

From Farmers to Merchants,
Voluntary Conversions and Diaspora:
A Human Capital Interpretation of Jewish History¹

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Abstract

From the end of the second century C.E., Judaism enforced a religious norm requiring Jewish fathers to educate their sons. We present evidence supporting our thesis that this change in the religious and social norm had a major influence on Jewish economic and demographic history. First, the high individual and community cost of educating children in subsistence farming economies (2nd to 7th centuries) prompted voluntary conversions, which account for a large share of the reduction in the size of the Jewish population from 4.5 million to 1.2 million. Second, the Jewish farmers who invested in education, gained the comparative advantage and incentive to enter skilled occupations during the vast urbanization in the newly developed Muslim Empire (8th and 9th centuries) and they actually did select themselves into these occupations. Third, as merchants the Jews invested even more in education—a pre-condition for the extensive mailing network and common court system that endowed them with trading skills demanded all over the world. Fourth, the Jews generated a voluntary diaspora by migrating within the Muslim Empire, and later to western Europe where they were invited to settle as high skill intermediaries by local rulers. By 1200, the Jews were living in hundreds of towns from England and Spain in the West to China and India in the East. Fifth, the majority of world Jewry (about one million) lived in the Near East when the Mongol invasions in the 1250s brought this region back to a subsistence farming and pastoral economy in which many Jews found it difficult to enforce the religious norm regarding education, and hence, voluntarily converted, exactly as it had happened centuries earlier.

JEL Classification: J1, J2, N3, O1, Z12, Z13

Keywords: social norms, religion, human capital, Jewish economic and demographic history, occupational choice, migration.

1 Introduction

Do changes in religious and social norms have long-term effects on economic and demographic outcomes? We address this question by studying one of the best documented historical examples of a change in religious norms that had a huge impact on long-term economic and demographic patterns. Specifically, we show that the implementation from the second century C.E. of the religious norm requiring Jewish fathers to educate their sons determined three major patterns in Jewish history: *(i)* a slow process of conversions out of Judaism among illiterate Jewish farmers who lived in subsistence economies, *(ii)* a comparative advantage in urban, skilled occupations in which the literate Jews selected themselves when urbanization and the development of a commercial economy provided them with the returns to their investment in education, and *(iii)* the voluntary Diaspora of the Jews in search of worldwide opportunities in crafts, trade, and moneylending.

In Botticini and Eckstein (2005) (summarized here in Section 2), we describe the transformation of Judaism (200 B.C.E.–200 C.E.) from a religion mainly based on sacrifices in the Temple into a religion whose core was the reading of the Torah in the synagogue. Jewish religious leaders further advanced this reform by encouraging the construction of synagogues in many towns and villages all over Palestine, by promoting the status of teachers and scholars, and by downgrading the status of illiterate people (*ammei ha-aretz*).¹ This religious transformation occurred when most of the Jewish population consisted of illiterate farmers in a subsistence rural economy.

We embed the transformation of Judaism into a formal model in order to study the economic and demographic implications of the change in the religious norm. We first model the Jewish farmers' decisions regarding their own religion and their sons' education (Section 3). Allowing for heterogeneity in farmers' incomes, children's opportunity costs of going to school, and levels of attachment to the Jewish religion, we show that in each cohort, there is always a proportion of Jews who decide not to educate their sons *and* to convert. Hence, the model predicts that Judaism with its increased emphasis on education cannot survive in the long-run in a subsistence farming society.

In Section 4 we show that Jewish population dynamics, as well as literary and archeological sources, support this prediction regarding a slow process of voluntary conversions.²

¹The Jews used the word Eretz Israel (= Land of Israel) to designate the area approximately east of the Mediterranean sea and west of the Jordan river. It consisted of the three regions of Judaea (south), Samaria (middle), and the Galilee (north). After crushing the Bar Kockba's revolt in 135 C.E., the Roman emperors renamed the area *Syria-Palaestina* (from the name of the ancient population Phylistines). Later, the Muslim rulers labelled the region Filastīn or Falastīn, whereas the Jews maintained the name Eretz Israel. Throughout the paper, we use interchangeably the two words—Eretz Israel and Palestine—as they were used by the people in the first millennium.

²The space constraint and the fact that we are dealing with a long period of time (first to fourteenth century C.E.), force us to just summarize the enormous amount of material and secondary sources we read. One has to keep in mind, though, that the secondary sources we read are the works of prominent scholars

The first key piece of evidence comes from the size of world Jewry, which shrank from 4.5–5 million in the first century to roughly 1.2–1.5 million in the early eighth century. In all locations, the Jewish population decreased more than the total population.

Massacres account for roughly 40 percent of the reduction of the Jewish population in Palestine, 25 percent of the decrease in Egyptian Jewry, and an uncertain percentage of the Jewish communities in Syria, Asia Minor and western Europe. However, after taking into account massacres, epidemics and general population decline, an additional 30 to 60 percent (according to which location one considers) of the contraction in the Jewish population was the outcome of voluntary conversions, mainly to Christianity.

Christianity emerged as one of the many groups within Judaism in the first century, and before becoming a predominantly Gentile religion, its main base consisted of Jewish Christians. A key feature of the new religion was that it abolished many requirements of Judaism, including circumcision for men and the reading of the Torah.

From a very large number of literary, epigraphic, and archeological sources, scholars have established three main patterns regarding the spread of Christianity *before* the age of Constantine (313–325 C.E.).³ First, Christianity deeply penetrated towns, villages, and rural districts in locations such as Palestine, Syria, Edessa in western Mesopotamia, Armenia and the provinces in Asia Minor, Egypt and North Africa, where large Jewish communities existed. In contrast, in areas where there were few or no Jewish settlements (e.g., eastern Persia, central and northern Gaul, Belgium, England, Germany, Raetia, and eastern Europe), Christianity spread very slowly or not at all before 325 C.E.

Second, many passages in the writings of the early Christian writers and Church Fathers indicate that most Jewish converts to Christianity were uneducated, low income Jews.

Third, outside Palestine Christianity grew primarily in locations (e.g., Syria, Greece, Egypt and North Africa, Spain, southern Italy and southern Gaul), where there were large

who studied a huge number of primary and secondary sources. Just to give an idea of some of the many secondary sources on which we rely:

a. Baron (1952), one of the most authoritative scholars of Jewish history, consists of 18 volumes, heavily footnoted, based on an impressive array of primary and secondary sources;

b. Goitein (1967-1988) is a 5-volume work based on the documents from the Cairo Geniza (thousands of letters, contracts, deeds, and wills of the Jewish communities in the Mediterranean basin from the ninth to the fourteenth century);

c. Gil (1992; 1997) consist of thousands of pages based on the documents from the Cairo Geniza, the thousands of letters in the Responsa literature, diaries of medieval travelers, legal codes, tax records, etc. The bibliography in each of the two books is more than 50 pages long.

d. Neusner (who wrote and edited more than 300 [three hundred] books) read and interpreted the huge amount of material from the Mishna and the Talmud (in addition to secondary sources).

To sum up, we do our best to organize and summarize the most relevant historical evidence, and we refer the interested readers to the specific historical works for additional information and details.

³With the edict of Milan in 313, Constantine made Christianity a religion permitted in the Roman Empire. In 325, the Council of Nicaea, attended by hundreds of bishops, represented a landmark in the history of the spread of Christianity.

Jewish settlements of mixed racial composition, including Hellenistic Jews and pagans or descendants of former pagans who had converted to Judaism in earlier times.

In Section 4, we also document that, while conversions were occurring, some Jewish farmers did not convert *and* invested in their sons' education. The Jewish farmers who invested in education gained the comparative advantage and incentive to enter urban skilled occupations during the vast urbanization in the newly developed Muslim empire under the Abbasid caliphate in the eighth and ninth centuries. This occupational transition (summarized in Section 5) was an endogenous and voluntary selection of literate Jewish farmers into skilled occupations when the vast urbanization in the Near East created a large demand for these occupations.

To analyze the implications of the religious transformation on the economic and demographic patterns of the Jews in an urban economy, we then extend the model to study the choice of religion and children's education of craftsmen, merchants, and urban dwellers (Section 6). Unlike in farming, education increases craftsmen's and merchants' earnings. The model predicts that (i) Jewish merchants invest more in their sons' education than Jewish farmers and non-Jewish farmers and merchants, and (ii) without a large tax penalty or occupational restrictions for being a Jewish individual, Jewish merchants do not convert.

We present historical evidence which is consistent with these predictions (Section 7). Once the Jews became skilled craftsmen, merchants, tax collectors, moneylenders, and doctors, they further invested in their sons' religious and general education, attaining levels of education comparatively higher with respect to non-Jews at that time. Moreover, there were no mass conversions of Jews to Islam and the size of the Jewish population remained roughly constant from the eighth throughout the twelfth century.

The main insight of our thesis is that Judaism, with its costly religious norm requiring fathers to educate their sons, cannot survive in the long run in subsistence farming economies where literacy does not increase earnings. It can survive in the long run only if the Jewish people can find occupations, such as crafts and trade, in which their earnings significantly gain from literacy. We present two additional historical facts that support this argument: first, the voluntary Diaspora of the Jews to western Europe during the tenth-thirteenth centuries, and, second, the voluntary conversions of Jews in the Near East after the Mongol invasions of Iraq and Persia in the 1250s.

Within the Muslim empire under the Abbasid caliphate, Jewish craftsmen and merchants freely migrated and settled in Egypt, North Africa, and Spain. The rise of Cordoba under Muslim rule as the largest European city before the end of the millennium coincided with the growth of a small but very wealthy and intellectually prominent Jewish community. From the tenth to the thirteenth century, the Jews also migrated to France, Germany, and England upon invitation by kings, bishops, and local rulers. In these countries, they established small but wealthy communities in hundreds of towns and cities where they were locally protected and free to engage in almost any occupation. The numerous early medieval

charters and privileges (summarized in Section 8) indicate that European cities competed for Jewish skilled intermediaries at a time when literacy rates in the local populations were at most 10 percent.

The voluntary migrations to western Europe contributed to the development of three increasingly distinct and separate Jewish communities. Under the intellectual leadership of Maimonides, the Jewish communities in Muslim Spain developed distinctive rules and customs with respect to the Ashkenazi Jewish communities in Germany, France, and England, which blossomed under the leadership of Rashi. Both communities established new academies that continued the tradition of the Babylonian Talmud but, at the same time, developed their own intellectual centers independent of the large Jewish center in Iraq.

More than one thousand years after the transformation that had made Judaism a religion centered on education, the Mongols invaded Iraq and Persia in 1256-60 and destroyed the urban economy (Section 9). Because of massacres, starvation, and epidemics, in less than two hundred years the total population was reduced by roughly 30–40 percent. The Jewish population in Iraq and Persia shrank much more, partly as the outcome of voluntary conversions. This process of conversions among the Jews when the Near East became again a subsistence farming and pastoral economy is consistent with the main insight of our theory.

The main contribution of our paper is to present a novel economic explanation for the major patterns in Jewish economic and demographic history. Prominent scholars (e.g., Baron, Ben Sasson, Gil, Goitein, and Roth just to mention a few) documented almost all the facts that we report, but do not highlight the transformation of Judaism as a factor for the occupational transition they described. In contrast, we link Jewish population dynamics, conversions, occupational choice, and migrations to the same factor—the transformation of the religious norm within Judaism at the beginning of the first millennium.

On the decline of the Jewish population in the first millennium and after the Mongol shock there are no alternative hypotheses. In contrast, by tracking the long-term trends in the size of the Jewish population, we highlight the impact of voluntary conversions on the reduction of the Jewish population.

Our theory is also consistent with the occupational selection of the Jewish people, which we document in detail in Botticini and Eckstein (2005, pp. 927–30) where we also discuss the main competing theories. The common explanation is the argument based on restrictions (e.g., Roth (1938)). According to this view, the Jewish people did not engage in farming in medieval Europe since they were prohibited from owning land. The problem with this view is that in the Roman Empire, in the Parthian and Sassanian empires (Babylonia), and especially later in the Muslim empire under the Abbasid caliphate, the Jewish people could own land and engage in any occupation including farming.

A less known view, the economics of small minorities, was proposed by Simon Kuznets (1960; 1972) who argued that the Jews, like any other minority, chose to engage in urban

occupations in order to maintain their religious and group identity. We show that this theory does not pass the test of the historical evidence. In Babylonia, the Jews were a minority both when most of them were farmers and when they became merchants. In Palestine, most Jews were engaged in agriculture regardless of whether they were the majority of the population (up to the end of the third century) or a minority (from the fourth century and in the Byzantine period).

Before Kuznets, Max Weber (1952) had maintained that the Jews voluntarily chose to segregate and to become an urban population in order to observe their ritualistic correctness, dietary prescriptions, and Sabbath rules, which would have been impossible to comply with in rural areas. In contrast, we argue that the Jews kept observing their dietary restrictions and common prayers for more than five centuries (about 100–750 C.E.) when most of them were farmers. Furthermore, other groups, such as the Samaritans, had the same (or even stricter) dietary restrictions and common prayers, and yet they remained farmers.

The third main pattern described by historians are the Jewish migrations within the Muslim empire and to western Europe. In our theory these migrations are the endogenous outcome of the occupational selection of the Jewish people. The distinctive engine of the Jewish migrations to the West was the incentive to maximize the returns to their investment in religious literacy, which had spillover effects on their general literacy and education. Since there was only a certain number of high-skill occupations in each town, Jewish craftsmen, traders, and moneylenders moved in search of these urban occupations, and by doing this, they created a voluntary, worldwide Diaspora and became a minority in all locations they settled. In contrast, in Kuznets' theory the minority status of the Jews is taken as given and, basically, left unexplained.

Our work also adds to several strands of literature in economics. First, it contributes to the literature on the long-term impact of institutions and social norms (e.g., North 1990, Acemoglu, Johnson, and Robinson 2002, 2005; and Kuran 2003, 2004) as it illustrates that some contemporary economic patterns (in our case the selection of Jewish people into high-skill jobs) have been influenced by institutions and social norms that emerged centuries ago.

We also contribute to the literature that studies the interactions between cultural values and economic outcomes (e.g., Temin 1997, and Mokyr 2002). Greif (1994), for example, has shown how different cultural beliefs among Jewish (Maghribi) traders and Genoese traders brought a divergence in their societal organizations in the early Middle Ages. We argue that the network externality among Jewish traders highlighted by Greif could not exist without the common written language (Hebrew), the high literacy levels, and the common law (Talmud).

Lastly, we contribute to the growing literature on the interaction between religion and economic performance although in a different way.⁴ Works such as Barro and McCleary

⁴Works on the economics of religion related to our research are Berman (2000), Carlton and Weiss (2001),

(2003, 2006) or Guiso, Sapienza, and Zingales (2003, 2006) are *cross-section* analyses of the correlation between religious values and economic performance. In contrast, the Jewish case enables us to study the *long-term* economic outcomes of a change in religious norms.

2 Jewish Religious Reform, 200 B.C.E.–200 C.E.: A Summary

The Jews consider the birth of a child to be no occasion for festivity or an excuse for drinking to excess. The law enjoins sobriety in their upbringing from the very first. It orders that they shall be taught to read, and shall learn both the laws and the deeds of their forefathers, in order that they may imitate the latter, and, being grounded in the former, may neither transgress nor have any excuse for being ignorant of them.

[Flavius Josephus (1st century C.E.), *Against Apion* II. xxv. 204]

In Botticini and Eckstein (2005, pp. 932–37) we present a detailed description of the transformation of Judaism at the beginning of the first millennium as established and widely accepted by scholars of Jewish history. Here we briefly summarize the main features of this religious transformation, which is the main assumption of our model.

At the beginning of the first millennium in Eretz Israel, there were many religious groups including pagans. Even within Judaism, the religion of the majority of the population, there were numerous groups such as the Sadducees, the Pharisees, the Samaritans, the Essenes, and the Zealots. Christianity too grew within Judaism in the first century C.E. Despite being similar and interrelated in their daily lives, people belonging to different groups were becoming increasingly distinguished in their religious rules and norms.

Before the destruction of the Temple in Jerusalem in 70 C.E., the two main groups were the Sadducees who accepted only the Written Torah and adopted the Hellenistic culture, and the Pharisees who aimed to expand the study of both the Written and the Oral Torah among all Jews, and opposed the expansion of the Greek language and culture (Neusner 1990c; and Cohen 2002).⁵ To reach this goal, some Pharisees prompted a major change in the educational institutions by first (around the first century B.C.E.) encouraging the establishment of free secondary schools throughout Eretz Israel, and later (in the first century C.E.) by issuing a religious ordinance asking parents to send their six or seven years old sons to school to read and learn the Torah.

Chiswick (1999, 2006), and Rapoport and Weiss (forthcoming).

⁵The Written Torah refers to the first five books of the Bible, the Oral Torah consists of the rulings of scholars and rabbis regarding the implementation of the Written Torah. The existence of the Oral Torah indicates, by itself, that literacy was not widespread in ancient Eretz Israel. If most of people could not read, there was no need to write down the religious rules.

When the Temple was destroyed, the Sadducees lost the source of their power and shortly after disappeared as a group within Judaism. Meanwhile, the Pharisees, who did not participate in the rebellion, became the dominant group and gave a major push to the religious and educational reform that they had started in the second–first centuries B.C.E. They replaced sacrifices, which could only be performed in the Temple in Jerusalem, with the study of the Torah in the synagogue, whose main function was to provide religious *instruction* to both children and adults.

After 70 C.E., the religious leadership became vested in the rabbis and scholars in the academy who interpreted the Torah, discussed religious norms as well as social and economic matters pertaining to daily life, and organized the vast body of Jewish Oral Law accumulated through the centuries. Rabbi Judah ha-Nassi completed their work by redacting the Mishna in about 200 C.E.⁶ Under his influence, the word *ammei ha-aretz* (literally: people of the land) acquired the new meaning of “someone who does not know or/and does not teach his sons the Torah” (Oppenheimer 1977). The transformation of the religion created the need for the devoted Jews to be literate and, more important, to make their children literate. To be an “*am ha-aretz letorah*” in a Jewish community meant to be considered an outcast, which involved a social penalty.

No other religion in the first half of the millennium, except Judaism, required fathers to educate their sons. In contrast, many religions required sacrifices or ceremonies in temples (e.g., Greek and Roman pagan religions, Zoroastrianism), faith and prayers (e.g., Christianity), initiation into mysteries and magic (e.g., Eleusinian mysteries, Dionysiac and Orpheic cults, Mithraism), or prayers and fasting (e.g., Manicheism) (Neusner 1990a).

We view the transformation of Judaism as a change in religious preferences, which was not motivated by economic incentives and, therefore, can be taken as given from the point of view of the Jewish population at the beginning of the first millennium. Before the destruction of the Temple the struggle between the Sadducees and the Pharisees was over religious matters, mainly over what should be the core of the Jewish religion—sacrifices in the Temple performed by the high priests or the reading of the Torah by any adult male Jewish individual. The competition between the two groups was ended by an external event—the destruction of the Temple by the Roman army in 70 C.E.—which made the Sadducees disappear as a group and the Pharisees become the religious leaders. As the new religious leaders, the Pharisees had to make the decision on what should be the core of the religion. As some of them were scholars and teachers, it was natural to rule out sacrifices given that there was no longer the Temple in Jerusalem in which to perform them, and to replace sacrifices with the reading of the Torah.

The Pharisees were not merchants and their goal was *not* to make any Jewish individual

⁶The Mishna consists of six volumes of rules regarding farming, religious holidays and ritualistic issues, marriage and divorce, and financial matters. One entire volume (*Zeraim*) is devoted to the rules of farming, which in itself provides evidence that Eretz Israel was mainly a farming society at that time (Neusner 1998).

an educated and wealthy merchant. Rather, their goal was to make any male Jewish child and adult individual able to read the Torah written in Hebrew in front of the Jewish community in the synagogue. Their emphasis on Hebrew, whereas the spoken languages of the Jewish communities in Eretz Israel and in the Diaspora were Aramaic, Greek, and Latin is one more indication that the educational reform within Judaism was not prompted by economic gains for the Jewish farmers.

Lastly, Palestine and Babylonia were not urban and commercial economies in the first half of the millennium. Most of the Jewish population consisted of illiterate farmers for whom the investment in children’s religious education was a religious sacrifice with no economic returns (section 4.1, pp. 11–12). In the next section we model the economic and demographic implications of this religious sacrifice.

3 A Model of Education and Conversion of Farmers

Based on the historical evidence of the transformation of Judaism from 200 B.C.E. to 200 C.E (Section 2 here, and Botticini and Eckstein [2005]), we present a model to study the economic and demographic consequences of the change in the religious norms and preferences. Since in the period 200 B.C.E.—200 C.E. almost all Jews were farmers, we first model the choices of farmers, where “farming” includes all occupations in which literacy does not increase an individual’s productivity and earnings.⁷

Before the educational reform within Judaism (up to 200 C.E.), both Jews and non-Jews are assumed to derive utility only from consumption as no religion required literacy. Also, we assume that before 200 C.E., Jews and non-Jews have the same level of education and income.

After the educational reform within Judaism (that is, after 200 C.E.), Jewish and non-Jewish individuals are identical from the production point of view but are different in terms of their religious preferences. Specifically, we model the transformation of Judaism by assuming that Jewish farmers derive utility from their children’s and their own Hebrew literacy (education). Therefore, a Jewish individual (after 200 C.E.) receives an exogenous taste parameter (an attachment index), $x > 0$, which weights the value of belonging to the Jewish (“reformed”) religion in the utility function, interacted with the family education level. This taste parameter is equal to 0 for an individual whose father is non-Jewish (either because born non-Jewish or because he had converted). This assumption models the well-established fact that no religion in the first millennium (except Judaism) had a norm which placed a positive value on literacy.

The basic setup is a two-period overlapping generations model with no population growth.⁸ An individual is assumed to live for two periods. In the first period, he is a

⁷Section 6 presents the model of “merchants” to study the choices of those urban and skilled occupations in which education enhances an individual’s productivity and earnings.

⁸The no population growth hypothesis fits the well known fact that the world population did not signifi-

child (son) living with (and maybe working for) his family and receiving religion-related education e_s . In the second period, the child becomes an adult with education level e , who decides whether to keep or change his religion r ($j = \text{Jewish}$, $n = \text{non-Jewish}$), and the education level of his children.

Like Iannaccone (1992), we assume that utility comes from consumption and religious participation.⁹ The utility of an adult individual has the following simple structure:

$$\text{Jewish individual} \quad : \quad u^j(c, e_s; e, x) = \log c + x(e + 1)e_s - \epsilon h \quad (1)$$

$$\text{Jewish individual who converts} \quad : \quad u^{jn}(c, e_s; e, x) = \log c - \pi x \quad (2)$$

$$\text{Non-Jewish individual} \quad : \quad u^n(c, e_s; e, x = 0) = \log c. \quad (3)$$

where c is family consumption.

In (1), the utility from belonging to the Jewish religion is increasing with the individual's education and his son's education.¹⁰ This interaction of the preference parameter x with the level of education in the family is our way to model the transformation of Judaism from a religion based on sacrifices to a religion whose core became centered around literacy and education around 200 C.E.

The term ϵh models the subsequent development within Judaism (third century on) that under the leadership of rabbis and scholars imposed a social penalty on illiterate individuals (*ammei ha-aretz*), as documented by the huge number of quotes against the *ammei ha-aretz* in the Mishna and the Talmud. $h = 1$ if a Jewish father chooses not to invest in his son's education ($e_s = 0$), and $h = 0$ otherwise. The community penalty for an illiterate Jewish individual is equal to $\epsilon > 0$.¹¹

cantly grow during the first millennium (Kremer 1993). Also, it would be straightforward to include fertility as an endogenous variable: the increased cost of raising children because of the religious requirement regarding education would make Jewish farmers have fewer children. This prediction (the decrease in the Jewish population because of lower fertility) would complement the prediction regarding the decrease in the Jewish population through conversions that we explore here. The main reason we do not make fertility an endogenous variable is that there is no historical evidence showing that Jews had lower fertility rates after the religious transformation of Judaism (see our discussion at page 16).

⁹The model can be modified to be like Iannaccone (1992)'s model of religion as a "club" whose size is endogenously determined. The utility needs to be specified as a general concave function. Then, in equilibrium the utility and the cost of education can depend on the Jewish population size.

¹⁰The specification above implies that if $e_s = 0$, the adult individual does not get any utility from belonging to the Jewish religion. This is an extrem version of the model, but it captures the paramount importance of educating children in Judaism after the educational reform.

¹¹ ϵ can be made an increasing function of the proportion of educated Jews in the community. This assumption would enhance the conversion result we derive below. It would also make the model closer to Iannaccone (1992)'s model if one solves for the size of the Jewish community in the static model. An alternative way to endogenize the social penalty for illiterate people is to have the Jewish religious leaders set the level of ϵ that maximizes the size of the Jewish educated community in the static model. These extensions affect the proportion of educated individuals in the Jewish rural population in the static framework but not

In contrast, education does not enter the utility function of either Jewish individuals who convert (2 above), or of non-Jewish individuals (3 above). This assumption models the well-established fact that no religion in the first millennium (except Judaism) assigned a positive value on the education of its followers. The term πx represents the disutility from conversion ($\pi \geq 0$).¹² In contrast, the conversion of a non-Jewish individual to Judaism is assumed to have zero cost.¹³

An individual who follows the Jewish religious norm regarding children's education has to provide at least a minimum level $e^{\min} > 0$ to his son; otherwise, if $0 < e < e^{\min}$, it is as if the education level is equal to 0. This minimum level represents the ability to read the Torah. Without loss of generality, we normalize $e^{\min} = 1$.

The cost of investing in the son's (religious) education is given by $\gamma (e_s)^\theta$, where $\gamma > 0$ and $\theta > 1$. The cost of providing the minimum level of education is then equal to γ , which can be interpreted as the teacher's salary and the cost of the books. It is possible that γ is decreasing with the size of the Jewish community in a given location; for example, in larger Jewish communities, each family will pay a smaller share of the teacher's salary. From the viewpoint of the child, γ can be interpreted as the child's intellectual ability (with γ being lower for high-ability children), and/or the opportunity cost of the time the child spends in school instead of working on his family's farm, and/or the cost of hiring a private teacher.¹⁴

A farmer's budget constraint is

$$c + \gamma(e_s)^\theta + \tau^{rF} \leq w^F. \quad (4)$$

where τ^{rF} is the tax a farmer pays according to his religion, and w^F is the farmer's income. Given the way agriculture was practiced in the first millennium (and even for most of the second millennium), literacy did not increase a farmer's productivity and earnings. This is why for both Jewish and non-Jewish farmers education does not enter the farmer's income, and the model captures this feature of agriculture in the first millennium by making w^F exogenous.

Education. From (3) and (4), the optimal choice for non-Jewish farmers is not to educate their sons ($e_s^* = 0$) given that the son's education does not provide any benefit (neither in utility nor in production).

the dynamic implications on the reduction of the Jewish population in the long run, which is the main goal of our model.

¹²The inclusion of the disutility from conversion is not essential for our main result but it helps interpreting the data in view of the model.

¹³We can also model a positive cost for non-Jewish individuals of converting to Judaism. However, the results would not change. Even without this cost, there are no conversions into Judaism.

¹⁴By making γ a decreasing function and ϵ an increasing function of the number of Jewish children in school, in the static framework one can analyze the implications on the incentives to live in large and/or wealthy Jewish communities, as well as the optimal community penalty that maximizes the proportion of educated Jewish individuals—the goal of the religious leaders in Talmudic times.

To solve for the optimal level of sons' education for Jewish farmers, let the budget constraint (4) hold with equality. Then, the optimal level of e_s is given by,

$$e_s^* = 0 \quad \text{if } x(e+1) < \frac{\gamma\theta}{w^F - \gamma - \tau^{jF}} \quad \text{and } x(e+1) < \log\left[\frac{w^F - \tau^{jF}}{w^F - \gamma - \tau^{jF}}\right] - \epsilon \quad (5)$$

$$e_s^* \geq 1 \quad \text{otherwise, and } e_s^* \text{ solves the equation } x(e+1) = \frac{\gamma\theta(e_s)^{\theta-1}}{w^F - \gamma(e_s)^\theta - \tau^{jF}}. \quad (6)$$

The first condition in (5) is because of the corner solution at $e_s = 1$. The second inequality is because of the condition that the utility of a Jewish individual with $e_s = 0$ has to be larger than that with $e_s = 1$.¹⁵

The two conditions give testable implications on children's education. Jewish fathers do not invest in their sons' education (*i*) if the marginal cost of providing basic Jewish education ($\gamma\theta$) is large, and/or (*ii*) if the level of family consumption ($w^F - \gamma - \tau^{rF}$) when the minimum level of education ($e_s = 1$) is provided, is low. When do (*i*) and (*ii*) occur?

At the community level, γ is large in small Jewish communities. It is also large when the aggregate economic conditions in a given community are bad. At the same time, negative aggregate shocks will drive agricultural incomes (w^F) down, which in turn will bring family consumption so low that it would make it almost impossible to invest in children's education.

At the individual level, families with low ability sons (γ large), or families whose opportunity costs of sending the sons to school instead of having them work on the farms are high (again, large γ), will be less likely to invest in children's education. Also, fathers with low levels of attachment to Judaism (low x) or who are themselves less educated (low e), will be less likely to educate their children.

Conversion. Conversion to another religion can be prompted by several factors, which we model as follows. A Jewish farmer converts if his utility as a Jewish individual is lower than his utility as a converted individual. That is, if

$$\begin{aligned} w^j(c, e_s^*; e, x) &< w^{jn}(c, e_s^*; e, x) \quad \text{or} \quad (7) \\ \log(w^F - \gamma(e_s^*)^\theta - \tau^{jF}) + x(e+1)e_s^* - \epsilon h &< \log(w^F - \tau^{nF}) - \pi x \end{aligned}$$

where a Jewish farmer's utility is evaluated at the optimal level of his child's education e_s^* as discussed above. Suppose that $\tau^{jF} = \tau^{nF}$. There are three cases.

- (i) Jewish farmers whose parameters (w^F, γ, θ, x) are such that they *do educate* their sons ($e_s^* \geq 1$), *do not convert* even if $\pi = 0$, as $w^j(c, e_s^* \geq 1; e, x) > w^{jn}(c, e_s^* = 0; e, x)$.

¹⁵It should be noted that the model could be simplified by assuming that education for farmers is a discrete choice of either zero or one. Then, $e_s^* = 0$ if $x(e+1) < \log\left[\frac{w^F - \tau^{jF}}{w^F - \gamma - \tau^{jF}}\right] - \epsilon$, and all the implications discussed above hold. We prefer modeling education as a continuous variable mainly for the sake of equivalence with the model for Jewish merchants presented later.

- (ii) Jewish farmers whose parameters (w^F, γ, θ, x) are such that they *do not educate* their sons ($e_s^* = 0$), *convert* if $0 \leq \pi x \leq \epsilon$.
- (iii) Jewish farmers whose parameters (w^F, γ, θ, x) are such that they *do not educate* their sons ($e_s^* = 0$), *do not convert* if $\pi x > \epsilon$.

Thus, heterogeneity across individuals (different x , e , and γ) in each cohort, and changes in aggregate economic conditions over time (a change in w^F , τ^{rF} , or γ) provide testable implications on conversions.

First, at a given point in time, because of the heterogeneity across individuals there is a proportion of Jewish farmers who educate their sons and do not convert, a proportion of Jewish farmers who do not educate their children but do not convert, and a proportion of Jewish farmers who do not educate their children and convert. This, by itself, reduces the Jewish rural population in any period. Also, conversions are more numerous when aggregate economic conditions are bad (low w^F , high τ^{rF}), and in small communities (high γ).¹⁶

Second, in the *long-run* Judaism cannot survive in a subsistence farming society as in each generation, the Jewish rural population keeps shrinking because of conversions. This process can be halted in two ways: (i) if Jewish farmers can migrate to locations with better economic conditions and/or larger Jewish communities where the cost of educating the children is lower, and (ii) if increased urbanization and the expansion of trade make it available to the literate Jewish farmers skilled occupations with positive returns to education.

4 Jewish Farmers Before the Eighth Century

We show that the historical evidence is consistent with the model's assumptions and predictions.

4.1 Education

At the beginning of the first millennium, the vast majority of world Jewry was engaged in farming exactly as the non-Jewish population (Botticini and Eckstein 2005, Table 1). Illiteracy was the common feature of all rural populations—Jewish and non-Jewish.¹⁷

In a predominantly rural economy, the investment in children's education as Judaism required after the religious reform, should be viewed as a religious sacrifice without any economic return (Iannaccone 1992; and Berman 2000). To the farmers it provided no benefit in terms of higher productivity and earnings. It was costly both at the community level, as the entire community had to bear some expenses (e.g., the construction of a synagogue in a village), and also at the individual level.

¹⁶If cognitive skills are inherited from fathers to sons, our work would share some of the features of Galor and Moav (2002)'s model of natural selection.

¹⁷Bowen (1972, vol. 1), Marrou (1982), Bar-Ilan (1992), and Hezser (2001).

Safrai (1994, p. 125) has estimated that in Roman Palestine, food expenses amounted to about 40-50 percent of a family’s total expenses. With taxes taking an additional 30 percent, little was left to buy other items such as clothing, books, and paying for the teacher’s salary. Table 1 presents data on the cost of living consistent with Safrai’s estimates.

TABLE 1—COST OF LIVING (IN DENARII), 1ST–3RD CENTURIES C.E.

<i>Items in a household budget</i>	<i>Palestine</i>	<i>Egypt</i>	<i>Babylonia</i>
Monthly wage of an agricultural worker	24–48	4–32	72–96
Monthly wage of an urban skilled worker	48–72	6–40	—
Monthly wage of a boy on farm work	—	2–10	—
Monthly bread expenses (family of 4 people)	10–20	5–10	—
Cattle (ox or cow)	100–200	15–100	—
Suit/cloak	30	—	—
Monthly rent of a house	4	—	—
Book	200	—	80–120

Source: Sperber (1965, 1966).

Note: We put Sperber’s data in the same unit of account (denarii). The range of values indicate (i) the different figures mentioned in primary sources, and (ii) the increase in wages and prices from the first to the third century.

Some clear patterns emerge from these data. First, farmers’ incomes were close to subsistence levels and lower than those of urban skilled workers. Second, food exhausted a substantial part of a farmer’s income. Third, the investment in children’s education was costly. The opportunity cost of sending a boy to school was large (in first-century Egypt, a boy earned more than 2 *denarii* per month on farm work—half the cost of providing bread for a family of four people for a month). Moreover, books were expensive. In fact, books remained very expensive until the invention of the movable type printing in the fifteenth century.¹⁸

Despite Jewish education being costly and “useless” in production for farmers, three independent sources show that religious instruction and primary education became more and more spread among the Jewish communities in Palestine and Babylonia from the end of the second century (see Botticini and Eckstein [2005, pp. 934–37] for a more detailed discussion).¹⁹

¹⁸Van Zanden (2004, Figures 4 and 5) estimates that in 1450, a printed Bible cost the equivalent of a laborer’s *annual* wage. Around 1780, the cheapest Bible cost only the equivalent of the *daily* wage of a carpenter. The drop in the real price of books was even more dramatic: in 1800, real book prices were 10 percent of what they have been in 1470.

¹⁹The historical evidence on standards of living, the cost of education, and the archeological findings on synagogues, which we present in this section, are new and in addition to the evidence discussed in Botticini and Eckstein (2005).

First, there is the endless number of discussions and rulings in both Talmud (the Talmud of the Land of Israel and the Babylonian Talmud) regarding schools, synagogues, and teachers.²⁰ These discussions among scholars were not just academic debates, but addressed specific questions raised within the Jewish communities. For example, one ruling established a communal tax to provide for the wages of teachers of the Torah and the Mishna. Another ruling settled the issue of whether unmarried people with no children who resided in a town, had to pay for the wages of teachers. Another ruling discussed the possibility that the community as a whole could fire a teacher if he did not follow the parents' instructions.²¹ *No other religion at this time had a similar body of discussions and rulings devoted to religious instruction.*

At the same time, the quotes in the Talmud against the *ammei ha-aretz* indicate that some Jews chose not to educate their sons, which is consistent with one prediction of our model.

Second, there is the wealth of archeological discoveries, which documents the timing of the construction of synagogues. Table 2 presents a sample of the archeological findings. Of the more than one hundred synagogues that have been excavated in Palestine, the largest number was built from the third to the fifth century in villages and rural communities in Judaea, Galilee, and the Golan. For the locations in the Diaspora (Syria, Asia Minor, Egypt and North Africa, and western Europe), there are archeological findings on more than 200 synagogues.^{22,23}

The archeological evidence of synagogues is very important because many discussions and rulings in the Talmud document that synagogues were primarily a place where children and adults read and learned the Torah.²⁴

Third, the growth of the academies in Babylonia indirectly show that more students must have gotten some primary education, without which they could not enter the academies. Related to the academies, the institution of the *kallah* (apparently begun in Babylon in the third century) indicates that literacy was spreading among the Jewish rural population from the fourth century. The months of *kallah* were two months a year (March and August, when there were no agricultural activities) when Jews from everywhere visited the academy where a specific section of the Talmud was read and discussed by scholars. An important

²⁰From the third to the sixth century, the scholars (*Amoraim*) in the academies in Eretz Israel and Babylon discussed the Oral Torah and clarified the rulings in the Mishna. Their work became codified in the *Talmud Yerushalmi* (the Talmud of the Land of Israel) redacted in the late fourth century, and in the *Talmud Bavli* (the Babylonian Talmud) redacted in the early sixth century.

²¹Safrai (1987, pp. 77-78) and Gafni (1990, pp. 107-09).

²²See Ovadiah (1978), Feldman (1996), Rutgers (1996), and Levine (1999, 2000).

²³The same archeological evidence is not available for Babylonia, but one can infer the existence of synagogues there from the many references in the Talmud (Gafni 1995).

²⁴See Safrai S. (1976b), Safrai Z. (1987; 1995), Oppenheimer (1995), Urman (1995), and Schiffman (1999) for detailed discussions on the functioning of synagogues as places devoted to worship, to the instruction of children and adult individuals, and to a variety of other social and community services.

event of Jewish life was aimed to occur at a time of the year when (literate) farmers could attend it.²⁵

TABLE 2—SAMPLE OF SYNAGOGUES IN PALESTINE, 200–550 C.E.

<i>Century</i>	<i>Locations</i>	<i>Region</i>
3 rd	Bar'am, Gush Halav, Horvat Shema, Kefar Kana, Nevoraya	Galilee
	En-Gedi, Eshtemoa	Judea
3 rd –4 th	Chorazin, Gush Halav, Hammat Gader, Hammath Tiberias,	Galilee
	Khirbet Shema, Maoz Hayyim, Meiron, Nabratein, Rehov	Galilee
	Horvat Sumaqa	Carmel range
	Horvat Rimmon	Judea
	Kokhav-Hayarden	Beth-Shean Valley
4 th	Arbel, Capernaum, Horvat ha-Amudim, Meroth	Galilee
	Beth Alpha, Beth Shean, Maoz Hayyim	Beth-Shean Valley
	Gaza, Horvat Susiya, Naaran	Judea
	Zumimra	Lower Golan
3 rd –5 th	Anim, Aphik, Dabbura, Kefar Hananiah	Golan
5 th	Assalieh, En Neshut, Horvat Kanef, Katzrin,	Lower Golan
5 th	Huseifa, Hirbet Amudim, Yiafia, Sepphoris	Galilee
6 th	Dabiya, Horvat Dikke, Umm el-Kanatir	Lower Golan

Sources: Levine (1982; 2000), Hachlili (1989), Stern (1993), and Urman and Flesher (1995).

During the kallah in spring, the questions sent from the Jewish communities from all locations to the scholars in the academies in Babylon were read and discussed. The written answers (= *teshuvot* in Hebrew, *Responsa* in Latin) to these questions were then sent back through the Jewish merchants.

From the early sixth century, this Responsa literature is the source of information on the spread of literacy in the Jewish communities (Alon 1984; and Brody 1998). These letters indicate that there were teachers who taught small children everywhere, even in villages.²⁶ These teachers were among the community officials (together with rabbis, judges, and heads of synagogues) listed at the end of letters of excommunication that the Geonim (the heads of the academies) sent to the many Jewish communities in the world.

The discussions and rulings in the Talmud (200–500 C.E.), the archeological evidence of synagogues, and the information from the early Gaonic Responsa (550–800 C.E.), indicate that more Jews educated their children in the period *before* the urbanization occurring in the Muslim Empire, that is, *before* the transition from agriculture into crafts and trade.

The spread of literacy among the Jewish rural population is even more impressive when compared to the literacy rates of the non-Jewish rural population. In Babylonia and the

²⁵Neusner (1965–1970, vol. 4, pp. 384–85). This was pointed to us by Aharon Oppenheimer.

²⁶Assaf (1925–1942, vol. 2, pp. 11–27).

Persian empire under Sassanian rule, primary education was mainly a private enterprise, carried on in the home and in court schools for children of the upper classes (Bowen 1972).

As for the Roman Empire, as Baron (1952, vol. 2, p. 279) points out “in the Talmudic period Jewish learning penetrated still deeper into the masses. This happened at a time when illiteracy was widespread throughout the Mediterranean world and when the Imperial City itself had only begun to establish public schools for the wealthy and the middle class.” In the Roman Empire, primary schools existed in the cities but primary education was neither compulsory nor universal. The lower socio-economic groups in the cities and the rural population were illiterate (Marrou 1982, chapters 4 and 7).

When the Roman Empire collapsed, illiteracy became the distinctive mark of the entire population of western Europe, with the exception of monks and clerics (Bowen 1972, chapter 13).²⁷

4.2 Conversions

The main prediction of the model is that some Jewish farmers convert to other religions as a result of the implementation of the costly educational reform in Judaism.

4.2.1 Evidence of Conversions from Jewish Population Dynamics, 1–750 C.E.

The first key piece of evidence supporting this implication comes from the size of the Jewish population, which shrank from about 4.5–5 million in the first century (with the four main centers being in Eretz Israel, Babylonia, Egypt, Syria and Asia Minor) to about 1.2–1.5 million in the early eighth century (Table 3).²⁸

As we show in detail below by going through each region, there is one common trend across the areas from the Near East to western Europe: from the first to the early eighth century, the Jewish population shrank more than the total population. This implies that after taking into account massacres, wars, famines, diseases and epidemics, which took a toll on both the Jewish and the non-Jewish populations, another factor must account for the larger decrease of the Jewish population.

²⁷The Catholic Church perceived this almost total illiteracy of the population to be a major problem to the extent that in various councils and synods from the seventh to the ninth century, it encouraged the bishops to establish elementary schools in towns and districts (Bowen 1975, pp. 29–31). Even in 1500, the share of the literate population in most of western Europe was no more than 10 percent (Reis 2004).

²⁸For population data in the first millennium, we rely on the works of leading historians and demographers. We also greatly benefited from a very helpful discussion with Sergio DellaPergola. While there is disagreement among scholars on specific numbers, there is a general consensus on the trends and the relative size of the populations in selected locations at given times. The numbers should be considered as ranges of values, instead of exact figures. We agree with DellaPergola’s estimate of 4.5 million Jews in the first century, which is an intermediate value between the 2–3 million estimate suggested by some scholars (e.g., Hamel [1990]) and the 8 million estimate proposed by Baron (1971).

TABLE 3—POPULATION DYNAMICS (IN MILLION), CA. 1–750 C.E.

Time	Jewish Population						Total Population					
	65 ^g	100 ^h	150	300 ⁱ	550	750	65	100	150	300	550	750
Palestine	2.5	1.8	1.2	0.5	0.2	few	3	2.25	1.75	1.1	1.5	1–1.5
Babylonia ^a	1	1	1–1.2	1–1.2	0.8–1	0.7–0.9	7	7.25	7.5	8.75	10.5	11.75
Egypt ^b	1	0.8–1	0.5	0.1	few	0.004	8.15	8.4	8.8	8.2	6.2	7.8
Syria ^c	many	many	some	few	few	few	2.25	2.25	2.25	2	1.5	2
Asia Minor ^d	many	many	some	few	few	few	10.25	11	11.5	11	8.5	8.75
E. Europe ^e	few	few	few	few	few	few	3.1	3.25	3.25	3.3	2.7	3.05
W. Europe ^f	some	some	some	few	few	few	21.1	22.6	22.95	22.05	16.95	16.95
Total	4.5–5	3.8–4	2.8–3	1.8–2	1.2–1.5	1–1.2	54.85	57	58	56.4	47.85	50.8
$\frac{\text{Jewish}}{\text{Total}}\%$	8.6	6.8	5.0	3.3	2.8	2.1	—	—	—	—	—	—

Sources: For Babylonia, Neusner (1965–1970, vol. 1, pp. 14–15, vol. 2, pp. 246–48), and Issawi (1981, pp. 376, 381). For Palestine, Herr and Oppenheimer (1990, pp. 108–9), Hamel (1990, pp. 137–40). For Egypt, Issawi (1981, pp. 376, 381), and Musallam (1981, p. 432). For data on Jewish population in all locations, Baron (1971), and DellaPergola (2001, Tables 1 and 2). For data on total population, Russell (1958), Clark (1968), Durand (1977, Table 1), and McEvedy and Jones (1978).

^a Babylonia includes: Iraq, Persia, and the Arabian peninsula.

^b Egypt includes North Africa.

^c Syria includes Lebanon.

^d Asia Minor includes Anatolia, Turkey, and the Balkans (Albania, Bulgaria, Greece, and Yugoslavia).

^e Eastern Europe includes Hungary, Romania, Poland, and Czechoslovakia.

^f Western Europe includes Italy, Portugal, Spain, France, the Low Countries, Germany, and England, which belonged to the Roman Empire for most of the first four centuries.

^g The Great Revolt in Palestine (66–70 C.E.) was crushed by emperor Titus. The Temple in Jerusalem was demolished.

^h The rebellion in Egypt and Cyrenaica (115–117) was put down by emperor Trajan. The Bar Kokhba revolt in Palestine (132–135) was ended by emperor Hadrian.

ⁱ The Edict of Milan (313 C.E.) by emperor Constantine made Christianity a religion permitted in the Roman Empire.

To the best of our knowledge, there is no historical evidence showing that Jewish households reduced their fertility following the transformation of Judaism. The Mishna and the Talmud, which contain an endless number of detailed discussions and rulings regarding marriage, sexual behavior among spouses, pregnancy, abortion, infertility, divorce, and the Biblical requirement that the very purpose of marriage is to fulfill the Biblical commandment “be fruitful and multiply” (*peru urevu*), do not have any discussion regarding reducing the number of children in order to fulfill the religious duty of educating the children. If this had been a major problem in the Jewish communities, somehow it would have been brought

to the attention of the scholars and rabbis in the academies, would have been discussed, and would have found its way in the Talmud.²⁹

Excluding a decrease in fertility, voluntary conversions remain the only other factor which can explain the comparatively larger reduction of the Jewish population with respect to the total population before the eighth century.

Palestine. As Table 3 shows (left-hand side), the Jewish population decreased by roughly 90 percent in the first half of the millennium—from about 2.5 million (including 300,000 Samaritans) before the Great Revolt (66–70 C.E.) to only 200,000 by the sixth century and even less by the eighth century.³⁰

The death toll of the Great Revolt against the Roman empire amounted to about 600,000 Jews, whereas the Bar Kokhba revolt in 135 caused the death of about 500,000 Jews.³¹ Massacres account for roughly 40 percent of the decrease of the Jewish population in Palestine. Moreover, some Jews migrated to Babylon after these revolts because of the worse economic conditions.

After accounting for massacres and migrations, there is an additional 30 to 40 percent of the decrease in the Jewish population in Palestine (about 1–1.3 million Jews) to be explained.

In contrast, looking at the right-hand side of Table 3, the non-Jewish population (which is equal to total population minus the Jewish population) went from roughly 500,000 Greeks, pagans, and some Christians in the first century to about 1.3 million people (mainly Christians) in the sixth century. These two opposite trends in the Jewish and Christian populations in Palestine supports the hypothesis that a certain proportion of Jews converted to Christianity.

Egypt and North Africa. As one can see in Table 3, total population in Egypt decreased by slightly more than 4 percent from the first to the early eighth century.

In contrast, Egyptian Jewry (which consisted almost entirely of Hellenistic Jews who spoke Greek) almost disappeared—from about 1 million in the first century to about four thousand before the Arab-Muslim expansion.

Of this decrease, about 25 percent is explained by the massacre of the Jews in Alexandria (about 150,000–200,000) when the emperor Trajan put an end to the rebellion of the Jewish

²⁹Sergio DellaPergola (2001) shows that the Jewish population experienced the demographic transition one century earlier than the rest of the European population. This means that the Jewish birth rate started declining only around the late 18th century.

³⁰The number of known Jewish settlements shrank from more than 200 to less than 50 between 135 and 640 C.E. (Avi-Yonah 1976, p. 20). See footnote 39 for detailed information on the Samaritans.

³¹Baron (1971, pp. 870–75) and Herr and Oppenheimer (1990, p. 109). The Samaritans sided with the Romans and the crushing of the rebellion did not affect them.

communities in Egypt and Cyrenaica in 115–117. Some Egyptian Jews also migrated to Babylon.

Yet, there is an additional 60 to 70 percent of the decrease in Egyptian Jewry which neither massacres nor migrations can explain. Notice that this is the time in which Christianity spread in Egypt and laid the foundation of the Egyptian Coptic church. Many of the early Hellenist Christians were Jews by birth.

Babylonia and Persia. Total population in Babylonia, Persia, and the Arabian peninsula including Yemen, increased by more than 60 percent from the first to the eighth century (Table 3).

Babylonian Jewry increased by roughly 20 percent from the second and the early fourth century as the outcome of the migrations of Jews from Palestine and Egypt. However, in the subsequent four centuries, Babylonian Jewry decreased despite no major massacres occurred. At the same time, the Christian population became as numerous as the Jewish one.

Asia Minor and Balkans, Syria, and Western Europe. Table 3 indicates that from the first to the eighth century, in Syria, Asia Minor and Balkans, and western Europe, total populations decreased by roughly 11, 12, and 20 percent, respectively.

The Jewish population in these locations also decreased although it is not possible to ascertain by how much. In 600 C.E. the Jews in western Europe were a few thousands but between 600 and 800, there is no information at all on the Jewish communities there (Toch 2005). Some persecutions and forced conversions of Jews occurred in Syria, Asia Minor and the Balkans in the early Byzantine period (sixth–early seventh centuries), and in Visigothic Spain (fifth–seventh centuries). However, the decline of the Jewish population in these areas had started much earlier, in the second–fifth centuries.

4.2.2 Evidence of Conversions from Literary and Epigraphic Sources, 1–325 C.E.

The two main competitors of Judaism in the first three centuries were the Greek-Hellenistic pagan religion, and Christianity.³²

Christianity emerged as one of the many groups within Judaism in the first century, and before becoming a predominantly Gentile religion, its main base consisted of Jewish

³²As for conversions of non-Jews to Judaism, there is a debate among scholars on whether Jewish religious leaders actively encouraged proselytism or not (see Feldman 1993, cap. 9, Goodman 1994, and Cohen 1999). There were conversions of pagans to Judaism *before* the revolts in the first century C.E. (Baron 1952, vol. 1, pp. 173–76). In contrast, *after* the third century people converted to Judaism only by coercion, such as in the case of slaves owned by Jews.

Christians (Schiffman 1985, 2003). The early Christian community in Jerusalem consisted entirely of Jews and proselytes to Judaism.

Under the influence of Paul (a Jew by birth), Christianity abolished many requirements imposed by Judaism, including circumcision for men and the reading of the Torah. From the very beginning Christianity aimed to make the lower socio-economic groups feel welcome. “Faith, hope, and charity” became the three main requirements for being a devoted Christian.³³

Among the Jewish Christians there were several sub-groups.³⁴ The Ebionites (in Hebrew *Evionim*, which literally means “poor people”) accepted the Pharisaic form of Judaism (Written and Oral Torah), practised circumcision, and kept the Sabbath. They rejected Paul’s doctrine whereas, at the same time, they recognized Jesus as a Prophet and Messiah. They spoke Jewish Aramaic and they had both a Hebrew Bible and a Hebrew version of the Gospel. The Nazarenes were observant Jews who accepted Paul’s doctrine like the Gentiles Christians, and shared hostility feelings toward the Jewish scholars and the Pharisees. Lastly, other groups, collectively designated as Jewish Christian Gnostics, adhered to the laws of the Torah but rejected some part of the Bible (e.g., the one dealing with sacrifices), believed in Jesus as Messiah, and shared gnostic elements together with other non-Jewish sects.

To these groups of Jewish Christians was addressed the substantial body of Jewish Christian literature (e.g., Pseudo-Clementine literature, the Gospels of the Nazarenes, Ebionites, Hebrews, Egyptians, and the *Kerygmata Petrou*), which in itself indicates the existence of Jews who were departing from Judaism and moving toward Christianity.³⁵

Until the destruction of the Temple, Jewish religious leaders held ambivalent feelings, mostly of tolerance, toward the Jewish Christian sects. However, after the Bar Kokhba revolt in 135, Jewish scholars declared the various sects of Jewish Christians outside the Jewish fold. To apostatize to Christianity was condemnable and apostates were regularly cursed in synagogues (this is captured by the cost of conversion π in our model).

Based on epigraphic evidence from hundreds of inscriptions, archeological findings on church buildings, and an enormous amount of literary sources, scholars have documented three main patterns regarding the spread of Christianity from the Near East to the West *before* 325 C.E., the year of the Council of Nicaea, the first of the great ecumenical councils,

³³See Danielou and Marrou (1964), Nock (1969), Lüdemann (1989), and Stark (1996).

³⁴Danielou (1964), Schoeps (1969), and Neusner (1990b, 1991).

³⁵See Georgi (1995) and Jones (1995). The Pseudo-Clementine literature is a main source for the knowledge of several forms of early Jewish Christianity. The author of the source edited by Jones (1995) is identified as a Jewish-Christian of about 200 C.E., possibly a Jewish-Christian presbyter or bishop in Jerusalem, who viewed Jewish Christianity as the only true form of Judaism.

which was a landmark in the history of the expansion of Christianity.^{36,37}

First, as shown in Table 4, Christianity deeply penetrated towns, villages, and rural districts in locations such as Palestine, Syria, Armenia and the provinces in Asia Minor, Egypt and parts of North Africa (Africa Proconsularis and Numidia), Edessa and Arbela in western Mesopotamia, where large Jewish communities existed. In contrast, in areas where there were few or no Jewish settlements (e.g., eastern Persia, Mauritania and Tripolitania in North Africa, central and northern Gaul, Belgium, England, Germany, Raetia, and eastern Europe), Christianity spread very slowly or not at all before 325.

TABLE 4—THE EXPANSION OF CHRISTIANITY, 1–325 C.E.

<i>Group</i>	<i>Locations</i>	<i>Christian Population % Total Population</i>
I	All provinces in Asia Minor (Armenia, Bithynia, Cappadocia, Caria, Diospontus, Galatia, Isauria, Lycia, Lydia, Lycaonia, Mysia, Pamphylia, Paphlagonia, Pisidia, Phrygia, Pontus), Cyprus, Thracia, towns (e.g., Caesarea) and villages in Palestine, Edessa in western Mesopotamia	Nearly one-half of the population was Christian and Christianity was the most widely spread religion
II	Villages in Palestine, Syria, Egypt, Cyrenaica, Africa Proconsularis and Numidia, Achaia, Thessaly, Macedonia, central and southern Italy, Iberia, southern Gaul	A large segment of the population was Christian
III	Galilee, Phoenicia, Assyria and Mesopotamia, western Persia, Mauretania and Tripolitana, Epirus, Dardania, Dalmatia, Moesia, Pannonia, northern Italy	Christianity was thinly scattered
IV	Eastern Persia, Philistia, Dacia and northern coast of the Black Sea, eastern Europe, Germany, Raetia, central and northern Gaul, Belgium	A small segment of the population was Christian

Sources: see footnote 36.

³⁶See Harnack (1908, vol. 2, pp. 89–337), Wolfson (1947, cap. 1), Baron (1952, vol. 2), Neusner (1965, vol. I, pp. 166–69), Latourette (1975, chapters 1 and 5), E. P. Sanders (1980), Stevenson (1982), Stark (1986, 1996), Feldman (1993, chapter 2; and 2002), Barclay (1996, 1998), Isaac (1998), J. Sanders (1999, 2000), Zetterholm (2003, chapter 3, and pp. 216–35), and Mullen (2004). Among the huge number of literary primary sources on which these scholars rely there are: Acts of the Apostles, Paul’s letters, the works of early Christian writers and Church fathers, the Coptic Bible, the canons of the synods, the Testament of the Forty Martyrs in Armenia, the Meletian Acts, and imperial decrees.

³⁷There were no major church buildings before 150 C.E. The growth in the number of churches started toward the end of the second century and picked up especially during the reign of emperor Gallienus (213–268 C.E.) and continued in the next centuries (Harnack 1908, vol. 2, pp. 86–89).

Second, the model predicts that Jews with a low attachment parameter to Judaism (low x) are more likely to convert. Consistent with this prediction, one finds that outside Palestine Christianity grew primarily in locations where the Jewish settlements consisted of Hellenistic Jews, as well as pagans or descendants of former pagans who had converted to Judaism in earlier times (e.g., Syria, Greece, Egypt and North Africa, Spain, central and southern Italy, and southern Gaul). Interestingly, both Asia Minor and Egypt, which hosted very large Jewish communities, never had a Torah academy like the ones established in Palestine and Babylon. Furthermore, no students from Asia Minor are mentioned among those studying at the academies in Palestine and Babylon.

The lower degree of observance of Jewish laws among the large Hellenistic Jewish communities in Egypt, Syria, and Asia Minor, as well as their close proximity to a society dominated by the Hellenistic religion and culture favored conversions to the Greek-Hellenistic pagan religion (especially in the first and second centuries), and to Christianity.

Third, the model predicts that Jewish farmers with low earnings w^F , and Jewish fathers with higher opportunity costs γ of educating their sons, are more likely to convert. Consistent with this prediction, the historical evidence indicates that most Jewish converts to Christianity were uneducated, low income Jews. Many passages in the writings of the early Christian writers and Church Fathers support this statement.³⁸ In addition to these literary quotes, one has to remember that about 90 percent of the Jewish population consisted of illiterate farmers in the first–sixth centuries (see Botticini and Eckstein 2005, Table 1). Therefore, if a million Jews converted and 90 percent of the Jews were illiterate farmers, it means that most conversions involved illiterate farmers.

Independently of these literary sources, the “puzzle” about the timing of the construction of synagogues in rural Palestine supports the view that conversions of Jews to Christianity occurred among the low income, rural population. The growth in the number of synagogues occurred in the worst economic times for Palestine—between the third and the fifth century—when some Jews were even migrating to Babylonia (Safrai 1976a, pp. 343–44). This implies that the Jews who funded the construction of synagogues in many villages across Palestine were better off than those who left Judaism and embraced Christianity.

4.2.3 Evidence of Conversions from Literary Sources, 325–700 C.E.

The Roman and Early Byzantine Empires. Table 3 indicates that from 300 to 700 C.E., the Jewish population in Palestine, Syria and Asia Minor, Egypt and the

³⁸See Harnack (1908, vol. 1, p. 47; vol. 2, pp. 33–34), Baron (1952, vol. 2, pp. 163–66), Latourette (1975, pp. 80–81), MacMullen (1984, p. 38), Fox (1987, p. 301), Theissen (1992, pp. 39–53), Stark (1996, pp. 19, 39, 46), and Mullen (2004, p. 9) who list the passages in these literary sources. Of course, Christianity drew converts from a cross section of the population and, therefore, it also attracted some middle income and wealthy individuals (Meeks 1983, pp. 54–72; and Fox 1987, pp. 272–77).

other locations under Roman rule shrank more than the general population did.³⁹ Thus, after accounting for common factors that explain both the Jewish and total population decline (epidemics, famines, and wars), one is left again with conversions to explain the comparatively larger decline of the Jewish population.

With the edict of Milan in 313, which made Christianity a religion permitted in the Roman Empire, and by summoning the Council of Nicaea in 325 where hundreds of bishops gathered from everywhere and established the main theological tenets of the new religion, the Roman emperor Constantine opened the way for Christianity to spread among pagans and Gentiles all over the Roman Empire.

Neither Constantine nor subsequent emperors, though, forced Jews to convert to Christianity. Each emperor imposed some restrictions on the Jews in the Roman and early Byzantine empires (e.g., the prohibition to buy Christian slaves, or the prohibition to build new synagogues), but they never imposed the Christian faith on the Jewish people.

Despite no coercion to convert to Christianity, some Jews voluntarily left Judaism from the fourth to the seventh century. Literary evidence of voluntary conversions comes from legal sources. As Table 5 illustrates, Roman and early Byzantine emperors issued decrees to protect Jewish converts to Christianity. There would be no need to issue these laws unless the possibility that Jews might harm Jewish converts to Christianity was perceived as a major problem.

³⁹The second group who increasingly separated from the Jewish religion in Palestine was the Samaritans. What separated the Samaritans from the Jewish community was the fact that the Samaritans kept considering sacrifices the core of the religion, accepted only the Pentateuch (the first five books of the Bible) as the sole source of religious law, refused the Oral Torah developed by the scholars in the academies, and never codified their canon law into a Mishna. Some Jewish scholars in the second century were still considering the Samaritans as belonging to the Jewish fold. But rabbi Judah ha-Nassi and later scholars equated them to Gentiles. In the Talmudic period, Jewish scholars debated whether the Samaritans were to be considered *haverim* (= members of the community) or *ammei ha-aretz* (*illiterate Jews*). This implies that the social penalty (ϵ) imposed by the Jewish community on the Samaritans was greater than zero.

Their numbers declined for two main reasons: massacres and *forced* conversions. The early Byzantine emperors crushed the Samaritan revolts in the fifth and sixth centuries. One of the cruelest repressions occurred in the year 529 under the emperor Justinian I when tens of thousands of Samaritans died or were enslaved. The Samaritan faith was virtually outlawed thereafter by the Christian Byzantine Empire; from a population once at least in the hundreds of thousands, the Samaritan community dwindled to near extinction (Montgomery 1968, chapters 4–9; Sharf 1971; Alon 1984, p. 745; Crown 1989; Herr and Oppenheimer 1990, p. 204; and Crown, Pummer, and Tal 1993).

Some Samaritans, though, did not convert, and from this point of view, were identical to the illiterate Jewish farmers (*ammei ha-aretz*) who did not educate their children and, yet, did not leave Judaism and were made outcast by the Jewish religious leaders. This historical fact is consistent with case (iii) in the model.

TABLE 5—LEGISLATION REGARDING JEWISH CONVERTS TO CHRISTIANITY, 300–600 C.E.

<i>Years</i>	<i>Emperor</i>	<i>Decree</i>
311–337	Constantine	Death penalty for Jews who harm Jewish converts to Christianity
364–375	Valentinian	Jewish parents cannot disinherit children who converted to Christianity
379–395	Theodosius	Death penalty by fire for Jews who harm Jewish converts to Christianity
395–423	Honorius	Jewish converts to Christianity can revert to Judaism
395–408	Arcadius	Jews cannot become Christians for economic motives
527–565	Justinian	Jewish parents cannot disinherit children who converted to Christianity

Sources: Parkes (1934), Alon (1984, p. 753), and Linder (1987; 1997).

Note: The years refer to the length of an emperor’s tenure.

Babylonia and Mesopotamia. As shown above (Table 4), conversions of Jews to Christianity had occurred in Mesopotamia and Babylonia in the first two centuries but it was limited to some locations, such as Edessa in western Mesopotamia.

Christianity penetrated more widely and deeply among Babylonian Jewry during the fourth and fifth centuries.⁴⁰ On the one hand, the Jewish population in Babylonia and Mesopotamia shrank (Table 3) despite the migrations of Jews from Palestine and Egypt to Babylon as the outcome of worsened economic conditions.

On the other hand, Christians in Mesopotamia and Babylonia became as numerous as the Jews there, and a certain proportion of these Christians were converted Jews given that in Babylonia there were no attempts to forcibly convert pagans to Christianity as in the Byzantine Empire (Gil 1997, vol. 1, p. 57).

Also, consistent with the prediction of the model, Christianity spread in those locations (e.g., Edessa and Arbela in western Mesopotamia) where there were large Jewish communities *not* under the influence of rabbinic Judaism (that is, in communities whose individuals had lower attachment indexes x to rabbinic Judaism). In contrast, Christianity spread slowly in locations (e.g., Nehardea and Nisibis) where rabbinic Judaism was well established (Neusner 1965–1970, vol. 2).

5 Occupational Dynamics: From Farmers to Merchants, 8th–9th Centuries⁴¹

Given the stagnant economies in the late Roman, early Byzantine, and Sassanian Empires in the fourth-seventh centuries, the growing number of educated Jewish farmers could not

⁴⁰Neusner (1965–1970, vol. 2, and vol. 4, p. 435).

⁴¹Here we summarize the detailed description of the occupational transition presented in Botticini and Eckstein (2005). In Table 6, however, we present data on urbanization not available in the other paper.

find skilled occupations in the existing cities at that time.⁴²

But in the eighth–ninth centuries, as Table 6 shows, urbanization greatly expanded in the newly established Muslim Empire (Lewis 1984).

TABLE 6—URBANIZATION IN THE NEAR EAST AND IN WESTERN EUROPE

<i>Iraq, Persia, and Egypt in the 8th–9th centuries</i>		
	Total Population (thousands)	Jewish Population (thousands)
Baghdad	600–1,000	200
Samarra	500+	7.5
Basra	200–600	10–50
Kufa	400	35
Nishapur	100–500	?
Isfahan	100	75
Qayrawan	100	?
Cairo	300	10
<i>Western Europe's eight largest cities in the late 12th century</i>		
	Total Population (thousands)	Jewish Population (thousands)
Palermo	150	7.5
Paris	110	1.5 ^a
Seville	80	many
Venice	70	?
Florence	60	0.1 ^b
Granada	60	many
Cordoba	60	many
Cologne	50	some

Sources: For total population in cities in Iraq and Persia, see Watson (1981, p. 56, footnote 45), and Lapidus (1981, p. 203). For total and Jewish population in Cairo, see Ashtor (1976, p. 89). For total population in European cities, see De Long and Shleifer (1993, Table 1, second column). For the Jewish population in Iraq and Persia, see Gil (1997, pp. 487–530) and Benjamin of Tudela (1170). For the Jewish population in European cities, see Benjamin of Tudela (1170).

Note: We agree with DellaPergola (2001) and interpret Tudela's numbers as the number of Jewish households in each city. Based on the evidence from the documents of the Cairo Geniza, the average family size was 5 people per household. Therefore, we multiply the number of Jewish households times 5 to obtain the number of Jewish people in a given city.

^a Benjamin of Tudela lists 300 Jewish households (about 1,500 people) for Marseilles.

^b Benjamin of Tudela lists 20 Jewish households (about 100 people) for nearby Pisa.

⁴²See Neusner (1965–1970) and Avi-Yonah (1976) for the stagnant and worsened economic conditions in the Roman, Byzantine, and Persian empires in the fourth–seventh centuries.

New cities were founded in Iraq and Persia. The Umayyad dynasty, which had its capital in Damascus, established as main centers Basra in 636 and Kufa in 638, whereas the Abbasid rulers developed Baghdad in 762 and Samarra in 836. The population of Baghdad in the eighth and ninth centuries was in the range of 600,000 to 1 million people, whereas the largest European cities in the late twelfth century had populations in the range of 60,000 to 150,000 people.

The growth of new cities, towns, and administrative centers in the Muslim Near East vastly increased the demand for urban and skilled occupations. The literate Jewish rural population in Iraq and later in all the Muslim Empire moved to urban centers, abandoned agriculture, and became engaged in a wide range of crafts, trade, moneylending, tax-farming, and the medical profession. This occupational transition took about 150 years and by 900, almost all Jews in Iraq, Persia, Syria, and Egypt, were engaged in urban occupations.⁴³

In these cities, the Jewish population became very large to the extent that roughly 80 percent of world Jewry lived in hundreds of cities and towns in eighth-century Iraq and Persia, with Baghdad alone hosting a large Jewish community of about 200,000 people (Gil 1997, p. 458).

While the most educated Jews (the scholars in the academies) had left agriculture and become merchants well *before* the expanded urbanization in Iraq and Persia, the literate Jewish rural population left agriculture only when the growth of cities in the Muslim Empire greatly expanded the demand for skilled occupations, in which the returns to their investment in literacy and education were high.

Since Jews, Christians (as numerous as the Jews), and other non-Muslim minorities could engage in any occupation in the Muslim Empire, the distinctive characteristic of the Jews—their endogenously determined higher literacy and education—gave them the comparative advantage to switch to the better paid occupations in the new cities, whereas most non-Jews remained farmers (Baron 1952; Gil 1997). This occupational selection into urban, skilled occupations remained the distinctive mark of the Jewish people thereafter.

6 A Model of Education and Conversion of Merchants

Once the occupational transition had reached its full-fledged stage in the eighth–ninth centuries as described above, most Jews were engaged in urban, skilled occupations. We then modify the model to study their choices of education and conversion as merchants.

Given that the change in religious preferences after 200 C.E. occurred for all Jewish individuals *regardless* of their occupation, the assumptions on the utility functions of Jewish

⁴³See Ashtor (1959b, pp. 147–54), Goitein (1967), Ben Sasson (1996), and Gil (1997, vol. 1). Goitein enumerated about 265 occupations involving Jewish individuals mentioned in the documents of the Cairo Geniza.

and non-Jewish merchants are the same as the ones discussed in Section 3 in the model for farmers.

As explained in Botticini and Eckstein (2005, p. 931), Hebrew religious education had spillover effects on general literacy and education, which in turn increased the productivity of urban, skilled occupations. We model this historical fact by making the earnings depend on the adult's and his son's education independently of the religious affiliation, that is,

$$w^M(e, e_s) = w^F[1 + Ae_s^\alpha e^{1-\alpha}], \quad (8)$$

Therefore, a merchant's budget constraint is given by,

$$c + \gamma(e_s)^\theta + \tau^{rM} \leq w^F[1 + Ae_s^\alpha e^{1-\alpha}] \quad (9)$$

where e and e_s are defined as above, A is an exogenous productivity parameter, and τ^{rM} is the tax paid by a merchant of religion r .⁴⁴

Education. The main prediction is that Jewish merchants invest more than non-Jewish merchants in children's education because their x (their taste parameter for Judaism as a religion centered on education) is positive.

Consider the first-order condition which gives the optimal level of a child's education for any merchant (Jewish or non-Jewish),

$$x(e+1) + [-\theta\gamma e_s^{\theta-1} + w^F A\alpha e_s^{\alpha-1} e^{1-\alpha}] \frac{1}{w^M - \gamma(e_s)^\theta - \tau^{rM}} \leq 0. \quad (10)$$

Consider first the steady-state education level ($e = e_s = e^*$) of non-Jewish merchants (who by definition have the exogenous taste parameter for Judaism $x = 0$). Then, from equation (10), $e = e_s = e^* = [\frac{w^F A\alpha}{\theta\gamma}]^{1/(\theta-1)}$. In the steady-state, non-Jewish merchants educate their sons (i.e., $e^* \geq e^{\min} = 1$) if the parameters satisfy the condition that $w^F A\alpha \geq \gamma\theta$, that is, if the marginal product of education is greater than, or equal to, the marginal cost of education at $e_s = e = e^{\min} = 1$. The better are the aggregate economic conditions, the higher are the earnings of merchants ($w^F A\alpha$) and, hence, the more likely is that both non-Jewish and Jewish merchants will invest in their sons' education.

Let us assume that, before the educational reform in Judaism, the education levels of both Jewish and non-Jewish merchants are positive ($e \geq 1$). Education has a positive effect on merchants' productivity and earnings regardless of which religion a merchant belongs to. However, after the religious transformation of Judaism, Jewish merchants will invest in their children's education comparatively more than non-Jewish merchants because they also derive *direct* utility from children's education at the rate x .⁴⁵

⁴⁴We analyze only the case of literate merchants as the optimization problem of illiterate merchants is the same as the one of illiterate farmers.

⁴⁵See equation (1).

Conversion. The main prediction regarding conversion is that if there is a small or no tax difference between Jewish and non-Jewish merchants, *no* Jewish merchant converts. Only if taxes on Jewish merchants are significantly higher, then Jewish merchants with low levels of attachment to Judaism (low x) convert. Hence, given that some Jewish farmers convert (see Section 3) and Jewish merchants do not (unless the tax differential is very high), the model predicts that over time, the *proportion* of merchants in the Jewish population will increase.

Formally, a literate Jewish merchant ($e^j \geq 1$) converts if the utility of remaining a Jewish individual is lower than the utility of becoming a non-Jewish individual, that is,

$$\begin{aligned}
 u^j(c, e_s; e, x) &< u^{jn}(c, e_s; e, x) \text{ or} \\
 \log(w^F [1 + A(e_s^j)^\alpha (e^j)^{1-\alpha}] - \gamma(e_s^j)^\theta - \tau_t^{jM}) + x(e^j + 1)e_s^j &< \quad (11) \\
 \log(w^F [1 + A(e_s^n)^\alpha (e^n)^{1-\alpha}] - \gamma(e_s^n)^\theta - \tau_t^{nM}) - \pi x.
 \end{aligned}$$

Assuming that the level of education of Jewish merchants *before* the religious reform (e^*) is greater than, or equal to, 1, equation (11) implies that if taxes on Jewish and non-Jewish merchants are the same ($\tau^{nM} = \tau^{jM}$), a literate Jewish merchant does not convert.

To see that, let us start first with the extreme case of $x = 0$, in which the Jewish individual places no value on the educational requirement established by Judaism. Then, from (11), a Jewish merchant will choose to invest in his son's education (e_s^j) exactly as a non-Jewish merchant (e_s^n), and, therefore, he will be indifferent regarding conversion since he derives the same utility as a Jewish and as a non-Jewish individual.

As the attachment index to Judaism x increases, the utility from being Jewish is increasing with the education level of the child e_s^j , and therefore, a Jewish merchant who educates his children, will not convert. Moreover, the higher the attachment index to Judaism x , the greater is the cost of conversion (πx), and hence, no Jewish merchant will convert if the tax differential between Jewish and non-Jewish individuals is zero or small.

7 Jewish Education and Conversion, 9th to 12th Centuries

We show that the historical evidence from the Muslim period is consistent with the model's predictions.

7.1 Education

In the Muslim Near East, primary education was almost universal in the Jewish communities (Goitein 1962).⁴⁶ The two main sources of information are the *Responsa* of the *Geonim* (described in Section 4.1) and the documents of the Cairo Geniza.

⁴⁶In Botticini and Eckstein (2005, pp. 937–39) we present detailed evidence to support this claim. Here we only summarize the main facts.

The existence and extent of the Responsa is by itself evidence of the spread of literacy in the Jewish communities. Many Responsa, even from villages, referred to schooling and teachers. Other Responsa indicate that in synagogues Jewish children learned the Hebrew and Arabic scripts, as well as arithmetic, and that even non-Jewish families were interested in sending their children to synagogues to learn non-religious topics.⁴⁷

The other impressive source of historical evidence consists of the thousands of letters, contracts, wills, and written transactions from the documents of the Cairo Geniza, which confirm the universality of primary education documented in the Responsa, but on a larger scale.⁴⁸ The budgets, letters, and contracts of wealthy and humble households even from small towns and villages contain an endless number of references to teachers and school fees. In addition to the school fees for his own children (2 *dirhems* per month per child), each household head was required to pay an education tax to finance the primary education of orphan and/or poor children.⁴⁹ Records from Old Cairo, Jerusalem, Damascus, and Baghdad mention “teachers of the orphans” supported by this communal tax.⁵⁰

Since urbanization affected both the Jewish population and the local population, other groups also invested in education. The key difference is that *all* Jews invested in children’s education, whereas among non-Jews only some invested in children’s education. For example, to spread the new religion, the Muslim rulers promoted the establishment of primary schools (*Maktab* or *Kuttab*), and by the end of the eighth century, there was a growing number of primary schools.⁵¹ Unlike in Judaism, though, providing a child with primary education was *not* a religious law in Islam. Moreover, the majority of these primary schools were devoted to the memorization of the Qumran, and few of them taught children to read and write.

The Muslim rulers also founded institutions of higher learning (academies) but only starting from the eleventh century—*more than six centuries after* the establishment of the Jewish academies in Iraq.

7.2 Conversions

Table 7 indicates that from the 8th to the 12th century, total population increased. Most of this population growth occurred in western Europe at the turn of the millennium together with expanding urbanization and the rebirth of a commercial economy.

⁴⁷ Assaf (1925–1942, vol. 2, pp. 11–27), and Goitein (1962).

⁴⁸ The documents of the Cairo Geniza were found in the basement of a synagogue in Fustat (Old Cairo, Egypt) where they had been housed for centuries because the name of God was written at the beginning of each document, and therefore, they could not be thrown away.

⁴⁹ A teacher’s average salary was 80 *dirhems* per month.

⁵⁰ Goitein (1971, pp. 174–93).

⁵¹ See Nakosteen (1964, pp. 44–47). Especially in early times, Jewish and Christians teachers were recruited to teach non-religious matters in Muslim schools.

TABLE 7—POPULATION DYNAMICS (IN MILLION), CA. 750–1170

	<i>Jewish Population</i>		<i>Total Population</i>	
	750	1170	750	1170
Palestine	few	0.002	0.5	0.5
Iraq, Persia, Arabia ^a	0.7–0.9	0.7–0.9	11.75	10.75
Egypt, North Africa	0.004	0.07	7.8	8.45
Syria, Lebanon	few	0.015	2	1.5
Balkans, eastern Europe ^b	few	0.047	11.8	16.4
Western Europe ^c	few	0.103	16.95	32.35
All locations	1–1.2	1–1.2 ^d	50.8	69.95
$\frac{\text{Jewish Population}}{\text{World Population}}$ (%)	2.1	1.6	—	—

Sources: For Babylonia, Neusner (1965–1970, vol. 1, pp. 14–15, vol. 2, pp. 246–48), and Issawi (1981, pp. 376, 381). For Palestine, Herr and Oppenheimer (1990, pp. 108–09), Hamel (1990, pp. 137–40). For Egypt, Ashtor (1959a; 1967; 1968, p. 13; 1976, chapter 7), Issawi (1981, pp. 376, 381), Musallam (1981, p. 432), and Dols (1981, p. 400–04). For data on Jewish population in all locations, Baron (1971), and DellaPergola (2001, Tables 1 and 2). For data on total population, Russell (1958), Clark (1968), Durand (1977, Table 1), and McEvedy and Jones (1978).

^a Arabia refers to the Arabian peninsula including Yemen.

^b Balkans includes Turkey and Anatolia, Albania, Greece, Yugoslavia, and Bulgaria. Eastern Europe includes Austria, Poland, Czechoslovakia, Hungary, and Romania.

^c Western Europe includes Italy, Portugal, Spain, France, the Low Countries, Germany, and England.

^d The total of 1–1.2 million also includes about 157,000 Jews in Central Asia, India, and East Asia.

In contrast, world Jewry remained roughly constant. Natural growth because of the high standards of living of many Jews in the Muslim empire (the so-called golden age in Jewish history) was offset by the losses caused by two events: massacres and forced conversions.

Deaths were caused by the waves of intolerance which, for example, in the seventh century, swept through Visigothic Spain, Merovingian France, and Langobard Italy, or from the bloodbath of the Crusades in the decades after 1099, which destroyed or significantly shrank some of the Jewish communities in Germany and elsewhere (Baron 1971).

At the same time, episodes of *forced* conversions took a toll on some Jewish communities in selected locations at specific times. The most severe persecutions and forced conversions of Jews (and especially Christians) occurred in the early eleventh century in Egypt under the Fatimid caliph al-Hakim, and in Muslim Spain and North Africa under the Almohads rulers, who massacred dissenting Muslims, Christians, and Jews, and prompted forced conversions to Islam among the last two groups.⁵²

On the other hand, no mass *voluntary* conversions of Jews to Islam occurred once the Jews became engaged in urban skilled occupations. This observation is supported by

⁵²Baron (1952, vol. 17, pp. 181–83), and Goitein (1971, pp. 299–303).

the thousands of letters and documents from the Cairo Geniza and the Responsa literature analyzed by Goitein (1971) and Gil (1992; 1997), in which episodes of voluntary conversions of Jewish individuals are mentioned as exceptional cases.

The few episodes of conversions of Jews to Islam involved prominent members of the Jewish communities who converted in order to enter prestigious positions in the bureaucracy of the Muslim caliphate (Goitein 1971, pp. 300-304). Hence, these conversions were very different from the conversion to Christianity of Jewish farmers in the subsistence economies of Palestine and Babylonia in the first five centuries, which were the outcome of the implementation of the costly religious norm.

The poll tax levied on non-Muslims was not a big burden for Jewish craftsmen, merchants, tax collectors, and doctors to prompt mass conversions among them, which is consistent with the prediction of our model that unless there is a large tax differential between Jews and non-Jews, Jewish merchants will not leave Judaism.⁵³ In addition, as highlighted by Greif (1993), membership in the same ethnic and religious group created a network externality and the possibility to impose community sanctions, which made it profitable for the Jewish merchants not to leave their religious network.

8 Voluntary Diaspora, ca. 800–1250

The main insight of our thesis is that the educational requirement established by Judaism could survive in the long run only if the Jews could find occupations which provide high returns to their investment in education. The migrations of Jewish people within the Muslim Empire in the eighth-tenth centuries and then to western Europe in the ninth-thirteenth centuries are an important historical development that supports this argument.

The timing, pattern, and characteristics of the Jewish Diaspora from the East to the West indicate that the Jews had some distinctive features compared to other minorities within the Muslim Empire, who did not migrate to western Europe despite the fact that no prohibitions prevented them from doing so. We argue that the distinctive engine of the Jewish migrations to the West was the incentive to maximize the returns to their investment in religious human capital, which had spillover effects on their general literacy and education.

The ability to read religious texts in Hebrew enabled the Jews to read any other document written in Hebrew, such as business letters, contracts, loans, and sales, even if the local languages they spoke were different. In addition, the ability to read and write one language (Hebrew) helped Jewish craftsmen, merchants, and moneylenders learn other languages, which heightened mobility and trading opportunities. This enabled the network externality

⁵³The poll tax (3.4 dirhems per month, about 5 percent of a teacher's salary at that time) was a burden for poor households, as indicated in some documents of the Cairo Geniza in which the entire Jewish community in a given location had to help poor families pay the poll tax (Goitein 1971, pp. 300–04).

among Jewish merchants described by Greif (1993). Literacy was a pre-condition for the use of community sanctions and the Jewish court system through (i) the written letters among Jewish merchants as illustrated by the documents of the Cairo Geniza, and (ii) through the rulings of the scholars in the academies in Iraq dispatched to the Jewish communities everywhere through the mail system of the Jewish merchants, as documented by the huge number of rabbinic Responsa.⁵⁴

Education made mobility less costly since it enabled educated people to stay in touch with each other, which was very valuable to maintain family and business connections when living in different and distant countries, as the historical evidence presented below highlights.

Migrations Within the Muslim Empire. As shown earlier in Table 6, in the eighth–ninth centuries the demographic, economic, and religious center of the Jewish communities was the Abbasid empire in the Near East. Jews there abandoned agriculture and moved to urban centers where they entered a wide range of urban and skilled occupations.

Within the Muslim Empire, the Jews *voluntarily* and freely moved from Iraq and Persia to Yemen, the Arabian peninsula, Syria, Palestine, Anatolia, Egypt and North Africa (Ben Sasson 1996). When the Muslim rulers overtook southern Spain by establishing the Cordoba Caliphate from 711 to 1236, a fairly large number of Jews settled there (Toch 2005).⁵⁵ In 756, Cordoba was the largest European city with a population of about 100,000. About two centuries later, it had a total population of about half a million people, housed 70 libraries (the one of the caliph alone containing about 400,000 volumes), 80,000 shops, and was a wealthy commercial economy belonging to a trading network that connected Constantinople, Alexandria, Baghdad, and Damascus, all the way to India and China.

The Jews who settled in Muslim Spain specialized in a very large set of crafts and skilled occupations, held a dominant role in local trade, and gained almost a monopoly in international trade. They also shared in the lively intellectual life that characterized Muslim Spain at this time. A *yeshiva* (academy) was founded in 929 in Cordoba. The establishment of the academy in Muslim Spain created a gradual separation between the very large Jewish community in Mesopotamia and Persia (about 800 thousand) and the comparatively smaller (about 100 thousand) but very wealthy and prominent Jewish community in Muslim Spain (Baer 1961).

The combination of wealth, luxury, and thriving intellectual life of the Jews in Muslim Spain is exemplified by the life of rabbi Samuel ha-Nagid (Marcus 1938, pp. 297–300). Living in early eleventh-century Cordoba, he was a merchant, a scholar, a poet, and later became the chief minister at the court of Granada. He is one of the most prominent examples

⁵⁴Goitein (1967), Ben Sasson (1976, pp. 393–402), and Gil (1997, vol. 1).

⁵⁵In 1031, the Cordoba Caliphate was split into several kingdoms and for two centuries was under the Almoravidi (Berber) rulers. It fell into Christians hands in 1236 and this ended the Muslim rule in this part of Spain.

of the type of Jewish individuals who contributed to the “golden age” in Jewish history (ca. 800 to 1200) (Raphael 1985). This period of spectacular intellectual fervor culminated with the contribution of rabbi Moses ben Maimon (called Rambam or Maimonides) who, born in Cordoba in 1131, later moved to Egypt where he became a court physician for the ruler Salah al-Din. He radically reformed Judaism by opening it to other cultures and philosophies. His teachings were accepted by all the Jews living in the Muslim Empire and set the foundations of the Sephardic Jewry as a distinct Jewish community with respect to the Ashkenazi Jewish communities in France, Germany, and England, as we will see below.

Hence, when Jewish economic prominence moved to the West, Jewish religious leadership moved there as well although most Jews still lived in the Near East.

Migrations to Western Christian Europe. When the Jews settled in locations within the Muslim Empire including Muslim Spain, they did not need any charter, permission, or special privileges because non-Muslims could freely settle and engage in any occupations as long as they paid the poll tax.

This is in striking contrast with their migrations to western Christian Europe from the ninth to the thirteenth centuries (Toch 2005). Their migrations there, exactly as the migrations of other foreign craftsmen, merchants, and moneylenders (e.g., the Venetian or Genoese traders, the Tuscan bankers, or the Flemish merchants), were regulated by kings, bishops, or local rulers in special charters. Table 8 presents a sample of these early medieval charters to Jewish traders, merchants, and moneylenders.

Despite the different timing and characteristics of the Jewish Diaspora in western European countries, these migrations share three main features.

First, until about 1250 the Jewish migrations to western Christian Europe were a *voluntary* process involving the most skilled and literate individuals. In the early stages, they started with a single Jewish individual or family asking the local ruler or bishop to settle in a given location. For example, the earliest charters in France were issued by the king Louis I the Pious around 820-825 to three individual Jewish merchants (Pakter 1988, p. 96; and Linder 1997).

Second, the early medieval charters (especially those for France, Germany, and England) clearly indicate that because of their high human capital and skills, Jews as craftsmen, but especially as local and long-distance merchants, moneylenders, tax collectors, court bankers, and royal treasurers, were viewed as essential for economic growth and development to the point that local rulers in western Europe competed among each other to have some Jews settle in their towns.⁵⁶

⁵⁶The occupational selection of European Jews in crafts and trade does not imply that they held a monopoly on local or long-distance trade (Toch 2000a, 2000b). Of course, among the local non-Jewish population there were also craftsmen and merchants. What is peculiar among the Jews is that almost all of them were craftsmen, merchants, and moneylenders, whereas most of the non-Jewish population was still engaged in agricultural occupations.

TABLE 8—SAMPLE OF JEWISH CHARTERS IN WESTERN EUROPE, CA. 800-1250

<i>Country</i>	<i>City</i>	<i>Year of charter</i>	<i>Activities allowed and regulated</i>		
			Own land	Travel/Trade	Moneylending
Spain	Barcelona	1053-1071	yes	yes	yes
	Sepulveda, Najera	1085	yes	yes	yes
	Leon	1090	yes	yes	yes
	Miranda de Ebro	1099	yes	yes	yes
	Tudela	1116	silent	yes	yes
	Catalayud	1134	yes	yes	yes
	Salamanca	1170	yes	yes	yes
	Cuenca	1177	yes	yes	yes
	Zurita	1218	yes	yes	yes
	Toledo	1222	yes	yes	yes
	Valencia	1250	yes	yes	yes
France	—	ca. 820-825	yes	yes	silent
	to a Jewish family	839	yes	yes	yes
	Grenoble	894	silent	yes	silent
	Narbonne	899	yes	silent	silent
	Gironne	922	yes	silent	silent
	—	1190	silent	silent	yes
England	—	ca. 1120, 1170	yes	yes	yes
	—	1190, 1201	yes	yes	yes
	—	1275	yes	yes	no
Germany	Trier	919	yes	silent	silent
	Magdeburg	965, 973, 979	silent	yes	silent
	Speyer	1084, 1090	yes	yes	yes
	Worms	1074	silent	yes	silent
	Worms	1090, 1157	yes	yes	yes
	Ratisbon	1182, 1216, 1230	yes	yes	silent
	—	1236	yes	yes	yes*
Austria	Vienna	1238	silent	silent	yes
	Austria	1244	silent	silent	yes
Italy	Treviso	905, 991, 1014	silent	yes	silent

Sources: Parkes (1938), Amador de los Rios (1960), Baer (1961), Blumenkranz (1966), Cantera Burgos (1966), Roth (1966), Schwarzfuchs (1966a, 1966b), Pakter (1988), and Linder (1997).

Note: when no specific cities or towns are listed in the second column, it means that the charter was valid all over a country. YES means that the Jews were allowed to engage in that specific activity. NO means that the Jews were prohibited from engaging in that specific activity. SILENT means that the charter did not have any clause regarding that specific activity.

This is nicely illustrated by some episodes. In 1066, William the “Conqueror” brought some Jews with him when he conquered England in order to collect taxes and to obtain help with financial matters. In 1084, bishop Rüdiger of Speyer in Germany explained that “when I converted the village of Spyres into a city, I believed to increase the dignity of our locality a thousandfold if I assembled there Jews too.” He invited a group of Jewish merchants from Mainz who were granted complete freedom to carry on their commercial enterprises in exchange for protection and exemption from tolls.

Similarly, King James I of Aragon around 1250 encouraged Jews from France and North Africa to settle in Aragon with land and property grants and exemptions from taxes. Around the same time, king Ferdinand III of Castile when refusing to implement the Pope’s imposition that Jews be forced to wear special badge and clothing, explained that otherwise, the Jews would flee to Muslim Granada, which would be disastrous for the revenues of his kingdom.⁵⁷

Third, the early medieval charters established no restrictions or prohibitions on the type of occupations in which the Jews could engage. As Table 8 shows, almost all charters enabled the Jews to settle in a town (or country), acquire real estate and land, freely move within the country’s geographical boundaries, and trade in goods as they wished. Both the Latin charters of the 9th–12th centuries, actual litigation cases from the *Responsa* literature, and formula books for Hebrew deeds indicate that the Jews in Italy, Christian Spain, and southern and east-central France owned, transferred, and mortgaged land holdings. Land ownership, though, did not imply that the Jews were farmers. Their lands, more often vineyards than fields, were worked by non-Jews through sharecropping contracts (Soloveitchik 2003, and Toch 2005).

Up to the early thirteenth century, the Catholic Church issued legislation regulating Jewish business activities with the sole goal of not losing revenues rather than prohibiting certain occupations or land owning. For example, canon 67 of the Fourth Lateran Council in 1215 established that the Jews had to pay the tithes to the Church on the land holdings once owned by Christians and become property of the Jews through purchase or through moneylending (Mansi 1961). This ruling did not certainly prohibit Jews from owning or farming land, it just ensured that the Church did not lose its steady income from tithes regardless of the religion of the property owner.

Exactly as it happened in Muslim Spain, in all western European countries in which they settled, most Jewish people reached very high standards of living.⁵⁸ As early as 770, Pope

⁵⁷For these historical episodes, see Parkes (1938, pp. 186-87), Baron (1952, vol. 4, p. 74), Amador (1960, vol. 1, p. 388), Grayzel (1966), and Ben Sasson (1976, pp. 394-97)

⁵⁸The high standards of living did not protect them from persecutions, or may have actually been used as an excuse to harm them. For example, in 1096 the Crusaders killed all the 800 Jews living in Worms. Similar persecutions and massacres occurred in other locations in Europe from the twelfth century onward. These persecutions alternated with periods of peace in which the Jewish communities came back to cities that they had abandoned and re-established flourishing communities.

Stephen IV complained with the bishops of Spain that the Jews had acquired numerous urban and rural estates in which they employed many Christian workers (Baron 1952, vol. 4, p. 42).⁵⁹ Similarly, in England between 1239 and 1260, despite being a tiny proportion of the population, the Jews contributed to roughly one-sixth and one-fifth of the crown revenues (Elman 1937, p. 146).

The numerous Jewish communities in Christian Spain, France, England, and Germany also blossomed from an intellectual point of view (Agus 1965). European Jewry's most important intellectual movement began to thrive when Rabbenu Gershom ben Judah (960-1028) founded a *yeshiva* (academy) in Mainz, Germany, which attracted Jews from all over Europe, including the famous Rashi. Study of the Talmud increased, and the German *yeshivot* in Mainz and Worms came to overshadow those in Iraq. The leadership of Rashi and of his grandson Rabbenu Tam laid the foundations for the Ashkenazi Jewish communities that, both economically and intellectually, separated themselves from the large Jewish communities in the Near East, and by refusing the teaching of Maimonides also separated from the Jewish communities in Muslim Spain (Grossman 1992; 1999; and Limor 1993).

When in 1170 Benjamin de Tudela wrote his travel itinerary, the voluntary Jewish Diaspora was at its height and world Jewry consisted of three main and almost independent economic and intellectual centers: *(i)* the Near East under Muslim rule where about 80 percent of world Jewry lived at that time, *(ii)* Muslim Spain where tiny but wealthy Jewish communities lived in more than 150 cities and towns, and *(iii)* France, England, and Germany where small but equally prominent Ashkenazi Jewish communities lived in more than 160 locations (DellaPergola 2001). Similarly small Jewish communities were to be found in an endless number of locations all over Italy, Bohemia, eastern Europe, Turkey, the Middle East, Egypt and North Africa, all the way to central Asia, China, and India.⁶⁰

9 The Mongol Shock, 1250-1260

The Mongol invasions in the 1250s, which brought the Near East back to a farming and pastoral economy, are an important historical development that provides an excellent test of our theory that Judaism with its costly social norm regarding children's education cannot

⁵⁹To appreciate the extent of the wealth attained by the Jewish communities in Christian Spain, one can also consider the size of the fiscal contributions they made. In 1274, the Jewish community in Saragossa paid 15,000 solidi jac., the one in Catalayud 10,000, where the more recent community in Valencia paid 5,000 solidi (Baron 1952, vol. 10, pp. 128-33).

⁶⁰Studies have shown that contemporary Jewish populations show a closer genetic link to Jews from far away locations than to their neighboring non-Jewish populations (Bonné-Tamir et al. 1978, and Hammer et al. 2000). This is especially true for the Ashkenazi Jews of eastern Europe who are genetically closer to Jews from the Middle East and North Africa, as well as to other Middle Eastern non-Jewish populations, than to eastern European non-Jewish populations. This provides additional evidence that there were no significant conversions to Judaism once the Jews became merchants, and it shows that all Jews migrated from the same original location (Mesopotamia-Babylonia).

survive in the long-run in subsistence rural economies.

The Mongols first entered Iraq in 1220, but their major invasions of Persia and Iraq started in 1256. Their army demolished Baghdad in 1258. From there, they quickly conquered the main cities in Iraq, Persia, Syria, and Palestine, but not Egypt because they were defeated in 1260 by the Egyptian Mamluks, who later defeated the Crusaders and controlled the area from Egypt to Syria (Gil 1997).

The Mongol conquests were a turning point in the demographic history of the Near East (see Table 9). While the population in western Europe grew by roughly 56 percent from 1170 and 1300, the population in Iraq and Persia was almost halved. In Baghdad alone, the population dropped from 800,000 to roughly 60,000.⁶¹ Many other cities and towns almost disappeared. Famines and epidemics greatly added to the death toll.

TABLE 9—POPULATION DYNAMICS (IN MILLION), CA. 1170–1490

<i>Time</i>	<i>Jewish Population</i>				<i>Total Population</i>			
	1170	1300	1400	1490	1170	1300	1400	1490
Palestine	0.002	few	few	few	0.5	0.5	0.5	0.5
Iraq, Persia, Arabia ^a	0.7–0.9	0.5–0.6	?	0.2–0.3	10.75	?	?	7
Egypt	0.040	few	few	0.005	4	5	3.5	4
North Africa ^b	0.030	few	few	few	4.45	5.2	4.05	4.05
Syria, Lebanon	0.020	few	few	0.007	1.5	1.75	1.25	1.5
Balkans, eastern Europe ^c	0.047	0.065	?	0.090	16.4	23.25	18.25	22.75
Western Europe ^d	0.103	0.385	?	0.510	32.35	49.55	34.9	47.65
All locations	1–1.2 ^e	1–1.2	?	0.8–1	69.95	?	?	87.45
$\frac{\text{Jewish Population}}{\text{World Population}}$ (%)	1.6	?	?	1.0	—	—	—	—

Sources: for total population, Russell (1958), Clark (1968, pp. 59–98), Durand (1977, Table 1), McEvedy and Jones (1978), for Jewish population, Ashtor (1959a; 1967; 1968, p. 13; 1976, chapter 7), Baron (1971), Dols (1981, pp. 400–04), and DellaPergola (2001, Tables 1 and 2).

Note: The years given as headings in the columns are approximate dates. One should more appropriately think that 1170 stands for the late 12th century, 1300 for the early 14th century, 1400 for the early 15th century, and 1490 for the late 15th century.

^a Arabia refers to the Arabian peninsula including Yemen.

^b North Africa includes Morocco, Tunisia, Algeria, and Libya.

^c Balkans include Albania, Bulgaria, Yugoslavia, Greece, Turkey and Anatolia. Eastern Europe includes Austria, Czechoslovakia, Hungary, Poland, and Romania.

^d Western Europe includes Spain, Portugal, France, Italy, Germany, the Low Countries, and England.

^e The total of 1–1.2 million also includes about 157,000 Jews in Central Asia, India, and East Asia.

⁶¹See Baron (1952, vol. 17, pp. 150–51), and Ashtor (1976, pp. 251–57).

The economic consequences of the Mongol shock were no less traumatic. The urban and commercial economy that had flourished under the Abbasid rulers in the eighth–tenth centuries almost disappeared and, instead, farming and especially nomadic pastoral activities became the source of income of most households. The ravages of the invasions, the devastation of the irrigation system, and harsh taxation left many farmers at subsistence levels. Eighty years after the Mongol invasions, tax revenues from Baghdad were only 10 percent of what they had been before. For the entire Iraq, tax revenues dropped by 80 percent.⁶²

As shown in Table 9, about 770,000 Jews (about 80 percent of world Jewry) lived in Iraq, Persia, and the Arabian peninsula around 1170. Three centuries later the Jews in the same locations were at most 200,000–300,000. Three factors can account for this huge reduction: *(i)* general population decline because of massacres during the Mongol invasions, famines and diseases, *(ii)* migrations, and *(iii)* conversions.

General Population Decline. The Jews seem to have been largely spared by the massacres that hit the Muslim population during the Mongol invasions. In fact, in both Jewish and non-Jewish primary sources (travellers’ reports, letters, Responsa, and the wealth of documents from the Cairo Geniza), there is not one single reference to huge massacres of Jews under the Mongol rulers.⁶³

Epidemics and famines certainly took a toll on the Jewish population as they did on the non-Jewish population. However, there is no reason to think that the Jews suffered from famines and epidemic diseases more than the local Muslim population or other minorities, especially given their higher hygienic standards dictated by religious norms.⁶⁴

Migrations. During and after the Mongol invasions, many Jews fled to Egypt and Syria, which were ruled by the Mamluks. However, as Table 9 indicates, the Jewish communities in Egypt and Syria also dwindled despite there are no records of mass expulsions or mass forced conversions of Egyptian and Syrian Jewry. Also, the surviving small Jewish communities in Egypt and Syria consisted mostly of poverty-stricken people.⁶⁵

Some Jews who left Iraq and Iran migrated to western Europe as the increase of the Jewish population in western Europe shows (Della Pergola 2001). One has to distinguish two periods of growth, though. From 1170 to 1300 European Jewry grew as the outcome of both general population growth and the so-called “golden age” of Iberian Jewry, which endowed the Jews with high standards of living, higher fertility, and lower mortality.

From 1300 to 1490, European Jewry increased because of an increase in fertility to offset the losses caused by the plagues in the fourteenth centuries, and because of the migrations

⁶²See Petrushevsky (1968, pp. 497–504), Bausani (1971, pp. 101–23), and Lambton (1988).

⁶³Strauss (1939), and Gil (1997, vol. 1, p. 430).

⁶⁴Baron (1952, vol. 17, pp. 161–62), and Ashtor (1959a, pp. 66–68).

⁶⁵See Baron (1952, vol. 17, pp. 160–66, 219), and Ashtor (1959a, p. 65; 1967; and 1968).

from Iraq and Iran.

However, unlike the mass migrations of Iberian Jewry out of Spain after the expulsions of the 1490s which is amply documented, there is *no mention* of huge waves of Jewish migrations from the Near East to western Europe after the Mongol invasions either in the numerous Jewish sources of the time (letters, travel itineraries, and Responsa), nor in the non-Jewish sources (tax records, censuses, and court records). Had a huge wave of Jewish migrations occurred to western Europe, it would certainly be documented in some sources.

As explained in Section 8, Jewish migrations to western Christian Europe were regulated by kings, bishops, or local rulers, and the Jews could not freely move there unless they were invited to settle and obtained charters and special privileges. The Jewish communities themselves strictly regulated the arrival of fellow Jews as they were potential competitors to their businesses.

So it is not surprising that Jewish migrations to western Europe after the Mongol shock in the Near East occurred but not in huge proportions to account for the big decline of the Jewish population in the Near East.

Conversions. Based on the material from the rabbinic Responsa and the chronicles of Arab historians of the late medieval period, Baron (1952, vol. 17, p. 165, 181–83) and Ashtor (1959a, pp. 65–66) maintain that conversions and assimilation of many Jews to Islam were an important factor which explains both the large reduction of the Jewish population in Iraq and Persia, and the shrinking Jewish communities in Egypt and Syria.

While the death toll from massacres, famines and epidemics after the Mongol shock were features that the Jewish population shared with the local population (although in different proportions), mass conversions (voluntary or forced) to Islam had occurred much earlier in the local population of Iraq, Persia, Egypt, and Syria (Bulliet 1979a, 1979b). Thus, the many conversions of the Jews to Islam in the two centuries after the Mongol shock were not part of a general conversion process in the entire population.⁶⁶

The conversions of Jewish people to Islam in Iraq, Persia, Egypt, and Syria after the Mongol invasions are consistent with our thesis regarding conversions. Once Iraq and Persia after the Mongol conquests (and Egypt and Syria under the Mamluks) became again subsistence farming and pastoral economies, the Jews who could not migrate to western Europe, had to move back to being farmers and low income workers. The investment in children's education, as the Jewish religious norm required, became too costly in the poor farming and pastoral economies of Iraq, Persia, Syria, and Egypt, and many Jews preferred to convert to Islam. Once converted, they had no longer to pay the poll tax and they were no longer required to invest in their children's religious education, which in a rural economy provided no economic returns.

⁶⁶Notice that the Mongol rulers adopted Islam only 80 years after their conquest of Iran and Iraq.

10 Concluding Remarks

It is a common view that the three main features of Jewish demographic and economic history—the selection into urban and skilled occupations, the reduction in the size of the Jewish population in various periods, and their Diaspora all over the world—were the outcome of restrictions, prohibitions, persecutions, and expulsions.

In this paper we built a simple model and then presented historical evidence that supports an alternative argument: the three main patterns in Jewish demographic and economic history were the joint, long-term, and endogenous outcomes of the transformation of Judaism in the first-second centuries C.E. into a religion focused on literacy and education. This change radically altered the religious beliefs and social norm which defined membership in the Jewish community.

A change in the religious norm at the beginning of the first millennium, which made every male Jewish child learn Hebrew for purely religious purposes, brought long-term economic returns in the form of general education, long-distance communication, and contract-writing among Jews all over the world. The Jews moved *voluntarily* to new locations since they had the skills that enabled them to engage in those occupations with high returns to their human capital. They became a *minority* in all the places where they settled as their comparative advantage was limited to few skilled occupations.

Table 10 in the Appendix shows that the comparatively higher educational attainment and these urban, skilled occupations remained the distinctive mark of the Jewish people throughout their history: in the countries which hosted the largest Jewish communities in the early twentieth century between 96 and 99 percent of the Jews were engaged in non-agricultural occupations even though no restrictions prevented them from being farmers.

Chiswick (2005) documents the same occupational selection of the Jewish population in the United States as late as the year 2000. For example, about 53 per cent of adult Jewish men are engaged in professions such as law, medicine, and academia, whereas the percentage for white non-Jewish men is about 20 per cent. In contrast, only six per cent of adult Jewish men are employed in the construction, transportation, and production sectors in comparison with about 39 per cent of adult non-Jewish men.

In a recent work, which generated a debate in academic circles, Cochran, Hardy, and Harpending (2005) maintain that there is evidence of higher than average cognitive abilities of Ashkenazi Jews, and that this maybe the outcome of centuries of prohibitions and restrictions on the occupations the Jewish people could practice. We do not have a strong view in favor or against this argument. On the one hand, one prediction of our model—individuals with low cognitive skills were pushed out of Judaism once the religion made literacy and education the main requirement for belonging to the Jewish community—may be consistent with this evidence on cognitive abilities. On the other hand, as we emphasize here and in Botticini and Eckstein (2005), the Jewish people left farming and selected into urban, skilled occupations *well before* any restrictions or prohibitions were imposed on them.

It is left to future research to establish the true rationale of the late medieval restrictions in western Europe on Jewish occupations, which were enacted at a time in which the Jews had already *voluntarily* abandoned farming, at least four-five centuries earlier.

11 Appendix

TABLE 10—OCCUPATIONAL STRUCTURE OF WORLD JEWRY, CA. 1930

<i>Country</i>	<i>Year</i>	<i>($\frac{\text{Jews in nonagr. jobs}}{\text{Jewish labor force}}$ %)</i>	<i>($\frac{\text{Non-Jews in nonagr. jobs}}{\text{Non-Jewish labor force}}$ %)</i>
Bulgaria	1926	99	31
Czechoslovakia	1930	91	73
Germany	1933	99	83
Hungary	1930	97	52
Latvia	1930	99	47
Poland	1931	96	47
Rumania	1930	96	37
Soviet Union	1926	96	27
Canada	1931	99	71
United States	1940	98	82

Source: This table reproduces Table 2 in Kuznets (1960, p. 1608).

Note: The Jewish population in these countries (about 12,749,000 people) amounted to 87% of world Jewry (see Baron 1971, Table 7).

References

- [1] Acemoglu, Daron, Simon Johnson, and James A. Robinson. “Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution.” *Quarterly Journal of Economics* 117 (2002): 1231–94.
- [2] ———. “The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth.” *The American Economic Review* 95, no. 3 (2005): 546–79.
- [3] Agus, Irving A. *Urban Civilization in Pre-Crusade Europe. A Study of Organized Town-Life in Northwestern Europe During the Tenth and Eleventh Centuries Based on the Responsa Literature*. 2 vols. Leiden: E. J. Brill, 1965.
- [4] Alon, Gedaliah. *The Jews in their Land in the Talmudic Age (70–640 C.E.)*. Vol. II. Jerusalem: Magnes Press, 1984.
- [5] Amador de los Rios, José. *Historia Social Politica y Religiosa de los Judios de España y Portugal*. Madrid: Aguilar, 1960.
- [6] Assaf, Simha. *Mekorot le-Toldot ha-Khinuch be-Yisrael (Sources for the History of the People of Yisrael)*. 4 vols. Tel Aviv: Devir, 1925–1942.
- [7] Ashtor, Eliyahu. “Prolegomena to the Medieval History of Oriental Jewry.” *Jewish Quarterly Review* 50, no. 1 (1959a): 55–68.
- [8] ———. “Prolegomena to the Medieval History of Oriental Jewry.” *Jewish Quarterly Review* 50, no. 2 (1959b): 147–66.
- [9] ———. “The Number of Jews in Medieval Egypt.” *Journal of Jewish Studies* XVIII (1967): 9–42.
- [10] ———. “The Number of Jews in Medieval Egypt.” *Journal of Jewish Studies* XIX (1968): 1–22.
- [11] ———. *A Social and Economic History of the Near East*. Berkeley: University of California Press, 1976.
- [12] Avi-Yonah, Michael. *The Jews of Palestine. A Political History from the Bar Kokhba War to the Arab Conquest*. Oxford: Basil Blackwell, 1976.
- [13] Baer, Yitzhak. *A History of the Jews in Christian Spain*. Vol. 1 Philadelphia: Jewish Publication Society of America, 1961.
- [14] Barclay, John M. G. *Jews In The Mediterranean Diaspora: From Alexander To Trajan (323 BCE - 117 CE)*. Edinburgh: T&T Clark, 1996.

- [15] ———. “Who Was Considered an Apostate in the Jewish Diaspora?” In *Tolerance and Intolerance in Early Judaism and Christianity*, edited by Graham N. Stanton and Guy G. Stroumsa, 80–98. Cambridge: Cambridge University Press, 1998.
- [16] Bar-Ilan, Meir. “Illiteracy in the Land of Israel in the First Centuries C.E.” In *Essays in the Social Scientific Study of Judaism and Jewish Society*, edited by Simcha Fishbane, Stuart Schoenfeld, and Alain Goldschläger, vol. 2, 46–61. Hoboken, N. J.: Ktav Publishing House, 1992.
- [17] Baron, Salo Wittmayer. *A Social and Religious History of the Jews*. 2nd edition. 18 vols. New York: Columbia University Press, 1952.
- [18] ———. “Population.” In *Encyclopedia Judaica*, vol. 13, 866–903. New York: MacMillan, 1971.
- [19] Barro, Robert J., and Rachel M. McCleary. “Religion and Economic Growth across Countries.” *American Sociological Review* 68, no. 5 (2003): 760–81.
- [20] ———. “Religion and Economy.” *Journal of Economic Perspectives* 20, no. 2 (2006): 49–72.
- [21] Bausani, Alessandro. *The Persians, from the Earliest Days to the Twentieth Century*. New York: St. Martin’s Press, 1971.
- [22] Benjamin of Tudela (ca. 1170). *Sefer Massa ’ot*. [*The Itinerary of Benjamin of Tudela*, edited by M.N. Adler]. London, 1907.
- [23] Ben-Sasson, Haim Hillel. “The Middle Ages.” In *A History of the Jewish People*, edited by Haim Hillel Ben-Sasson, 393–723. Cambridge, Mass.: Harvard University Press, 1976.
- [24] Ben-Sasson, Menahem. *The Emergence of the Local Jewish Community in the Muslim World (Qayrawan, 800–1057)*. Jerusalem: Magnes Press, 1996.
- [25] Berman, Eli. “Sect, Subsidy and Sacrifice: An Economist’s View of Ultra-Orthodox Jews.” *Quarterly Journal of Economics* 115 (2000): 905–53.
- [26] Blumenkranz, Bernhard. “Germany, 843–1096.” In *The Dark Ages: Jews in Christian Europe, 711–1096*, edited by Cecil Roth and I. H. Levine, 162–74. New Brunswick: Rutgers University Press, 1966.
- [27] Bonn -Tamir, B., J. G. Bodmer, W.F. Bodmer, P. Pickbourne, C. Brautbar, E. Gazit, S. Nevo, and R. Zamir. “HLA Polymorphism in Israel. An Overall Analysis.” *Tissue Antigens* 11 (1978): 235–50.

- [28] Botticini, Maristella, and Zvi Eckstein. “Jewish Occupational Selection: Education, Restrictions, or Minorities?” *Journal of Economic History* 65, no. 4 (2005): 922–48.
- [29] Bowen, James. *A History of Western Education. Vol. 1. The Ancient World: Orient and Mediterranean, 2000 B.C.—A.D. 1054*. London: Methuen & Co., 1972.
- [30] Bowen, James. *A History of Western Education. Vol. 2: Civilization of Europe, Sixth to Sixteenth Century*. London: Methuen & Co., 1975.
- [31] Brody, Robert. *The Geonim of Babylonia and the Shaping of Medieval Jewish Culture*. New Haven: Yale University Press, 1998.
- [32] Bulliet, Richard W. *Conversion to Islam in the Medieval Period: An Essay in Quantitative History*. Cambridge, Mass.: Harvard University Press, 1979a.
- [33] ———. “Conversion to Islam and the Emergence of a Muslim Society in Iran.” In *Conversion to Islam*, edited by Nehemia Levtzion, 30–51. New York: Holmes & Meier, 1979b.
- [34] Cantera Burgos, Francisco. “Christian Spain.” In *The Dark Ages: Jews in Christian Europe, 711–1096*, edited by Cecil Roth and I. H. Levine, 357–81. New Brunswick: Rutgers University Press, 1966.
- [35] Carlton, Dennis W., and Avi Weiss. “The Economics of Religion, Jewish Survival, and Jewish Attitudes toward Competition in Torah Education.” *Journal of Legal Studies* XXX, no. 1 (Jan. 2001): 253–75.
- [36] Chiswick, Barry R. “The Occupational Attainment of American Jewry: 1990-2000.” IZA Discussion Paper No. 1736. Bonn, Germany: Institute for the Study of Labour, 2005.
- [37] Chiswick, Carmel Ullman. “The Economics of Jewish Continuity.” *Contemporary Jewry* 20 (1999): 30–56.
- [38] ———. “An Economic Perspective on Religious Education: Complements and Substitutes in a Human Capital Portfolio.” *Research in Labor Economics* 24 (2006): 429–67.
- [39] Clark, Colin. *Population Growth and Land Use*. London: Macmillan, 1968.
- [40] Cochran, Gregory, Jason Hardy, and Henry Harpending. “Natural History of Ashkenazi Intelligence.” *Journal of Biosocial Science* (2005): 1–35.
- [41] Cohen, Gerson D. “Rabbinic Judaism.” In “Judaism,” *Encyclopedia Britannica*, 2002.
- [42] Cohen, Shaye J. D. *The Beginnings of Jewishness: Boundaries, Varieties, Uncertainties*. Berkeley: University of California Press, 1999.

- [43] Crown, Alan D. (ed.) *The Samaritans*. Tübingen: Mohr Siebeck, 1989.
- [44] Crown, Alan D., Reinhard Pummer, and Abraham Tal, (eds.) *A Companion to Samaritan Studies*. Tübingen: Mohr Siebeck, 1993.
- [45] Daniélou, Jean. *The Theology of Jewish Christianity*. Chicago: The Henry Regnery Company, 1964.
- [46] Daniélou, Jean, and Henri I. Marrou. *The Christian Centuries, vol. 1: The First Six Hundred Years*. New York, McGraw-Hill, 1964.
- [47] De Long, J. Bradford, and Andrei Shleifer. “Princes or Merchants? City Growth before the Industrial Revolution” *Journal of Law and Economics* 36 (1993): 671–702.
- [48] DellaPergola, Sergio. “Some Fundamentals of Jewish Demographic History.” In *Papers in Jewish Demography 1997, Jewish Population Studies 29*, edited by Sergio DellaPergola and Judith Even, 11–33. Jerusalem: Hebrew University Press, 2001.
- [49] Dols, Michael. “The General Mortality of the Black Death in the Mamluk Empire.” In *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by Abraham L. Udovitch, 397–428. Princeton, N.J.: Darwin Press, 1981.
- [50] Durand, John D. “Historical Estimates of World Population: An Evaluation.” *Population and Development Review* 3, no. 3 (1977): 253–96.
- [51] Elman, P. “The Economic Causes of the Expulsion of the Jews in 1290.” *Economic History Review* 7, no. 2 (1937): 145–54.
- [52] Feldman, Louis H. *Jew and Gentile in the Ancient World: Attitudes and Interactions from Alexander to Justinian*. Princeton, N.J.: Princeton University Press, 1993.
- [53] ———. “Diaspora Synagogues: New Light from Inscriptions and Papyri.” In *Sacred Realm: The Emergence of the Synagogue in the Ancient World*, edited by Steven Fine, 48–66. New York: Oxford University Press, 1996.
- [54] ———. “Hellenistic Judaism.” In “Judaism,” *Encyclopedia Britannica*, 2002.
- [55] Fox, Robin Lane. *Pagans and Christians*. New York: Knopf, 1987.
- [56] Gafni, Isaiah. *Jews of Babylonia in the Talmudic Era*. Jerusalem: The Zalman Shazar Center for Jewish History, 1990 (in Hebrew).
- [57] ———. “Synagogues in Babylonia in the Talmudic Period.” In *Ancient Synagogues; Historical Analysis and Archaeological Discovery*, edited by Dan Urman and Paul V. M. Flesher, vol. 1, 221–31. Leiden, Boston: Brill, 1995.

- [58] Galor, Oded, and Omer Moav. “Natural Selection and the Origin of Economic Growth.” *Quarterly Journal of Economics* 117 (2002): 1133–91.
- [59] Georgi, Dieter. “The Early Church: Internal Jewish Migration or New Religion?” *The Harvard Theological Review* 88, no. 1 (1995): 35–68.
- [60] Gil, Moshe. *A History of Palestine, 634–1099*. Cambridge: Cambridge University Press, 1992.
- [61] ———. *In the Kingdom of Ishmael. Studies in Jewish History in Islamic Lands in the Early Middle Ages*. 4 vols. Tel Aviv: Tel Aviv University Press, 1997 (in Hebrew).
- [62] Goitein, Schlomo D. *Jewish Education in Muslim Countries. Based on Records from the Cairo Geniza*. Jerusalem: Hebrew University Press, 1962 (in Hebrew).
- [63] ———. *A Mediterranean Society. The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza. Volume I: Economic Foundations*. Los Angeles: University of California Press, 1967.
- [64] ———. *A Mediterranean Society. The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza. Volume II: The Community*. Los Angeles: University of California Press, 1971.
- [65] Goodman, Martin. *Mission and Conversion: Proselytizing in the Religious History of the Roman Empire*. Oxford: Clarendon Press, 1994.
- [66] Grayzel, Solomon. *The Church and the Jews in the XIIIth Century. A Study of their Relations during the years 1198-1254, Based on the Papal Letters and the Conciliar Decrees of the Period*. New York: Hermon Press, 1966.
- [67] Greif, Avner. “Contract Enforceability and Economic Institutions in Early Trade: the Maghribi Traders’ Coalition.” *American Economic Review* 83, no. 3 (1993): 525–48.
- [68] ———. “Cultural Beliefs, and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies.” *Journal of Political Economy* 102, no. 5 (1994): 912–50.
- [69] Grossman, Avraham. “Relations between Spanish and Ashkenazi Jewry in the Middle Ages.” In *The Sephardi Legacy*, edited by Haim Beinart, vol.1, 220–39. Jerusalem: Magnes Press, 1992.
- [70] ———. “The Yeshivot in Babylonia, Germany and France from the Ninth to the Eleventh Centuries.” In *Education and History*, edited by Immanuel Etkes, 79–99. Jerusalem: The Zalman Shazar Center, 1999 (Hebrew).

- [71] Guiso, Luigi, Paola Sapienza, and Luigi Zingales. “People’s Opium? Religion and Economic Attitudes.” *Journal of Monetary Economics* 50, no. 1 (2003): 225–82.
- [72] ———. “Does Culture Affect Economic Outcomes?” *Journal of Economic Perspectives* 20, no. 2 (2006): 23–48.
- [73] Hachlili, Rachel, ed. *Ancient Synagogues in Israel: Third-Seventh Century C.E.* Oxford: B.A.R., 1989.
- [74] Hamel, Gildas. *Poverty and Charity in Roman Palestine, First Three Centuries C.E.* Berkeley: University of California Press, 1990.
- [75] Hammer, M. F., A. J. Redd, E. T. Wood, M. R. Bonner, H. Jarjanazi, T. Karafet, S. Santachiara-Benerecetti, A. Oppenheim, M.A. Jobling, T. Jenkins, H. Ostrer, and B. Bonn -Tamir. “Jewish and Middle Eastern non-Jewish Populations Share a Common Pool of Y-Chromosome Biallelic Haplotypes.” *Proceedings of the National Academy of Sciences* (2000): 1–6.
- [76] Harnack, Adolf von. *The Mission and Expansion of Christianity in the First Three Centuries*. 2 vols. London: Williams and Norgate; New York, G.P. Putnam, 1908.
- [77] Herr, Mosheh David, and Aharon Oppenheimer. “Social-Economic and Cultural-Religious History from the Destruction of the Second Temple to the Division of the Empire (70-395 C.E.).” In *The History of Eretz Yisrael. The Roman-Byzantine Period, The Mishna and Talmud Period, and the Byzantine Rule (70–640)*, edited by Mosheh David Herr, 107–229. Jerusalem: Keter Publishing, 1990 (in Hebrew).
- [78] Hezser, Catherine. *Jewish Literacy in Roman Palestine*. T bingen: Mohr Siebeck, 2001.
- [79] Iannaccone, Laurence R. “Sacrifices and Stigma: Reducing the Free-Riding in Cults, Communes and Other Collectives.” *Journal of Political Economy* 100, no. 2 (1992): 271–91.
- [80] Isaac, Benjamin. “Jews, Christians and Others in Palestine: The Evidence from Eusebius.” In *Jews in a Graeco-Roman World*, edited by Martin Goodman. Oxford: Clarendon Press, 1998.
- [81] Issawi, Charles. “The Area and Population of the Arab Empire: an Essay in Speculation.” In *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by Abraham L. Udovitch, 375-96. Princeton, N.J.: Darwin Press, 1981.
- [82] Jones, F. Stanley. *An Ancient Jewish Christian Source on the History of Christianity: Pseudo-Clementine Recognitions 1.27-71. Texts and Translations 37. Christian Apocrypha Series 2*. Atlanta: Scholars Press, 1995.

- [83] Kremer, Michael. "Population Growth and Technological Change: One Million B.C. to 1990." *Quarterly Journal of Economics* 108, no. 4 (1993): 681–716.
- [84] Kuran, Timur. "The Islamic Commercial Crisis: Institutional Roots of Economic Underdevelopment in the Middle East." *Journal of Economic History* 63, no. 2 (2003): 414–46.
- [85] ———. "Why the Middle East Is Economically Underdeveloped: Historical Mechanisms of Institutional Stagnation." *Journal of Economic Perspectives* 18, no. 3 (2004): 71–90.
- [86] Kuznets, Simon. "Economic Structure and Life of the Jews." In *The Jews: Their History, Culture, and Religion*, edited by Louis Finkelstein, 1597-1666. Philadelphia: Jewish Publication Society of America, 1960.
- [87] ———. *Economic Structure of U.S. Jewry: Recent Trends*. Jerusalem: Institute of Contemporary Jewry, Hebrew University of Jerusalem, 1972.
- [88] Lambton, Ann K. S. *Continuity and Change in Medieval Persia. Aspects of Administrative, Economic, and Social History, 11th–14th Century*. Albany, N.Y.: Bibliotheca Persica, 1988.
- [89] Lapidus, Ira M. "Arab Settlement and Economic Development of Iraq and Iran in the Age of the Umayyad and the Early Abbasid Caliphs." In *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by Abraham L. Udovitch, 177–208. Princeton, N.J.: Darwin Press, 1981.
- [90] Latourette, Kenneth S. *A History of Christianity. Vol. I: to A.D. 1500*. New York: Harper & Row Publishers, 1975.
- [91] Levine, Lee I., ed. *Ancient Synagogues Revealed*. Detroit: Wayne State University Press, 1982.
- [92] Levine, Lee I. "The Hellenistic-Roman Diaspora, 70-235 C.E. The Archaeological Evidence." In *The Cambridge History of Judaism*, vol. 3, 991–1024. Cambridge: Cambridge University Press, 1999.
- [93] ———. *The Ancient Synagogue: The First Thousand Years*. New Haven: Yale University Press, 2000.
- [94] Lewis, Bernard. *The Jews of Islam*. Princeton, N.J.: Princeton University Press, 1984.
- [95] Limor, Ora. *Jews and Christians in Western Europe*. 2 vols. Tel Aviv: The Open University Press, 1993.

- [96] Linder, Amnon. *The Jews in Roman Imperial Legislation*. Jerusalem: Israel Academy of Sciences and Humanities, 1987.
- [97] ———. *The Jews in the Legal Sources of the Early Middle Ages*. Jerusalem: Israel Academy of Sciences and Humanities, 1997.
- [98] Lüdemann, Gerd. *Opposition to Paul in Jewish Christianity*. Minneapolis: Fortress Press, 1989.
- [99] MacMullen, Ramsay. *Christianizing the Roman Empire (A.D. 100-400)*. New Haven: Yale University Press, 1984.
- [100] Marcus, Jacob. *The Jew in the Medieval World: A Sourcebook, 315-1791*. Cincinnati: The Sinai Press, 1938.
- [101] Mansi, Joannes Dominicus. *Sacrorum conciliorum nova et amplissima collectio*. Vol. 22. Graz: Akademische Druck, 1961.
- [102] Marrou, Henri I. *A History of Education in Antiquity*. Madison, WI: University of Wisconsin Press, 1982.
- [103] McEvedy, Colin, and Richard Jones. *Atlas of World Population History*. New York: Penguin, 1978.
- [104] Meeks, Wayne A. *The First Urban Christians: The Social World of the Apostle Paul*. New Haven: Yale University Press, 1983.
- [105] Mokyr, Joel. *The Gifts of Athena: Historical Origins of the Knowledge Economy*. Princeton, N.J.: Princeton University Press, 2002.
- [106] Montgomery, James A. *The Samaritans. The Earliest Jewish Sect: Their History, Theology, and Literature*. New York: Ktav Publishing House, 1968.
- [107] Mullen, Roderic L. *The Expansion of Christianity: A Gazetteer of its First Three Centuries*. Leiden, Boston: E. J. Brill, 2004.
- [108] Musallam, Basim. "Birth Control and Middle Eastern History: Evidence and Hypotheses." In *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by Abraham L. Udovitch, 429-69. Princeton, N.J.: Darwin Press, 1981.
- [109] Nakosteen, Mehdi Khan. *History of Islamic Origins of Western Education, A.D. 800-1350*. Boulder: University of Colorado Press, 1964.
- [110] Neusner, Jacob. *A History of the Jews in Babylonia*. 5 vols. Leiden: E. J. Brill, 1965-1970.

- [111] ———. *Judaism, Christianity, and Zoroastrianism in Talmudic Babylonia*. Atlanta: Scholars Press, 1990a.
- [112] ———. *The Economics of the Mishna*. Atlanta: Scholars Press, 1998.
- [113] Neusner, Jacob (ed.). *Judaism and Christianity in the First Century*. New York: Garland, 1990b.
- [114] ———. *The Pharisees and Other Sects*. New York: Garland, 1990c.
- [115] ———. *Judaism in the Matrix of Christianity*. Atlanta: Scholars Press, 1991.
- [116] Nock, Arthur D. *Conversion. The Old and the New in Religion from Alexander the Great to Augustine of Hippo*. London, New York: Oxford University Press, 1969.
- [117] North, Douglas. *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press, 1990.
- [118] Oppenheimer, Aharon. *The am ha-aretz: A Study in the Social History of the Jewish People in the Hellenistic-Roman Period*. Leiden: E. J. Brill, 1977.
- [119] ———. “Babylonian Synagogues with Historical Associations.” In *Ancient Synagogues; Historical Analysis and Archaeological Discovery*, edited by Dan Urman and Paul V. M. Flesher, vol. 1, 40–48. Leiden: E. J. Brill, 1995.
- [120] Ovadiah, Asher. “Ancient Synagogues in Asia-Minor.” In *Proceedings of the Xth International Congress of Classical Archaeology*, edited by Ekrem Akurgal, 857–66. Ankara: Türk Tarih Kurumu, 1978.
- [121] Pakter, Walter. *Medieval Canon Law and the Jews*. Ebelsbach: Verlag Rolf Gremer, 1988.
- [122] Parkes, James W. *The Conflict of the Church and the Synagogue: A Study in the Origins of Antisemitism*. New York: JPS, 1934.
- [123] ———. *The Jew in the Medieval Community: A Study of his Political and Economic Situation*. London: Soncino Press, 1938.
- [124] Petrushevsky, I. P. “The Socio-Economic Condition of Iran Under the Il-Khans.” In *The Cambridge History of Iran*. Vol. 5, 483–537. Cambridge: Cambridge University Press, 1968.
- [125] Raphael, Chaim. *The Road from Babylon. The Story of Sephardi and Oriental Jews*. New York: Harper and Row Publisher, 1985.

- [126] Rapoport, Hillel, and Avi Weiss. “In-group Cooperation in a Hostile Environment: An Economic Perspective on Some Aspects of Jewish Life in (Pre-modern) Diaspora.” In *The Economics of Judaism and Jewish Human Capital*, edited by Carmel Chiswick and Tikva Lecker. Ramat Gan: Bar-Ilan University Press (forthcoming).
- [127] Reis, Jaime. “Economic Growth, Human Capital Formation, and Consumption in Western Europe Before 1800.” In *Living Standards in the Past. New Perspectives on Well-Being in Asia and Europe*, edited by Robert C. Allen, Tommy Bengtsson, and Martin Dribe. Oxford: Oxford University Press, 2004.
- [128] Roth, Cecil. *The Jewish Contribution to Civilization*. London: Macmillan & Co., 1938.
- [129] ———. “Economic Life and Population Movements.” In *The Dark Ages: Jews in Christian Europe, 711–1096*, edited by Cecil Roth and I. H. Levine, 13–48. New Brunswick: Rutgers University Press, 1966.
- [130] Russell, J. C. “Late Ancient and Medieval Population.” *Transactions of the American Philosophical Society* 48, no. 3 (1958): 1–152.
- [131] Rutgers, Leonard V. “Diaspora Synagogues: Synagogue Archaeology in the Greco-Roman World.” In *Sacred Realm: The Emergence of the Synagogue in the Ancient World*, edited by Steven Fine, 67–95. New York: Oxford University Press, 1996.
- [132] Safrai, Shmuel. “The Era of the Mishna and Talmud.” In *A History of the Jewish People*, edited by Haim Hillel Ben-Sasson, 307–82. Cambridge, Mass.: Harvard University Press, 1976a.
- [133] ———. “Education and the Study of the Torah.” In *The Jewish People in the First Century: Historical Geography, Political History, Social, Cultural, and Religious Life and Institutions*, edited by Shmuel Safrai and Menahem Stern, vol. II, 945–70. Assen: Van Gorcum, 1976b.
- [134] Safrai, Zeev. “Financing Synagogue Construction in the Period of the Mishna and the Talmud.” In *Synagogues in Antiquity*, edited by Aharon Oppenheimer, Aryeh Kasher, and Uriel Rappaport, 77–96. Jerusalem: Yad Yitzhak Ben-Tzvi Publishers, 1987.
- [135] ———. *The Economy of Roman Palestine*. London and New York: Routledge, 1994.
- [136] ———. “The Communal Functions of the Synagogue in the Land of Israel in the Rabbinic Period.” In *Ancient Synagogues; Historical Analysis and Archaeological Discovery*, edited by Dan Urman and Paul V. M. Flesher, vol. 1, 181–204. Leiden: E.J. Brill, 1995.
- [137] Sanders, E. P. (ed.) *Jewish and Christian Self-Definition. Vol 1. The Shaping of Christianity in the Second and Third Centuries*. Philadelphia: Fortress Press, 1980.

- [138] Sanders, Jack T. "Did Early Christianity Succeed because of Jewish Conversions?" *Social Compass* 46 (1999): 493–505.
- [139] ———. *Charisma, Converts, Competitors: Societal and Sociological Factors in the Success of Early Christianity*. London: SCM Press, 2000.
- [140] Schiffman, Lawrence H. *Who Was a Jew? Rabbinic and Halakhic Perspectives on the Jewish Christian Schism*. Hoboken, N.J.: Ktav Pub. House, 1985.
- [141] ———. "The Early History of Public Reading of the Torah." In *Jews, Christians, and Polytheists in the Ancient Synagogue; Cultural Interaction During the Greco-Roman Period*, edited by Steven Fine, 44–56. London: Routledge, 1999.
- [142] ———. *Understanding Second Temple and Rabbinic Judaism*. Jersey City, N.J.: Ktav Pub. House, 2003.
- [143] Schoeps, Hans-Joachim. *Jewish Christianity: Factional Disputes in the Early Church*. Philadelphia: Fortress Press, 1969.
- [144] Schwarzfuchs, Simon. "France and Germany Under the Carolingians." In *The Dark Ages: Jews in Christian Europe, 711–1096*, edited by Cecil Roth and I. H. Levine, 122–42. New Brunswick: Rutgers University Press, 1966.
- [145] ———. "France Under the Early Capets." In *The Dark Ages: Jews in Christian Europe, 711–1096*, edited by Cecil Roth and I. H. Levine, 143–61. New Brunswick: Rutgers University Press, 1966.
- [146] Sharf, Andrew. *Byzantine Jewry: from Justinian to the Fourth Crusade*. London, Routledge & K. Paul, 1971.
- [147] Soloveitchik, Haym. *Principles and Pressures: Jewish Trade in Gentile Wine in the Middle Ages*. Tel Aviv: Am Oved, 2003.
- [148] Sperber, Daniel. "Costs of Living in Roman Palestine." *Journal of the Economic and Social History of the Orient* VIII, no. III (1965): 248–71.
- [149] ———. "Costs of Living in Roman Palestine." *Journal of the Economic and Social History of the Orient* IX, no. III (1966): 182–211.
- [150] Stark, Rodney. "Jewish Conversion and the Rise of Christianity: Rethinking the Received Wisdom." In *Society of Biblical Literature Seminar Papers*, edited by Kent Harold Richards, 314–29. Atlanta: Scholars Press, 1986.
- [151] ———. *The Rise of Christianity: A Sociologist Reconsiders History*. Princeton, N.J.: Princeton University Press, 1996.

- [152] Stern, Ephraim. *The New Encyclopedia of Archaeological Excavations in the Holy Land*. 4 vols. New York: Simon & Schuster, 1993.
- [153] Stevenson, J. *A New Eusebius: Documents Illustrative of the History of the Church to A.D. 337*. London: S.P.C.K., 1982.
- [154] Strauss, Eli. "The Mongol Conquest and the Jews." *Zion* 4 (1939): 51–70.
- [155] Temin, Peter. "Is it Kosher to Talk about Culture?" *Journal of Economic History* 57, no. 2 (1997): 267–87.
- [156] Theissen, Gerd. *Social Reality and the Early Christians: Theology, Ethics, and the World of the New Testament*. Minneapolis: Fortress, 1992.
- [157] Toch, Michael. "Jews and Commerce: Modern Fancies and Medieval Realities." In *Il ruolo economico delle minoranze in Europa. Secc. XIII-XVIII (Atti della XXXI Settimana di Studi, Istituto Francesco Datini, Prato)*, edited by Simonetta Cavaciocchi, 43-58. Firenze: Le Monnier, 2000a.
- [158] ———. "The Economic Activity of German Jews in the 10th-12th Centuries: Between Historiography and History." In *Facing the Cross: The Persecutions of 1096 in History and Historiography*, edited by Yom Tov Assis, Jeremy Cohen, Aaron Kedar, Ora Limor, and Michael Toch, 32–54. Jerusalem, 2000b.
- [159] ———. "The Jews in Europe, 500-1050." In *The New Cambridge Medieval History*, edited by Paul Fouracre, vol. I, 547–70, 872–78. Cambridge: Cambridge University Press, 2005.
- [160] Urman, Dan. "The Synagogue and the House of Study (*Beth ha-Midrash*) - Are They One And The Same?" In *Ancient Synagogues; Historical Analysis and Archaeological Discovery*, edited by Dan Urman and Paul V. M. Flesher, vol. 1, 232–55. Leiden: E.J. Brill, 1995.
- [161] Urman, Dan, and Paul V. M. Flesher (eds.). *Ancient Synagogues; Historical Analysis and Archaeological Discovery*. 2 vols. Leiden: E. J. Brill, 1995.
- [162] van Zanden, Jan Luiten. "Common Workmen, Philosophers, and the Birth of the European Knowledge Economy." Utrecht University, Manuscript. 2004.
- [163] Watson, Andrew M. "A Medieval Green Revolution: New Crops and Farming Techniques in the Early Islamic World." In *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by Abraham L. Udovitch, 29–58. Princeton, N.J.: Darwin Press, 1981.

- [164] Weber, Max. *Ancient Judaism*. Translated and edited by Hans H. Gerth and Don Martindale. Glencoe, Illinois: The Free Press, 1952 (first edition in German 1917).
- [165] Wolfson, Harry A. *Philo: Foundations of Religious Philosophy in Judaism, Christianity, and Islam*. 2 vols. Cambridge, Mass.: Harvard University Press, 1947.
- [166] Zetterholm, Magnus. *The Formation of Christianity In Antioch: A Social-Scientific Approach To The Separation Between Judaism and Christianity*. London, New York: Routledge, 2003.