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Notes toward a Demographic History of the Jews

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Abstract: As an essential prerequisite to the genealogical study of Jews, some elements of Jewish demographic history are provided in a long-term transnational perspective. Data and estimates from a vast array of sources are combined to draw a profile of Jewish populations globally, noting changes in geographical distribution, vital processes (marriages, births and deaths), international migrations, and changes in Jewish identification. Jews often anticipated the transition from higher to lower levels of mortality and fertility, or else joined large-scale migration flows that reflected shifting constraints and opportunities locally and globally. Cultural drivers typical of the Jewish minority interacted with socioeconomic and political drivers coming from the encompassing majority. The main centers of Jewish presence globally repeatedly shifted, entailing the intake within Jewish communities of demographic patterns from significantly different environments. During the 20th century, two main events reshaped the demography of the Jews globally: the Shoah (destruction) of two thirds of all Jews in Europe during World War II, and the independence of the State of Israel in 1948. Mass immigration and significant convergence followed among Jews of different geographical origins. Israel's Jewish population grew to constitute a large share—and in the longer run—a potential majority of all Jews worldwide. Since the 19th century, and with increasing visibility during the 20th and the 21st, Jews also tended to assimilate in the respective Diaspora environments, leading to a blurring of identificational boundaries and sometimes to a numerical erosion of the Jewish population. This article concludes with some implications for Jewish genealogical studies, stressing the need for contextualization to enhance their value for personal memory and for analytic work.

Keywords: Jewish population; geographical distribution; demographic transition; international migration; who is a Jew?; Jewish identity options; Jewish population genetics; Jewish genealogical studies

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From the perspective of historiography and the social sciences, it is customary to address genealogical studies as *ancillary* or *auxiliary* (Stampfer 2019). Genealogy is often appraised as a specialized approach to collect, process and organize biographical data—no matter how technically articulated and sophisticated—meant to help the main analytic thrust within the broader conceptual framework of a given main underlying discipline. When genealogy holds the centerstage, the roles are somewhat reversed, and the main disciplines themselves turn into the auxiliary tools that provide the essential context to the particular case under investigation. This paper aims at offering a basic demographic framework to the genealogical study of Jews which constitutes the main theme of this volume. It summarily covers a wide time span, from Jewish ethnogenesis to present time (DellaPergola 2001, 2023).

1. Jewish Population Size and Geographical Distribution

1.1. Early Origins

At the outset, it may be useful to briefly review the main developments in world Jewish population, namely its estimated global size and continental distribution (for earlier

treatments of similar matters, see (DellaPergola 1983, 2001, 2014, 2023)). I will not enter here into the question of Jewish population size during antiquity, and limit the overview to the last millennium, or so. However, it must be remembered that the beginning of a Jewish idea and collective entity dates back around the second millennium B.C.E., at least if one follows the Biblical narrative. According to the *Mikra* (literally Readings = Scripture), the Jewish people originated from the intuition of one man, Avraham the son of Terach, who lived in Ur Kasdim in Mesopotamia. This man assumed, accepted, and diffused the idea of one omnipresent, omniscient, and infinitely powerful God, and of the possibility of direct, mutual communication between God and the individual person. The subsequent development of a Jewish community—and later population—involved the growth of one person's family into a multi-generation dynasty, followed by transition into several tribes of descendants of the same original ancestor, or rather of his grandson Jacob. Jacob was renamed Israel after a dramatic nocturne encounter and fight with a stranger entity (*Genesis*, 32, 29). His children and subsequent descendants became, by definition, the *Bnei Israel* (*Sons of Israel*). Only later were the *Sons of Israel* attributed the caption of *people*—firstly by Pharaoh in Egypt (*Exodus*, 1, 9). These people would be known in Egypt as *'Yvrim* (those from the other side (*'ever*—of the river Euphrates) = *the Hebrews*) (*Exodus*, 1, 6), and much later as *Yehudim* (those from Judea = *the Jews*) (*Ester*, 8, 16).

The ancient demographic history of Jews, as told by both internal and external sources, involved a transfer of nomadic people to an ideal *spiritual centre* in a place on the Eastern Mediterranean shore known as the Land of Canaan, renamed by the Jews *Eretz Israel* (*The Land of Israel*—among other attributes of the place). Since the destruction of the First Temple in Jerusalem in the 6th century B.C. and the deportation of the residents, substantial shares of all Jews lived elsewhere, forming a Jewish *Diaspora*. Such *Eretz Israel-Diaspora* dual presence characterized the rest of Jewish history, through rising and declining weights of its geographical components.

1.2. Antiquity through Middle Ages

From antiquity to the Middle Ages, Jews were abundantly dispersed across all then-reachable regions. The Biblical account of 70 Israelites (actually 66 males) who went from the Land of Israel to Egypt (*Genesis*, 46, 8–27) and the 600,000 who allegedly left Egypt (*Exodus*, 27–41) cannot rely on documentary support. However, it is interesting to note that that over a period of 430 years of stay in Egypt, which can be deducted by a reading of the text, such an apparently amazing population increase—corresponding to a 2.15% annual growth rate—would be feasible through a simple combination of a total fertility of 6 children and a life expectancy at birth of 40 years (Coale and Demeny 1966; DellaPergola 1993b).

Beyond literary sources, and based on archaeological evidence, on information about the level of development of agriculture and commerce, and on assumptions about population sustainability of the land, different scholars have expressed widely different opinions about Jewish population size in ancient times (see the review in Bachi 1977). At the high of the Roman Empire, some high estimates of 4 to 6 million were suggested for the total number of Jews around the enlarged Mediterranean basin (Beloch 1886; Juster 1914; Baron 1971), of whom roughly half were in the Land of Israel. Other opinions, with whom we tend to concur, suggested much lower figures, namely 600,000–1 million in the Land of Israel (Avi Yona 1947; Albright 1960; Broshi 2001), if not less (McEvedy and Jones 1978). Similar or slightly higher numbers might be postulated for the Jewish Diaspora at the time.

A synthesis of Jewish population history between the Middle Ages and present is presented in Figure 1. Within the limits of abundant yet fragmentary evidence of unequal quality, during the Middle Ages, the Jewish population was geographically scattered and mobile. Local Jewish populations were quite small, and their size widely fluctuated over time. During a period of time extending over five hundred years, between the 12th and 17th centuries, the size of world Jewry probably never fell much below one million nor exceeded one and a half million. The data for the late 12th century comprise this author's processing from the memories of the Jewish traveler Benjamin of Tudela, who is

generally considered reliable at least for those parts of the world that he actually visited (de Tudela 1170; DellaPergola 1983, 2001; Botticini and Eckstein 2012). Jews at that time were still markedly concentrated in the Middle East and Asia but were expanding into Western Europe and had already moved from Europe's southern shores into the central and northern parts of the continent.

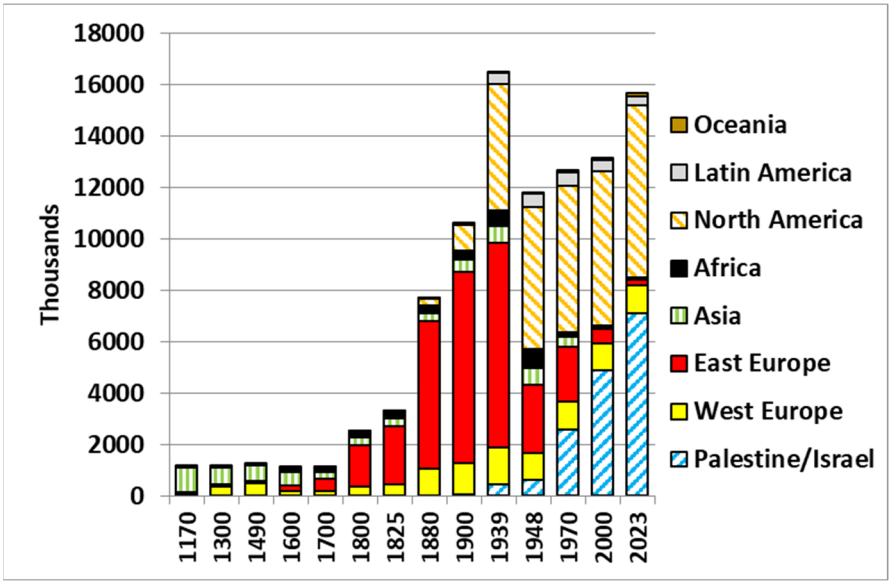

Figure 1. Distribution of Jewish population in the world by major areas—1170–2023. Source: (DellaPergola 2001, 2023; Lestschinsky 1929, 1948; Schmelz 1970; and author's processing).

As a rule, stages of slow demographic build-up were suddenly followed by major disruptive events and decline. Population crises, connected with major epidemics—epitomized by the 13th century Black death—wars and famine, but also political crises—such as Gengis Khan conquests in the early 13th century—affected both Jewish and general populations of a given locale. Other factors, negatively affecting Jewish populations alone, were massacres of entire communities, forced conversions, major expulsions, and segregation into ghettos or enforced residence areas. The most notable expulsion, preceded by several other ones from England and from various European continental lands, was from Spain and Portugal toward the end of the 15th and early 16th centuries (see below). Jews who left the Iberian Peninsula redistributed within Western Europe, throughout the Mediterranean shores, in Eastern Europe, and eventually in the American continent that had recently become part of the geopolitical and economic World system (Wallerstein 1974, 1980, 1989).

1.3. Early Modern Era through World War II

The Jewish population size probably reached one of its lowest levels ever after the wave of violence against Jewish communities in Eastern Europe (1648–1660). The latter events followed the Thirty Years War which, by itself, caused a serious demographic crisis and population decline in the European regions concerned. During the second half of the 17th century, there were possibly around or fewer than one million Jews left in the world. Soon after, though, the Jewish population started growing significantly.

During the 18th century, when the already noted negative factors began to attenuate—namely the eruption of large-scale epidemics, and the massacre or forced conversion of entire Jewish communities—world Jewry possibly more than doubled their numbers. As against a rough estimate of 1.1 million Jews in 1700, the Jewish population was estimated at 2.5 million around 1800. Until then, the Jews had grown more slowly than the total population, but in the course of the 18th and 19th centuries, growth rates shifted. Before World War I, Jews attained annual growth rates of 1.6–1.8%, and in 1900, world Jewry reached 10.6 million, a four-fold increase since 1800. Jewish growth rates

slowed down in the interwar years, but the absolute Jewish population increase was still substantial, and on the eve of World War II, an absolute historical peak of 16.5 million was attained.

The demographic developments just outlined were not synchronic and were mainly noted in Eastern Europe (Stampfer 1989, 1997). Yearly growth rates of over 2% were typical of Jews in Eastern Europe during the last quarter of the 19th century, higher than Europe's faster growing general populations such as England, Poland and Russia between the 1880s and 1910 (McEvedy and Jones 1978). The demographic evolution of East Europe's Jewish communities is better illustrated by the fact that whilst around 1650 they possibly numbered between 250,000 and 350,000 people (following Weinryb 1972), by 1900, their total size could be projected at 8.5 million—also considering the families of Eastern European Jewish emigrants to western countries. These estimates are consistent with Jewish vital statistics of Jewish deaths and births and translated into estimates of life expectancy and fertility rates for various countries in the 18th and 19th centuries (Ruppin 1913; DellaPergola 1983; Schmelz and DellaPergola 2006a). The very rapid Jewish population growth in Eastern Europe, namely in the Pale of Settlement (Rowland 1986) during the 19th and early 20th century does not need alternative explanations, such as large-scale immigration or conversions to Judaism—which surely did not occur during the modern era.

On the other hand, the Jewish population grew much more slowly outside Eastern Europe. In Western and Central Europe, there was moderate growth, and an early slowdown emerged. While the former was induced by seclusion into ghettos, forced conversions and dislocation through repeated expulsions, the latter was significantly related to modernization, integration and the beginnings of assimilation of Jews into more developed societies. In the less developed societies of North Africa and the Middle East, the Jewish population did not take-off until the end of the 19th or the early 20th century (DellaPergola 2010).

Among the consequences of these internal developmental lags, the geographical distribution of the Jewish people radically changed. Whereas in a more distant past the Jewish presence was mostly in areas culturally dominated by Islam and was later numerically split between Islamic and Christian nations, the rapid Jewish population surge in Eastern Europe now generated its quantitative predominance in a global perspective. Around 1880—close to the onset of major Jewish intercontinental migration flows in the early 1880s—Eastern European Jews, including the Balkans, constituted about 75% of the world total, up from 52% around 1700. Concurrently, the number of Jews in North Africa and Asia, including the minute *yishuv* (settlement) in Palestine, stagnated or slowly grew, hence their share declined, possibly from about 35% of world Jewry in 1700, to 8% in 1880. Jews in Western and Central Europe basically kept their share of the total—14% in 1880, versus 13% in 1700—while new Jewish communities were beginning to emerge in America, from less than 1% of world Jewry in 1700, mostly in the Caribbean area, to 3% in 1880.

Major geographical shifts between 1880 and 1939 mainly reflected mass international migrations (Lestschinsky 1960; Schmelz and DellaPergola 2006b). The share of Jews in the Americas was up to 33% of the total; Eastern and West-Central Europe were down to 49% and 8%, respectively. Jews in Moslem countries featured further moderate relative decreases, down to 7% of the total Jewish population, while Palestine's *yishuv* grew up to about 3% of world Jewry in a still predominantly Arab environment (Notestein and Jurkat 1945). Along with these changes in Jewish geographical distribution, each regional Jewish population substantially increased its absolute size between 1880 and 1939.

1.4. Post World War II to Present

Major events in the 20th century determined an unprecedented redirection of Jewish history, and radically transformed Jewish demography as well (DellaPergola 2023). On the eve of World War II, world Jewry was estimated at 16.5 million. In 1945, the number left approached 11 million, reflecting the estimated loss of about six million because of persecution and the Holocaust (*Shoah*) (Lestschinsky 1948; Fein 1979; Benz 2001; DellaPergola 1996), but also a moderate increase in areas not affected by the Shoah (DellaPergola 2011).

The murdering of close to six million Jews during World War II caused the loss of 36% of pre-war Jewry, over 60% of European Jewry, and almost all of the large Central-Eastern European Jewish populations. Neither the countries more directly concerned, nor the Diaspora overall, nor, for that matter, world Jewry, ever recovered their pre-war Jewish population size. Deferred demographic consequences of the Shoah, such as mass murdering of children and non-marriage, hindered Jewish population development in the longer term (DellaPergola 1996). In turn, under the impact of a massive geographical redistribution following large-scale migrations since the end of WWII, the *yishuv* in Palestine became the fastest growing component of world Jewish population. In 2023, the world Jewish population was estimated at 15.7 million (DellaPergola 2023).

Demographic trends in Israel and in the Diaspora were quite different. In Israel, Jews increased from half a million in 1945 to 7 million in 2022, also reflecting the immigration of over 3.5 million. The Jewish Diaspora stood at 10.5 million in 1945, was quite stable until the early 1970s and, by 2022, had decreased to 8.2 million. The world's total population increased from 2.315 billion in 1945 to 8 billion in 2022, and the share of Jews among the world's total population diminished from 4.75 per 1000 in 1945 to 1.95 per 1000 in 2022.

The geographical distribution of Jews has drastically changed over the last few decades, reflecting, firstly, intensive international migration but also the differential impact of marriage, fertility, life expectancy, ageing, assimilation, and, hence, variable growth rates in different Jewish communities across the world (see Figure 2). The major difference between 1970 and 2022 was the shifted rank of the two largest Jewish populations—the U.S. was the largest in 1970 and Israel was the largest in 2022. The world Jewish population also became more strongly concentrated in fewer main and more developed locations (DellaPergola et al. 2005). In 2022, Israel and the U.S. accounted for over 85% of the total, versus 63% in 1970. Twenty-three other countries, each with more than 10,000 Jews, accounted for 14% of the world total, and another eighty countries, each with smaller Jewish populations, together held 1%. Of the 24 largest Jewish communities besides Israel, 2 were in North America, 6 in Latin America, 11 in the European Union and other Western Europe, 2 in Eastern Europe, one in the Balkans, 1 in Oceania, and 1 in Africa (DellaPergola 2023). Several countries that were prominent in 1970, mostly in Asia and Africa as well as republics of the former Soviet Union (Tolts 2018), disappeared from the 2022 top list. By the mid-21st century, a potential majority of all Jews worldwide might live in Israel.

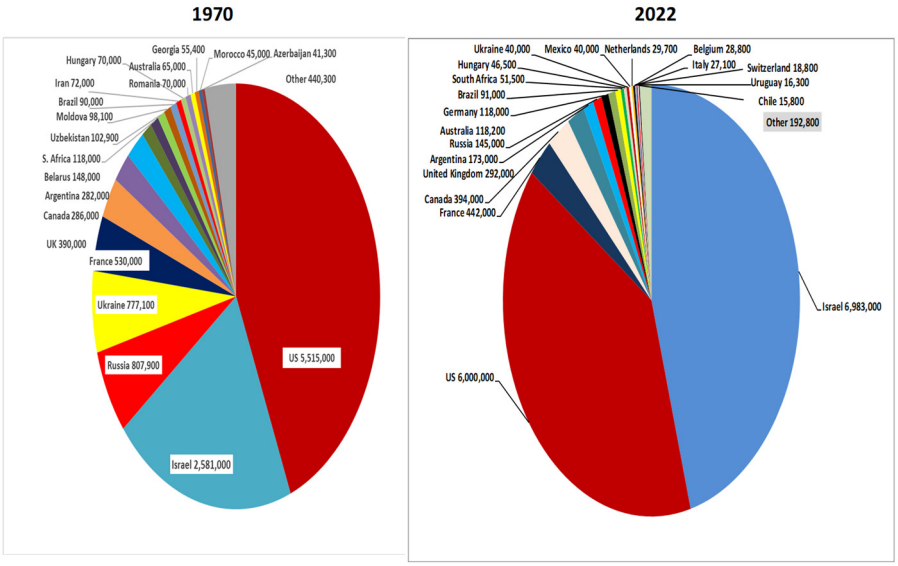

Figure 2. Twenty largest Jewish populations in the world—1970–2022. Source: DellaPergola (2023).

1.5. How Many Jews ever Lived?

Demographers, historians and genealogists might wish to engage in the study of the number of Jews who ever lived, including the descendants of *Conversos*, who lived in the Iberian Peninsula during the Middle Ages, or of those Middle Eastern Jewish populations which were Islamized much earlier in the area between the Eastern Mediterranean shores and the Saudi peninsula, or even of converts during the Roman Empire. Today, greater awareness of history and also greater interest toward Judaism brings people to research their own ancestry, namely in South America, and even to seek an official return within the fold of Judaism (Parfitt 2002; Israel Ministry of Diaspora Affairs 2018).

Table 1 presents an explorative model of the cumulative number of persons who lived on Earth, and, of those, the number of Jews since inception to 2022. This is similar to attempts to evaluate the total number of human beings who ever lived (Keyfitz 1966; Durand 1974; McEvedy and Jones 1978; Biraben 1979). Our model is based on some elementary assumptions about the number of births—expressed by birth rates per 1000 population—and of conversions in different historical periods, each characterized by different environmental and cultural conditions but also by different availability and plausibility of data. The annual birth rates for the pre-modern period were consciously imagined at a rather low level of 25 per 1000, considering the frequent disruptions due to persecutions, high death rates, and repeated migrations. The population sizes underlying the numbers of births and conversions for the period after 1170 are those presented in Figure 1 above. For earlier periods, the suggested estimates consider traditional and critical narratives for antiquity, and prevailing notions and assumptions for the eras between the Roman period to the early Middle Ages (Baron 1971; Bachi 1977; DellaPergola 1983; Botticini and Eckstein 2012; McEvedy and Jones 1978). The cumulated numbers are different from periodical population estimates as they only factor in the input of births and conversions to Judaism, but not the output of deaths and secessions.

Table 1. Tentative estimates of number of Jews who ever lived on Earth—thousands, 1500 B.C.E.-2022.

Years	Years	Initial Pop. Estimate	Final Pop. Estimate	Pop. Growth Estimate	Average Pop.	Birth Rate per 1000	Yearly Births	Total Births Period	Total Conversions	Total Addition	Cumulated J. Pop.
1500–1100 BCE	400	0	600	600	60	25	1.5	600	40	640	640
1100–1060 BCE	40	600	600	0	600	25	15	600	4	604	1244
1060–400 BCE	560	600	250	−350	500	25	13	7000	5	7005	8249
400 BCE–0	400	250	2500	2250	500	25	13	5000	1000	6000	14,249
1–500	500	2500	1200	−1300	1000	25	25	12,500	5	12,505	26,754
500–1700	1200	1200	1200	0	1000	25	25	30,000	12	30,012	56,766
1700–1800	100	1200	2500	1300	1750	30	53	5250	10	5260	62,026
1800–1900	100	2500	7600	5100	6500	35	228	22,750	10	22,760	84,786
1900–1940	40	7600	16,500	8900	13,500	25	338	13,500	4	13,504	98,290
1940–1945	5	16,500	11,000	−5500	13,750	10	138	688	0	688	98,978
1945–2015	70	11,000	14,800	3800	12,900	20	258	18,060	70	18,130	117,108
2015–2022	7	14,800	15,700	900	15,250	15	229	1601	30	1631	118,739

Source: author's estimates.

If these assumptions are correct, about 120 million Jews possibly ever lived from Avraham to the time of this writing. About half of them entered the Jewish population by birth or conversion during the 3200 years between 1500 B.C.E. and 1700, the other half did during the 300 years between sometime in the 18th century and today. The descendants of those who ceased to be Jewish were not included in this model. If the latter were to be added, the numbers would be much higher. Readers may detect possible weaknesses in this model. Any correction, improvement or alternative assumptions would obviously lead to different results.

2. Determinants of Jewish Population Change

As with any population, Jews are subject to two main determinants of demographic transformation:

1. The balance of births and deaths, or vital events, which is relevant both locally and globally, through significant variation across countries;
2. The balance of immigration and emigration, or international migration, which is relevant locally, again through high variability across countries, but can also indirectly affect the global trends in the longer run;
3. A third determinant, relevant only to a sub-population, like the Jews, is defined not only by its physical existence but also by certain specific symbolic or cultural criteria: the balance of accessions to and secessions from Judaism, or identification changes.

While the different types of events outlined here are analyzed by demographers in aggregate format, genealogical studies study them individually and in connection with other similar events pertaining to one given family or a network or related families. To understand the likelihood that such events happen or not, three types of factors must be considered (Dixon 1971):

1. The desirability of the event, reflecting on its normative aspects;
2. The feasibility of the event, reflecting the economic support framework needed for the event;
3. The availability of means and tools—legal, logistical, technological, or other—essential for the event to come into being, and variable according to the specific circumstances of each event.

It is important to appreciate that demographic events, namely those relevant to genealogists, do not happen randomly but rather reflect a complex chain of explanatory determinants. The impact of each of these factors on Jewish demography historically will be reviewed in the following.

3. International Migration

3.1. Premodern

Besides the negative impact of the mentioned periodically destructive factors, international migration was the leading mechanism of Jewish population change in the long term. The geography of the Jews to this day reflects events that occurred in the distant past, namely large-scale migrations. Figure 3 schematically illustrates the main migration streams and some of the main areas of settlement and resettlement between antiquity and the Middle Ages. For a more detailed treatment, the reader is referred to DellaPergola (2001).

The prime and nearly perennial thrust of global Jewish migrations was the dialectic between the pristine location in *Eretz Israel* (the Land of Israel), and the rest of the world where a Jewish Diaspora (dispersion, or exile) of varying size and influence developed. As noted, the center of Diaspora Jewry repeatedly shifted, but the general trend was one of continued diffusion as long as the settled ecumene reached new and more distant frontiers. In Figure 3, flow n.1 illustrates the exile from *Babel* (Babylon), after the fall of the First Temple between the 8th and the 6th century B.C.E. Flow n. 2 testifies of a partial return (*Shivat Zion*), while the majority would remain in what later would become Iraq, further expanding northward and eastward.

A major expansion westward followed two parallel paths: a southern one (n. 5 in Figure 3) and an eventually more influential northern one (n. 3 in Figure 3). The latter, following the northern shores of the Mediterranean, led to Turkey and Greece—with the formation of the Romaniote communities (Bonfil et al. 2011)—but most importantly to insular and continental southern Italy. This for a while in antiquity was one of the densest areas of Jewish settlement in Europe. But what counts more was the drift to Rome and to the north, up to the border areas of today's France and Germany, where the original community of *Ashkenaz* was born and consolidated already since the 4th century (n. 4 in Figure 3). A parallel northbound stream passed from southern France, along the Rhone and

Rhine valleys. The Ashkenazic settlements expanded to East European lands after the 11th century (n. 6) and continued to grow there into the 16th century thanks to the relatively more hospitable conditions found there, as against the frequent expulsions incurred by Jews in various parts of Western Europe. As noted, those initially tiny East European communities were bound to become the backbone of world Jewry.

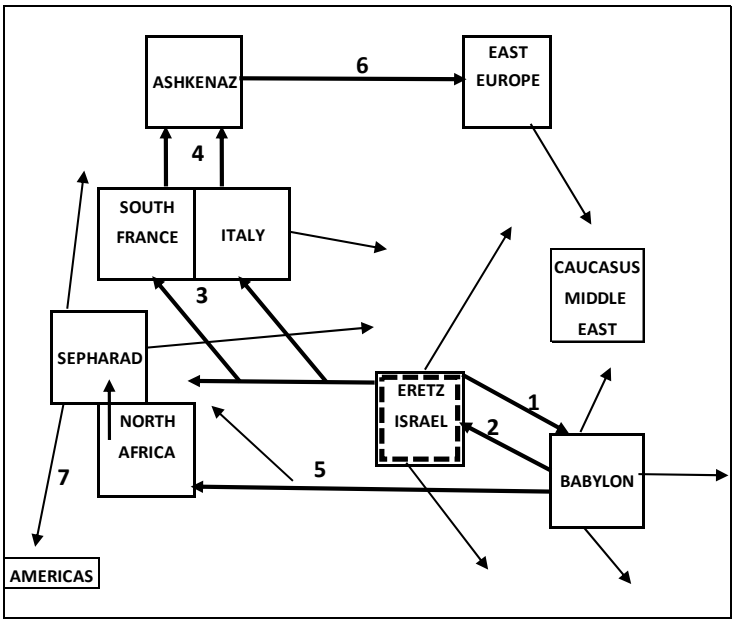

Figure 3. Main Jewish migration streams in antiquity and the Middle Ages. Source: elaborated from DellaPergola (2001).

In turn, the southern westbound migration path (n. 5), passing from Alexandria, and following the westward expansion of Islam (since the 7th–8th centuries), reached the northern shores of Africa and the south-western shores of Europe—especially the Iberian Peninsula. The expulsion from Spain and Portugal, variously evaluated at around 100–150,000 Jews (out of a total Jewish population of 250–300,000), followed by expulsions from other Spanish-held territories, such as Southern Italy and Sicily, generated a very large dispersion of the Sephardic settlement (Gerber 1994). Such migrants reached into Western, Central and Northern Europe, North Africa, the Ottoman Empire, namely the Balkans, Turkey (namely Constantinople), Syria and the Land of Israel (Lewis 1952), and the newly settled Americas (path n. 7 in the figure)—initially the Caribbean islands, followed by Brazil and other northern parts of South America.

As exemplified in Figure 3, along these migration streams, there were several smaller others toward areas such as Yemen, Central, Southern and Eastern Asia into China (namely Kaifeng; see Leslie 1972), the Caucasus, the northern shores of the Black Sea, possibly Ethiopia (Kaplan 1995), the newly reached Americas, and eventually New Amsterdam—later New York (Sarna 2004).

This elementary scheme carries several significant implications for the possible commonalities and differences within the Jewish world. The origins of the Jews were clearly Middle Eastern. The early demographic and cultural Jewish partition began with the development of a large and influential Diaspora in Babylonia, with a smaller but constant presence in the Land of Israel. It is possible that the split between the 2nd and the 8th centuries into what was to become *Ashkenazic* Jewry and *Sephardic* Jewry might be traced to the different frequencies of their respective ancestral roots in *Eretz Israel* and in *Babel*. Some support for this view rests on analyses of prevailing Jewish rituals relying on either version of the *Talmud*—the *Yerushalmi* (the Jerusalem version) vs. the *Bavli* (the Babylonian version) (Grossman 1973; Bonfil 1983). Other scholars, however, do not accept this opinion as they find reliance on the *Talmud Bavli* already by the 8th century in Western European locations (Soloveitchik 2014; Lifshitz 2022).

When significant Jewish migrations occurred, it is likely that a minority left while a majority remained. Jewish migrants therefore comprised a self-selected pool of people. Jewish communities that remained in pre-existing locales were exposed to cultural and social change, which could lead to demographic erosion and assimilation, and sometimes disappearance. One case in point may have been the significant presence of Jews in Saudi Arabia—still mentioned by de Tudela (1170), which eventually completely disappeared with the rise of Islam, yet leaving behind still retrievable genetic markers (see below) (Hammer et al. 2000).

If the assumptions presented here are correct, the main thrust of pre-modern Jewish migration history can be summarized by a significant movement from the early Middle East, westward to North Africa and Southern Europe, then northward to the early *Ashkenaz* of Central-Western Europe, and finally eastward to Eastern Europe (*Ashkenaz* in a broader figurative sense).

3.2. Modern and Contemporary

During the early modern period, constant migrations of moderate entity occurred, with no outstanding long-distance major flow. Small-scale—though culturally significant—and wavelike Jewish migrations occurred to the Land of Israel and to the Americas, as well as throughout Europe (Israel 2002). This relative stagnation was followed by a dramatic migration surge since the 1880s, throughout the 20th century, and in the first decades of the 21st century. A total of over nine million Jews relocated, mostly to a different continent, along with a huge urbanization process. Of these, nearly four million moved before 1948 and over five moved after 1948 (Willcox and Ferenczi 1929; Lestschinsky 1960; Kuznets 2012; Schmelz and DellaPergola 2006b). Figure 4 illustrates the rhythm and main directions of Jewish international migrations between 1880 and 2022, showing the partition between those moving to Israel (*aliyah* = figuratively ascent) and to other destinations.

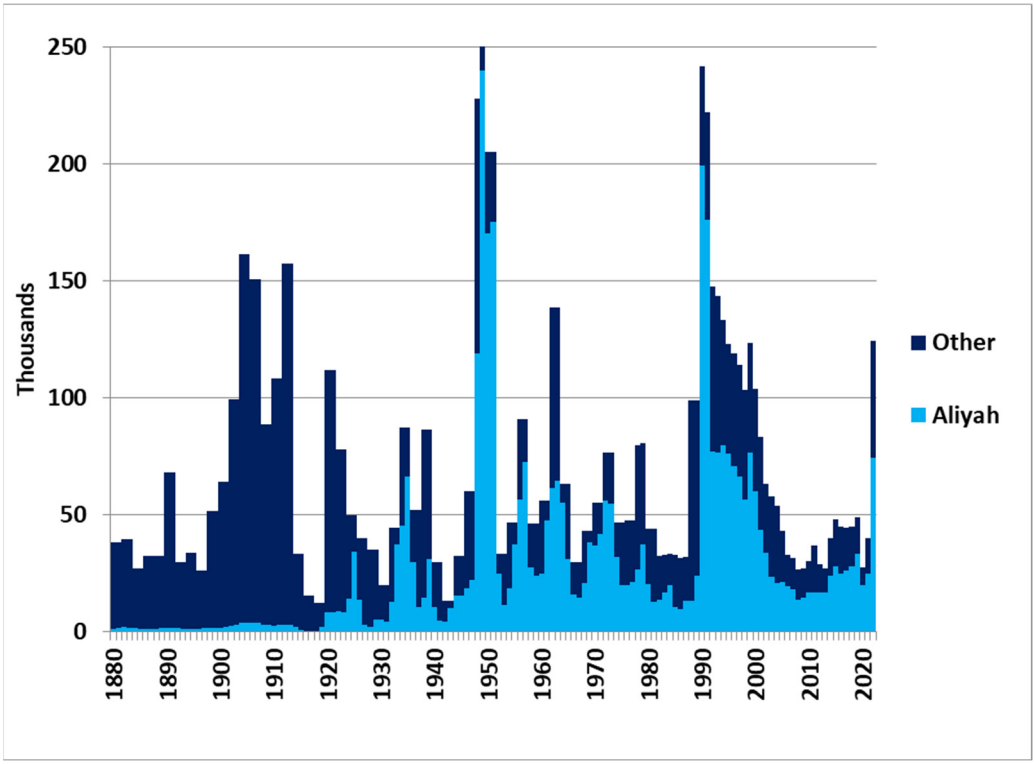

Figure 4. International migration of Jews, total and to Israel (*aliyah*), thousands—1880–2022. Source: adjusted from Willcox and Ferenczi (1929); Gurevich et al. (1944); Sicron (1957); Lestschinsky (1960); Schmelz and DellaPergola (2006b); DellaPergola (2009b, 2020); Israel Central Bureau of Statistics 1950–2023, and author's processing.

The marked wavelike profile of world Jewish migration reflected the response of Jews to major crises and the consequent destabilization and push factors that emerged in different epochs and parts of the world. It also reflected the ever-changing opportunities, often limited by stringent quotas, to find adequate resettlement locations. The main peaks appeared mostly in correspondence with major global geopolitical changes, namely the liquidations of major empires and the emergence of a new world order. In particular, we note the surge of migration mostly to the U.S., preceding and following the end of the Russian, Habsburg, and Prussian Empires at the end of World War I; the end of the British Empire as background of Israel's independence in 1948 and the subsequent major *aliyah* wave; the end of the French Empire and decolonization in North Africa in the 1950s and 1960s; and the end of the Soviet Union—also a form of an Empire—following the fall of the Berlin wall in 1989 and the subsequent exodus of nearly 90% of all Jews who lived there. Russia's war in Ukraine is reflected in the data for 2022. The important lesson to be learned is that paramount developments in Jewish society reflected and were largely dependent on major changes occurring in the general surrounding environment (DellaPergola 1998, 2009b, 2020). Jews finally adjusted to the opportunities and constraints offered by a truly global system of economies and cultures (Inglehart and Welzel 2005).

The shifting population sizes and geographic distributions between the 18th century and World War II, already noted in Figure 1, reflect the variable Jewish growth rates in Eastern and Western Europe, Asia and Africa, and in the new communities in the Americas and Oceania. This massive reshuffling of the Jewish presence derived from the changing balance of hold and push determinants in the places of origin, and of pull and repel in the places of destination. Examples of these factors are shown in Table 2.

Table 2. Examples of factors related to Jewish international migration.

Factor	Example
Hold	Prohibition to emigrate (such as from the former Soviet Union); legal, socioeconomic and cultural conditions favorable to Jewish presence (like in Western democracies)
Push	Expulsion (such as from European countries in the Middle Ages); physical persecution, economic sanction, cultural discrimination (like in 19th century Eastern Europe, or in Moslem countries)
Pull	Normative attractiveness of place (like the Land of Israel); positive legal and socioeconomic conditions (like in Western democracies, or Israel's Law of Return)
Repel	Prohibition to immigrate or quotas regulating immigration (like in the U.S. in the 1920s); unfavorable socioeconomic conditions in receiving country

The role of migrations, both ancient and modern, in creating and reshaping the character of Jewish communities globally cannot be over-evaluated, no less than their geographical alignment and shifting center of gravity. Jewish individuals and organized communities disconnected and reconnected as well as innovated but also kept traces of past memories (Bokser Liwerant 2021; DellaPergola 2021). Similar experiences occurred in the migration experiences of other ethnoreligious and sociocultural groups, but the Jews were on the move over a more extended time span and with greater complexity and articulation geographically.

4. Demographic Transitions

4.1. Lifecycle Vital Events

The *demographic transition* was a crucial process in modern demographic history epitomized by the reduction in the levels of mortality and subsequently of natality (Thompson 1929; Lesthaeghe and van de Kaa 1986; Livi-Bacci 2017). These changes reflected the different timing in the modernization of mortality and fertility and in turn affected population

growth rates, first generating expansion, and later shrinkage. Modern Jewish demographic transitions generally preceded the non-Jewish populations in the same locales (Livi 1918, 1920; Lestschinsky 1926; Bachi 1976; DellaPergola 1983, 1992, 2001; Bachi and DellaPergola 1984). Jews often (though not always) anticipated the early take-off of rapid demographic expansion, but in due course, they also anticipated the modern slowing down of growth and even turning into a deficit of births versus deaths. In quick synthesis, major demographic changes can be explained by a combination of three factors:

1. Factors specifically related to religion, culture and community organization of the Jews;
2. Factors related to legal and other patterns of interaction between the Jewish communities and the non-Jewish environment;
3. Factors related to the general characterization of the societal environment and shared by Jews and others at a given time and place.

The unfolding of demographic processes among Jews in Eastern Europe calls for special attention. According to the evidence, the few thousand Ashkenazic Jews in the Middle Ages had grown to several hundred thousand by the 18th century, and to several million toward the end of the 19th. One may ask whether such an increase, which would make European Jewry the overwhelming majority of the world total, was at all possible, and in the affirmative, under which conditions?

We reconstructed this crucial phase of Jewish demographic history by combining the evidence from censuses and vital records, with some life-expectancy and fertility levels assumptions (Mahler 1958; Weinryb 1972; Baron 1971, 1976; Gieysztorowa 1976; Bloch 1980; DellaPergola 1983; Stampfer 1989, 1997, 2018; Jagur-Grodzinski 1997; Šiaučiūnaitė-Verbickienė 2018; Troskovaite 2018; Toch 2018) (Table 3). According to the sparse notions of the early Middle Ages (de Tudela 1170), Jews in Eastern Europe were then only beginning to settle, coming from the west, whereas by the end of the 19th century, they constituted the source of massive emigration to the west, in particular to the Americas. Our tentative estimates are not limited to the main nucleus of the Polish-Lithuanian communities but also cover a broader area including Bohemia, Galicia, Hungary, Romania, Ukraine, and Russia. Thus, they incorporate small pre-existing Jewish communities in Europe, which probably arrived from the Black Sea and more southern locations (DellaPergola 2001).

Table 3. Tentative estimates of population size and main demographic variables among Jews in Eastern Europe, 1170–1900.

Year	Years Span	Jewish Population Thousands	Yearly Growth Rate %	Life Expectancy Female	Total Fertility Rate
1170		7			
	130		0.9–1.0		
1300		25			
	190		0.3–0.4	25	5.8
1490		50			
	160		1.0	27.5/30	6.4/5.9
1650		250			
	115		1.1–1.2	30	5.9
1765		910			
	60		1.5–1.6	35	5.9
1825		2272			
	55		1.7	40	5.5
1880		5727			
	20		2.0	45	5.4
1900		8510 [a]			

[a]. Including emigrants overseas. Adjusted from DellaPergola (2001). Sources: Baron (1971); Weinryb (1972); Bloch (1980); DellaPergola (1983, 1992); Stampfer (1989); Coale and Demeny (1966), and author's estimates.

The Jewish population growth rates suggested in Table 3 draw from stable population models (Coale and Demeny 1966) that mathematically link the different parameters of demographic change under various assumptions of life expectancy, fertility and generation length. Once assuming a certain population size and growth rate, the demographic models determine whether these assumptions would be plausible and under which conditions of mortality and fertility. Coale-Demeny "West" models, better than others, fit populations with relatively low child mortality, as plausibly was the case of the Jews (Schmelz 1971). We (DellaPergola 2001) assumed an average age of women giving birth around 29, with Jewish brides marrying young, and a longer span of childbearing reflecting better health and longevity.

Under an assumption of Jewish female life-expectancy at birth gradually improving from a level of 25 years in 1300–1490, to 45 years toward the end of the 19th century, the latter estimated on the basis of available data (Bloch 1980), Jewish total fertility rate (TFR) should have approached most of the time five to six children born alive per woman (only some of whom would survive to adulthood). This is highly feasible.

Early longevity advantages among Jews versus contemporaneous populations were probably enhanced by widespread adherence of Jewish communities to traditional ritual prescriptions, such as selective control over food, personal and family hygienic norms, the presence of Jewish physicians, and social assistance awarded to the Jewish poor. Socio-economic differences between Jews and non-Jews later became the main determinant of persisting mortality and fertility differentials. More widespread urbanization, significant advantages in educational levels, and secondary and tertiary occupational specializations translated into better Jewish survivorship and longevity. Comparisons of causes of death for Jews and non-Jews confirm these assumptions, namely a lower incidence of Jewish deaths related to socially related causes, such as consumption of alcohol or venereal disease, and lower infant mortality due to gastrointestinal causes, possibly reflecting more widespread and longer breastfeeding with its related benefits (Woodbury 1925; Schmelz 1971; Jelliffe and Jelliffe 1978; DellaPergola 1983).

Average total fertility rates of 6–7 children were often recorded across demographic history. Much higher levels of 10 children or more were only recorded among the Hutterite community in the U.S. during the 1920s, Israel's Muslim community during the 1960s, and Israel Bedouins still in the 2000s, all of whom enjoyed better health conditions than populations in a more distant past. Many of the same social factors associated with the early decline of Jewish mortality, such as better education and urbanization, later translated into an earlier onset and quicker decline of Jewish fertility. The data and estimates reported here support the view of a small initial pool of immigrants rapidly expanding to a very large population (Xue et al. 2017).

The basic differences in the timing and speed of demographic evolution of Jews and non-Jews followed similar patterns in different continents (DellaPergola 2001). Death rates generally declined earlier among Jews, and the same happened later with regard to birth rates. Jews in England and in the U.S. in the late 19th and early 20th centuries represented cases of Jewish communities whose composition changed under the impact of immigration from predominantly German to mostly East European stock, entailing temporary increases in fertility and growth rates, before eventual decline (Kosmin 1982; Billings 1890; Grabill et al. 1958; Chiswick 2020).

4.2. Structural and Normative Correlates of Demographic Behaviors

In constructing an interpretation of historical changes in the demographic patterns of Jewish versus other populations, factors related to geographical distribution and differences in settlement density are usually mentioned—often the product of legal and political constraints. Other factors touched upon social class differences between Jews and the majority population, property and inheritance arrangements, cultural habits, namely gender inequality, psychological differences linked to the minority status of Jews, and sometimes biological factors and inherited properties (Bachi 1976; Bachi and DellaPergola 1984).

Differences related to the normative order prescribed by the different religions or other ethical persuasions to which people adhere are less often mentioned in the scientific literature but deserve careful examination (DellaPergola 1983; Bachi and DellaPergola 1984). This is precisely the terrain on which the Jew should be evaluated as an active bearer of his or her own autonomous cultural and religious values and not simply as a passive actor, a *different* person, or a victim of discrimination aimed at nullifying the legitimacy of such otherness. Normative differences, although eventually diluted or even forgotten in widespread long-term processes of modernization, appear to have exerted singularly powerful and lasting influences on the demography of marriage, the family, and household structure.

Table 4 compares a number of fundamental parameters for family formation and procreation, as they are prescribed, respectively, by Jewish and Catholic normative codes (or else, widely predominant by common practice). A similar scheme can be drawn comparing Judaism with other branches of Christianity, with Islam, or with any other religious or moral doctrine. In this and the following table, items in brackets indicate a prescription in a certain direction but with explicit exceptions provided for by religious law, or are preferable but not strictly enforced.

Table 4. Scheme of normative Jewish and Catholic codes about marriage and fertility.

Variable	Prevailing Norms		Possible Added Effect of Normative Judaism on Frequency
	Jewish	Catholic	
Marriage			
1. Universal	Yes	No	+
2. Early	Yes	No	+
3. Monogamic	Yes/No [a]	Yes	(+)
4. Heterosexual	Yes	Yes	
5. Consanguineous	(Yes)	No	(+)
6. Endogamic (religion)	Yes	(No)	(-)
7. Patrilocal	Yes/No [a]	No	
8. Arranged marriage (*shiduch*)	Yes	No	+
9. Divorce	(Yes)	No	(-)
10. Remarriage	Yes	(No)	+
Fertility			
1. "Procreate and multiply"	(Yes)	No	(+)
2. Sex only for procreation	(No)	Yes	(+)
3. Purity/couple separation	Yes	No	(+)
4. Contraception—men	No	No	
5. Contraception—women	(No)	No	(-)
6. Sterilization	No	No	
7. Abortion	(No)	No	(-)
8. Breastfeeding of infants	Yes	(No)	(-)
9. Adoption	(Yes)	Yes	
10. Assisted reproduction	(Yes)	No	+

[a] Variable according to geo-cultural areas. Parentheses indicate weaker effects, such as for circumstances allowed but not encouraged, or encouraged but weakly enforced. Adjusted from DellaPergola (2018).

This scheme of normative prescriptions underlines similarities but also some fundamental differences between Jewish and other civilizations. Jewish marriage is normatively

heterosexual. Judaism emphasizes mandatory marriage—also affecting the attitude to remarriage—and endogamy, and the role of marital love as an important element of stability and peace in the home (*shalom bayt*). The Catholic ideal and normative priority would rather stress ascetism and abstinence, as well as more ecumenical inclusiveness in the range of possible partners (Noonan 1968). The possibility of divorce among Jews contrasts against total rejection in the Catholic ethos. In various instances, the Jewish marriage model, if cogently applied, would presumedly lead to higher levels of nuptiality and, hence, fertility. Jewish traditional marriage, according to regional circumstances, could be monogamic—in Europe since the year 1012 (Grossman 1981)—or polygamic in Muslim environments (Goiten 1967). The residential choices of the new family, related to dowry customs, could be patrilocal or matrilocal, in robust correlation with pre-marriage dowry arrangements (Weinstein 2006; Andreoni et al. 2018).

The normative foundations of Jewish and Catholic family behavior thus appear to be diametrically opposed in several respects. The concept of a Judeo-Christian civilization is hardly supported by an examination of traditional family patterns. Of course, it must be borne in mind that in any real population actual behaviors corresponded only partially to the normative prescriptions of the group in question. Not everyone ever chose to follow the commandments, and not everyone was even aware of the existence of those standards and their implications. It is important to underline, though, that family formation in the past was principally the product of decisions taken by an authority within the family independent of the free will of the spouses themselves. The role of intermediaries or matchmakers could be conspicuous, especially when communities were small and geographically spread, or special social class interests had to be preserved when determining the composition of a new household. But it is also important to realize that the devising of activist matrimonial strategies can be individualized and interpreted in the sense of a diffuse preoccupation with Jewish survival and continuity of significance not only regarding economic interests but also an ideal existential imperative. The emergence of freedom of choice and romantic love was a relatively late development, part of a broader process of secularization and individuation (Goode 1970; Shorter 1975).

In order to highlight the unique aspects of the development of birth patterns among Jews in different locales and at different times, and to enable comparisons to be made between Jewish populations and contemporaneous or co-resident non-Jewish populations, it is also necessary to highlight the points of contact between fertility processes and the detailed normative system that regulated the lives of Jews in the past. Such codes continue to regulate their lives currently among relatively small communities still closely guarding Jewish tradition.

In this context, it is worth briefly examining some of the voluntary and involuntary intervening factors affecting fertility levels (Davis and Blake 1956; Bongaarts 1978). With regard to each of these factors, we can compare the extent to which laws and customs prevalent among tradition-abiding Jews could lead to boosting or depressing their birth levels. In several respects, the Jewish model, if applied, might plausibly lead to higher fertility levels. However, certain forms of birth control—limited to women, in any case, forbidden to men—can be retrieved in normative Judaism, with great restrictions (Feldman 1968; Irshai 2012). Normative Judaism does not impose to maximize the birth rate but demands that each adult marry and procreate *at least one boy and one girl*. More children are welcome but not mandatory. These observations throw some light on the empirically ascertained lower or equivalent levels of Jewish birth rates compared to those of the Catholic population during the late modern era—including rules for adoption (Kapnek Rosenberg 1998). Taking this into account, in historical times prior to modernization, it is plausible that the Jewish population could have grown more rapidly than the surrounding population. Under certain specific physiological conditions, however, strict enforcement of Jewish prescriptions concerning sexual life could lead to some impairment of fertility (Toaff 1970). Overall, high rates of natural increase occurred among Jews mainly thanks to

certain advantages that religious regulatory prescriptions might have created with respect to the determinants of morbidity and mortality levels.

4.3. Differential Reproduction

Jewish marriage and fertility transitions followed definite regional patterns and time schedules (Rabinowitsch Margolin 1909; United States Bureau of the Census 1945; Katz 1959; Schmelz 1966; Cohen 1976; Nahon 1981; Plakans and Halpern 1981). The general demographic literature customarily marks a Trieste–Leningrad dividing line between Western and Eastern European marriage patterns (Hajnal 1965). This partition is equally relevant in the case of the Jewish family. In addition, a further division separated the northern Christian from the southern Islamic civilizations within which Jewish communities developed and from which they absorbed important cultural and behavioral traits. This virtual line might run between Tangier and Astrakhan, emblematically separating north from south Italy around Rome (DellaPergola Forthcoming). In each area, Jews, as noted, anticipated the surrounding others, possibly with some exceptions at the local level (Livi 1918, 1920; Grabill et al. 1958; Bachi 1976; Coale et al. 1979; Nouschi 1980; Kosmin 1982; Livi Bacci 1986; Allegra 1993; DellaPergola 1993a; Schellekens and van Poppel 2006; Derosas 2007; Vobecká 2013; Lowenstein 2023).

Further insights on the Jewish fertility transition are provided by an analysis of parity progression ratios (PPR), which illustrate the pace of family formation. PPRs measure the propensity of a family of a given size to expand by adding an additional birth (Blau 1953; Bensimon and DellaPergola 1984, 2001; Israel Central Bureau of Statistics 1950–2023). These likelihoods are expectedly different as a function of current parity. PPRs could be calculated for Jewish women of different ages in different countries at the turn of the 19th and 20th centuries. Four main patterns appear, outlining the whole course of demographic modernization. Fertility was typically high and unchecked among Jewish women in Eastern Europe who had children in the second half of the 19th century, meaning that a woman with one or five children had an equal probability of having one further child. Fertility control began among Jewish women in Central Europe shortly after the mid of the century, and emerged in Eastern Europe at least one generation later, by stopping higher parities and distancing more between births. The next stage was a clear partition of the Jewish population across Europe between a larger segment with declining birth rates and a smaller one with persisting high fertility. This also characterized Israel's population well into the 20th century. Finally, much lower, down to extremely low, fertility prevailed, but a bi-modal profile could still be observed toward the end of the 20th century. Bimodality implies a diffused decline in the propensity to add a child once one, two, or three are already born. On the other hand, women with relatively larger families—around six births in the past, and later around four—apparently made no or lesser efforts to prevent a further birth.

Importantly, then, the diffusion of modernization and secularization during the 19th century implied a general lowering of fertility rates, but it did not involve all women, not even in the same locale. Each Jewish community displayed a modernizing majority and a more traditional minority. In the East European past Jewish context, and among the contemporary very orthodox, segregated Jewish communities, there often appeared a consonance between a relatively higher social status and a higher degree of religious observance. The social class-religiosity relationship, which crucially affected household size, was reversed from positive to negative at the peak of modernization—if and when modernization reached out to the different segments of the Jewish population.

As a consequence of these patterns, Jewish communities grew at quite different speeds, and the same occurred between different sectors within the same community. In any case, the burden of demographic growth was mainly carried by relatively small minorities within the total Jewish population in Eastern Europe in the past, and in Israel, in the U.S., or elsewhere today (Hartman 2017). Differential fertility was and remains a crucial engine in the uneven transmission of physical and cultural characteristics across the global Jewish population at large.

5. Jewish Identificational Options and Choices

5.1. Boundaries of Jewishness

Far from being a fixed entity, Judaism—both as a set of norms and as a set of people—was and is subject to variations and transformations over time and across space. As noted, over time, the Jewish world system increasingly came to depend on an intertwined cluster of demographic and socio-cultural variables. Biology—particularly the role of fertility in generating new lives—and personal choices—particularly the individual willingness or ability to be part of a Jewish community—were the two drivers of Jewish demography in the past and present. Following modernization, the nature and coherence of world Jewish peoplehood was increasingly challenged in the context of the numerous existing identificational options along the continuum between full Jewish self-segregation and full Jewish integration in the broader societal context (Gordon 1964; Goldscheider and Zuckerman 1986; DellaPergola 2023). Nevertheless, *being* was and is the eternal prerequisite to *choosing*, thus letting a primary role to procreation in determining the existence, presence, nature, evolution, and characteristics of populations, and of world Jewry among them.

Judaism is notoriously a multi-variate cluster of normative, cognitive, behavioral, affective, relational and other perceptions and experiences. It can be at the same time a shared ancestry, a religion, an ethnicity, a culture, an organized community, a social group, a complex of collective and personal historical memories, folklore, and more. In a more distant past, each of these different options totally overlapped. Someone identified as a Jew by parentage was also identified as Jewish by religion, by ethnicity, by a peculiar vernacular, and by residential neighborhood, occupation, and other personal traits. Separation between Jews and non-Jews was marked by a thick boundary, often legally reinforced (see Figure 5).

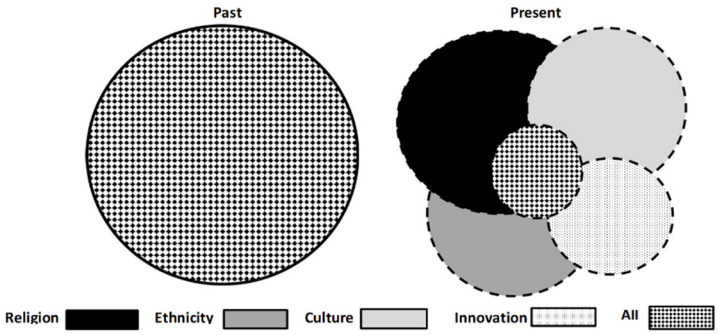

Figure 5. The contents of Jewish identification: past and present. Source: author's elaboration.

Modernization and secularization introduced a growing differentiation emerged between the different possible identification markers. The relevance, intensity, contents and complexity of Jewish identification could not be caught any more by one single indicator. Different if not rival modes of belonging and association emerged through a gradual split of a developing national secular identification from the earlier overarching religious one, of the linguistic from the political, of folklore from social class. At the same time, new forms of Jewish identification possibly emerged. People can today define themselves as Jewish by ethnicity but not by religion, or vice versa (Herman 1977). The Jewish cognitive, affective and experiential sides could be variously expressed through different markers, creating new challenges to the analytic quest to study its changing nature and intensity (Phillips 1991; DellaPergola and Staetsky 2021). In other words, there are multiple doors of entry to and exit from Jewish identification, whereas previously there was one path only. The boundaries separating these various options and all of them from the non-Jewish environment have become flexible and porous.

Throughout history, passages from and into Judaism occurred all the time in the form of formal conversions—voluntary or under coercion—and most of the time resulted in a negative balance for the Jewish side, with rare exceptions concentrated over specific time spans, especially during antiquity in the Middle East and Mediterranean basin. In

the contemporary era, especially in the U.S., religious shifts are frequent between holding a religion or not holding it, and between different religious denominations. In these exchanges, the net balance was usually negative for the Jewish population (Rebhun 2016).

5.2. Intermarriage

One momentous correlate of the Jewish population becoming more integrated in the surrounding civilizations can be found in Jewish marriage patterns, from historical and contemporary perspectives. Of particular significance was the likelihood to marry inside or outside the community of belonging, which testified to the degree of resilience of pre-existing Jewish bonds versus the tendency to assimilate into a broader, multi-ethnic societal frame of reference. Table 5 summarizes the frequencies of Jewish intermarriage across the world between the 1930s and the 2020s, showing great gaps between different countries, along with a generally increasing frequency in the Diaspora. However, the growing weight of Israel among total Jewry, where marriages with non-Jews are few, created a powerful balancing factor. The U.S. data on the share of Jews marrying a non-Jewish partner not converted to Judaism underlie fast-increasing heterogamy (Kosmin et al. 1991; DellaPergola 2009a; Phillips 2018; Pew Research Center 2021).

Table 5. World synopsis of intermarriage rates among Jews currently marrying—1930s–2020s.

% Jews Currently Marrying Non-Jews	1930s			1980s			2020s		
	Country	Jewish Pop. Distribution		Country	Jewish Pop. Distribution		Country	Jewish Pop. Distribution	
		N 000	%		N 000	%		N 000	%
	Total	16,500	100	Total	12,979	100	Total	15,166	100
0–0.9%	Poland, Lithuania, Greece, Palestine, Iran, Yemen, Ethiopia	4130	25	Israel	3659	28			
1–4.9%	Latvia, Canada, United States, Latin America, United Kingdom, Spain-Portugal, Other Asia, Maghreb, Egypt, Libya, Southern Africa	6600	40	Mexico, Africa not else stated	57	1	Israel	6871	45
5–14.9%	Switzerland, France, Austria, Luxembourg, Hungary, Romania, Czechoslovakia, USSR, Estonia, Belgium, Bulgaria, Yugoslavia	5340	33	North Africa, Asia besides Israel	46	0	Mexico, Panama, Belgium, Gibraltar, Iran, North Africa	92	1
15–24.9%	Italy, Germany, Netherlands	385	2	Southern Africa	120	1	Caribbean low, Venezuela, India, Singapore, South Africa, Australia	184	1
25–34.9%	Australia, New Zealand, Scandinavia	45	0	Canada, Australia, New Zealand, United Kingdom, Brazil, Other Latin America, Europe not else stated	936	7	Canada, Chile, Rest of Latin America, Austria, France, United Kingdom, Turkey, China, Rest of Africa, N. Zealand	1196	8
35–44.9%				Argentina, Italy, France, Belgium	818	6	Argentina, Brazil, Uruguay, Spain, Rest of West Europe	310	2
45–54.9%				United States, USSR, Austria, Switzerland, Netherlands	7186	56	Germany, Hungary, Italy, Netherlands, Switzerland, Asian FSU, Rest of Asia	255	2
55–64.9%				Scandinavia, West Germany, Eastern Europe non-USSR	156	1	United States, Denmark, Rest of East Europe	6036	40
65–74.9%							Sweden, Poland, Belarus, Moldova, Ukraine	71	0
75% +				Cuba	1	0	Russia, Cuba	151	1
Weighted world average			5%			33%			31%

Sources: (DellaPergola 2009a, 2017; DellaPergola and Staetsky 2020; Graham 2018, 2020); and author's estimates.

A parallel trend was the growing tendency to intermarriage in Israel between Jews of different geographic origins. Based on a dichotomous classification of Europe and America vs. Asia and Africa (Israel Central Bureau of Statistics 1950–2023; Okun 2004), the percent of inter-subethnic marriages rose all the time, though it did not yet reach the level expected if the choice of spouse was random and only depended on the size of the different extant population groups.

Interaction of Jews of different origins in Israel and the interaction of Jews and non-Jews in the Diaspora are two symmetric though different aspects of the increasing contact and assimilation of Jews within the broader societal contexts where they live. The demographic implications for the future of Jewish populations in the Diaspora and in Israel are obviously different.

6. Defining, Classifying, Counting the Jews

6.1. Conceptual Steps in Jewish Population Research

Following the discussion of Jewish identification modes among the Jewish global collective, the not-unsubstantial chore remains of defining who the constituting people are for the purpose of empirical studies. Numerous challenges must be met in establishing and implementing the criteria for attribution. At first look to determine who is a Jew may seem quite simple. However, Jewish population estimates are quite complex to attain, as such or as a framework for sampling. Different organizations or individual scholars may produce data lacking uniform definitions, reflecting the very different institutional, cultural and socioeconomic contexts of the Jewish presence.

In the rather open, fluid, and somewhat unbound environment of contemporary societies, the very feasibility of undertaking a valid and meaningful study of the Jewish collective generates debate. Four different intellectual stances can be detected in this respect, which can be defined as *maximizing* (Moles 1965), *consolidationist* (DellaPergola 2013, 2014), *situational* (Schnapper 1994), and *manipulative* (Kimmerling 1999; Sand 2009). Difficulties involve sources of data, possible alternative Jewish population definitions, and techniques adopted to actually reach the target (for extended treatment, see DellaPergola 2014).

An outline of the metacriteria that precede the operational definitional options should distinguish between principles established *from within the group* itself or *from the outside*. A second distinction is between *normative* definitions, based on juridical principles reflecting traditional Rabbinical law (*Halakha*), on other rulings by progressive Jewish religious movements; and *operational* definitions based on various criteria. The traditional rabbinical ruling is that a Jew is *anyone who was born of a Jewish mother or was converted to Judaism by a Jewish court*. In antiquity, patrilineal, not matrilineal criteria prevailed in the attribution of children to the Jewish people (Cohen 2001). Other Jewish rulings—such as by the Reform movement—recognize patrilineal descent along with matrilineal descent. Normative definitions provide absolute conceptual criteria but are not practical in empirical work because, in theory, one should verify the personal status and background of each individual in the world before assessing the Jewish population worldwide.

Operational definitions rely on particular proxies of quintessential aspects of the population at stake. Among these, some particular genome configurations may be designated as indicative of a Jewish origin (see below). Attribution can rely on broad and somewhat abstract concepts like religion or ethnicity, often ascertained through self-assessment by the people investigated. Otherwise, one characteristic frequent among the group at stake can be chosen as representative—such as certain countries of origin of immigrants or certain urban residential areas known for their high Jewish population density. These markers can be attributed from the outside, from the inside, or from both sides. Definitions can be *stringent* if they require the simultaneous satisfaction of several criteria, with a *minimalist* quantitative outcome; or *lenient* if they only require the presence of one single criterion among the many possible, resulting in a *maximalist* yield. This clearly entails huge variation in the actual results and in the assessment of their consequences.

Any empirical study of a Jewish population or of any other population group or sub-population requires solving three main problems: *defining* the target group; *identifying* those such defined, by means of membership lists in organizations, typical surnames, customer or electoral lists, or selecting micro-areas for subsequent canvassing; and *covering* the persons such identified through fieldwork, face-to-face, by mail, telephone or internet. It follows that the more conceptual aspects, besides ideal theorical premises, often must comply with practical and logistical feasibility. The ultimate empirical step—obtaining relevant data from relevant persons—crucially reflects the readiness of people to cooperate in the data collection effort.

6.2. Definitional Alternatives and Their Implications

Unlike in the past, besides occasional exceptions, in contemporary times, a clean binary division between Jews and non-Jews is no longer possible (DellaPergola 2014). A major and growing bone of contention in the quantitative study of contemporary Jewry is whether or not group identities should hold mutually exclusive definitions and boundaries. Holders of multiple identities constitute a growing share in contemporary societies. Hence, four major definitional concepts were developed to provide consistent comparative foundations for Jewish population studies. These are illustrated in Figure 6.

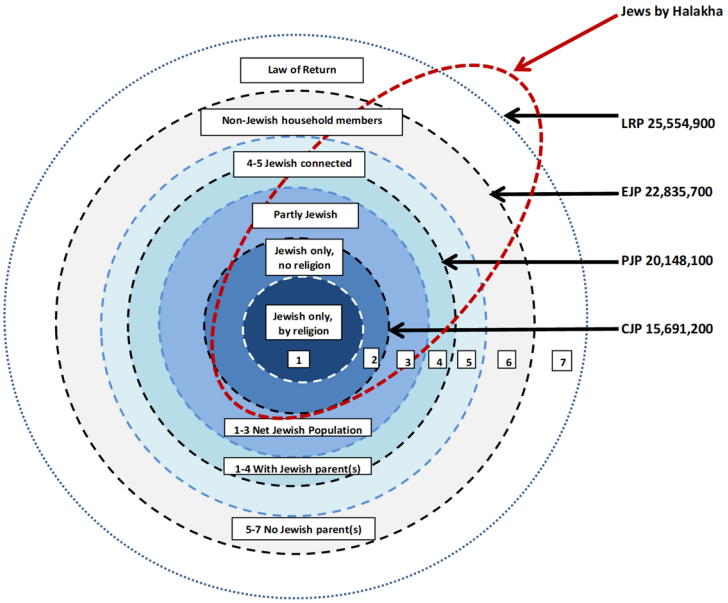

Figure 6. Configuring contemporary Jewish populations—2023. Source: DellaPergola (2023).

As specified in DellaPergola (2014, 2023), the *Core Jewish population* (*CJP*) (Kosmin et al. 1991) includes all those who identify themselves as Jews, *or* who are identified as Jews by a respondent in the same household, *and* do not have another monotheistic religion. Such a definition reflects *subjective* perceptions, whether or not backed by *Halakhah* or other normative definitions. It includes people who identify as Jews by religion, as well as others who are not interested in religion but see themselves as Jews by ethnicity or by other cultural criteria. Some others do not recognize themselves as Jews when asked but can be included if they descend from Jewish parents and do not have another religious identity. Converts to Judaism by any procedure as well as other people who declare they are Jewish even without conversion may also be included in the *core* Jewish population.

Other more extensive definitions are the *Jewish Parents Population (JPP)*, including persons who are not Jewish but are the direct descendants of Jews; *the Jewish Enlarged Population (EJP)*, including all non-Jewish members of a household with at least one core Jew; and the *Law of Return Population* (LRP), the legal instrument to immigration and

citizenship in Israel, which extends eligibility to Jews, children and grandchildren of Jews, and the respective spouses, irrespective of their present identity.

Figure 7 displays seven concentric circles plus an intersectional ellipse, corresponding to different Jewish population definitions, showing global estimates for 2022 (DellaPergola 2023). In 2022, the *CJP* was estimated at 15.3 million, the *JPP* at 20 million, the *EJP* at 22.7 million, and the *LRP* at 25.4 million. A 10 million gap separated the more restrictive from the more extensive criterion. A line describing the possible extension of a Jewish population according to the *Halakha* also appears, hinting that many people eligible on rabbinical grounds are not actually part of the collective of people as empirically assessed here. At the same time, some who are conscious of their current or past Jewish identity may not be eligible on rabbinical grounds.

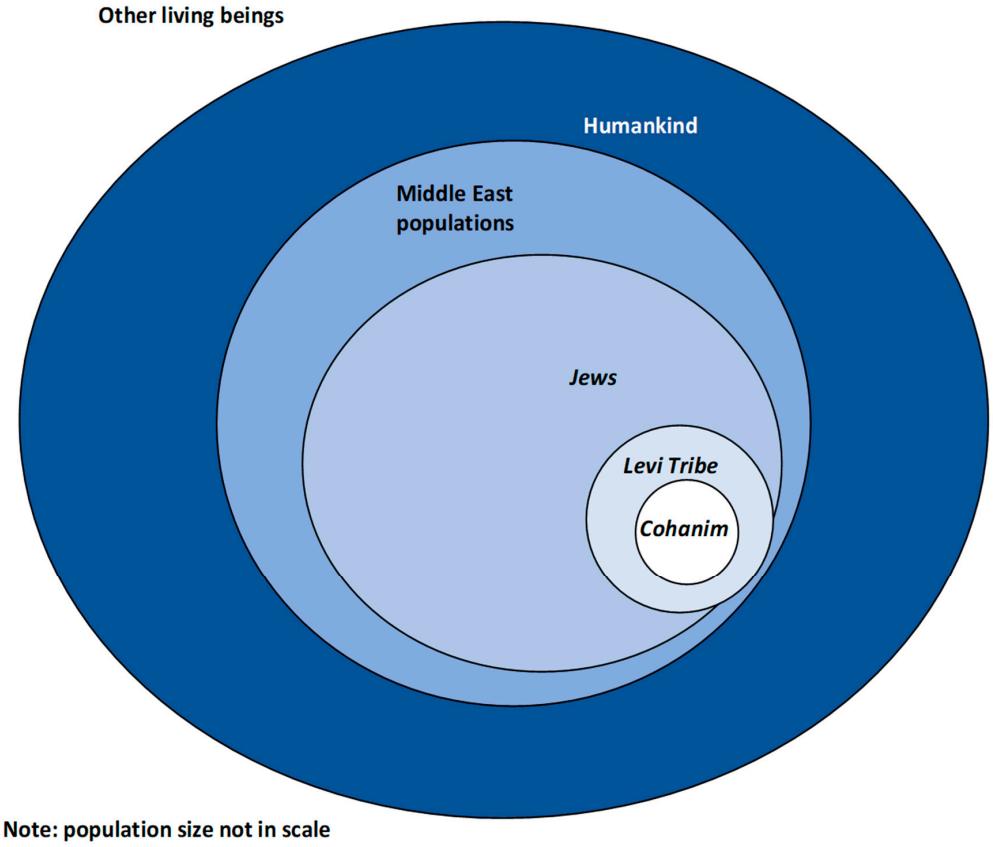

Figure 7. Schematic representation of the positioning of Jews on a global DNA scale. Source: author's elaboration.

Jewish populations in the Diaspora are sometimes documented through population censuses or socio-demographic surveys where respondents may choose how to answer questions on religious or ethnic identities (DellaPergola 1975, 2023; Kotler-Berkowitz et al. 2003; Heilman 2005, 2013; Sheskin and Dashefsky 2022). In Israel, personal status is determined by the Ministry of the Interior, based on decisions by the Israeli Central Rabbinate and by the Supreme Court (Corinaldi 1998, 2001; Gavison 2009). In Israel, therefore, the *core* Jewish population does not express subjective identification but reflects definite legal rules entailing matrilineal Jewish origin, or conversion to Judaism, *and* not holding another religion.

7. A Note on Population Genetics

The discussion on the Jewish population was significantly transformed by the recent emergence of genome-mapping-based literature. The tragic political misuse of genetics in the past must always be present in the mind, calling for the cautious use of these tools.

Genome studies have the double purpose of mapping out and taking care of genetically inherited disease as well as of clarifying the ancient genetic origins of the Jews. It should be clarified, at the outset, that in any population, within-group variation is ostensibly greater than between-group variation. It has also been extensively argued above that the determinants of Jewish identification are rooted not only in biological but also in cultural factors. Some of these are anchored in a distant past, nonetheless based on a voluntary contemporary perception of the sense of belonging of an individual with the Jewish religion or nation.

Recent studies of population genetics uncovered the early shared backgrounds and subsequent mutations of contemporary Jewish populations (Bonné-Tamir et al. 1992; Motulsky 1995; Skorecki et al. 1997; Hammer et al. 2000; Risch et al. 2003; Behar et al. 2004a, 2010; Bradman et al. 2004; Adams et al. 2008; Carmi et al. 2014; Yardumian and Schurr 2019). Although the historicity of the traditional Biblical account should be critically scrutinized, recent genome research allowed us to figure out the ancient antecedents of fatherhood and motherhood of present populations. Some contemporary DNA evidence would indeed attribute the shared male ancestry of many contemporary Jews to a man who might have lived in the Middle East around the 17th century B.C.E. (Hammer et al. 2000). On the Jewish matrilineal side, mitochondrial DNA studies do not reveal one shared ancestress but rather several ones (Thomas et al. 2002; Behar et al. 2008). This is not surprising in view of the fact that the Jewish forefathers had wives (Avraham's Sarah, Itzhak's Rebecca, and Jacob's Leah and Rachel plus the concubines Bilha and Zilpa), each of which had different mothers, not to mention King David's grandmother who was Ruth the Moabite. Allowing for such initial heterogeneity, especially on the maternal side, and instances of rejoining in antiquity, much recent research concurs in showing shared ancestry and other markers across many Jewish populations, despite their widespread dispersion over the globe. Ashkenazi, North African, and Sephardi Jews share substantial genetic ancestry, and they derive it from Middle Eastern and European populations (Lucotte et al. 1993; Semino et al. 2004), although the eventual geographical separation and isolation of different Jewish communities also shows up (Kopelman et al. 2020). These findings are graphically summarized in Figure 7.

Often, Jews in different countries share more similarity than Jews and the non-Jews of the same place. Jews also share certain genome segments with populations that are not Jewish and whose origins are from various areas of the Middle East. A Sephardi Jew, an Ashkenazi Jew, and a Palestinian Arab may share a common ancestor (Nebel et al. 2001). Evidently, conversion does not affect the genome; therefore, it is possible today to retrace the ancient Jewish origins of population groups, which are not Jewish (mostly Moslems and Christians). At the same time, is it possible to detect the early input of other population groups in the genome of contemporary Jewish populations. An interesting refinement is that the *Cohanim*—the Priests, a selected sub-set of the descendants of the ancient Tribe of Levi—share among themselves a greater amount of similarity (Skorecki et al. 1997), arguably reflecting the later common ancestry of this group vis-à-vis the more ancient common Abrahamitic origins. On the other hand, it also appears that the broader Levi tribe's descendants may have incorporated some individuals with non-Jewish ancestries (Behar et al. 2003, 2017).

The more specific discussion about the origins of Ashkenazic Jewry focuses on a relatively closed group of founders who moved to East Europe at a relatively late stage of Jewish history. The last generation of genetic studies confirms the existence of some similarity between Jews of Eastern European origins and Jews of southern European, namely of Italian and Middle Eastern origin, through intermediate stages of prolonged residence in various Western and Central European areas. Reflecting repeated bottlenecks due to epidemics and local massacres, the initially higher heterogeneity of these small populations apparently decreased (Waldman et al. 2022). Some linguists and geneticists hypothesized Slavic and Turkish influences on Yiddish language and literature as well as on genetics. A substantial input of converts in the early Middle Ages was hypothesized,

entailing that Ashkenazi Jews were the product of the fusion of Jewish immigrants with Eastern European non-Jews (Koestler 1976; Herzog 1992; King 1992; Das et al. 2016). These hypotheses were disproven by more recent research (Behar et al. 2014; Stampfer 2014). Actually, the fact a very small initial pool of people could grow very rapidly over several centuries—such growth being interrupted by periodical bottlenecks (Behar et al. 2004b; Carmi et al. 2014)—can explain well what has been clearly demonstrated by recent medical research. The high genetic and genealogical proximity among Ashkenazi Jews generated a uniquely high frequency of certain inherited diseases, such as Tay-Sachs, but also possibly some immunities facing certain environment-related diseases, such as tuberculosis (Fraikor 1977; Risch et al. 1995; Withrock et al. 2015). On the Sephardic side, recent genetic research confirms the presence in Spain and Portugal of significant traces of Jews who converted to Catholicism during the Inquisition (Adams et al. 2008).

8. Implications for Genealogical Studies

The preceding survey summarily reported the main stages and articulations of Jewish demographic history, with an emphasis on the modern and contemporary eras. Genealogy strives to reconstruct history and society through particular personal linkages of marriage and reproduction obtained thanks to patient work of family reconstitution (Fauve-Chamoux 2016). The study of Jewish genealogy mostly focuses on a specific subpopulation, or more frequently on particular sub-sets of Jews related to local geography, selected spans of years or generations, or peculiar personal characteristics—such as genealogies of rabbis or other notable Jewish families (Jacobi 2019). What is sometimes felt is a lack of broader contextualization, and in particular the merger and expansion of those particular sub-sets into a much broader demographic frame of reference.

The background information provided here may be useful to those who worked and currently work to create one or more databases of genealogical information, including as many as possible Jewish records (e.g., Gasperoni 2018; Gasperoni et al. 2023). Given contemporary technical capabilities, the creation of a vast integrated international database would not be a prohibitive task, provided all pieces of relevant information can be collected and organized. At the same time, the continuing expansion of the pool of extended family members, inclusive of Jews and non-Jews, may challenge such a project.

A few major conclusions of interest for genealogical studies can be drawn from the present survey:

1. The Jews stem from an initial small nucleus of people originally located in the Middle East. Their subsequent history involved significant entries of people who were external to the original founders, and a massive number of exits, often under duress but also following voluntary choices. This implies a lot of inner coherence but also a certain inherent initial diversity, and huge ramifications out of the core Jewish population at any point in time.
2. The size of Jewish minorities has always been relatively small, although at certain points in time, Jewish concentrations could represent a significant share and even the majority of the total population of the respective locales.
3. The Jewish population is historically dispersed all around the world. Jews influenced, and were deeply influenced by, the respective environments of residence, enhancing transnational diversity.
4. Jewish identity was always differentially and selectively transmitted from one generation to the next by a self-selected pool of families substantially smaller than the total, translating into a different rhythm of growth of the various geographical segments, and of specific sub-groups within each locale. The physical and socio-cultural characteristics and the relational networks of the descendants were therefore significantly different from those of the founders.
5. Genealogy is capable of holding together, connecting and reconnecting the ever-transforming chain of the generations, thus restituting coherence to the whole system of Jewish communities and individuals.

6. There is no Jewish family where genealogy does not point to multiple geographical origins and possible extensions among non-Jewish populations.
7. Genealogy is a compilation and interweaving of events affecting human beings that really occurred. The occurrence of such events could sometimes reflect mere randomity but was most often the product of specific sets of determinants that embedded particular Jewish norms and values along with more general factors shared by Jews and others.

The information presented in this paper, and in particular these last observations, may help provided genealogical studies a much-needed and appropriate contextualization. This, in turn, may enhance the value of genealogy for personal memory and analytic work.

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References

Adams, Susan M., Elena Bosch, Patricia L. Balaresque, Stéphane J. Ballereau, Andrew C. Lee, Eduardo Arroyo, Ana M. López-Parra, Mercedes Aler, Marina S. Gisbert Grifo, Maria Brion, and et al. 2008. The genetic legacy of religious diversity and intolerance: Paternal lineages of Christians, Jews, and Muslims in the Iberian Peninsula. *The American Journal of Human Genetics* 83: 725–36. [CrossRef] [PubMed]

Albright, William F. 1960. The Biblical period. In *The Jews: Their History, Culture and Religion*. Edited by Louis Finkelstein. New York: Harper and Brothers, vol. 1, pp. 3–69.

Allegra, Luciano. 1993. A model of Jewish devolution: Turin in the eighteenth century. *Jewish History* 7: 29–58. [CrossRef]

Andreoni, Luca, Michaël Gasperoni, and Cyril Grange, eds. 2018. Familles juives, Europe-Méditerranée, XIXe-XXe siècles. In *Annales de Démographie Historique*. Paris: Belin, vol. 2018–2022.

Avi Yona, Michael. 1947. Historical survey of the number and density of the population of Ancient Palestine. In *Three Historical Memoranda, Submitted to the United Nations Special Committee on Palestine*. Jerusalem: General Council (Vaad Leumi) of the Jewish Community in Palestine.

Bachi, Roberto. 1976. *Population Trends of World Jewry*. Jerusalem: The Hebrew University, The Institute of Contemporary Jewry.

Bachi, Roberto. 1977. *The Population of Israel*. Paris: CICRED. Jerusalem: The Hebrew University, Institute of Contemporary Jewry.

Bachi, Roberto, and Sergio DellaPergola. 1984. Did characteristics of pre-Emancipation Italian Jewry deviate from a general demographic paradigm for Jewish traditional communities? In *Contemporary Jewry, Studies in Honor of Moshe Davis*. Edited by G. Wigoder. Jerusalem: The Hebrew University of Jerusalem, The Institute of Contemporary Jewry, pp. 159–89.

Baron, Salo. 1971. Population. *Encyclopedia Judaica* 13: 866–903.

Baron, Salo. 1976. *A Social and Religious History of the Jews*. New York: Columbia University Press, vol. 3.

Behar, Doron M., Bayazit Yunusbayev, Mait Metspalu, Ene Metspalu, Saharon Rosset, Jüri Parik, Siiri Rootsi, Gyaneshwer Chaubey, Ildus Kutuev, Guennady Yudkovsky, and et al. 2010. The genome-wide structure of the Jewish people. *Nature* 466: 238–42. [CrossRef]

Behar, Doron M., Daniel Garrigan, Matthew E. Kaplan, Zahra Mobasher, Dror Rosengarten, Tatiana M. Karafet, Lluis Quintana-Murci, Harry Ostrer, Karl Skorecki, and Michael F. Hammer. 2004a. Contrasting patterns of Y chromosome variation in Ashkenazi Jewish and host non-Jewish European populations. *Human Genetics* 114: 354–65. [CrossRef] [PubMed]

Behar, Doron M., Ene Metspalu, Toomas Kivisild, Saharon Rosset, Shay Tzur, Yarin Hadid, Guennady Yudkovsky, Dror Rosengarten, Luisa Pereira, Antonio Amorim, and et al. 2008. Counting the founders: The matrilineal genetic ancestry of the Jewish Diaspora. *PLoS ONE* 3: e2062. [CrossRef]

Behar, Doron M., Lauri Saag, Monika Karmin, Meir G. Gover, Jeffrey D. Wexler, Luisa F. Sanchez, Elliott Greenspan, Alena Kushniarevich, Oleg Davydenko, Hovhannes Sahakyan, and et al. 2017. The genetic variation in the R1a clade among the Ashkenazi Levites' Y chromosome. *Scientific Reports* 7: 14969. [CrossRef]

Behar, Doron M., Mait Metspalu, Yael Baran, Naama M. Kopelman, Bayazit Yunusbayev, Ariella Gladstein, Shay Tzur, Hovhannes Sahakyan, Ardeshir Bahmanimehr, Levon Yepiskoposyan, and et al. 2014. No evidence from genome-wide data of a Khazar origin for the Ashkenazi Jews. *Human Biology* 85: 859–900. [CrossRef]

Behar, Doron M., Mark G. Thomas, Karl Skorecki, Michael F. Hammer, Ekaterina Bulygina, Dror Rosengarten, Abigail L. Jones, Karen Held, Vivian Moses, David Goldstein, and et al. 2003. Multiple origins of Ashkenazi Levites: Y chromosome evidence for both Near Eastern and European ancestries. *American Journal of Human Genetics* 73: 768–79. [CrossRef] [PubMed]

Behar, Doron M., Michael F. Hammer, Daniel Garrigan, Richard Villems, Batsheva Bonne-Tamir, Martin Richards, David Gurwitz, Dror Rosengarten, Matthew Kaplan, Sergio Della Pergola, and et al. 2004b. MtDNA evidence for a genetic bottleneck in the early history of the Ashkenazi Jewish population. *European Journal of Human Genetics* 12: 355–64. [CrossRef] [PubMed]
Beloch, Karl Julius. 1886. *Die Bevölkerung der Griecisch-Römischen Welt*. Leipzig: Duncker & Humblot.
Bensimon, Doris, and Sergio DellaPergola. 1984. *La population juive de France: Sociodémographie et identité*. Paris: CNRS. Jerusalem: The Hebrew University of Jerusalem, Institute of Contemporary Jewry.
Benz, Wolfgang. 2001. Death toll. In *The Holocaust Encyclopedia*. Edited by Walter Laqueur and Judith Tydor Baumel. New Haven: Yale University Press, pp. 137–45.
Billings, John. S. 1890. Vital Statistics of the Jews in the United States, in U.S. Department of the Interior, Census Office. *Census Bulletin* 19: 3–23.
Biraben, Jean Noël. 1979. Essai sur l'évolution du nombre des hommes. *Population* 34: 13–25. [CrossRef] [PubMed]
Blau, Bruno. 1953. On the frequency of births in Jewish marriages. *Jewish Social Studies* 15: 237–52.
Bloch, Bronislaw. 1980. Vital events among the Jews in European Russia towards the end of the XIX Century. In *Papers in Jewish Demography 1977*. Edited by Uziel O. Schmelz, Paul Glikson and Sergio DellaPergola. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, pp. 69–81.
Bokser Liwerant, Judit. 2021. Globalization, Diasporas, and Transnationalism: Jews in the Americas. *Contemporary Jewry* 41: 711–53. [CrossRef] [PubMed]
Bonfil, Roberto. 1983. Tra due mondi: Prospettive di ricerca sulla storia culturale degli ebrei nell'Italia meridionale nell'alto Medioevo. In *Italia Judaica*; Roma: Ministero per i Beni Culturali e Ambientali, vol. 1, pp. 135–58.
Bonfil, Robert, Oded Irshai, Guy G. Stroumsa, and Rina Talgam, eds. 2011. *Jews in Byzantium: Dialectics of Minority and Majority Cultures*. Jerusalem Studies in Religion and Culture. Leiden: Brill, vol. 14.
Bongaarts, John. 1978. A framework for analyzing the proximate determinants of fertility. *Population and Development Review* 4: 105–33. [CrossRef]
Bonné-Tamir, Batsheva, Avshalom Zoossmann-Diskin, and Aharon Ticher. 1992. Genetic diversity among Jews reexamined: Preliminary analysis at the DNA level. In *Genetic Diversity among the Jews*. Edited by Batsheva Bonné-Tamir and Avinoam Adam. New York and Oxford: Oxford University Press, pp. 80–94.
Botticini, Maristella, and Zvi Eckstein. 2012. *The Chosen Few: How Education Shaped Jewish History, 70–1492*. Princeton: Princeton University Press.
Bradman, Neil, Mark G. Thomas, Michael E. Weale, and David B. Goldstein. 2004. Threads to antiquity: A genetic record of sex-specific demographic histories of Jewish populations. In *Traces of Ancestry: Studies in Honour of Colin Renfrew*. Edited by Martin Jones. Cambridge: McDonald Institute, pp. 89–98.
Broshi, Magen. 2001. *Bread, Wine, Walls and Scrolls*. London: Sheffield University Press.
Carmi, Shai, Ken Y. Hui, Ethan Kochav, Xinmin Liu, James Xue, Fillan Grady, Saurav Guha, Kinnari Upadhyay, Dan Ben-Avraham, Semanti Mukherjee, and et al. 2014. Sequencing an Ashkenazi reference panel supports population-targeted personal genomics and illustrates Jewish and European origins. *Nature Communications* 5: 4835. [CrossRef]
Chiswick, Barry R. 2020. The Billings Report and the occupational Attainment of American Jewry, 1890. In *Jews at Work: Their Economic Progress in the American Labor Market*. Edited by Barry R. Chiswick. Cham: Springer, pp. 33–50.
Coale, Ansley, and Paul Demeny. 1966. *Regional Model Life Tables and Stable Populations*. Princeton: Princeton University, Office of Population Research.
Coale, Ansley J., Barbara A. Anderson, and Erna Härm. 1979. *Human Fertility in Russia since the Nineteenth Century*. Princeton: Princeton University Press.
Cohen, Robert. 1976. Jewish Demography in the Eighteenth Century, a Study of Lodon, the West Indies, and Early America. Ph.D. dissertation, Brandeis University, Waltham, MA, USA.
Cohen, Shaye J. D. 2001. *The Beginnings of Jewishness: Boundaries, Varieties, Uncertainties*. Berkeley: University of California Press.
Corinaldi, Michael. 1998. Jewish identity, Chapter 2. In *Jewish Identity: The Case of Ethiopian Jewry*. Edited by M. Corinaldi. Jerusalem: Magnes Press, The Hebrew University.
Corinaldi, Michael. 2001. *The Enigma of Jewish Identity: The Law of Return, Theory and Practice*. Srigim-Lion: Nevo. (In Hebrew)
Das, Ranajit, Paul Wexler, Mehdi Pirooznia, and Eran Elhaik. 2016. Localizing Ashkenazic Jews to primeval villages in the ancient Iranian lands of Ashkenaz. *Genome Biology and Evolution* 8: 1132–49. [CrossRef]
Davis, Kingsley, and Judith Blake. 1956. Social structure and fertility: An analytic framework. *Economic Development and Cultural Change* 4: 211–35. [CrossRef]
DellaPergola, Sergio. 1975. The Italian Jewish population study: Demographic characteristics and trends. In *Studies in Jewish Demography: Survey for 1969–1971*. Edited by Uziel O. Schmelz, Paul Glikson and Stephen J. Gould. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, London: Institute of Jewish Affairs, pp. 60–97.
DellaPergola, Sergio. 1983. *La trasformazione demografica della diaspora ebraica*. Torino: Loescher.
DellaPergola, Sergio. 1992. Major demographic trends of World Jewry: The last hundred years. In *Genetic Diversity among the Jews*. Edited by Batsheva Bonné-Tamir and Avinoam Adam. New York: Oxford University Press, pp. 3–30.

DellaPergola, Sergio. 1993a. Precursori, convergenti, emarginati: Trasformazioni sociodemografiche degli ebrei in Italia, 1870–1945. In *Gli ebrei nell'Italia unita, 1870–1945, Italia Judaica*; Gli ebrei nell'Italia unita. Roma: Ministero per i Beni Culturali e Ambientali, Ufficio Centrale per i Beni Archivistici, vol. 4, pp. 48–81.
DellaPergola, Sergio. 1993b. Histoire démographique du peuple juif: Bref aperçu. In *La société juive à travers l'histoire*. Edited by Shmuel Trigano. Paris: Librairie Arthème Fayard, vol. 4, pp. 574–619, 727–32.
DellaPergola, Sergio. 1996. Between science and fiction: Notes on the demography of the Holocaust. *Holocaust and Genocide Studies* 10: 34–51. [CrossRef]
DellaPergola, Sergio. 1998. The global context of migration to Israel. In *Immigration to Israel: Sociological Perspectives, Studies of Israeli Society*. Edited by Elazar Leshem and Judith T. Shuval. New Brunswick and London: Transaction, vol. 8, pp. 51–92.
DellaPergola, Sergio. 2001. Some fundamentals of Jewish demographic history. In *Papers in Jewish Demography 1997 in Memory of U.O. Schmelz*. Edited by Sergio DellaPergola and Judith Even. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, pp. 11–33.
DellaPergola, Sergio. 2009a. Jewish out-marriage: A global perspective. In *Jewish Intermarriage around the World*. Edited by Shulamit Reinharz and Sergio DellaPergola. London and New Brunswick: Transaction, pp. 13–39.
DellaPergola, Sergio. 2009b. International migration of Jews. In *Transnationalism: Diasporas and the Advent of a New (dis)order*. Edited by Eliezer Ben-Rafael, Yitzhak Sternberg, Judit Bokser Liwerant and Yosef Gorny. Leiden and Boston: Brill, pp. 213–36.
DellaPergola, Sergio. 2010. Demography. In *Encyclopedia of Jews in the Islamic World*. Edited by Norman A. Stillman. Boston and Leiden: Brill, pp. 53–66.
DellaPergola, Sergio. 2011. Jewish Shoah survivors: Neediness assessment and resource allocation. In *Holocaust Survivors: Resettlement, Memories, Identities*. Edited by Dalia Ofer, Françoise. S. Ouzan and Judith Tydor Baumel-Schwartz. New York and Oxford: Berghahn Books, pp. 292–314.
DellaPergola, Sergio. 2013. Jewish Demography: Discipline, Definitions, Data, Investigators, Interpretations. In *The Bloomsbury Companion to Jewish Studies*. Edited by Dean P. Bell. London: Bloomsbury, pp. 282–316.
DellaPergola, Sergio. 2014. Measuring Jewish Populations. In *Yearbook of International Religious Demography 2014*. Edited by Brian J. Grim, Todd M. Johnson, Vegard Skirbekk and Gina A. Zurlo. Leiden and Boston: Brill, pp. 97–110.
DellaPergola, Sergio. 2017. Ethnoreligious intermarriage in Israel: An exploration of the 2008 Census. *Journal of Israeli History* 36: 149–70. [CrossRef]
DellaPergola, Sergio. 2018. Démographie historique et histoire de la famille juive en Italie. (entretien avec Luca Andreoni et Michaël. Gasperoni). *Les Annales de Démographie Historique: Familles Juives Europe-Méditerranée, XIX^{e}-XX^{e} Siècles* 2: 37–58.
DellaPergola, Sergio. 2020. *Diaspora vs. Homeland: Development, Unemployment and Ethnic Migration to Israel, 1991–2019*. Jerusalem: The Avraham Harman Institute of Contemporary Jewry, The Hebrew University of Jerusalem.
DellaPergola, Sergio. 2021. Jewish Populations, Migrations and Identities in the Americas: The Shared and the Particular. *Contemporary Jewry* 41: 755–91. [CrossRef]
DellaPergola, Sergio. 2023. World Jewish population 2022. In *American Jewish Year Book 2022*. Edited by Arnold Dashefsky and Ira Sheskin. Cham: Springer, pp. 279–391.
DellaPergola, Sergio. Forthcoming. Demography of the Jewish family: Continuities and discontinuities. In *The Jewish Family*. Edited by Harriet Hartman. Cham: Springer.
DellaPergola, Sergio, and L. Daniel Staetsky. 2020. *Jews in Europe at the Turn of the Millennium: Population Trends and Estimates*. London: Institute for Jewish Policy Research JPR, European Jewish Demography Unit.
DellaPergola, Sergio, and L. Daniel Staetsky. 2021. *The Jewish identities of European Jews. What, Why and How*. London: Institute for Jewish Policy Research JPR, European Jewish Demography Unit.
DellaPergola, Sergio, Uzi Rebhun, and Mark Tolts. 2005. Contemporary Jewish diaspora in global context: Human development correlates of population trends. *Israel Studies* 11: 61–95. [CrossRef]
Derosas, Renzo. 2007. The Jewish anticipation of fertility control in Nineteenth-Century Europe: A reassessment. Paper presented at PAA Annual Meeting, New York, NY, USA, March 29–31; Venice: Ca' Foscari University, Department of History.
de Tudela, Benyamin. 1170. *Sefer Massa'ot. The Itinerary of Benjamin of Tudela*. Edited by M. N. Adler. London: Henry Frowde, Oxford University Press, Amen Corber, 1907.
Dixon, Ruth. 1971. Explaining cross-cultural variations in age at marriage and proportions never-marrying. *Population Studies* 25: 215–33. [CrossRef] [PubMed]
Durand, John D. 1974. *Historical Estimates of World Population: An Evaluation*. Analytical and Technical Reports, N. 10, Table 2. Philadelphia: University of Pennsylvania, Population Center.
Fauve-Chamoux, Antoinette. 2016. Historical demography and international network developments, 1928–2010. In *A Global History of Historical Demography. Half a Century of Interdisciplinarity*. Edited by Antoinette Fauve-Chamoux, Ioan Bolovan and Sølvi Sogner. Bern: Peter Lang, pp. 15–66.
Fein, Helen. 1979. *Accounting for Genocide: National Responses and Jewish Victimization during the Holocaust*. New York: The Free Press.
Feldman, David M. 1968. *Birth Control in Jewish Law: Marital Relations, Contraception and Abortion as Set Forth in the Classic Texts of Jewish Law*. New York: New York University Press.
Fraikor, Arlene L. 1977. Tay-Sachs disease: Genetic drift among the Ashkenazim. *Social Biology* 24: 117–34. [CrossRef] [PubMed]

Gasperoni, Michaël. 2018. *Reconstructing and Analyzing a Jewish Genealogical Network: The Case of the Roman Ghetto (Seventeenth-Eighteenth Centuries)*. Jerusalem: International Institute of Jewish Genealogy.
Gasperoni, Michaël, Doriane Hare, and Paraskevi Michailidou. 2023. Géomatique et histoire économique et sociale des populations. Paper presented at Conference on Mapping Past Populations: Digital Tools and Quantitative Methods, Paris, France, October 19–20; Paris: CNRS/Sorbonne, Centre Roland Mousnier.
Gavison, Ruth. 2009. *60 Years to the Law of Return: History, Ideology, Justification*. Jerusalem: Metzilah Center for Zionist, Jewish, Liberal and Humanistic Thought.
Gerber, Jane. 1994. *The Jews of Spain: A History of the Sephardic Experience*. New York: The Free Press.
Gieysztorowa, Irena. 1976. *Wstep do demografii Staropolskiej*. Warsaw: Państwowe Wydawnictwo Naukowe.
Goiten, Shlomo D. 1967. A Mediterranean Society. In *The Family*. Berkeley: University of California Press, vol. 3.
Goldscheider, Calvin, and Alan Zuckerman. 1986. *The Transformation of the Jews*. Chicago: University of Chicago Press.
Goode, William J. 1970. *World Revolution and Family Patterns*. New York: The Free Press.
Gordon, Milton. M. 1964. *Assimilation in American Life: The Role of Race, Religion, and National Origins*. New York: Oxford University Press.
Grabill, Wilson H., Clyde V. Kiser, and Whelpton Pascal K. 1958. *The Fertility of American Women*. New York: John Wiley and Sons.
Graham, David J. 2018. Britain and Australia, a World apart, together: An international contextualization of Jewish intermarriage using census data. In *Jewish Population and Identity: Concept and Reality*. Edited by Sergio DellaPergola and Uzi Rebhun. Cham: Springer, pp. 3–24.
Graham, David J. 2020. *The Jews in South Africa in 2019: Identity, Community, Society, Demography*. London: Institute for Jewish Policy Research. Cape Town: Kaplan Centre for Jewish Studies.
Grossman, Avraham. 1973. The Rabbinical Literature in Ashkenas and North France in the Eleventh Century (1030–1085). Ph.D. dissertation, The Hebrew University, Jerusalem, Israel.
Grossman, Avraham. 1981. *The Early Sages of Ashkenaz*. Jerusalem: Magnes Press. (In Hebrew)
Gurevich, David, Aaaron Gertz, and Roberto Bachi. 1944. *The Jewish Poopulation of Palestine. Immigration, Demographic Structure and Natural Growth*. Jerusalem: Department of Statistics of the Jewish Agency for Palestine.
Hajnal, John. 1965. European marriage patterns in perspective. In *Population in History*. Edited by David V. Glass and David E. C. Eversley. London: Arnold, pp. 101–43.
Hammer, Michael F., A. J. Redd, E. T. Wood, M. R. Bonner, Hamdi Jarjanazi, Tatiana M. Karafet, A. Silvana Santachiara-Benerecetti, Ariella Oppenheim, Mark A. Jobling, Trefor Jenkins, and et al. 2000. Jewish and Middle Eastern non-Jewish populations share a common pool of Y-chromosome biallelic haplotypes. *Proceedings of the National Academy of Sciences* 97: 6769–74. [CrossRef] [PubMed]
Hartman, Harriet. 2017. The Jewish family. In *American Jewish Year Book 2016*. Edited by Arnold Dashefsky and Ira M. Sheskin. Cham: Springer, pp. 79–126.
Heilman, Samuel, ed. 2005. *Contemporary Jewry* 25: 1–226. Special Issue: NJPS 2002 (sic). Available online: https://www.researchgate.net/publication/238363446_Foreword_Contemporary_Jewry (accessed on 16 November 2023).
Heilman, Samuel, ed. 2013. *Contemporary Jewry* 33: 1–167. Special Issue: Jewish Demography in the United States, Guest Editors Leonard Saxe and Sergio DellaPergola. Available online: https://www.academia.edu/48613870/Introduction_Special_Issue_on_Jewish_Demography_in_the_United_States?from_sitemaps=true&version=2 (accessed on 16 November 2023).
Herman, Simon N. 1977. *Jewish Identity: A Social Psychological Perspective*. Beverly Hills and London: Sage.
Herzog, Marvin J., ed. 1992. *The Language and Culture Atlas of Ashkenazic Jewry*. Tübingen: Max Niemeyer.
Inglehart, Roy, and Christian Welzel. 2005. *Modernization, Cultural Change, and Democracy: The Human Development Sequence*. New York: Cambridge University Press.
Israel Central Bureau of Statistics. 1950–2023. *Statistical Abstract of Israel*; Jerusalem: CBS.
Israel, Jonathan I. 2002. *Diaspora within a Diaspora. Jews, Cripto-Jews and the World of Maritime Empires (1540–1740)*. Leiden: Brill.
Israel Ministry of Diaspora Affairs. 2018. *Report of the Consultative Public Commission to Evaluate Israel's Attitudes to World Populations with an Attachment to the Jewish People*; Jerusalem: Ministry of Diaspora Affairs.
Irshai, Ronit. 2012. *Fertility and Jewish Law: Feminist Perspectives on Orthodox Responsa Literature*. Waltham: Brandeis University Press.
Jacobi, Paul J. 2019. *The Jacobi Papers: Genealogical Studies of Leading Ashkenazi Families*. Edited by Emanuel Elyasaf. 3 vols, New Haven: Avotaynu.
Jagur-Grodzinski, Joseph. 1997. Origins of Ashkenazic Jewry: Natural growth vs. immigration. In *Papers in Jewish Demography 1993*. Edited by Sergio DellaPergola and Judith Even. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, pp. 79–90.
Jelliffe, Derrick B., and E. F. Patrice Jelliffe. 1978. *Human Milk in the Modern World*. London: Oxford University Press.
Juster, Jean. 1914. *Les juifs dans l'empire romain*. Paris: Geuthner.
Kaplan, Steven. 1995. *The Beta Israel (Falasha) in Ethiopia. From Earliest Times to the Twentieth Century*. New York: New York University Press.
Kapnek Rosenberg, Shelley. 1998. *Adoption and the Jewish Family: Contemporary Perspectives*. Philadelphia and Jerusalem: The Jewish Publication Society.
Katz, Jacob. 1959. Family, kinship and marriage among Ashkenazim in the sixteenth to eighteenth centuries. *The Jewish Journal of Sociology* 1: 4–22.

Keyfitz, Nathan. 1966. How many people have lived on Earth? *Demography* 3: 581–82. [CrossRef]
Kimmerling, Baruch. 1999. Conceptual Problems. In *One Land, Two Peoples*. Edited by Davi Jacoby. Jerusalem: The Magnes Press, pp. 11–22. (In Hebrew)
King, Robert D. 1992. Migration and Linguistics as Illustrated by Yiddish. In *Reconstructing Languages and Cultures*. Edited by Edgar C. Polome and Werner Winter. Berlin and New York: Mouton-De Gruyter, pp. 419–39.
Koestler, Arthur. 1976. *The Thirteenth Tribe: The Khazar Empire and Its Heritage*. New York: Random House.
Kopelman, Naama M., Lewi Stone, Dena G. Hernandez, Dov Gefel, Andrew B. Singleton, Evelyne Heyer, Marcus W. Feldman, Jossi Hillel, and Noah A. Rosenberg. 2020. High-resolution inference of genetic relationships among Jewish populations. *European Journal of Human Genetics* 28: 804–14. [CrossRef]
Kosmin, Barry A. 1982. Nuptiality and fertility of British Jewry 1850–1980: An immigrant transition? In *Demography of Immigrants and Minority Groups in the United Kingdom*. Edited by David A. Coleman. London: Academic Press, pp. 245–61.
Kosmin, Barry A., Sidney Goldstein, Joseph Waksberg, Nava Lerer, Ariella Keysar, and Jeffrey Scheckner. 1991. *Highlights of the CJF 1990 National Jewish Population Survey*. New York: Council of Jewish Federations.
Kotler-Berkowitz, Laurence, Steven M. Cohen, Jonathon Ament, Vivian Klaff, Frank Mott, Danyelle Peckerman-Neuman, Lorraine Blass, Debbie Bursztyn, and David Marker. 2003. *The National Jewish Population Survey 2000–2001: Strength, Challenge, and Diversity in the American Jewish Population*. New York: United Jewish Communities.
Kuznets, Simon. 2012. Economic Structure and Life of the Jews. In *Jewish Economies: Development and Migration in America and Beyond*. Edited by Stephanie Lo and E. Glen Weyl. Vol. I, The Economic Life of American Jewry. New Brunswick: Transaction, pp. 1–106.
Leslie, Donald D. 1972. *The Survival of the Chinese Jews: The Jewish Community of Kaifeng*. Leiden: Brill.
Lesthaeghe, Ron J., and Dirk van de Kaa. 1986. Twee demografische transities? In *Bovolking: Groei en kimp*. Deventer: Van Logum Staterus, pp. 9–24.
Lestschinsky, Jacob. 1926. Probleme der Bewölkerungs-Bewegung bei den Juden. *Metron* 6: 1–157.
Lestschinsky, Jacob. 1929. Die Umsiedlung und Umschichtung des jüdischen Volkes in Laufe des letzten Jahrhundrts. *Welwirtschaftliches Archiv* 30: 123–156.
Lestschinsky, Jacob. 1948. *Crisis, Catastrophe and Survival. A Jewish Balance Sheet, 1914–1948*. New York: Institute of Jewish Affairs of the World Jewish Congress.
Lestschinsky, Jacob. 1960. Jewish migrations, 1840–1956. In *The Jews: Their History, Culture and Religion*. Edited by L. Finkelstein. New York: Harper and Brothers, vol. 2, pp. 1536–96.
Lewis, Bernard. 1952. *Notes and Documents from the Turkish Archives. A Contribution to the History of the Jews in the Ottoman Empire. Oriental Notes and Studies*. Jerusalem: The Israel Oriental Society, vol. 3.
Lifshitz, Joseph I. 2022. *In Time Immemorial. The Development of Ashkenazi Law*. Tel Aviv: Idra. (In Hebrew)
Livi Bacci, Massimo. 1986. Social-group forerunners of fertility control in Europe. In *The Decline of Fertility in Europe*. Edited by Ansley J. Coale and Susan Cotts Watkins. Princeton: Princeton University Press, pp. 182–200.
Livi-Bacci, Massimo. 2017. *A Concise History of World Population*, 6th ed. Hoboken: John Wiley & Sons.
Livi, Livio. 1918. *Gli Ebrei Alla Luce Della Statistica. Vol. I, Caratteristiche Antropologiche e Patologiche ed Individualità Etnica*. Firenze: Libreria della Voce.
Livi, Livio. 1920. *Gli Ebrei Alla Luce Della Statistica. Vol. II, Evoluzione Demografica, Economica e Sociale*. Firenze: Vallecchi.
Lowenstein, Steven M. 2023. *The Population History of German Jewry 1815–1939. Based on the Collections and Preliminary Research of Prof. Usiel Oscar Schmelz*. Boston: Academic Studies Press.
Lucotte, Gérard, Pierre Smets, and Jacques Ruffié. 1993. Y-chromosome-specific haplotype diversity in Ashkenazic and Sephardic Jews. *Human Biology* 65: 835–40. [PubMed]
Mahler, Raphael. 1958. *Yidn in Amolikn Poyln in Likht Fun Zifern*. Warsaw: Yidish bukh.
McEvedy, Colin, and Richard Jones. 1978. *Atlas of World Population History*. Harmondworth: Penguin Books.
Moles, Avraham. 1965. Sur l'aspect théorique du decompte de populations mal definies. In *La vie juive dans l'Europe Contemporaine*. Brussels: Centre national des hautes études juives and Institute of Contemporary Jewry of the Hebrew University of Jerusalem, pp. 81–87.
Motulsky, Arno G. 1995. Jewish diseases and origins. *Nature Genetics* 9: 99–101. [CrossRef] [PubMed]
Nahon, Gérard. 1981. *Les "Nations" Juives Portugaises du Sud-Ouest de la France (1684–1791)*. Paris: Fundação Calouste Gulbenkian.
Nebel, Almut, Dvora Filon, Bernd Brinkmann, Partha P. Majumder, Marina Faerman, and Ariella Oppenheim. 2001. The Y Chromosome Pool of Jews as Part of the Genetic Landscape of the Middle East. *American Journal of Human Genetics* 69: 1095–112. [CrossRef] [PubMed]
Noonan, John T. 1968. Intellectual and demographic history. *Daedalus* 97: 463–85.
Notestein, Frank W., and Ernest Jurkat. 1945. Population Problems of Palestine. *Milbank Memorial Fund Quarterly* 23: 307–52. [CrossRef]
Nouschi, André. 1980. Observations sur la démographie historique des juifs algériens. In *Les juifs dans l'histoire de France. Premier Colloque International de Haifa*. Edited by Myriam Yardeni. Leyden: Brill, pp. 165–75.
Okun, Barbara S. 2004. Insight into ethnic flux: Marriage patterns among Jews of mixed ancestry in Israel. *Demography* 41: 173–87. [CrossRef]
Parfitt, Tudor. 2002. *The Lost Tribes of Israel: The History of a Myth*. London: Weidenfeld & Nicholson.

Pew Research Center. 2021. *Jewish Americans in 2020. U.S. Jews are Culturally Engaged, Increasingly Diverse, Politically Polarized and Worried about Anti-Semitism*. Washington, DC: Pew Research Center.
Phillips, Bruce A. 1991. Sociological analysis of Jewish identity. In *Jewish Identity in America*. Edited by D. M. Gordis and Yoav Ben-Horin. Los Angeles: University of Judaism, The Susan and David Wilstein Institute of Jewish Policy Studies, pp. 3–25.
Phillips, Bruce A. 2018. Intermarriage in the Twenty-First century: New Perspectives. In *American Jewish Year Book 2017*. Edited by Arnold Dashefsky and Ira Sheskin. Cham: Springer, pp. 31–119.
Plakans, Andrejs, and Joel M. Halpern. 1981. An historical perspective on eighteenth century Jewish family households in Eastern Europe: A preliminary case study. In *Modern Jewish Fertility*. Edited by Paul Ritterband. Leiden: Brill, pp. 18–32.
Rabinowitsch Margolin, Sara. 1909. Die Heiraten von Juden im Europaischen Russland vom Jahre 1867 bus 1902. *Zeitschrift fuer Demographie und Statistik der Juden* 5: 145–52, 167–73, 177–87.
Rebhun, Uzi. 2016. *Jews and the American Religious Landscape*. New York: Columbia University Press.
Risch, Neil, Deborah de Leon, Laurie Ozelius, Patricia Kramer, Laura Almasy, Burton Singer, Stanley Fahn, Xandra Breakefield, and Susan Bressman. 1995. Genetic analysis of idiopathic torsion dystonia in Ashkenazi Jews and their recent descent from a small founder population. *Nature Genetics* 9: 152–59. [CrossRef]
Risch, Neil, Hua Tang, Howard Katzenstein, and Josef Ekstein. 2003. Geographic distribution of disease mutations in the Ashkenazi Jewish population supports genetic drift over selection. *American Journal of Human Genetics* 72: 812–22. [CrossRef]
Rowland, Richard H. 1986. Geographical Patterns of the Jewish Population in the Pale of Settlement of the Late Nineteenth Century. *Jewish Social Studies* 48: 207–34.
Ruppin, Arthur. 1913. *The Jews of To-Day*. Translated by Margery Bentwich. New York: Henry Holt.
Sand, Shlomo. 2009. *The Invention of the Jewish People*. New York: Verso.
Sarna, Jonathan D. 2004. *American Judaism. A History*. New Haven and London: Yale University Press.
Schellekens, Jona, and Frans van Poppel. 2006. Religious differentials in marital fertility in The Hague (Netherlands) 1860–1909. *Population Studies* 60: 23–38. [CrossRef] [PubMed]
Schmelz, Uziel O. 1966. The Israel population census of 1961 as a source of demographic data on Jews in the Diaspora. *The Jewish Journal of Sociology* 8: 49–63.
Schmelz, Uziel O. 1970. A guide to Jewish population studies. In *Jewish Population Studies 1961–1968*. Edited by Uziel O. Schmelz and Paul Glikson. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, London: Institute of Jewish Affairs, pp. 13–97.
Schmelz, Uziel O. 1971. *Infant and Early Childhood Mortality among the Jews of the Diaspora*. Jerusalem: The Hebrew University, The Institute of Contemporary Jewry.
Schmelz, Uziel O., and Sergio DellaPergola. 2006a. Demography. In *Encyclopedia Judaica*, 2nd ed. Edited by Fred Skolnik. Farmington Hills: Thomson Gale, vol. 5, pp. 553–72.
Schmelz, Uziel O., and Sergio DellaPergola. 2006b. Migrations. In *Encyclopedia Judaica*, 2nd ed. Edited by Fred Skolnik. Farmington Hills: Thomson Gale, vol. 14, pp. 207–19.
Schnapper, Dominique. 1994. Israélites and Juifs: New Jewish Identities in France. In *Jewish Identities in the New Europe*. Edited by Jonathan Webber. London: Littman Library of Jewish Civilization, pp. 171–78.
Semino, Ornella, Chiara Magri, Giorgia Benuzzi, Alice A. Lin, Nadia Al-Zahery, Vincenza Battaglia, Liliana Maccioni, Costas Triantaphyllidis, Peidong Shen, Peter J. Oefner, and et al. 2004. Origin, diffusion, and differentiation of Y-chromosome haplogroups E and J: Inferences on the neolithization of Europe and later migratory events in the Mediterranean area. *American Journal of Human Genetics* 74: 1023–34. [CrossRef] [PubMed]
Sheskin, Ira M., and Arnold Dashefsky. 2022. Jewish population in the United States 2021. In *American Jewish Year Book 2021*. Edited by Arnold Dashefsky and Ira M. Sheskin. Cham: Springer, pp. 207–97.
Shorter, Edward. 1975. *The Making of the Modern Family*. New York: Basic Books.
Šiaučiūnaitė-Verbickienė, Jurgita. 2018. Sources of Eighteenth Century general Jewish censuses of the Grand Duchy of Lithuania and their applicability to historical demography research. In *Jewish Population and Identity: Concept and Reality in Honor of Sidney Goldstein*. Edited by Sergio DellaPergola and Uzi Rebhun. Cham: Springer, pp. 233–47.
Sicron, Moshe. 1957. *Immigration to Israel, 1948–1953*. Special Series, n. 60; Jerusalem: Falk Project for Economic Research in Israel, and Israel Central Bureau of Statistics.
Skorecki, Karl, Sara Selig, Shraga Blazer, Bruce Rappaport, Robert Bradman, Neil Bradman, P. J. Waburton, Monic Ismajlowicz, and Michael F. Hammer. 1997. Y chromosomes of Jewish priests. *Nature* 385: 32. [CrossRef] [PubMed]
Soloveitchik, Haym. 2014. Agobard of Lyons, Megillat Aḥima'ats, and the Babylonian Orientation of Early Ashkenaz. In *Collected Essays*. Edited by Haym Soloveitchik. Liverpool: Liverpool University Press, The Littman Library of Jewish Civilization, vol. 2, pp. 5–22.
Stampfer, Shaul. 1989. The 1764 Census of Polish Jewry. In *Bar Ilan Annual*. Ramat Gan: Bar Ilan University, vols. 24–25, pp. 41–147.
Stampfer, Shaul. 1997. The 1764 Census of Lithuanian Jewry and what it can teach us. In *Papers in Jewish Demography 1993 in Memory of U.O. Schmelz*. Edited by Sergio DellaPergola and Judith Even. Jerusalem: The Hebrew University, Institute of Contemporary Jewry, pp. 91–121.
Stampfer, Shaul. 2014. Did the Khazars convert to Judaism? *Jewish Social Studies* 19: 1–72. [CrossRef]
Stampfer, Shaul. 2018. Settling down in Eastern Europe. In *Jews and Germans in Eastern Europe. Shared and Comparative Histories*. Edited by Tobias Grill. Berlin: De Gruyter, pp. 1–20.

Stampfer, Shaul. 2019. In praise of "auxiliary sciences", genealogy and Dr. Paul Jacobi. In *The Jacobi Papers: Genealogical Studies of Leading Ashkenazi Families*. Edited by Emanuel Elayasaf. New Haven: Avotaynu, vol. 1, pp. xiii–xiv.
Thomas, Mark G., Michael E. Weale, Abigail L. Jones, Martin Richards, Alice Smith, Nicola Redhead, Antonio Torroni, Rosaria Scozzari, Fiona Gratrix, Ayele Tarekegn, and et al. 2002. Founding mothers of Jewish communities: Geographically separated Jewish groups were independently founded by very few female ancestors. *American Journal of Humam Genetics* 70: 1411–20. [CrossRef]
Thompson, Warren S. 1929. Population. *American Journal of Sociology* 34: 959–75. [CrossRef]
Toaff, Renzo. 1970. A religious factor for sterility in Orthodox women. *Harefuah* 78: 162–68. (In Hebrew).
Toch, Michael. 2018. The emergence of the Medieval Jewish Diaspora(s) of Europe from the ninth to the twelfth Centuries, with some thoughts on historical DNA studies. In *Regional Identities and Cultures of Medieval Jews*. Edited by Javier Castaño, Talya Fishman and Ephraim Kanarfogel. London: The Littman Library, pp. 21–35.
Tolts, Mark. 2018. Post-Soviet Jewish demographic dynamics: An analysis of recent data. In *Jewish Population and Identity: Concept and Reality in Honor of Sidney Goldstein*. Edited by Sergio DellaPergola and Uzi Rebhun. Cham: Springer, pp. 213–29.
Troskovaite, Dovile. 2018. The first General Census in the Grand Duchy of Lithuania and socio-economic characteristics of the Karaite and Rabbanite communities. In *Jewish Population and Identity: Concept and Reality in honor of Sidney Goldstein*. Edited by Sergio DellaPergola and Uzi Rebhun. Cham: Springer, pp. 249–62.
United States Bureau of the Census. 1945. *16th Census of the U.S., 1940, Differential Fertility 1940 and 1910*; Washington, DC: Government Printer.
Vobecká, Janna. 2013. *Demographic Avant-Garde: Jews in Bohemia between the Enlightenment and the Shoah*. Budapest and New York: CEU-Central European University Press.
Waldman, Shamam, Daniel Backenroth, Éadaoin Harney, Stefan Flohr, Nadia C. Neff, Gina M. Buckley, Hila Fridman, Ali Akbari, Nadin Rohland, Swapan Mallick, and et al. 2022. Genome-wide data from medieval German Jews show that the Ashkenazi founder event pre-dated the 14th century. *Cell* 185: 4703–16. [CrossRef]
Wallerstein, Immanuel. 1974. *The Modern World-System. Vol. I, Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.
Wallerstein, Immanuel. 1980. *The Modern World-System. Vol. II, Mercantilism and the Consolidation of the European World-Economy, 1600–1750*. New York: Academic Press.
Wallerstein, Immanuel. 1989. *The Modern World-System. Vol. III, The Second Era of Great Expansion of the Capitalist World-economy: 1730–1840s*. New York: Academic Press.
Weinryb, Bernard D. 1972. *The Jews of Poland: A Social and Economic History of the Jewish Community of Poland from 1100 to 1800*. Philadelphia: Jewish Publication Society.
Weinstein, Roni. 2006. Gift Exchanges During Marriage-Rituals among the Italian Jews in the Early Modern Period. *Revue des Études Juives* 165: 485–521. [CrossRef]
Willcox, Walter F., and Imre Ferenczi. 1929. *International Migrations*; Statistics. New York: National Bureau of Economic Statistics, vol. 1.
Withrock, Isabelle C., Stephen J. Anderson, Matthew A. Jefferson, Garrett R. McCormack, Gregory S. A. Mlynarczyk, Aron Nakama, Jennifer K. Lange, Carrie A. Berg, Sreemoyee Acharya, Matthew L. Stock, and et al. 2015. Genetic diseases conferring resistance to infectious diseases. *Genes & Diseases* 2: 247–54.
Woodbury, Robert M. 1925. *Causal Factors in Infant Mortality*; Washington, DC: U.S. Department of Labor, Children's Bureau.
Xue, James, Todd Lencz, Ariel Darvasi, Itsik Pe'er, and Shai Carmi. 2017. The time and place of European admixture in Ashkenazi Jewish history. *PLoS Genetics* 13: e1006644. [CrossRef] [PubMed]
Yardumian, Aram, and Theodore G. Schurr. 2019. The geography of Jewish ethnogenesis. *Journal of Anthropological Research* 75: 206–34. [CrossRef]