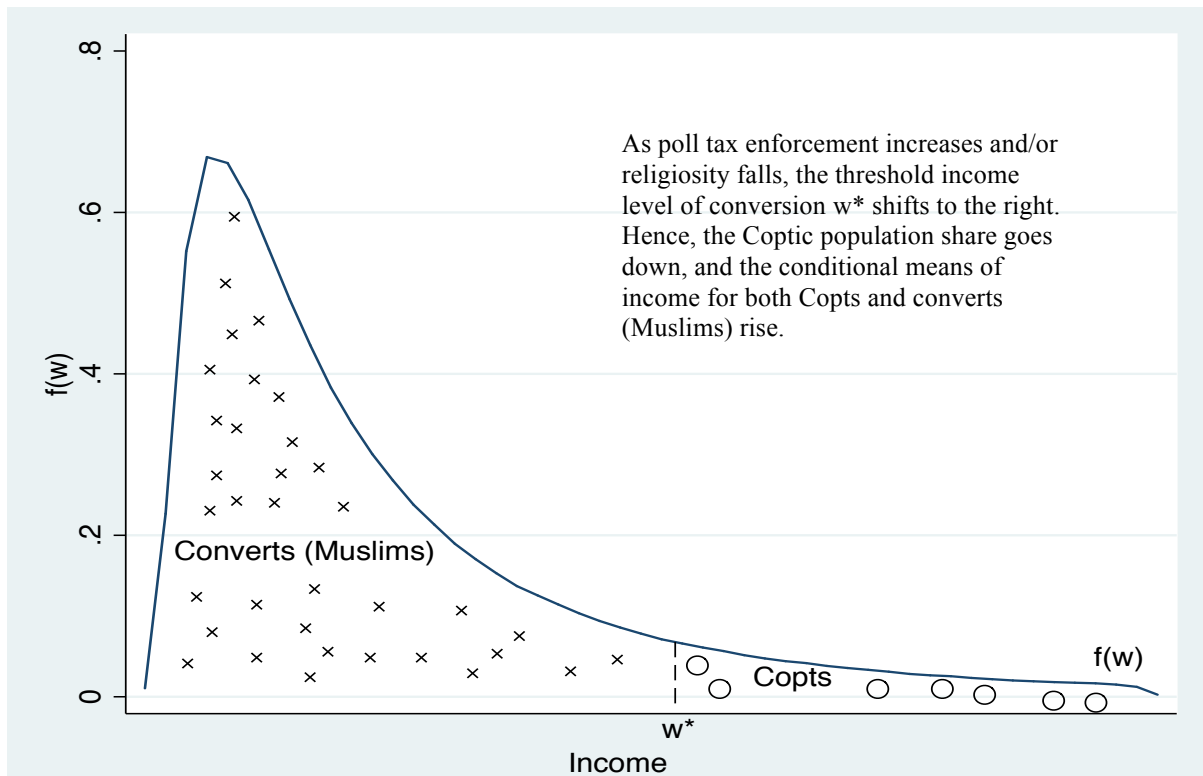
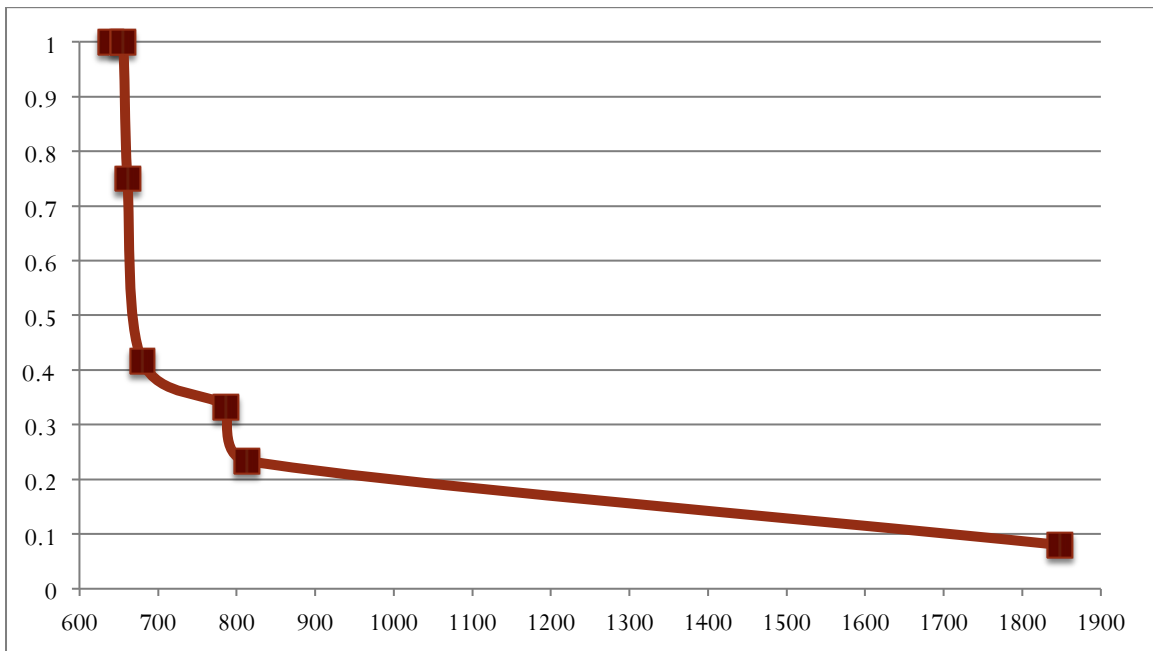
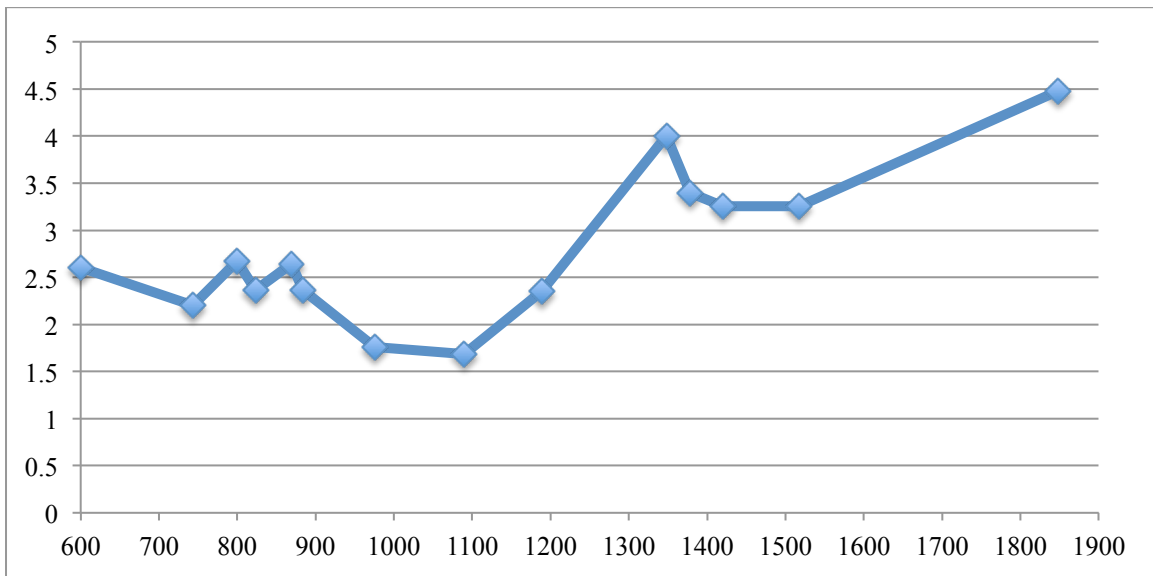


FIGURE II
Islamization of Egypt in 640-1848



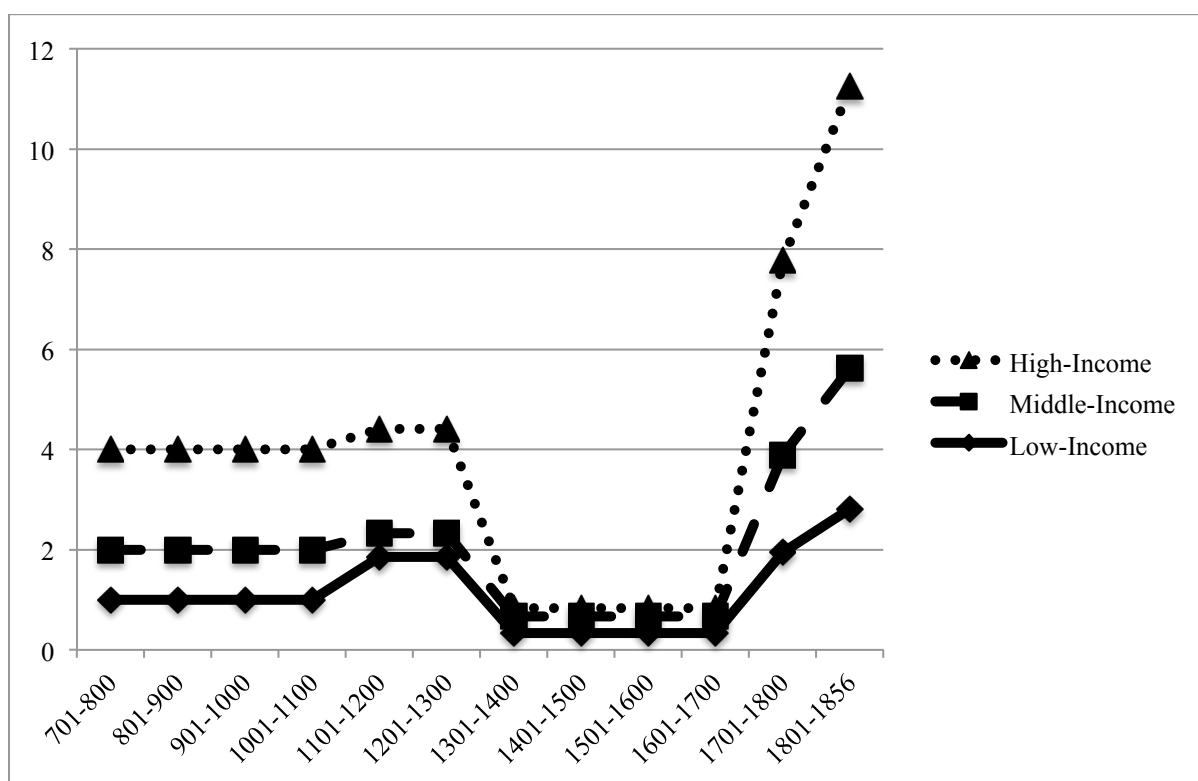
Source: Courbage and Fargues (1997, pp. 27-28). The number of non-Muslims in 640-813 is estimated from the total poll tax revenues, assuming a fixed nominal poll tax per capita, while the population figures are taken from Russell (1966), where they are estimated from the total land tax revenues. The percentage of non-Muslims in 1848 is estimated from the 1848 census sample.

FIGURE III
Population of Egypt in 600-1848



Source: Russell (1966). Population figures in 743-1189 are estimated from the total land tax revenues (p. 74), while figures for 600 and 1348-1517 are taken from the analysis in pp. 80-82. The population in 1848 is taken from Alleaume, Ghislaine and Philippe Fargues, "La Naissance d'Une Statistique d'Etat," *Histoire & Mesure* 13 (1998), 147-193.

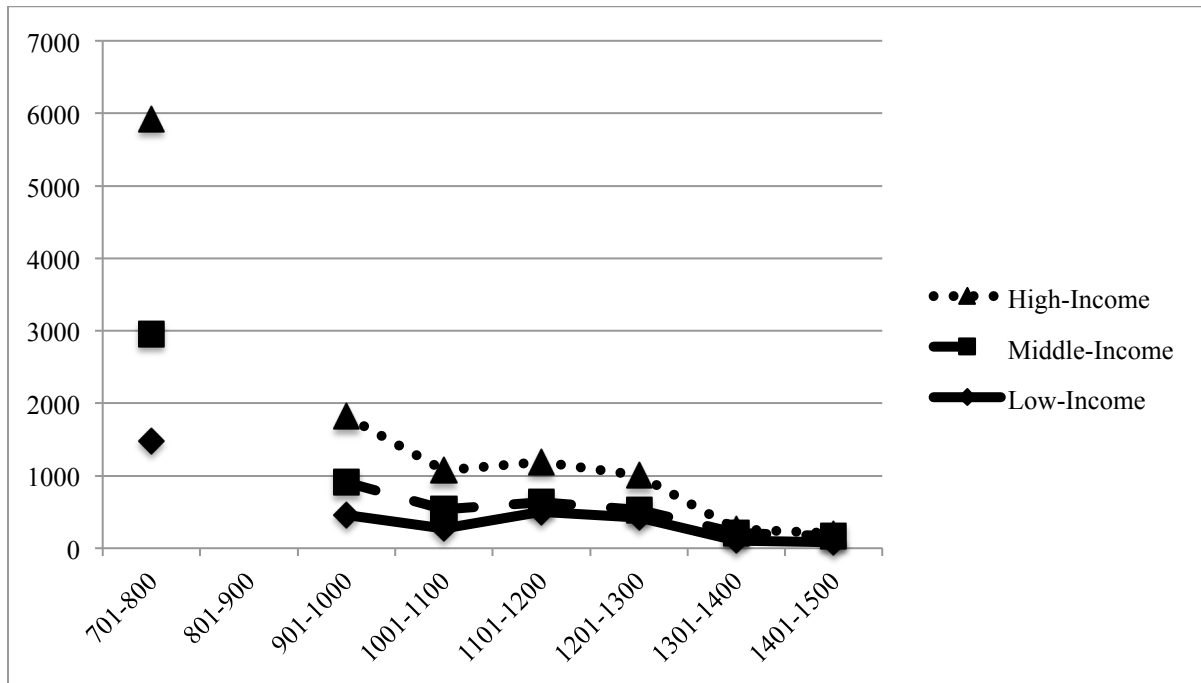
FIGURE IV
1. Nominal Annual Poll Tax in Islamic Dinars in 701-1856



Poll tax in 701-1100 is taken from Abu-Youssef (1979, pp. 122-4) and Al-Qadi Al-Nu'man (1963, pp. 379-381), in 1101-1300 from Ibn-Mamati (1991, p. 318), in 1301-1700 from Al-Qalqashandi (1914, p. 462), and in 1701-1856 from Mahmoud (2009a, pp. 112, 136). Poll tax amounts are in Islamic Dinars weighing 4.25 grams of gold. These Dinars remained in circulation until they were replaced in 1425 with the Ashrafi Dinars that weighed 3.45 grams. Since the nominal poll tax is recorded in each source in different currencies, I had to transform the recorded amount into Islamic Dinars as follows:

1. In 701-1100, I used the exchange rate of 12 Dirhams: 1 Dinar under the Umayyads and Abbasids (661-969) from Ashtor (1969, p. 77).
2. In 1101-1300, I used the following rates:
 - (a) 9 Dirhams: 1 Dinar under Saladin (1171-1193) from Ashtor (1969, p. 122).
 - (b) 24 Kirats: 1 Dinar from Zambaur, E. V., "Kirat," In *Encyclopedia of Islam*, First Edition (1913-1936), M. Th. Houtsma, T.W. Arnold, R. Basset, R. Hartmann (Eds.) (Brill Online, 2013).
 - (c) 72 Habbas: 1 Dinar from Goitein, Shelomo D., *A Mediterranean Society: The Jewish Communities of the World as Portrayed in the Documents of the Cairo Geniza*, Vol. 1 (Economic Foundations), (Berkeley: University of California Press, 1967), p. 371.
3. In 1301-1700, I used the rate of 30 Dirhams: 1 Dinar under Barquq (1382-99) from Ashtor (1969, p. 277).
4. In 1701-1800, I used the exchange rate of 45 Nisfs: 1 Sharifi Dinar in 1608 from Mahmoud, Ayman Ahmad, *al-ard wal mugtama' fi misr fil 'asr al-uthmani* (Land and Society in Egypt in the Ottoman Era) (Giza: Ein for Human and Social Studies, 2008), p. 112. The Sharifi Dinar weighed 3.45 grams of gold, and is thus equivalent to 0.81 Islamic Dinars.
5. In 1801-1856, I used the rate of 6 Piasters: 1 Mahbub Dinar in 1807 from Mahmoud (2009a, p. 123). The Mahbub Dinar weighed 3.45 grams of gold, and is thus equivalent to 0.81 Islamic Dinars.

2. Real Annual Poll Tax in *Ratls* of Bread in 701-1500



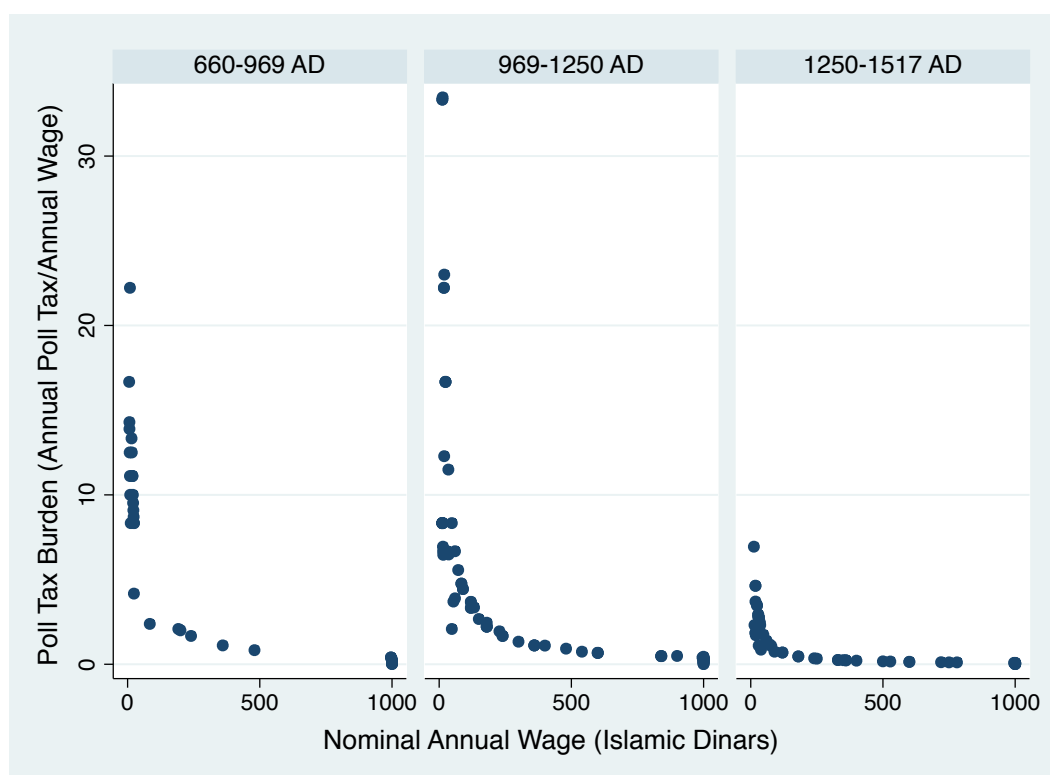
Nominal poll tax amounts are as in figure IV.1. Real poll tax is computed from Ashtor (1969, p. 465). The *ratl* in Cairo weighed 450 grams.

3. Low-Income Poll Tax as Percentage of a Laborer's Wage in 701-1500



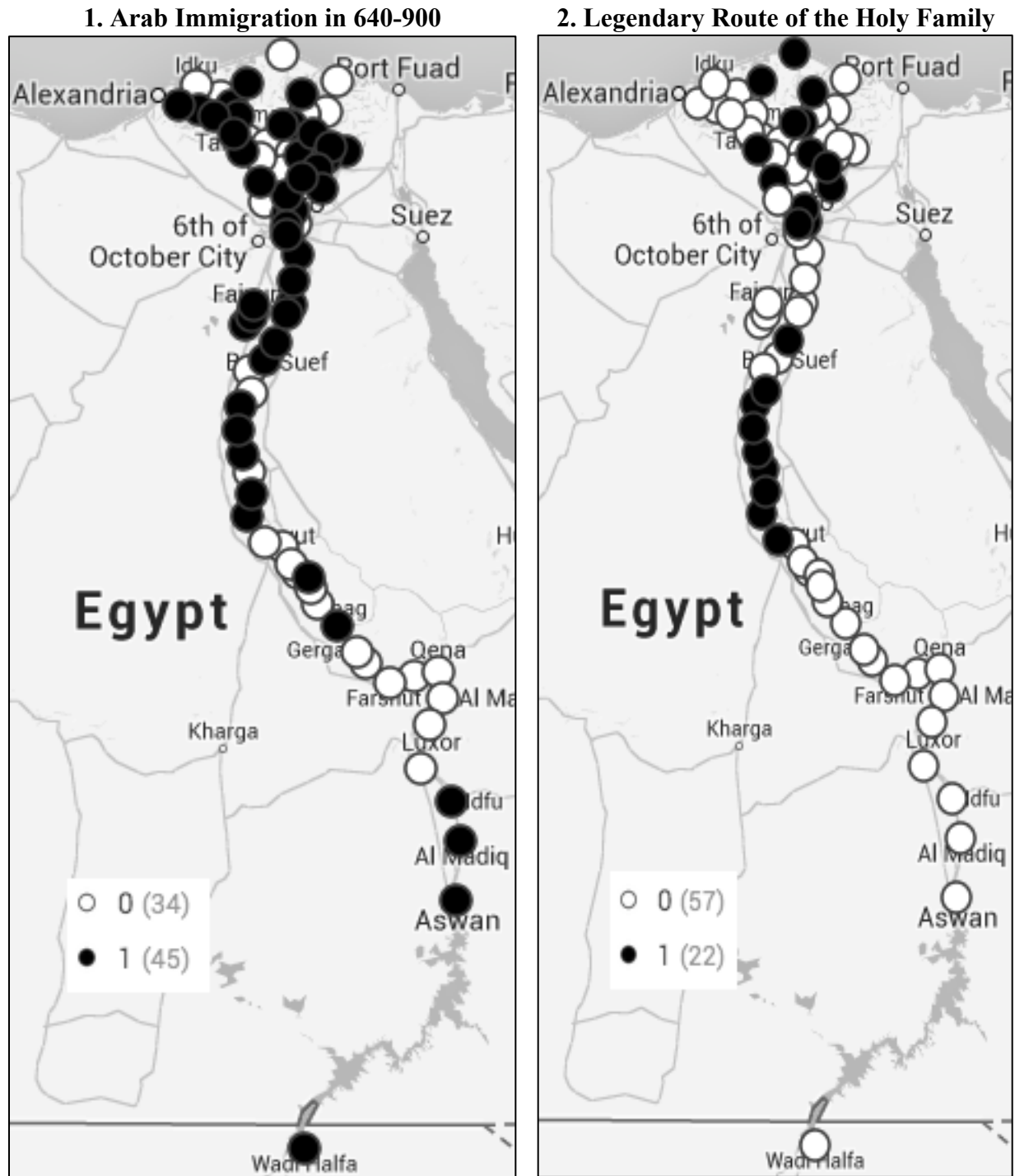
Nominal poll tax amounts are as in figure IV.1. Laborer's nominal wage is taken from Ashtor (1969, p. 465).

FIGURE V
Wages and De Jure Average Poll Tax Rate in 660-1517



The figure is based on Ashtor (1969, pp. 90-4, 223-9, 372-81), who documents the wages of various occupational titles in each historical episode of medieval Egypt. I classified each occupational title into one of three income brackets (low, middle, high), according to the criteria in Abu-Youssef (1979, pp. 122-4), and assigned to each title/wage the nominal poll tax amount of the relevant historical episode based on the historical sources of figure IV.1. The average poll tax rate is then computed as the nominal annual poll tax divided by the nominal annual wage, both measured in Islamic Dinars.

FIGURE VI
Spatial Variation in Historical Cost of Conversion in 640-900 and Coptic Population Share in 1897



3. Coptic Population Share in 1897

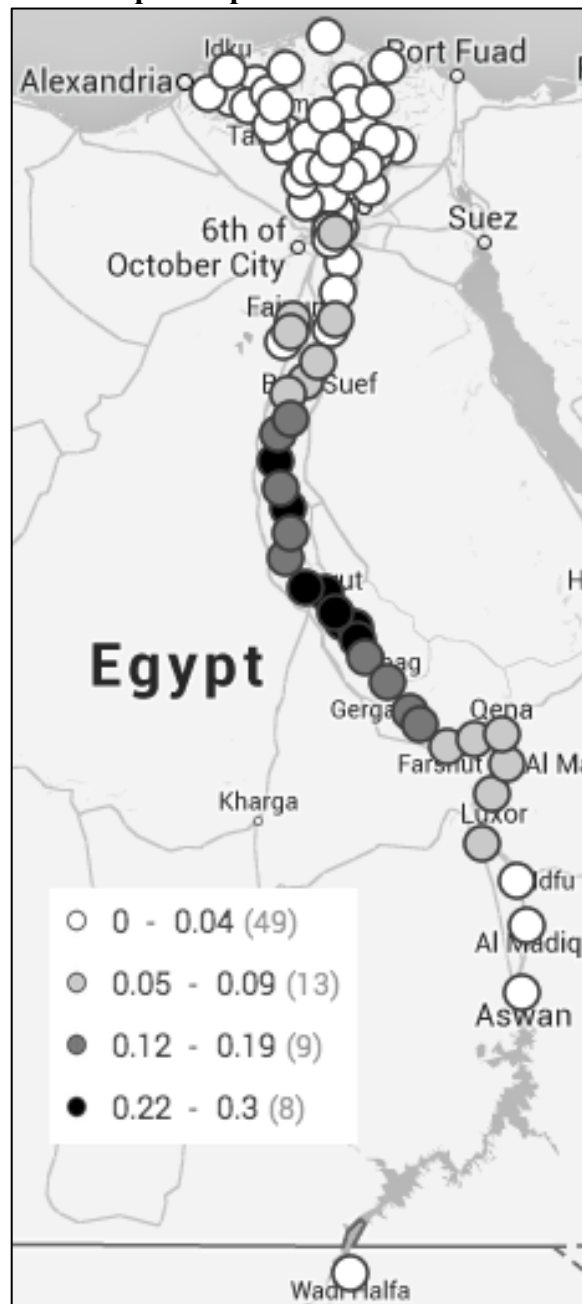
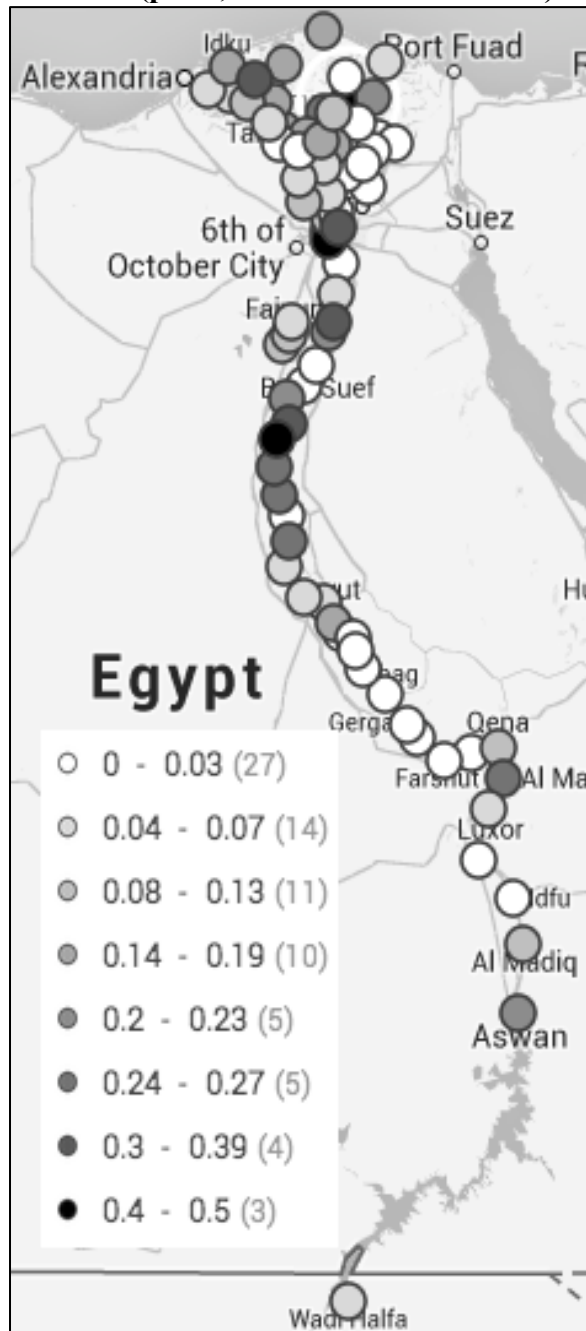


FIGURE VII
Spatial Variation in Coptic Churches and Monasteries in Medieval Egypt

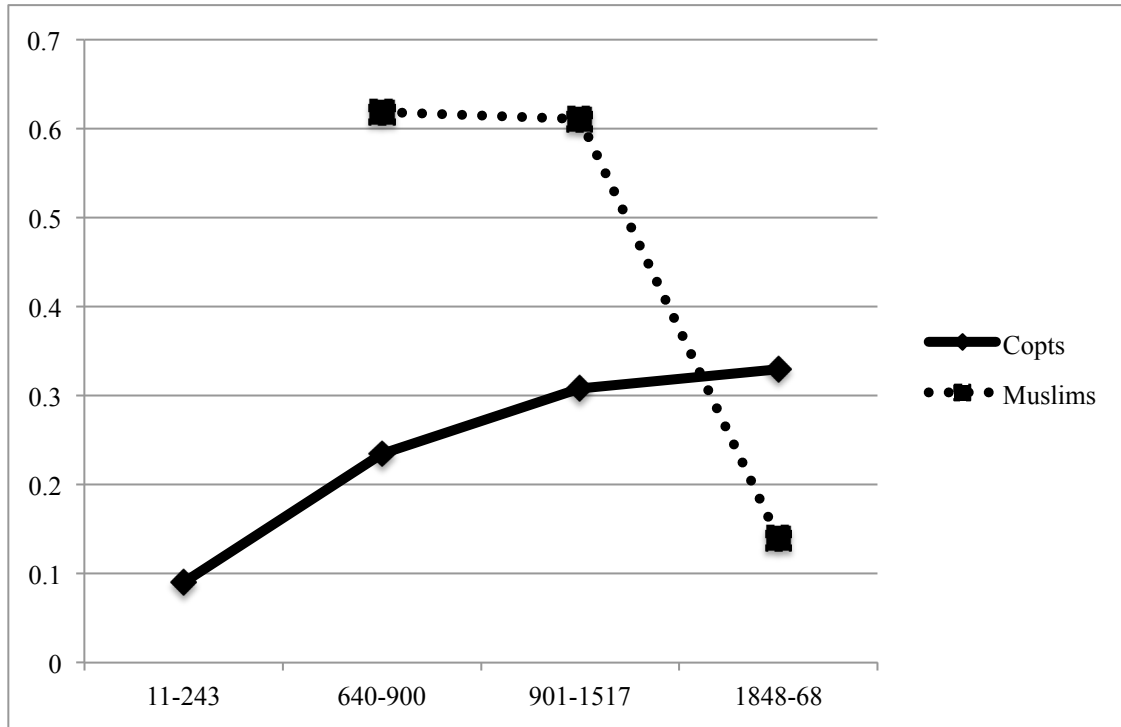
1. Number of Churches and Monasteries in 1200 (per 1,000 Individuals in 1897)



2. Number of Churches and Monasteries in 1500 (per 1,000 Individuals in 1897)



FIGURE VIII
Percentage of Copts Working in White-Collar Jobs (SES3) from the First to the Nineteenth Centuries Compared to Muslims



Sources: See text. Sample sizes for Copts in the four periods are 66, 192, 120, and 1,551 respectively, while for Muslims, in the latter three periods, are 160, 126, and 29,243 respectively.