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Israel's Demography 2023: Declining Fertility, Migration, and Mortality

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Alex Weinreb

Introduction

Israel's population maintained its unusually high growth rates during 2023. By the end of the year, the population was 9.84 million. That is an addition of 180,000 people, representing 1.86% annual growth rate, just shy of the 10-year average (1.93% per year).

In the first section of this chapter, we survey some of the latest trends in the three core components of population change — fertility, mortality, and migration — that are driving this growth. We make four major points:

1. Fertility is coming down in every religion in Israel, and for all levels of religiosity within the Jewish population.
2. Until the end of September 2023, Israel's mortality rate was on target to hit a historical low.
3. As in 2022, migration accounted for a much larger share of overall population growth than was standard during the 2010s.
4. 20% of Israel's growth in 2022 and 2023 came from increases in its *Other* population, up from 6% per year 10 years earlier, and 3%, 15 years earlier. Absent the Other population, Israel's growth would have fallen to 1.6% per year.[1]

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1 The *Other* population includes people not categorized as Jewish, Muslim, or Christian in the Population Register.

In the second section of the chapter, we focus on two corollaries of the ongoing reductions in fertility. Each points to an area of culture change and has implications for Israel's sociodemographic future. The first is the relationship between rising age at first birth and the share of births outside of marriage and the share arising from assisted reproductive technologies like IVF. The second is the mild deviation from the standard sex ratio at birth in parts of the Arab population.

The first section of the paper also includes three smaller Spotlights, each briefly illuminating a minor topic. The first describes *replacement-level fertility* and explains why we define that as a TFR of 2.08 for Israel. The second Spotlight identifies some basic trends in labor migration to Israel. This is the most widely covered type of migration in the social science literature, but not in Israel. The third Spotlight looks at demographic categories, in this case, highlighting the substantial variability in the types of groups that high-income countries' central bureaus of statistics are allowed to collect data on, and linking this back to the relative freedom of Israel's Central Bureau of Statistics (CBS).

Before beginning to describe those phenomena, it is important to note the two things that roiled Israeli society during 2023 and that may affect Israel's demography, especially through shifts in fertility and migration. The first was the profound division over the government's proposed judicial reform. The second is the October 7th War that broke out after Hamas' brutal mass murder of Israelis (and non-Israelis) in the Otef Aza region on Simchat Torah, a major Jewish religious festival.

It is too early to tell how these events will affect Israel's demography. The most widely-used conceptual model of household decision-making employed by demographers to study the effects of natural calamities, sociopolitical and economic instability, including instability arising from war, is *multiphasic response theory* (Davis, 1963). Broadly, it points to the ways in which households strategically decide on the timing of fertility and migration, among many other decisions, in response to rapid change or shocks. All these decisions are simultaneous and sequential (which complicates the robust identification of causal mechanisms for statisticians). In either case, the demographic effects of both the political divisions and the October 7th war will only be reflected in 2024 and 2025 data. In terms of fertility, that is because the decision to have a child is only fully felt around a year later: average nine months of pregnancy plus four months average waiting time to conception for couples

that immediately decide to have a child and act on that decision (Bongaarts & Potter, 2013). Likewise, in terms of migration, Israelis who leave Israel are only counted as *out-migrants* after they have been resident outside the country for at least 12 months. Until then, they remain part of Israel's de jure population. This is the standard population recorded in Central Bureau of Statistics tables.

Core components of demographic change

Fertility

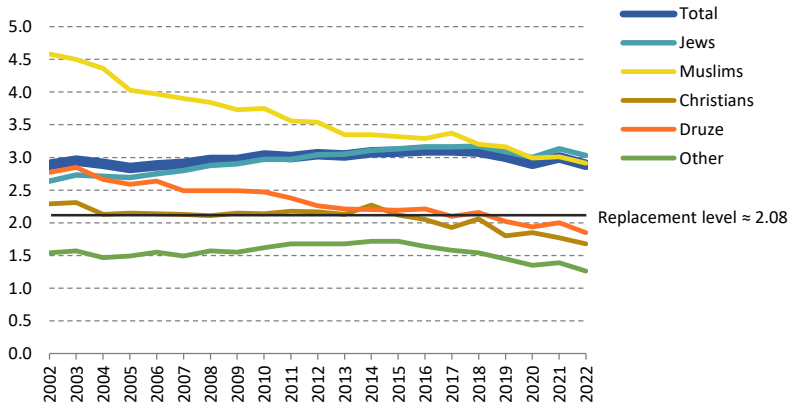
Fertility rates started falling in Israel in 2018. Despite a minor COVID-related fertility boost in 2021, trends returned to their pre-COVID downward trajectory in 2022. In our last general survey, we called attention to the emergence of low-fertility communities in Israel and we said that we expect continued reductions in fertility (Weinreb & Shraberman, 2022). The 2023 data are consistent with those expectations.

This reduction in fertility can be seen among Jews, Arabs, and Others. Figure 1 shows official CBS data on trends in the period Total Fertility Rate (TFR), by religion.[2] Among the two largest religious groups, Jews and Muslims, fertility remains very high by the standards of high-income countries, though it is on a downward trajectory, especially among Muslims. Between 2018 and 2022, the TFR of Jewish women fell from 3.17 to 3.03 and of Muslim women from 3.20 to 2.91. Among all smaller religious groups, fertility is already much lower and it fell further. Between 2018 and 2022, the TFR of Christian and Druze women fell from 2.06 and 2.16, respectively, to 1.68 and 1.85. Their TFR levels are now significantly below *replacement-level* fertility, which is approximately 2.08 in Israel (see the first Spotlight in this chapter). For those categorized as having *no religion* — these largely overlap with the *Others* described in footnote 1 — TFR fell from 1.54 to 1.26 over the same period. This is deep into *lowest-low* fertility levels that have characterized much of southern and eastern Europe

2 The TFR is the standard and most widely-used measure of fertility in demography. It is the sum of age-specific fertility rates, where each of these is the number of births to women aged *x* divided by the number of women aged *x*. Where those rates are measured at a particular point in time, as is the case here, the TFR is a period measure, interpreted as the average number of children that women aged 15–49 would give birth to if all age-specific fertility rates remained constant. Occasionally, a cohort TFR is also used, based on cohorts' retrospective birth histories.

since the 1990s (Kohler et al., 2002), despite more recent increases in some of the most-affected countries (Goldstein et al., 2009; Klüsener et al., 2019).

Figure 1. Total Fertility Rate (TFR) in Israel, by religion



Source: Alex Weinreb, Taub Center | Data: CBS

Among Jews, the reductions can be seen at all levels of religiosity. Hleihel (2023) has recently updated his estimates of TFR by religiosity to include 2022 data, though since he uses 3-year centered means, these are part of the 2021 TFR estimates.[3] Table 1 is adapted from his estimates. It shows that despite the minor COVID-related fertility boost in 2021, the 3-year mean TFR at each level of religiosity was lower in the 2020–2022 period than in the 2017–2019 period. The reduction was most notable among religious women, whose TFR fell by 0.56 children. However, the TFR also fell by around 0.3 children among Haredi women and 0.2 children among traditional women, with the TFR of traditional-not religious women approaching replacement level.

3 Hleihel's method relies on self-reported religiosity in the Israel Social Survey (ISS) and official birth records available through the Population Register. He uses a 3-year centered mean to smooth fluctuations arising from the small sample sizes of religious and Haredi women in the Israel Social Survey.

Table 1. Period TFR (3-year centered mean) of Jewish women in the Israel Social Survey, by religiosity, and change over the prior 3 years

	Haredi	Religious	Traditional-religious	Traditional-not religious	Not religious
TFR, 2020–2022	6.38	3.77	2.80	2.22	1.98
Change since 2017–2019	-0.34	-0.56	-0.21	-0.17	-0.13

Source: Hleihel (2023)

Another notable finding here is that the TFR of Jewish women who self-identify as either not religious or secular has now been below replacement-level for three years. This is after having hovered in the 2.09–2.26 range for the whole 2008–2018 period. This reduction has implications for long-term compositional shifts within Israel's population, though migration and shifts in religiosity complicate all attempts to forecast this type of change.

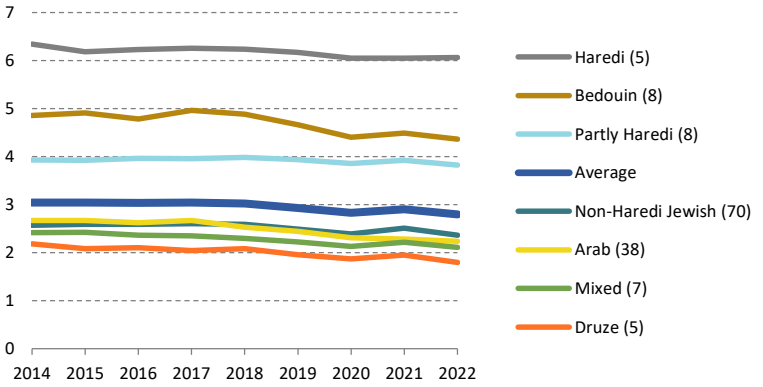
Hleihel's estimates are the standard reference for looking at fertility by religiosity in Israel. Their Achilles heel is that they are based on Israel Social Survey (ISS) respondents. This means that the Haredi and Bedouin samples in the TFR estimates, in particular, are likely to be biased. It also means that the religiosity is self-reported.

To check on the robustness of Hleihel's estimates, and to add non-Jewish religious groups, we use CBS data on TFR in Israeli *yishuvim* (towns/cities) that have at least 10,000 residents, which are available from 2014 until 2022. We assign each of the yishuvim — 126 in 2014, rising to 141 in 2022 — to the dominant population within the yishuv, then create a population-weighted TFR for that category. Within the Jewish population, this allows us to distinguish exclusively Haredi yishuvim (more than 90% Haredi) from yishuvim that have a recognizable Haredi minority (they are given a Haredi homogeneity score by the CBS), and from those that have a negligible share of Haredim (Non-Haredi Jewish). Within the Arab population, it allows us to distinguish Bedouin from non-Bedouin yishuvim.

The results of this exercise are shown in Figure 2. The trends are consistent with those shown in Figure 1. Here, too, we note a 0.2 child reduction in the national TFR, and the 2021 bump in all but Haredi and non-Bedouin Arab towns. The TFR in Druze towns falls from 2.1 to 1.8 children, and in Haredi towns it falls by 0.2 children. The other notable result here is the sharp

difference in TFR levels in Arab towns between those inhabited by Bedouin and those by non-Bedouin. The TFR has fallen quite sharply among the former, but as of 2022, it remained around 4.5 children. In non-Bedouin Arab towns, in contrast, the TFR fell consistently from 2.7 children in 2017 to 2.2 children in 2022, just above replacement-level. In fact, between 2014–2020, the trends in non-Bedouin Muslim towns and the general Jewish non-Haredi towns was remarkably similar.

Figure 2. Total Fertility Rate (TFR) in towns/cities with more than 10,000 residents, by dominant population



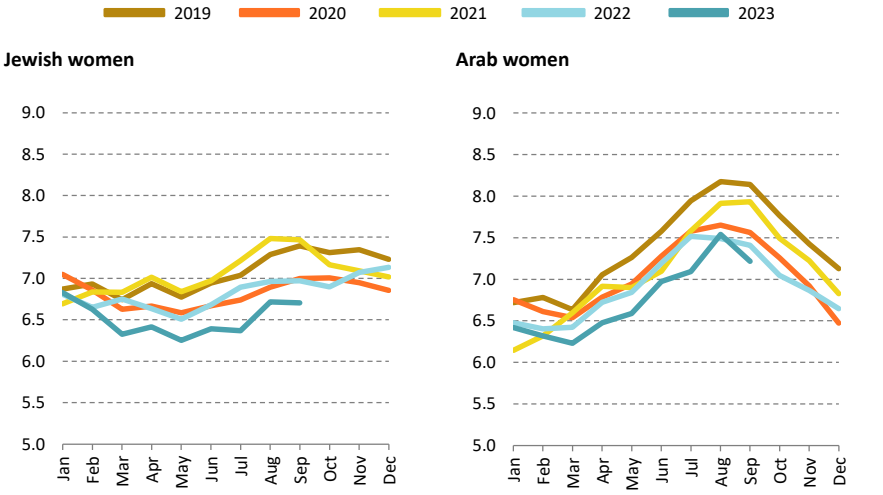
Note: The number of yishuvim appears in parentheses.

Source: Alex Weinreb, Taub Center | Data: CBS

The overall pattern in the yishuvim data up to 2022 confirms the Hleihel estimates of ongoing declines in the general Jewish population and Haredi population. More generally, the fertility data point to a growing number of Israel's subpopulations falling below replacement-level. This includes small religious minorities like Christians and Druze, the rapidly growing Other population, and, most importantly given its demographic weight, Israel's non-religious Jewish population.

The latest birth data released by the CBS suggest that the observed declines in fertility up to 2022 intensified over the first several months of 2023. This can be seen in Figure 3, which shows the monthly General Fertility Rate (GFR) for Jewish and Arab women from January, 2019 until September, 2023, presented here as the monthly number of births per 1,000 women aged 15–49.[4]

Figure 3. The General Fertility Rate (GFR), by month, for Jewish and Arab women, 2019–2023



Notes: The GFR is the number of births per 1,000 women aged 15–49.

Source: Alex Weinreb, Taub Center | Data: CBS

Among both Jewish and Arab women, the monthly trend from March–September, 2023 has been markedly lower than during the same period in any prior year. Summed across all nine months, it has been 3.6% and 3.1% lower

4 The General Fertility Rate (GFR) is the total number of births in the population in a given period divided by the number of women aged 15–49 in that period. By restricting the denominator to women of reproductive age, it is a superior measure of fertility levels than the Crude Birth Rate (CBR), widely used outside demography. It is not as good as the Total Fertility Rate (TFR), which has better identification of fluctuations in the age structure within the 15–49 population. Since estimates of the 2023 TFR will not be available until mid-2024, at the earliest, we calculated the GFR.

for Jewish and Arab women, respectively, than in 2022, which, as discussed above, was already a low-fertility year for Israel. If the 2023 TFR falls by the same magnitude as the GFR — fluctuations in age structure within the 15–49 age group means that shifts in one do not necessarily lead to shifts of the same magnitude in the other — Jewish women will end the year with a TFR of 2.92, and Arab women with a TFR of 2.66. Again, those are very high TFRs for a high-income country today, but the trend is now consistently downward, especially for Arab women.

Combining these recent trends in births with the estimated reductions by religion and religiosity in Figure 2 and Table 1 also suggests that Israel's growing constituency of below-replacement populations will be joined over the next three years by both the *traditional non-religious* Jewish population and by non-Bedouin Muslims. If so, this will leave more religious Jews, Haredim, and Bedouin as the sole remaining subpopulations with above replacement-level fertility. In light of the current war, it is possible that this downward trend may be frozen by a couple of years, among Jews in particular, since post-war baby booms are a common phenomenon. But the freeze will not last long. No amount of post-war celebration of life, however fevered with nationalistic sentiment, will weaken the structural and ideational forces — climbing costs of living, shifting consumer desires, and a wider set of aspirations — that have been steadily depressing Israel's fertility toward more standard levels of other high-income countries.

In the second section of this chapter we shall enlarge on some other aspects of fertility that are accompanying these overall reductions.

SPOTLIGHT

Replacement-Level Fertility in Israel

Replacement-level fertility (TFR_R) refers to the fertility rate required to replace the population, absent any migration. The widely-used value is $TFR_R = 2.1$.

That is relatively accurate for low-mortality settings. In Israel, the TFR is 2.08. As in most other countries with very high life expectancy, the TFR_R has been inching downwards. The opposite is also the case. The TFR_R in populations with very high mortality has remained high: it can exceed 3.0 (Espenshade et al., 2003).

The key point is that the TFR_R is not fixed. Rather, it is affected by three population parameters, as can be seen in the formula:

$$TFR_R \approx (1 + SRB)/p(A_M)$$

where SRB is the sex ratio at birth (number of male births/female births), A_M is mother's mean age across all births (i.e., the *mean of the fertility schedule*), and $p(A_M)$ is a women's probability of survival from her own birth to A_M. All of these are cross-sectional measures, so like many other widely-used demographic measures, the TFR_R is a period rather than cohort measure. It provides a statistic for a *synthetic cohort* that assumes that current rates will remain constant over the period between a woman's birth and A_M.

Using this formula, Table 2 shows that the replacement-level fertility for Jews/Others is 2.07 and for Arabs is 2.10. Most of this difference stems from differences in the SRB, which we discuss in more detail in section two of this chapter. The average of these two approximates 2.08 for the country as a whole. We shall occasionally revisit this estimate and, when necessary, update it.

Table 2. Replacement-level TFR in Israel

	Sex ratio at birth	Average age of mother across all births	Woman's probability of survival from age 0 to A_M	Replacement-level TFR
	SRB	A_M	$p(A_M)$	TFR_R
Jews/Others	1.058	31.4	0.9944	**2.07**
Arabs	1.078	28.4	0.9887	**2.10**

Notes: SRB and A_M are from 2022 birth data, as published in the Statistical Abstract of Israel 2023; $p(A_M)$ is from 2015–2019 Israel Life Tables.
Source: Alex Weinreb, Taub Center | Data: CBS

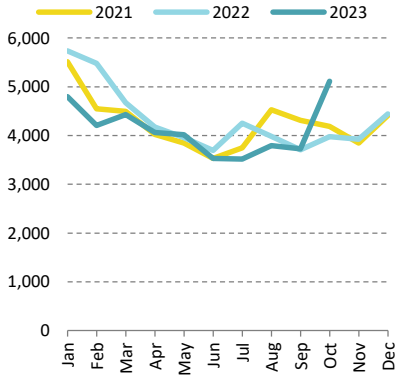
Mortality

2023 is the first year since 2019 in which there is no notable effect of COVID-19 on mortality. This can be seen in Figure 4a, which shows the monthly number of deaths in 2021, 2022, and the first ten months of 2023.

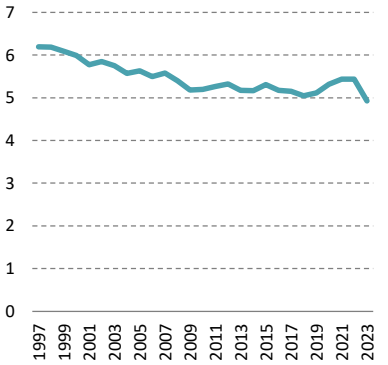
Aside from the standard seasonality in mortality, which tends to peak during January and February and to reach its lowest point during the summer months, the effects of COVID-19 can be seen in both 2021 and 2022. In 2021, Israel was in the midst of a rapid vaccination campaign during the first two months of the year, leading to a precipitous decline in the number of deaths. There was then a large wave of mortality from August–October. In 2022, mortality was unusually high in January and February due to the COVID-19 Omicron-variant but then relatively normal for the rest of the year. This return to a more standard seasonal mortality pattern continued into and throughout 2023.

Figure 4. Number of deaths by month, 2021–2023, and Crude Death Rate, 1997–2023

a. Monthly number of deaths



b. Crude death rate



Notes: The Crude Death Rate is the annual number of deaths per 1,000 people (mid-year population). Annualized 2023 estimates are extrapolated from the number of deaths that occurred between January 1, 2023, and September 30, 2023, seasonally adjusted to the share of 2021 and 2022 deaths occurring in those months.

Source: Alex Weinreb, Taub Center | Data: CBS

Extrapolating the number of deaths until the end of 2023 based on (a) the number from January 1–September 30, and (b) the seasonal patterns observed in 2021 and 2022, we would expect to end the year with around 47,500 deaths. The current war means that we almost certainly shot past that target. Based on the events of October 7th alone, deaths will approach 50,000. The sudden spike in deaths in October can be seen clearly in Figure 4a.

Another measure of Israel's lower mortality over the first nine months of the year is the Crude Death Rate (CDR). Figure 4b shows that, absent the current war, Israel was on a path to its lowest CDR ever, dipping below five deaths per 1,000 people for the first time.[5] It is important to acknowledge that the

5 The dramatic increases in the murder rate in 2023, especially in the Arab population (Weinreb et al., in preparation), have little effect on the CDR because an increase of 100 deaths is a small fraction of the 48,000 annual deaths overall. In mortality statistics, that rise in the murder rate will be easiest to see in age-specific mortality of younger Arab men.

CDR is not the preferred measure of mortality in demography since it ignores fluctuations in the age structure. In this case, we can say with confidence that Israel's falling CDR is not a product of an increasingly young age structure. On the contrary, it has occurred in spite of an increase in the share of the population that is elderly. Specifically, between 2019, the last pre-COVID year, and 2023, the population aged 70+ grew by 19%, whereas the general population grew by 7.6%. The increasing share that is elderly is supposed to drive up the CDR since the probability of death increases sharply with age (Preston et al., 2000). In Israel, that did not happen. The predicted number of deaths in all of 2023, absent the 2023 war, is only 3.6% higher than the number of deaths in 2019. This is a noteworthy accomplishment. It suggests that Israel's life expectancy is heading back toward its pre-COVID upward trajectory. We have yet to see whether, and for how long, deaths from the current war will prevent this.

Migration

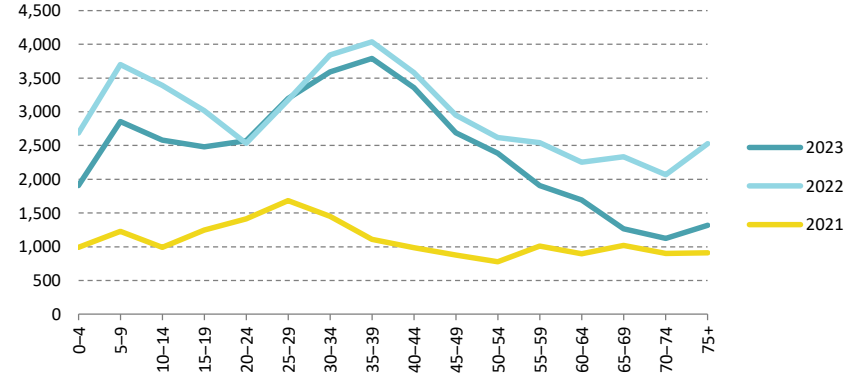
Throughout the 2010s, migration accounted for around 20% of Israel's population growth in any given year. 2022 saw a change in this pattern. Slightly lower fertility alongside a sharp rise in the number of immigrants from Russia and Ukraine after Russia's initiation of war in February 2022, increased the contribution of migration to Israel's growth. Israel's net migration in 2022 — that is, the number of immigrants, including returning Israelis, minus the number of people who left Israel — was 79,805 people.[6] That is 2.5 times as high as the average net migration in the 5-years prior to the COVID-19 pandemic. As a result, net migration accounted for 39% of Israel's total population growth in 2022, double its normal share.

The overall number of immigrants into Israel in the first half of 2023 looked more similar to 2022 than to the 2010s. As shown in Figure 5, immigrants' age profile through October also looked similar, though not identical, to 2022. In particular, the modal age-range of 2023 migrants is the same as in 2022, ranging from 30 to 44, instead of the more standard peak at ages 20–34 that characterized immigrants to Israel in preceding years, including in 2021, and characterizes migration in general (Rogers & Castro, 1981). This points to a

6 This is my estimate based on the standard *balancing equation* of a change in population. Israel's official net migration balance, as published in Table 2.12 of the 2023 Statistical Abstract, was 81,200 people. In either case, the core point is that the 2022 figure was at least twice as high as in any previous year since the early 2000s.

continued challenge for integration in Israel since it is more difficult for older migrants to integrate into the Israeli labor force in ways that match their skills than it is for younger migrants, in part because of more limited Hebrew (Bleikh, 2020). The key difference between the 2022 and 2023 age profiles is that the more recent wave includes fewer children and elderly. This implies that a higher share of these more recent arrivals are childless (though they could also have sent their children ahead of them in 2022). In either case, the 2023 wave of migrants will cost Israel considerably less than the 2022 wave, since a smaller share are in school or have reached an age where they make more use of public health resources.

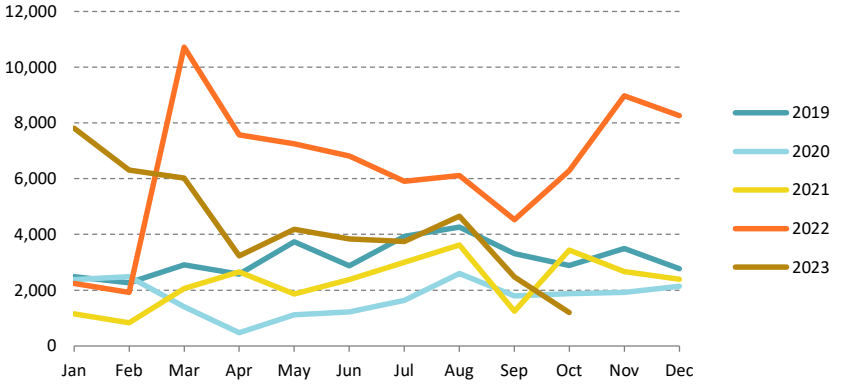
Figure 5. Age-distribution of *olim* to Israel between January–October, by year



Source: Alex Weinreb, Taub Center | Data: CBS

Figure 6 shows that the excess number of migrants thus far in 2023 is largely driven by the unusually high immigration between January and March. From April to August, the number was close to its 2019 levels, implying that the large wave of migrants from the Russia-Ukraine War is now over. Those who were going to come have already made the move. Moreover, Israel's own current war will likely reduce the number of migrants to Israel to much lower levels in the final months of the year. The latest available data show that in-migration of olim fell substantially in October. If those low levels continue until the end of the year, the overall number of immigrants into Israel in 2023 will have fallen to its 2018–2019 levels, somewhere in the mid-30,000s.

Figure 6. Monthly number of immigrants, including returning Israelis, January 2019–October 2023



Source: Alex Weinreb, Taub Center | Data: CBS

SPOTLIGHT

Labor Migration

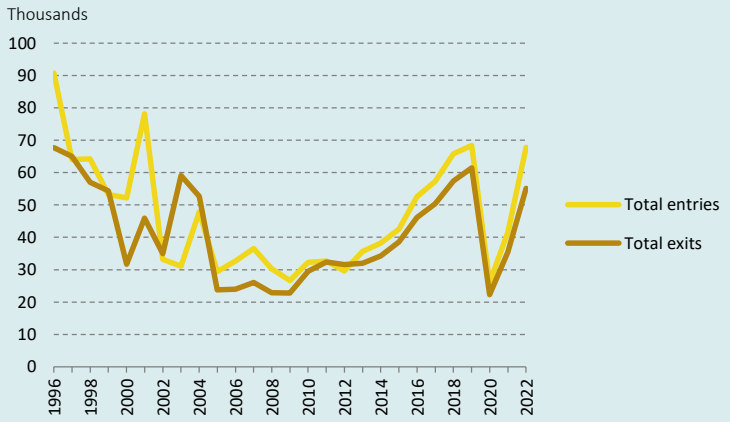
Labor migration, moving from one place to another in order to work, is the most common type of migration, accounting for about 90% of migrant flows (ILO, 2010). Not surprisingly, this also makes labor migration the most widely covered type of migration in the social science literature.

This is not the case in Israel, where labor migration receives a lot less attention than *aliya*, even though labor migration makes important contributions to major sectors of Israel's economy, particularly care of the elderly, construction, and agriculture. Here, we briefly address this topic by discussing shifting trends related to foreign workers. We do not include a discussion of Palestinian workers from the West Bank/Judea and Samaria or Gaza, whose daily or weekly *cyclical migration* places them in a different category. More detailed coverage of all of these sources of Israel's non-domestic workers, including a breakdown of those migration flows by country of origin, age, sex, and economic sector, will appear in a future publication.

Israel's labor market has relied on foreign workers, not including Palestinians, since the First Intifada in the late 1980s, since that closed off the supply of cheaper Palestinian workers, or led to employment strikes by the workers themselves. In 1996, the CBS began to publish annual statistics on the number of foreign workers who enter and exit Israel with official work permits. The basic trends in these data are shown in Figure 7.

The main point we make here is related to the shifting magnitude of the mismatch between the number of workers entering Israel and the number leaving. Over the first 13 years of these data, there is a marked excess of labor migrants entering Israel over the number leaving. Between 1997–2009, that excess, even allowing for a one-year lag, and the temporary reversal of the trend during the Second Intifada years, was 124,000 people.[7] During these years, there were sufficient cases of abuse of migrant workers in Israel that the US State Department placed Israel on a list of countries with some evidence of *trafficking* (Raijman & Kushnirovich, 2012).

Figure 7. Annual number of people entering and exiting Israel with work permits



Source: Alex Weinreb, Taub Center | Data: CBS

7 By a one-year lag we mean that we compare the total number of labor migrants that entered Israel in 1996–2008 to the total number that exited in 1997–2009 (implicitly assuming that an average labor contract lasts 1-year).

From 2009 to 2019, the data point to much better regulation of labor migration in Israel. This can be seen visually. The trend in the number exiting Israel parallels the trend in the number entering, albeit with a one-year delay. In fact, over this 10-year period, the cumulative number of labor migrants who entered Israel over those that exited was only 500 people. This improved regulation corresponds to the government entering a series of bilateral agreements with sending countries that included much more protection for labor migrants from middlemen and exploitative employers (Raijman & Kushnirovich, 2019).

The COVID-19 pandemic led to a large break in this data series in 2020. By 2022, whereas the number of labor migrants entering Israel (67,800) had almost climbed back to its 2019 levels (68,400), the number exiting Israel (55,100) remained below its 2019 levels (61,500). This shifting ratio likely stems from the sharp rise in labor in-migration. That rise is likely to continue given the need to provide in-home care for Israel's rapidly growing elderly population, and sufficient skilled labor for Israel's burgeoning construction sector and for its agricultural sector, both of which are increasingly unattractive to young Israelis. Anticipated barriers to the employment of Gazans, who met some of this need, will also raise demand for foreign workers.

The general point here is that Israel's steady climb into the top half of high-income countries, as measured in terms of GDP per capita, has made it an increasingly attractive target for labor migrants. The magnitude of these recent movements into Israel, even with heightened regulation, points to another small source of growth in Israel's population. It is not only that, at any given point, there are around 100,000 non-Israelis and non-Palestinians in Israel working legally. It is also inevitable that a small share of those labor migrants will stay because they will meet someone and marry. Others will stay because they are

responding to perverse incentives in migration policy, such as invitations to work illegally. These are little-discussed migration backdoors, though they are recognized in formal theoretical research in economics (Epstein et al., 1999).

Population growth

As noted in the introduction, the observed rate of growth in Israel over 2023 was 1.86%, just below the average over the last 10 years (1.93% per year). Despite this modest slowdown in Israel's rate of growth, the steady stream of migration from Russia and the Ukraine over the last 15 years, accelerated in 2022–2023, has led to important compositional shifts within Israel's population. To place these shifts in context, we first highlight the quite different patterns of growth across Israel's diverse subpopulations. By patterns of growth we refer to both the magnitude and sources of growth.

Growth in any population can be broken down into two sources: natural increase, which is the difference between the number of births and deaths; and net-migration, which is the difference between the number of in-migrants and out-migrants. Figure 7 presents the overall growth rates for each of Israel's five major religious groups between 2015 and 2022, while disaggregating those rates into its two sources. The height of each column indexes its annual growth rate in percentage terms.

Figure 8. Annual population growth rates (%), 2015–2022, by religious group and source of growth

Source: Alex Weinreb, Taub Center | Data: CBS Statistical Abstract of Israel 2023, Table 2.12

The four panels on the left present growth rates for Israel's four historic religious groups. In all, barring Christians, growth rates have been trending down, but in 2022, they still remained high relative to other high-income countries. At the low end of the spectrum, the Druze population grew by 1.1%. Growth rates were exactly double that level in the Muslim population. And Jewish and Christian populations fell between these two extremes, growing by 1.7% and 1.3%, respectively.

The more interesting difference between these four populations is in the source of growth. Net-migration accounted for about 25% of growth in the Jewish population. This was a notable increase over the 16% of growth in 2021

and average of 14.5% for the 2015–2019 period. It was driven by higher Jewish immigration from Russia and Ukraine. In the Muslim population, whose overall growth rates remain the highest despite falling fertility and lower life expectancy, net migration accounted for only 7% of population growth. Among Druze, net migration accounted for zero percent of growth. This is not surprising since the Druze do not allow exogamy and, with the exception of some Druze communities in the Golan, there are no connections between Israel's Druze population and their coreligionists in Lebanon and Syria. Finally, among Christians, whose rates of natural increase have long been the lowest of any of Israel's religions — mainly because of their earlier fertility decline — overall population growth rates remained relatively high because of net migration. The latter accounted for 66% of the Christian population's growth in 2022, up from 49% in the 2015–2019 period.

Both in terms of magnitude and sources of demographic growth, Israel's Other population, referred to as *Not classified by religion* in CBS religion tables, has quite different patterns. From 2015 to 2019, the annual rate of increase rose from 3.9% to 5.7%. This made it the fastest growing subpopulation in Israel, outpacing the Haredi subpopulation, whose growth rate is around 3.9% per year, but are included here in the general Jewish category. During the COVID years, the Other's growth rates continued to exceed 2% and then, in 2022, they leaped up to 11.2%. In absolute terms, that is an increase of 48,000 people, equivalent to about one-third of the total Druze population in Israel (currently around 150,000 people). It is also 10,000 people more than the total increase in the Muslim population, even though there are about 1.75 million Muslims.

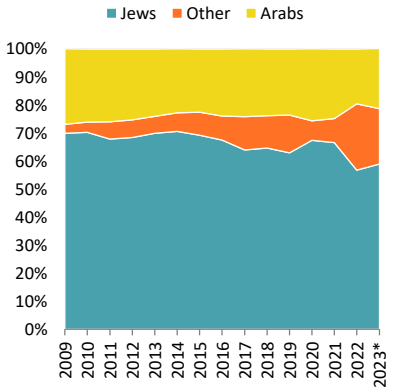
The Other population's source of growth is also markedly different. In most years, between 75%–90% of its growth is driven by net-migration. In 2022, net-migration was the source of 97% of its growth.

It is important to note that this growth in the Other population is not completely new, even if the Russia-Ukraine War gave it a substantial boost. Rather, the share of Israel's overall growth associated with the Other population has been climbing steadily for the last 15 years. We show this in Figure 9, extrapolating trends over the first eight months of 2023 to the end of the year. Panel a documents the falling share of national growth accounted for by both the Jewish and Arab populations as the Other's contribution increases. Specifically, in 2009, around 3% of Israel's annual growth came from the Other population. That figure increased to 6% by 2012, 8% by 2015, 13% by 2019, and it will account for close to 20% of Israel's growth in 2023.

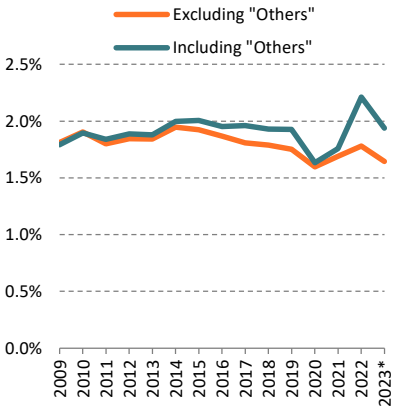
Panel b shows what would have happened to Israel's national growth rate in the absence of the Other population. Its contribution increased steadily from about 2014. From then until 2019, Israel's growth rate remained in the 1.9%–2.0% per year range because of the Other population. Absent the latter, Israel's growth rates would have fallen from 1.95% in 2014, to 1.75% in 2019, and to around 1.6% in 2023.

Figure 9. Share of Israel's annual population growth by ethnicity, and national growth rates with and without the Other population, 2009–2023

a. Share of Israel's annual population growth



b. Annual population growth rates with and without the Other population



* An annual estimate for 2023 is extrapolated from growth during the first eight months of the year.

Source: Alex Weinreb, Taub Center | Data: CBS Statistical Abstract of Israel 2023, Table 2.12

It is equally important to consider this contribution to the overall growth rate in combination with the age profile of 2022 and 2023 migrants shown in Figure 5. The growth is disproportionately in prime working ages. Moreover, data from the Labor Force Survey show that the Other population has the highest employment rate and longest work hours of any group in Israel — even higher than those of secular Jews. In other words, this group of migrants appears to be the exact type of productive population that many promoters of migration in Europe endorse and seek to encourage. If so, Israel has lucked out economically.

SPOTLIGHT

Demographic Categories and the *Other* Population

The ways that official statistics disaggregate the population reflects social boundaries that key political or administrative actors consider important to either create, highlight, or erase. Typically, these decisions about administrative statistics are formally enshrined in law. Where that is not the case, they are the product of precedent that becomes more powerful over time, building on statisticians' clear preference for replication, and their (reasonable) fear that using a different method or definition will undermine the reliability of their data. This is an old theme in demography that parallels wider debates about how official statistics, and the polling industry in general, reify social boundaries (Igo, 2008; Schor, 2017; Szereter, 1996).

Since the political and cultural factors affecting these decisions are country-specific, there is substantial variability across countries in the types of groups that central bureaus of statistics collect data on, despite shared best-practices on all methodological issues (sampling design, questionnaire construction and translation, interviewing protocols, data editing procedures, and so on). Here are examples from three other high-income countries.

- In France, the law prohibits the collection of any data on race, religion, or ethnicity, so no official statistics about France can be disaggregated by these characteristics.

- Sweden, known for its incredibly rich population data that go back around 270 years (Sköld, 2004), applies a more moderate version of this principle. It collects information on every individual's religion, but collects no data whatsoever on an individual's race or ethnic origin.
- The US is the mirror image of Sweden. The collection of data on an individual's religion is prohibited. However, race has been a variable in every US census since the first one in 1790, with mixed race (*mulatto*) added in 1850. In several censuses, the racial classification system in US census data was very detailed. Between the 1890 and 1920 censuses, the heyday of racial theory in global academic circles, all non-white US residents were ascribed one of the following racial categories by enumerators: fully Black, half (*mulatto*), a quarter (*quadroon*), or eighth (*octoroon*). From 1930, the *one-drop rule* was used to cover all possible combinations.

Users of Israel's official statistics have long been accustomed to the CBS disaggregation along two axes, neither of which would be possible in France, and only one of which would be possible in Sweden and the US. The first is a binational axis of Jews versus Arabs. This implicitly maps the overall conflict between the two core subnational groups onto Israeli social statistics. The second axis is by religion, also important given Israel's religious diversity.

We have seen throughout this chapter that there is a large and distinct new subpopulation that does not fit neatly into the existing categories on either axis. Luckily, Israel has no constitutional or common-law barriers to the CBS responding to the emergence of this new population. As a result, the old binational category of Arabs and Jews has been inching toward a trinational category since the 1990s, and the religion axis now includes "not classified by religion."

Note, too, that this new CBS category is completely different to the irreligious *nones* that increasingly appear in social surveys in other high-income countries. People *not classified by religion* in Israel's official statistics may actually be religious. They're just not categorized as halachically Jewish — that is, Jewish according to standard orthodox interpretations of religious law — by Israel's Ministry of the Interior. Nor are they Arab Muslims or Arab Christians.

Corollaries of Israel's shifting fertility

The first section of this chapter documented sustained reductions in fertility across most of Israel's subpopulations. Here, we dig a little deeper into a few corollaries of these reductions. Each points to areas of culture change and has implications for Israel's sociodemographic future.

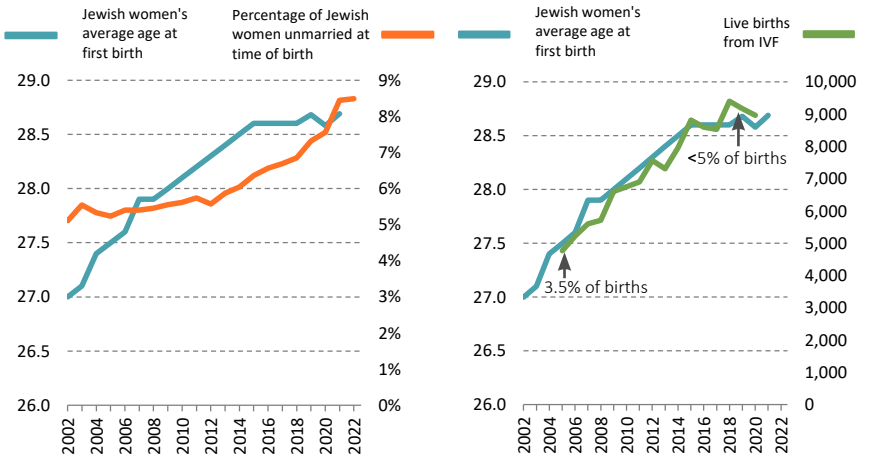
Rising age at first birth, non-marital births, and IVF

Globally, there is a strong correlation between falling fertility and rising age at first birth. This partly reflects ongoing rises in women's education, economic autonomy, shifting aspirations and abilities regarding work and family, and ideational changes that legitimize low fertility, or even zero fertility (Lesthaeghe, 2010). There is also a simple biological component. *Fecundability*, the probability of successful conception in any given month that includes unprotected sex, begins to fall rapidly in women's mid-30s (Bongaarts & Potter, 2013). This leads to a smaller fertility window at the individual level and, consequently, to lower levels of completed fertility.

In a prior publication we showed that among Arab women in Israel, the relationship between age at first birth and fertility followed the standard path: as the first rose, the second fell. In contrast, Israel's Jewish women were unusual in this regard. The 2.8 year rise in women's mean age at first birth over the 1994–2016 period accompanied a rise in fertility. This occurred because reductions in age-specific fertility below age 30 were more than offset by increases above age 30 (Weinreb et al., 2018).

Today, things look a little different. Among Jewish women, the recent reductions in fertility documented above have occurred as age at first birth has remained relatively flat, hovering around 28.6 since 2015. Over the same period, however, there have been two other slight shifts in the composition of fertility in Israel that are also associated with rising age at first birth. We show both in Figure 10.

Figure 10. Trends in average age at first birth, share of births to never-married women, and share of births associated with IVF treatment



Source: Alex Weinreb, Taub Center | Data: CBS

The first light compositional shift is the ongoing rise in the share of births to never-married Jewish women, seen in the left panel (these data are not available for Arab women and are assumed to be close to zero percent). Between 2002–2012, this share remained quite stable in the 5.0%–5.5% range. From 2012–2022, it climbed to around 8.5% of all births. That is still very low in comparison to women in European countries or North America, where rates have been rising for decades (Heuveline et al., 2003), and now typically account for between 30%–60% of all births. But it is a notable shift. Moreover, since we can infer that the share of these births to unmarried women is close to zero among Haredi and religious women, the clusters will be more concentrated

in secular areas. In other high-income societies, never-married mothers, or single parents in general, tend to be poorer, less educated and to be a factor in *reproducing poverty* and in *diverging destinies* of people with different SES levels (Kalmijn & Monden, 2010; Kollmeyer, 2013; McLanahan et al., 1991). A recent and carefully conducted cross-national comparison using survey data from 18 European and North American countries suggests that these trends are ongoing. In the measured language of social science, the authors conclude that the high share of single parents "may increase parental SES differentiation in family demography" (Koops et al., 2021). In simpler language, the data show that single parenthood tends to increase inequality.

In Israel, single motherhood is not associated with poverty in the same way (Levanon et al., 2019), in spite of the fact that being in a single-income household has long been the most important risk factor for poverty (Ben Arieh & Gal, 1998; Navon & Bowers, 2023). This appears to stem from three factors: the expanded tax benefits for single mothers in the 1992 Single Parent Law and subsequent legislative changes in 1994 and 1995 (Flug & Kasir, 2006); the concentration of poverty in large Haredi and Arab families where the parents are married but only one works; and from the fact that secular Jewish women, the most likely to become single (never-married) mothers, are the most educated subpopulation in the country and are therefore likely to have higher incomes.

The second compositional shift in Israel's fertility is the rise in the share of births conceived with Assisted Reproductive Technology (ART). Most ART is in vitro Fertilization (IVF), though intracytoplasmic sperm injection (ICSI) is also quite common. Across high-income countries with low fertility, ART babies constitute an increasing share of all births. Präg et al. (2017) put estimates for around 2010 at almost 6% of births in Denmark, and more than 4% in Sweden, Norway, Iceland, Belgium, Estonia, and Slovenia. In most other major European countries and the US, about 2% of births are from IVF. By 2014, 8% of Danish births were from IVF/ICSI (Mohr & Koch, 2016), and Danish clinics were treating infertile women globally (Bajekal, 2019).

Proponents of ART increasingly see it as one of the ways to raise fertility, especially in places with low fertility and worryingly low, or negative, rates of population growth (Faddy et al., 2018). This is certainly not Israel's motive since it has no population growth concerns. Rather, its overall pronatalist culture has supported the development of unusually liberal IVF policies, with full public

funding for treatment cycles up to two children. This is even more liberal than Denmark's, which fully funds three cycles up to age 40 for involuntary childless Danish residents (at the other extreme among high-income countries, current costs of an IVF cycle in the US range from 15,000–30,000 USD).

Either way, alongside the rise in age at first birth in Israel, there has been a steady increase in ART in Israel, too. There are currently 26 IVF centers in Israel with Ministry of Health approval.[8] In 2005, they conducted 24,995 treatment cycles. In 2020, they conducted 50,680 treatment cycles. Over the same period, the number of IVF births rose from 4,772 births, accounting for 3.3% of all live births, to 9,176 births in 2019, accounting for 5.0% of all live births.

On the one hand, it seems likely that this trend will continue since it is associated with delayed fertility or rising rates of secondary infertility, including ongoing, even accelerating, reductions in sperm count (Levine et al., 2023). On the other hand, over the last 15 years there has been an intriguing flattening out and, more recently, a reduction in the rate of IVF live births per fresh cycle in the US, Canada, Australia, and Japan (Gleicher et al., 2019). As of 2020, there was no sign of this occurring in Israel. The ratio of IVF live births to IVF cycles continued to rise. In either case, even if the share of children born from IVF remains relatively constant, there are cost implications to the medical system. And no ART technology works for everyone. There are, in other words, risks in delaying fertility for those who want a child, and in Israel's case, any costs of that delay are borne by the taxpayer.

8 The list is on the Ministry of Health site: https://www.gov.il/he/Departments/Guides/med-inst-ivf?chapterIndex=2

Distortions in the sex ratio at birth

Across virtually all societies in all continents, high- and low income, rural and urban, the sex ratio at birth (SRB) at the population level falls in a very small range, despite considerable heterogeneity across families. For every 100 girls that are born, there are between 102.7–106.7 boys born (Chao et al., 2019). This slight excess of boys was first noted in a scientific publication more than 300 years ago (Arbuthnot, 1710). It has been repeatedly confirmed across societies in all regions of the world, though the most recent studies allow for a somewhat larger normal range than their predecessors.[9]

This is relevant to Israel because we are experiencing a decline in fertility, and across many Asian societies, reductions in fertility since the 1980s have been accompanied by distortions in the SRB. The earliest distortions occurred in South Korea and China, followed by areas of India and subsequently several countries in Central and Southeast Asia. In South Korea, the SRB climbed to 115 boys per 100 girls by the mid-1990s before dropping again to 106 by 2007. The SRB in China as a whole exceeded 120 in 2000 and remained there until at least 2004, with the rate climbing above 130 in certain regions. The SRB also exceeded 120 in Armenia, Azerbaijan, and various Indian states (Punjab,

9 The classic explanation for this excess of males at birth is rooted in ideas about natural order. Classical frameworks see the rules as set by some moral Divine force — Arbuthnot (1710) interprets the SRB as proving that polygamy runs counter to Divine wishes. Contemporary research frames it more in the amoral survivalist code of evolutionary biology. In either case, the underlying empirical finding is clear. From conception until early childhood, female XX chromosomes tend to provide better protection from death than male XY chromosomes (Waldron, 1983). From early childhood, a broader set of behavioral and environmental factors become increasingly important, among them gendered behaviors that lead to more male deaths in accidents and violence. This drives the relative number of men and women closer to parity by people's mean reproductive age.

More recent research provides better identification of social and biological mechanisms associated with greater XY fragility and death. It implicates rising paternal age (Jacobsen et al., 1999), economic stressors (Catalano, 2003) and exposure to various toxins and pollutants (Pongou, 2013) in depressing the SRB. It also implicates rising temperatures (Catalano et al., 2008; Helle et al., 2009), economic success (Catalano, 2003) and war — the *returning soldier effect* (James, 2009), including shifts in women's hormones during war (Grant, 2008) — in raising the SRB. In its underlying econometrics, some of this literature is problematic since many of the potential causes are correlated with each other (e.g., heat and war) and with other variables that are almost always unobserved (e.g., frequency and type of sex). However, for obvious reasons this continues to be an active area of research in demography, population biology, environmental health, and related fields.

Haryana, Rajasthan). In many other Asian countries (e.g., Georgia, Pakistan, Vietnam), the SRB climbed to a more modest 112–113 range (Duthe et al., 2012; Guilmoto, 2009).

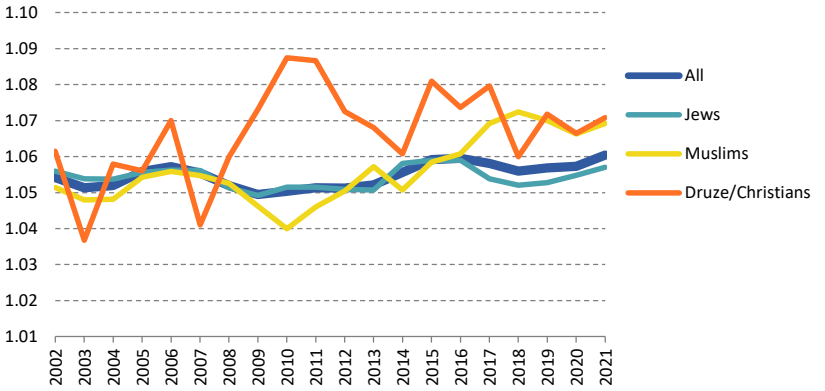
The standard explanation for this upward distortion in the SRB combines low fertility desires, *son preference*, that is, higher cultural value placed on sons than daughters, and the availability of ultrasounds. Specifically, as people choose to have fewer children, a preexisting preference for male children — related to the expectation of old-age support by working men or religious values — drives them to ensure that at least one of those children will be male. The increasing availability of ultrasound technologies and abortion over the last decades has been the enabler of this desire. They can check the sex of the fetus and practice sex-selective abortion.

The *demographic masculinization* arising from these distortions has generated a lot of scholarly and policy-related conversations in a number of areas, from security through economics. Demographers have pointed to the fact that *missing women* in high sex-ratio populations with steadily falling cohort sizes will lead to a marriage squeeze (Guilmoto, 2011). The resulting *empty branches*, as unmarried men in China are referred to, may stimulate instability within China, or globally as the Chinese government exports its excess men (Hudson & den Boer, 2005).

Based on that relationship between fertility decline and rising SRB in other Asian countries, we check whether there are signs of distortions in the SRB in Israel. Here, too, there are cultural markers of at least a moderate son preference among both Jews and Muslims. For example, in both the orthodox Jewish and Muslim traditions, certain religious duties can only be conducted by men. Druze society also remains *patriarchal* in some senses, though there has rapid improvement in Druze women's educational and employment prospects (Abbas & Court, 2012; Faraj Falah, 2023).

Figure 11 presents the SRB across religious groups in Israel from 2002–2021. There appear to be some mild distortions in the SRB. As expected, given the timing of their fertility reductions, we initially see it in the Druze and Christian Arab population, combined here since they are small populations. From around 2017, just before the rapid reduction in Muslim fertility begins (shown earlier in Figure 1), we also see an increase in the Muslim SRB to around 107. It remained there until 2021.

Figure 11. Sex ratio at birth in Israel, by religion



Source: Alex Weinreb, Taub Center | Data: CBS

From an international perspective, these are mild distortions. However, they threaten to magnify existing problems associated with gender imbalance in Israeli Arab society. In a prior publication, we pointed to the excess number of Arab males relative to females arising from a combination of the youth bulge (a very large cohort size currently in its early 20s) and four-year differences in median age at marriage between men and women (Weinreb, 2021). The rising SRB will exacerbate this structural imbalance.

Table 3 shows how this exacerbation will occur. Before the epidemiological transition to low mortality, higher levels of child mortality among boys than girls meant that the number of young men and women reaching marriageable age was similar. Today, that is no longer the case. Mortality has fallen dramatically. CBS Life Tables for Israel's Arab population in the 2015–2019 period suggest that out of every thousand Arab boys born, 984 survive to age 25, and out of every thousand Arab girls born, 990 survive to age 25.

When we multiply these survival rates by the actual number of Arab boys and girls born in the 2018–2022 period, we get the expected numbers of survivors for each of these cohorts at age 25. These are presented in Table 3.

Table 3. Expected number of Arab boys and girls surviving from birth to age 25, by year of birth

	2018	2019	2020	2021	2022	Totals
Total births	43,268	43,617	42,433	43,803	43,582	216,703
Expected survival						
Males	22,027	22,138	21,511	22,391	22,170	110,237
Females	20,670	20,903	20,362	20,833	20,836	103,604
Male excess	1,357	1,235	1,149	1,558	1,334	**6,633**

Source: Alex Weinreb, Taub Center | Data: CBS

There is a clear excess of males at age 25, that is growing as the SRB rises. Over this five-year period alone, the excess exceeds 6,600 males. Arab males are also increasingly falling behind Arab women in terms of education.

What will happen to these men? Is this a local version of China's *empty branches*? Elsewhere we have asserted that this excess of young unmarried men feeds criminal activity or political violence (Weinreb, 2021). A rising SRB may add more fuel to that fire.

Conclusion

Israel's population dynamics have long made it an outlier in comparison to other high-income countries. During 2023 we saw continued signs of change in the most notable source of difference and the biggest driver of Israel's demographic growth: fertility. It is coming down in Israel. We also saw signs of a much-awaited return to falling mortality. We cannot fully interpret that until data are available on trends in age-specific mortality, but until the Hamas attacks in October, it was on target to hit a historical low. Finally, there are signs of tapering in-migration, pushing it down to its normal levels, though both the scale and composition of that in-migration — roughly 120,000 people in 2022–2023, the majority of whom are officially *Other* — will leave a permanent impact on Israel's sociocultural and economic fabric.

Other sociocultural shifts are also occurring. We have documented the rise in non-marital births and the rising sex ratio at birth in Israel's Arab population. These are examples where, rather than deviating from international patterns, Israel's demography is consistent with them. In this, Israelis' demographic choices, the behaviors that in the aggregate drive social change, parallel and reflect global shifts. Over the next couple of years, we shall see how their behavior, if at all, is affected by the current war.

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