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The fiscal consequences of changing demographic composition: Aging and differential growth across Israel's three major subpopulations

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ABSTRACT

Israel's rapidly growing population comprises three major groups: Israeli Arabs; Haredim, also known as ultraorthodox Jews; and the general population, mainly composed of secular and religious Jews. Each of these has a different demographic and socioeconomic profile, including very different age structures and anticipated growth patterns. Here, we disaggregate Israel's 2018 national NTA schedule for each of the three subpopulations. We show that as of 2018, collected tax income fell short of public expenditures by 4.9% in the general population, 56.2% in the Arab population, and 66.1% in the Haredi population. The Haredi population was almost fully reliant on public transfers to make up this difference. The low fiscal support ratios (FSRs) in Israel's Arab and Haredi populations are a direct result of their low employment levels and low-quality employment. We forecast the fiscal consequences of two type of compositional shifts within Israel's population up to 2050: aging and a rapid increase in the share of Haredi Jews at all ages. These forecasts point to a 12% reduction in Israel's national fiscal support ratio by 2050, with two-thirds of this caused by aging, and the remainder by the increasing share of Haredim.

Introduction

Among high-income countries, Israel has an unusual demographic profile. While averaging 1.8 % growth per year in GDP per capita (constant USD) over the last 25 years, its population has been increasing by 1.9 % per year. Most years, around 80 % of this population growth is driven by Israel's high fertility: the period TFR was 3.0 in 2022, almost double the OECD average. As a result, Israel's age-structure is much younger, and its old-age dependency ratio much lower, than other high-income countries with a similar life expectancy (e.g., Italy and Spain) or a similar GDP per capita (e.g., Canada and Sweden).

In a forthcoming paper, we describe how this young age structure alongside other idiosyncratic national characteristics—in particular, the lengthy national military service that delays entry into higher education and into the labor market—are reflected in Israel's National Transfer Accounts (NTA) profile (Weinreb et al., 2024b). Using data from 2018, we identify a number of key differences between Israel's profile and that of other high-income countries: Israel's substantial public expenditures on education last deeper into the lifecourse than in most high-income countries; Israelis enter the labor market relatively late, remain in it for longer, and their average labor income only comes to exceed average consumption later in life; as a share of average income, private transfers, both intrahousehold and interhousehold, are relatively high and extend over more years, deep into people's 70s in terms of net interhousehold outflows transfers from elderly to younger generations. Finally, Israel's lifecycle deficit as a percentage of GDP is higher than the average for high income countries, reflecting its unusual combination of substantial public expenditures, relatively low tax revenues, unusually high public asset income relative to the OECD, and a young population whose continued growth makes saving more difficult.

This paper has two starting points. The first is the anticipated compositional shifts within Israel's population that will alter the balance within its "generational economy" across three core groups or subpopulations, each of which has distinct demographic and socioeconomic profile: *Haredim* (ultraorthodox) Jews, who currently constitute about 12.5 % of the total population[1]; *Arabs*, comprizing about 21 % of the population; and the remaining *general population* that is mostly composed of non-Haredi Jews but also includes more than 500,000

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[1] There are three major groups of Haredim: Hasidim; Mitnagdim, also known as Lita'im in Israel; and Sefardi Haredim. Dödtmann (2022) provides a clear description. We do not distinguish between them here since in terms of demographic and economic behavior, all three are much more similar to each other than to the two other major Israeli subpopulations.

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people who are categorized as being neither Jewish, according to religious Jewish law, nor Arab. The second starting point is the rapid growth of Israel's elderly population, in general, and its differential growth patterns across the three core subpopulations, in particular. Both the compositional shifts and the rapid growth in the elderly population will occur as Israel's population is projected to grow from 9.7 million in mid-2022 to 15.9 million in 2050 (Israel Census Bureau's medium scenario projection).

In the next section of the paper we delineate each of these starting points in some detail. We then describe the NTA framework that we employ to estimate the likely range of effects on public finances that will result from these anticipated demographic shifts by: (i) disaggregating Israel's overall NTA schedule into its discrete age-specific patterns for each of the three core subpopulations; and (ii) forecasting the fiscal consequences of compositional shifts in Israel's population, in particular the effects on "fiscal support ratios" associated with aggregated net public transfers. By fiscal support ratio (FSR), we refer to the ratio between a state's income from taxes and its total expenditures, where each of these is based on age-specific tax profiles and public consumption. As is standard in the NTA literature, our forecasts look at how the FSR will shift if current age-profiles of taxes and benefits remain constant (Miller, 2011). Here, we consider both group-specific FSRs for each of the three core populations, and the national FSR, which will be increasingly influenced by behavioral patterns in Israel's Haredi and elderly populations.

Our analysis is intended to make two contributions. The first is empirical and Israel-specific. We confirm that by 2050, unless there is a substantial reduction in support from public transfers among Haredim and Arabs, Israel's two poorest subpopulations, Israel's overall FSR will deteriorate. However, our NTA models also suggest that, given current economic conditions, the most important factor driving this deterioration is population aging, especially in the general population. It accounts for about two-thirds of the detioration in Israel's FSR, as opposed to the third arising from anticipated increases in the share of Haredim. This strong effect of aging means that in Israel, as in other high-income countries, substantial increases in the FSR are baked-in to the current age structure, despite its unusual demographic profile. Recognizing this adds weight to those calling for increases in employment and skill levels in Israel's poorer and less educated subpopulations. Barring some radical and transformative economic transition—for example, some combination of AI, robotics and automation, universal basic income and other innovations that herald the dawn of a new economic utopia—improving employment rates at higher income levels, and thus tax revenues, is the only way to help reduce the impact of aging on a range of national fiscal parameters and support ratios.

The second intended contribution is more general. Israel is uniquely heterogeneous in its particulars—it is the only majority Jewish country in the world—but it is far from unique in being heterogeneous. On the contrary, most countries in the world are religiously or ethnically diverse (Horowitz, 2000); and in many of these countries, those same religious and ethnic distinctions also mark differences in socioeconomic characteristics and patterns of demographic growth. In some cases, the diversity underlying differences in sociodemographic patterns is more regional. The vast majority of post-colonial states in Africa and Asia fall into this category: particular areas within many of these countries experienced educational and demographic transitions far earlier than other regions within the same country, in part, driven by the colonial-era placement of Protestant missions (Woodberry, 2012). Well-known examples of such areas in demography and international development include Kerala in India, Kikuyu areas in Kenya's Central Province, and Igbo areas in south-central Nigeria (Chukwuezi, 2001; Véron, 2001; Weinreb, 2001). In other cases, the diversity underlying differences in sociodemographic patterns is associated with longstanding religious minorities or immigrant populations distributed across regions. Christian minorities in Middle Eastern countries often fall into this category, being disproportionately urban, more highly educated and low fertility (Fargues, 2001; Masters, 2008). So do non-European immigrants in European cities, typically less educated than the national average, having higher fertility in the first generation and being somewhat concentrated within "ethnic enclaves" (Coleman, 2006; Demireva & Zwysen, 2021).

Israel has both patterns of diversity when it comes to the three subpopulations that are our focus here. It has spatially *distinct* areas associated with a single group. In fact, most of Israel's Arab and Haredi population live in separate towns or in distinct neighborhoods within cities. New neighborhoods or towns are often explicitly built for Haredim (Hershkowitz, 2010; Rosen & Razin, 2008). In fact, even when in spatially *integrated* areas that include at least two and sometimes all three of the subpopulations that are our focus here, as can be found in officially defined "mixed cities" (e.g., Jerusalem, Haifa, Lod, Ramle), the educational and lifecourse track of each of the three subpopulations is distinct: each subpopulation is educated in a separate school systems (described below); and while only small minorities of Haredi and Arab men serve in the army or do some other type of national service, as do even smaller minorities of women from these communities, in the general population, which includes the "national religious" population, there is almost universal service for both men and women. This not only delays the progression from secondary school to higher education or into the labor force by a few years. It also affects the degree of exposure to others, which in turn influences national versus subpopulation-level solidarity (Alesina et al., 2020; Cáceres-Delpiano et al., 2021). All of these factors have downstream effects on sociodemographic and economic profiles of each of the three subpopulations.

The combination of these three populations' discrete sociodemographic profiles and political geographies is what makes the current exercise valuable for the NTA in general. We argue that despite frequent odes to singular national cultures or economies, analysts need not limit their attention to a single set of national estimates. This is at least implicitly recognized in NTA analyses that have generated regional NTA estimates (e.g., Olayinka et al., 2023) or disaggregated national estimates by educational class and parenting status (Hammer & Prskawetz, 2022; Spielauer et al., 2022). Our analysis complements these, and confirms that it can also be productive to disaggregate NTA estimates into subnational contributions, based on sociodemographic differences. At the very least, it provides a more solid empirical ground for targeted interventions by policy makers.

Background

Differential age-structure and growth

The differences between Israel's three core subpopulations—Haredim, Arabs, and everyone else, referred to here as the "general population"—begin with age structure. Each of these three subpopulations has a very different age structure, shown in Figure 1, that signals substantial differences in past demographic behavior and future patterns of growth.

At younger ages, these differences in age structure have mostly been driven by different fertility patterns. Since the early 1980s, the TFR has been in the 2.5–3.0 range in the general population, in the 6.5–7.2 range for Haredim Jews, and it has fallen from around 5.7 in 1980 to 2.8 in 2022 in Israel's Arab population.[2] The results of these differences can be

[2] Within the non-Haredi Jewish population, the most important predictor of fertility in Israel has long been religiosity (Friedlander and Feldman, 1993) even as secular Israelis also have surprisingly high fertility given their other socioeconomic and educational characteristics (Okun, 2016; Weinreb et al., 2018). Current levels of period TFR ranges from arund 2.2 for secular Jews to 3.8 for religious (non-Haredi) Jews, and has fallen to 1.4 for the growing population of "Other"/religiously unaffiliated (ethnically and politically associated with the Jewish population). Within the Arab population, the TFR is around 2.9 for Muslims, 1.9 for Druze and 1.7 for Christian Arabs (Weinreb, 2023).

seen in Figure 1: the slow and steady growth in the general population, the very young Haredi population, and a sudden flattening of the age structure in the Arab population over the last 20 years.

Other differences in age structure reflect particular demographic histories of each subpopulation. The distinct bumps in the age structure of the general population, along with echo effects every 30 years, have their origin in the post-WWII baby-boom that coincided with Israel's founding, with the movement of surviving European Jews after the end of the British Mandate, shortly followed by a large stream of Jewish refugees from Arab countries. The eldest of the three largest bumps was augmented by the arrival of almost one million Jews from the ex-USSR during the 1990s, many of whom were in their 40s and 50s. A relatively constant fertility rate over multiple decades has given rise to the echo effects at younger ages, with recurring bumps and dips every 30 years. More generally, this signals the distinctive cohort-associated demographic effects on Israel's economic development.

The age structure of Israel's two other subpopulations are quite different. A slight dip in the Arab population's age structure at age 70 coincides with the lower number of births during Israel's 1948–49 War of Independence. Rapid growth of cohorts in their 40s through 60s was driven by a TFR of around 8 children up to the late 1970s. And the rapidly increasing size of cohorts born between 1988 and 2001 coincides with the freezing of the fertility transition around the First Intifada (1987–1993), though it continued past the 1993 Oslo peace agreements. Across these decades, Israel's Arab population grew from around 11 % of Israel's 2.15 million people in 1960 to 21 % of Israel's 9.66 million people in 2022.[3] Over the last 10 years, as implied by the flattening age structure, the pace of growth in Israel's Arab population has slowed substantially, such that it is projected to peak around 2030 and then fall to around 20.3 % of Israel's population by 2050. This slowdown is driven by fertility reductions that are similar in timing and magnitude to those in neighboring Arab societies (United Nations, Department of Economic and Social Affairs, Population Division (2023), 2023), and it has coincided with substantial improvements in Israeli Arabs' socioeconomic characteristics, such as the share holding academic degrees, especially among Arab women.

The Haredi population has few notable fluctuations in its age structure. Rather, the overall shape is very similar to that of sub-Saharan African countries in the pre-demographic transition era of the 1970s-1990s, pointing to consistent high rates of growth over many decades. There are no robust estimates of the number of Haredim in Israel during the state's first decades since they were more integrated into the general population in those years, both residentially and in terms of employment. This made it both more difficult and less important analytically to distinguish them from other orthodox Jews (Keren-Kratz, 2023). Recent Israel Central Bureau of Statistics estimates point to around 1.15 million Haredim in 2020, around 12.4 percent of the total population, and 15.7 % of the Jewish population. Other indications point to rapid growth. Notably, the four discrete Haredi school systems now educate around 20 % of Israeli children, up from 10 % in 2001 (Cahaner & Malach, 2020). Almost no non-Haredi children are in these networks beyond primary school, so this growth comes from within the community. Even allowing for denominational shifts that leads to some net movement from the Haredi to the general subpopulation, Haredim will comprise a growing share of Israel's total population over the next few decades: 15 % by 2030, 17.7 % by 2040 and 20.5 % by 2050.

Growth in Israel's aging population

The larger weight of Israel's general population at older ages means that Israel's overall age structure currently has a distinct bulge in the mid-to-late 60s age-group, seen in the top panel in Figure 1. As shown in panel (a) of Figure 2, this means that between 2020 and 2030, the number of people aged 70+ will increase by around 3.7 % per year on average, twice the rate of the overall population growth rate. It will then slow somewhat, fluctuating between 2.0 and 2.8 % per year until 2050.

Hiding beneath these shifts in the share of the national population that reaches older ages, there are substantial differences across the three major subpopulations covered here. Between 2020 and 2035, the annual rate of increase in the Arab population aged 70+ will be around 6 % per year, before dropping off to around 3 % per year by 2050; and the annual rate of increase in the Haredi population aged 70+ will be around 8 % per year until 2028 before falling into the 4–5 % range until 2050. Growth rates in the general population will track the national average, albeit at a somewhat lower level.

Panel (b) confirms that in all three subpopulations, this rapid growth will lead to a rise in the share of the population that is elderly, triggering an overall rise at the national level from 8.2 % of the population aged 70+ in 2020 to 11.2 % in 2050. However, in absolute terms the rise will be most pronounced in the Arab subpopulation—the share of the Arab population aged 70+ will rise from around 62,000 in 2020 to 289,000 in 2050, or 3.3 % to 8.9 % out of total Arab population. In contrast, in the Haredi population, despite higher growth rates among the elderly overall, ongoing (expected) high fertility rates will continue to fill out the bottom of the age structure. This will allow the Haredi population to maintain a classic pyramid-shape. That is, even as the number of Haredim aged 70+ will increase from 24,000 in 2020 to 122,000 in 2050, the share of elderly within the Haredi population will increase from only 2.0 % to 3.7 %.

As is the case in other high-income welfare states, the overall increase in the share of the population that is aged will pose fiscal challenges, since it will require a rising share of national resources to be devoted to public expenditures on health, pension schemes and other allowances directed at the old-age population.

Educational and socioeconomic differences

What magnifies the relevance of Israel's three subpopulations' distinct age stuctures and growth patterns for any NTA analysis, especially one focused on current and future fiscal situations, is that each of them also has substantially different socioeconomic profiles. These profiles are driven by different levels of individual and household income, which in turn influence net contributions to the state (taxes less allowances), but also the magnitude of private transfers within each subpopulation, both at the inter- and intra-household level.

Figure 3 presents trends in educational and employment characteristics across these three populations, and by gender. The general population has substantially higher scores on both. In 2022, 42 % of men and 53 % of women in the general population aged 25–64 had an academic degree. By international standards, the overall share with an academic degree is high, and the female advantage very substantial: OECD averages for these two were 40.7 % and 47.4 %, respectively, in 2022 (2023).[4] The percentage with academic degrees was much lower in the two other subpopulations: 18 % of men and 25 % of women in the Arab population, and only 11 % of men and 28 % of women in the Haredi population.

It is important to acknowledge the uniqueness of the Haredi population's low levels of secular education, especially that of Haredi men. We know of no other population in which there is a 17 percentage point difference, to the advantage of women, in the share with an academic degree. These different secular educational levels are also meaningful economically since they affect both total expenditures on education in Israel today and expected employment and income patterns in the future. There are two key points here.

[3] Currently, around about 85% of the Arab population is Muslim, and the remaining 15% is divided roughly equally into Arab Christians and Druze. Each of these also has a distinct demographic, educational and employment characteristics, which are not addressed here.

[4] Education at Glance: Share of population by educational attainment aged 25–64 (Data extracted on 30 Oct 2023 from OECD.Stat).

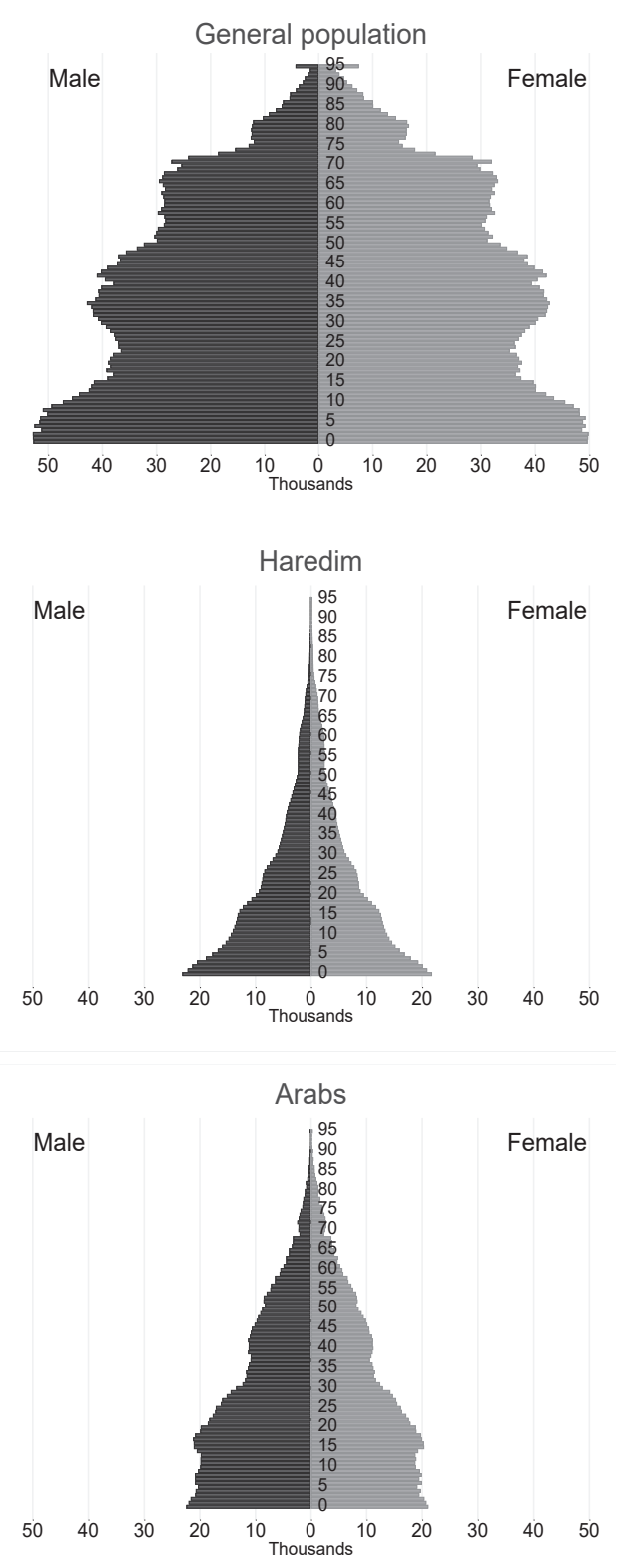

Figure 1. Israel's major subpopulations, by age and sex, 2018.

First, to receive full public funding (per student) from the state, Israeli schools need to teach core subjects, as defined by the Ministry of Education. These include humanities, sciences, mathematics and English. Schools can choose to forego full funding, and avoid educational supervision by the Ministry of Education, by not teaching those core subjects. That is what the vast majority of Haredi boys schools do (Haredi schools are gender-segregated from kindergarten). As of 2018, only 16 % of Haredi boys were being taught *any* math or English at the secondary school level (Government comptroller (2020), 2020). In contrast, the majority of Haredi girls schools do teach some version of a standard curriculum that includes core subjects. This provides a much easier pathway for Haredi girls into some form of post-secondary education, including into degree-granting institutions. More generally, the decision to avoid core subjects means that per student public expenditures on education are substantially lower in the Haredi population than in the general or Arab population.

Second, from the perspective of the Haredi leadership in almost all its educational streams, the relative lack of secular education, especially in boys schools, is intentional. It reflects the dominance of a segregationist ideology within the Haredi population that treats secular learning for *men* in particular as both dangerous and profane. This is a relatively new ideology within Jewish thought, arising as a response to the attractions of modernity. It is based on the articulation of a new set of ideas that valorize a lifetime of Torah-based learning for Haredi men over employment, supported by their working wives or society in general (Keren-Kratz, 2023; Stadler, 2002). These new ideas redefine any secular learning as *bitul Torah* ("cancellation of Torah"), that is, an unjustified waste of time spent on things other than Jewish religious learning, where the latter is seen as men's key function, privilege and burden in this world (Ahrend, 1980). This is the source of Haredi women's longstanding advantage over their male counterparts in terms of secular education (El-Or, 1994). The Haredi leadership does not apply the principle of *bitul Torah* to women.

Employment rates largely reflect these differences in educational characteristics. 87.2 percent of adult men aged 25–64 in the general population are employed. If all Israeli men were employed at this level, Israel's national employment rate would be the highest in the OECD (OECD 2023b).[5] The same is true of women. Their employment rate of 84.2 % in the general population is also higher than the national average of any OECD country. In large part, these high rates reflect strong pro-employment norms for both men and women, as well as the financial needs that arise from a combination of high fertility and strong consumption desires.

Arab men have long entered and exited the labor force at younger ages, the latter occurring in part because of injuries arising from higher employment in blue-collar professions (Habib, 2010). Their overall employment rates have also been lower than those of Jews, as their lower educational levels limit their employment prospects (Habib, 2010). This process appears to have intensified more recently. Between 2016 and the Covid-19 pandemic, employment rates of Arab men under age 30 fell by about 10 percentage points (Debowy, Epstein, & Weiss, 2021a). This is in spite of the fact that the number of Arab students successfully completing matriculation exams in high school rose from 50 % of high school cohorts in 2010 to 70 % in 2020 (Blass, 2022), and over the same period, the number of Arab students in higher education more than doubled, from 31,782 in 2010 to 65,531 in 2022 (Malach & Cahaner, 2023). Consistent with these improved measures of educational attainment, there has been a concomitant rise in employment, but mainly among Arab women: from 33 % in 2012 to 45 % in 2022. These trends suggest, if continued, that the gender gap in employment levels in the Arab population will eventually converge to that of general population. More generally, it also points to an improvement in the

[5] OECD (2023b), Employment rate (indicator). https://doi.org/10.1787/1de68a9b-en (Accessed on 9 October 2023).

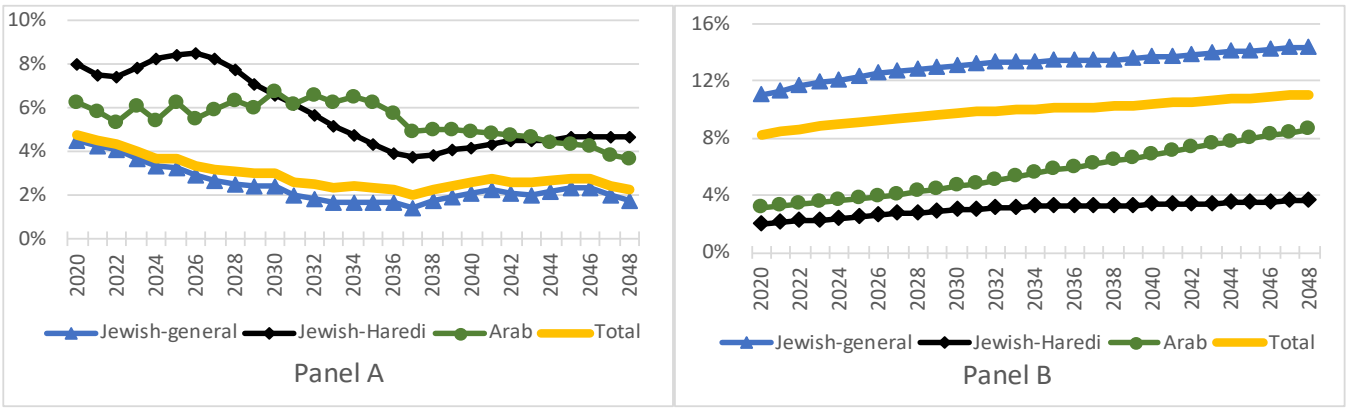

Figure 2. Annual growth rate (%) in the number of people aged 70+ (Panel A), and share of each subpopulation aged 70+ (Panel B), 2020–2050, by subpopulation.

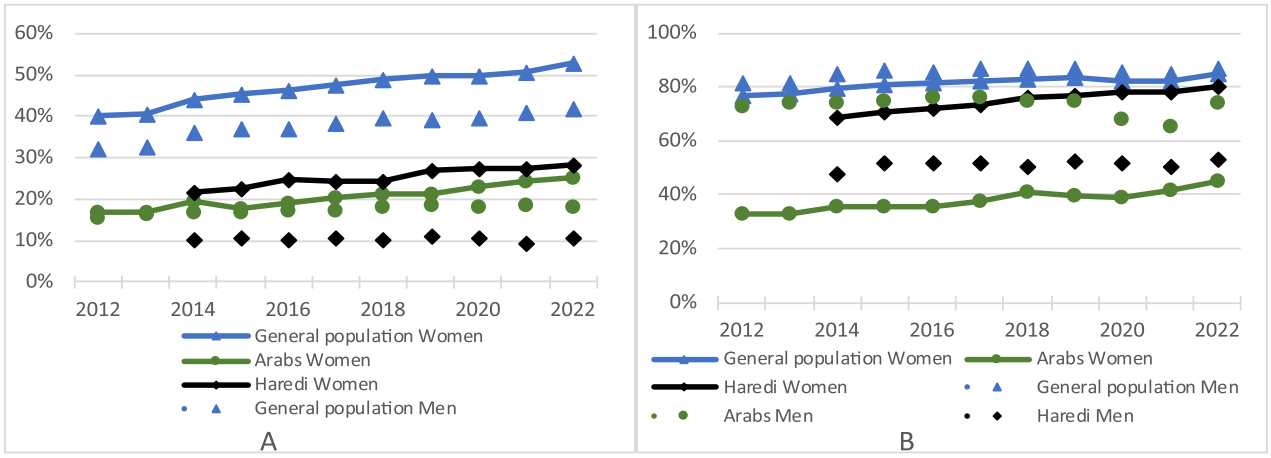

Figure 3. Academic degree holders (Panel A) and employment rates (Panel B) among people aged 25–64, 2012–2022, by gender and subpopulation.

socioeconomic status of Israel's Arab minority.[6]

Lower employment levels of Haredi men also pulls down the national male employment rate. Only 53.3 % of Haredi men aged 25–64 were employed in 2022. This figure has fluctuated a little over the last decade, generally moving upward, from 47.9 % in 2014. Observers have linked these low employment levels to Haredim men's inadequate skills for the local labor market, and to financial disincentives associated with the package of financial support made available to Haredi families in which there is a male "learner" (Cohen Kovatch, 2022; Debowy, Epstein, & Weiss, 2021b). Evidence of this support will be shown below in the magnitude of public monetary transfers. Yet there is also some evidence that the strength of norms promoting religious learning, and the associated political and institutional support for them within the Haredi community, makes it particularly costly to pull the most devout Haredi men into higher (secular) education appears (Perelman et al., 2019). That is, the more religiously devout, the higher the financial incentive needs to be. This has been a longstanding challenge for Israel's policy makers.

The overall picture that emerges from these patterns is that low Haredi employment is a product of, and made possible by, the political influence of Haredi political parties in Israel's unicameral proportional-representation-based legislature. That disproportionate political leverage has enabled those parties to enshrine norms that valorize Torah-based learning over employment into narrowly focused, sectorally-specific, financial support from the state. Government allowances for older and married yeshiva students (*avarechim*) is the best example of this support. We show later (see Figure 6) that these amount to almost 8,000 USD per year per *avarech* aged 25–44. That is in addition to the standard array of non-sectoral welfare programs made available to all poor households (Gal et al., 2019).

It should also be noted that even in the absence of extra funding for Haredi institutions, the mismatch between Haredi skills and a shifting labor market that places increasing emphasis on highly skilled labor (Berrebi et al., 2017; Madhala, 2019), would pose increasing challenges to the Haredi population. This is not unique to Israel. Kingsbury (2020) describes very similar patterns, and the fiscal challenges they pose, in the UK's rapidly growing Haredi population.

The results of these substantial differences in educational attainment are reflected in average labor income within each of these subpopulations. These estimates, shown in Figure 4, are taken directly from our NTA accounts, described shortly. Between people's 30s and 60s, average labor income in the higher-skilled general population is more

[6] Inequalities between Jews and Arabs has been a focus of academic and policy-related research in Israel since the 1970s (Smooha & Peres, 1975). Over the last two decades, these inequalities have diminished, in part because of considerable investments in the Arab sector. For example, in Arabic-language state schools, classes are now smaller and teachers are more likely to have a degree than in in Hebrew-language state schools (Blass & Bleikh, 2022). Likewise, at the upper end of the educational spectrum, more than 30% of newly registered physicians in the healthcare system since 2016 have been Arab, alongside more than half of the pharmacists and a large share of nurses (Tur-Sinai et al., 2020). This signals the growth of large and highly educated Arab middle class, in spite of persistent inequalities across a range of other dimensions (Saabne and Shalev, 2024), and in particular a rapid rise in the murder rate of young Arab men since 2017 (Weinreb et al., 2024a).

than double the labor income in the lower-skilled Arab and Haredi populations. Some of that difference is employment; most is wages.

Anticipated compositional shifts

Over many decades, the object of demographic-economic concerns in Israel was Israel's rapidly growing Arab minority. The combination of rapid increases in Arabs' educational attainment, especially among women, and a growing share of white collar professions, alongside a foreseeable demographic peak in that population, has largely dampened those concerns.

The primary focus of contemporary anxiety is now the Haredi population. The combination of low secular education, low and low-quality employment, especially among men, low taxes paid, and very high demographic growth, undergirds numerous pessimistic accounts of Israel's economic and political future. These are especially notable in Hebrew-language publications (repeated articles by Tel-Aviv University economist Dan Ben-David, and one of Israel's leading economic correspondents, Meirav Arlozorov), but they can also be found, though framed more soberly, in regular IMF and OECD reports on Israel's economy (2023; IMF 2023) and in more general academic surveys of challenges confronting Israel (Conway, 2017; Endeweld & Karadi, 2023; Krebs, 2009). Those accounts uniformly point to the impending reduction in per capita levels of human capital, with subsequent falls in the type of scientific and technological innovation that powers Israel's high-tech sector, the "locomotive of growth" in Israel's otherwise relatively low-productivity economy (OECD, 2023). Specifically, the high-tech sector currently employs around 12 % of the labor force, and is responsible for approximately 25 % of payroll taxes, making it a major source of funds for Israel's substantial system of public transfers. However, employees in the tech sector are disproportionately non-Haredi males since skill-levels in math, science and English are lower in all other groups, including among non-Haredi Jewish females (Fuchs et al., 2018). Pessimistic accounts of Israel's future point to the reduction in the share of the population that is in this non-Haredi general population and project an increasing burden on Israel's most economically productive core, as will be shown below.

The compositional shifts in Israel's core working age population—defined here as those age 30–59—across the three core subpopulations are shown in Table 1. As of 2020, only 8 % of Israel's working-age population was Haredi. Within 30 years that share will almost double. In contrast, the Arab population's share of the working age population will peak around 2040 and then slowly fall, as the more recent smaller birth cohorts start to enter the labor market, and relatively large ones age out of it.

Employment rates of Arab men are higher than those of Haredi men, and even if Arab women currently have lower levels of employment than their Haredi counterparts, there are, as noted above, ongoing sharp increases among the former, driven both by a compositional shift into more educated groups, and by a secular rise in employment.

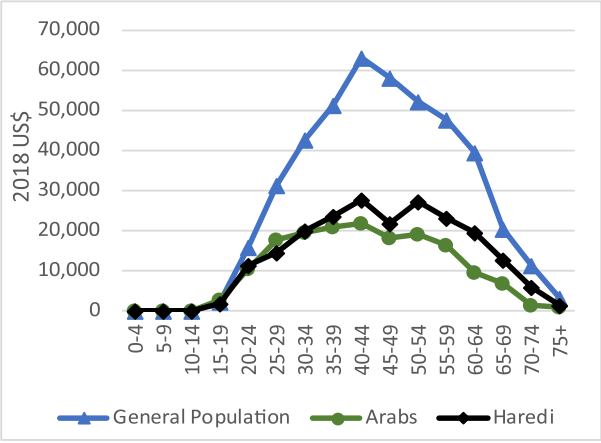

Figure 4. Annual Labor Income per capita, 2018, by age and subpopulation.

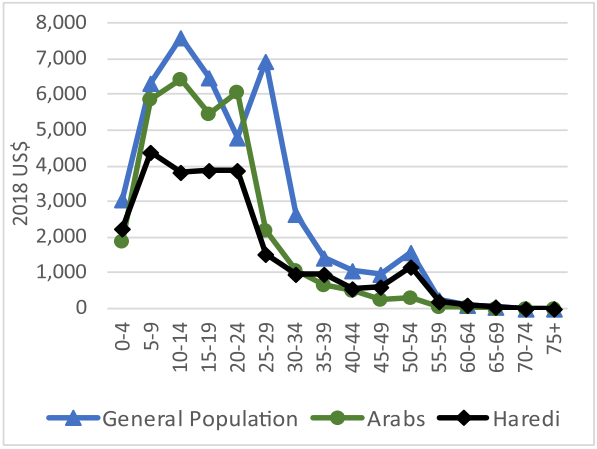

Figure 5. Annual Public Consumption of education per capita, 2018, by subpopulation.

Table 1
Composition of peak working age population (30–59), by subpopulation (%).

	Haredim	Arab	General population
2020	8.0	20.0	72.0
2030	10.3	22.3	67.4
2040	12.9	23.7	63.5
2050	15.3	23.2	61.6

Notes: Based on Israel Census Bureau projections, moderated by assumption of 15 % movement of Haredim to general population over ages 0–24

Combining changing composition and aging

We noted earlier in relation to Figure 2 that the share of the total population aged 70 + will grow quite substantially by 2050, with the most rapid growth (in relative terms) in the Arab population and the slowest in the Haredi population. Together, the share of the population aged 70 + that is in the general population will shrink from 89.1 % today to 77.4 % by 2050.

A priori, we expect the rising number of elderly in Israel's two poorest subpopulations, and the rising share of the national total, to increase public expenditures even more, since even when members of these groups are employed, it is at lower wages than in the general population. Additionally, the mandatory pension law, effective since 2008, preserves observed gaps between these subpopulations in their labor income, and exacerbates the income gaps even more at older age, due to poorer coverage that private pensions offer to workers from the lower half of the wage distribution.[7] On both these counts, therefore, the elderly in Israel's two poorest subpopulations will be more reliant on public transfers of one type or another as they age.

[7] Seasonal and temporary employment is more common in the lower half of the wage distribution. According to Mandatory Pension Law, effective since 2008, both employee and employer make mandatory contributions to the private pension fund of the employee after a 3-months period of work for same employer. Not surprisingly, this eligibility period leaves many seasonal and temporal workers with insufficient coverage, or no coverage whatsoever. A detailed analysis of private pension coverage by wage deciles can be found in Gronau and Spivak (2021).

An NTA approach

By an NTA framework, we refer to the comprehensive system of age-based economic accounting that incorporates age into standard systems of national accounts (SNA) and, therefore, allows for the disaggregation of all major components of National Accounts by age, as well as estimates of all private transfers within and across households. NTA methods were developed over a number of decades, beginning with the integration of mathematical demography into overlapping generational models (Arthur & McNicoll, 1978) and further developments by Lee (1980, 1994), Mason (1987) and Willis (1988). It is widely considered the most effective analytic architecture for considering the consequences of population aging for standards of living and the sustainability of government programmes (UN 2013). Yet the key focus on age-specific fluctuations also makes it extremely useful for looking at the effects of any type of demographic change, including those arising from compositional shifts in educational class and parenting status (Hammer & Prskawetz, 2022; Spielauer et al., 2022).

Our analysis, which disaggregates Israel's national NTA schedule into three core subpopulations, applies a similar approach, albeit across a different type of social boundary. This is intended to correct two core weaknesses in existing empirical predictions of Israel's future economic growth (Argov & Tzur, 2019; 2023; Popper et al., 2015). First, they pay insufficient attention to age-specific patterns, including those associated with age-specific compositional shifts, and the age-specific level of public and private transfers. This is especially important in a country that, like Israel, has a distinctively cyclical age structure (see Figure 1). It affects the accuracy of projected patterns of growth, labor force participation, and related assumptions about taxes and age-specific public expenditures.

Second, existing accounts treat the Haredi and general non-Arab Israeli population as "closed populations," meaning estimates are premised on a net-zero shift in religiosity between these two populations. This is contrary to the best empirical estimates of this type of change in Israel, which suggests a net "migration" of roughly 15 % of children born in the Haredi population who move toward the general population by early adulthood (Weinreb & Blass, 2018).

The NTA framework used here corrects for both of these. It incorporates age-specific patterns while disaggregating Israel's national NTA schedule into the three core subpopulations discussed thus far. Additionally, the population projections that we employ to forecast the fiscal consequences of compositional shifts in Israel's population—the effects on dependency and fiscal support ratios (FSRs) and aggregated net public transfers—assume a 15 % shift away from the Haredi population into the general (non-Arab) population between birth and age 25.

We proceed in two stages. We first describe the current fiscal status using the baseline 2018 data, while pointing to key differences across the three subpopulations in public expenditures, including cash allowances. We then project FSRs in 10-year increments up to 2050 based on the 2018 age-specific patterns. The full NTA profiles for each of the three populations are available as supplementary material.[8]

Current fiscal status

We follow the standard NTA framework (United Nations, 2013) in distinguishing between public expenditures, referred to as *inflows* in the NTA, ascribed to: 1) health; 2) education; 3) public pensions (National Insurance Institute allowances) and cash allowances (other governmental institutions); and 4) in-kind expenditures. We focus on public expenditures for two reasons. First, these account for a much greater share of total educational and health expenditures: 82 % and 76 %, respectively. Second, separate analyses using household-level data from Israel's Household Expenditures Survey show substantial differences in public pensions and other public cash inflows across subpopulations, when measured in relation to the labor income of those aged 30–49 within each subpopulation.

The fiscal status of each subpopulation depends on the magnitude of its public *outflows*, that is, the amount it pays into the public purse, relative to the magnitude of public inflows that it receives. As is standard in the NTA, our estimated outflows also account for asset-based reallocations, representing public capital movements, which are complementary to taxes paid. We show below that the much lower labor income of Haredim and Arabs, seen in Figure 4, reduces their outflows in very significant ways. This occurs both because of Israel's progressive income tax system and because of differences in the absolute amount of indirect taxes associated with private consumption, itself correlated with household income.[9] In addition, since many government programs are means-tested, the same differences in incomes also imply that these three subpopulations qualify for different levels of public *inflows*, that is, services and direct monetary support received from the government.

To summarize the differences in the magnitude of public inflows and outflows we calculate FSRs of each subpopulation. Within the NTA framework, the FSR is the ratio of the effective number of tax payers to the effective number of beneficiaries (NTA 2013: 19), sometimes expressed as the ratio of aggregated public outflows (taxes paid) to aggregated public inflows (public expenditures).

Health

We assign equal per capita health inflows (expenditures) at any given age to all three population groups. This is based on two factors. First, since 1995, when the National Health Insurance Law was passed, all citizens of Israel have been entitled to health coverage through membership in one of four "Sickness Funds" (a version of the Bismarck model used in Germany, France, Belgium, the Netherlands, Japan, and a number of other countries), all of which provide a mandated list of health services. Second, the distribution of public monies to Sickness Funds to cover health expenditures is determined by an age-based capitation formula that has the same J-shape as a classic age-specific mortality curve, in order to cope with rising expenditures as people age. Alongside the universality of health coverage, that capitation formula provides the basis for assigning equal health inflows (per capita spending on health) at each age across all three population groups, at least from public sources. There are known differences across populations in private health spending, which in Israel occurs primarily through supplementary insurance, since that rises sharply with income (Chernichovsky et al., 2016).[10]

The much higher incidence of type-2 diabetes in the Arab population, alongside the elevated per capita health expenses of people with type-2 diabetes (Charbonnel et al., 2017; Stedman et al., 2020), raises questions about how accurately this equal assignment of public health inflows captures actual public expenditures on health in the Arab population as opposed to the two Jewish populations. Here we assume that the higher expenditures in the former are somewhat offset by the Arab population's lower access to health services, given that a disproportionate share of the Arab population lives in the north and south of the country, both of which have a substantially lower share of physicians per capita (Levi & Davidovitch, 2022).

[8] Available at: https://www.taubcenter.org.il/wp-content/uploads/2023/12/Israel-NTA-2018-by-subpopulation-taub2023.xlsx.

[9] Israel's income-tax gradients are more similar to those in Western Europe than in the US. Tax credits and exemptions are also much more favorable to families with children. This further diminishes the contributions of the less affluent, particulary those with larger families.

[10] The main source of finance for Health Funds is the separate health tax, paid by every adult, regardless of employment status, collected by NII. Transfers from NII to Health Funds' depend on capitation formula, rather personal contributions. Budgetary deficits are financed by supplementary government expenditures from its general budget.

Education

The calculation of age-profiles of public education inflows across the three populations are more complicated, at least from 1st to 12th grade. This stems from the fact that though only a very small percentage of Israeli pupils are in private schools, and that the publicly-funded educational system has several streams, as noted above, where each stream receives a different amount per student. This amount is affected by many criteria. Broadly, between kindergarten and 12th grade, differences in funding per pupil are linked to the grade-level, the SES of the pupils' residential area, the number of hours spent on different types of subjects, percent of pupils assigned to special education, number of children per classroom, and a number of other factors. These criteria continue to fuel public debates and social tensions between groups. However, they are largely transparent, as highlighted in detailed empirical reviews of school funding at the primary and secondary level (Blass & Bleikh, 2020).

In our estimates, Arab-language schools are assigned to the Arab population, Haredi schools to the Haredi population, and all remaining Hebrew-language schools (religious, mixed, or secular) are assigned to the general population. Our estimates of public education inflows for each population are based on Ministry of Education data, which include several data sources. The first is the number of students by subpopulation and level of education, from day-care until the end of secondary education—these data are from "Mabat Rahav", the Ministry of Education's database. The second source is the number of students in higher education, including students for academic degrees, technical degrees and vocational training. These data come from the CBS Statistical Abstract for 2018. The third source of data is the Ministry of Education's online source of budgetary information ("shkifut ba'chinuch", literally "Transparency in Education"), which provides detailed budgetary information by level of education and stream.

Educational expenditures on higher education, which is highly subsidized in Israel, are mostly linked to attainment rates of each subpopulation. Higher academic attainment within a subpopulation means higher per capita public education inflows.

The age-profile for public educational expenditures are shown in Figure 5. It confirms the relatively equal per capita spending between the general and Arab education systems during school years. The slightly higher spending in Hebrew-language middle- and secondary schools largely stems from additional subjects taught at religious schools (Blass & Bleikh, 2024). Lower per capita expenditures in the Haredi system reflect their decision to forego full funding, especially in boys' schools, as discussed earlier, in favor of independence from Ministry of Education. The differently timed peaks during people's 20s reflect delays associated with military or other national service in the general population and very low rates of service in the Arab and Haredi populations. Differences in levels of public inflows for these ages reflect different educational attainment rates.

Pensions and other cash allowances

Age profiles of public pensions, which includes disability and other allowances,[11] and other cash inflows were estimated from HES data and then calibrated to SNA values in order to preserve the distributional properties of these transfers within and between subpopulations.

Whereas many NII allowances, including pensions, are universal and quite similar across subpopulations (Figure 6A), the age-profile of other cash inflows looks very different (Figure 6B). This is mainly due to allowances for married Haredi men who are involved in religious studies. These range between 7,500–8,500 USD per year per capita between people's mid-20s to mid-40s. There are also some Ministry of Defence allowances associated with military service and Holocaust survivors allowances to the 75+ age group. The Arab population does not qualify for the latter, and since only a small number will have served in the Israeli security forces, few Arabs qualify for the former.

Other in-kind public consumption

This final catch-all category of inflows in the NTA framework includes all types of public expenditures not covered by education, health, public pensions or other cash inflows. It includes all expenditures on defense and internal security, infrastructure, repayment of public debts, and so on. These kind of expenditures, especially those associated with security, are quite significant in Israel, relative to other rich countries: around 5.5 % of GDP is spent on defense, more than twice the OECD average.

As is standard in the NTA, aggregated expenditures in this category are equally distributed across the entire population, with identical per capita values (in a uniform age structure) imputed based on amounts reported in the SNA.

Public outflows

Figure 7 shows the per capita age-profiles of public outflow transfers, by tax type and by subpopulation in Israel in 2018. This figure provides a detailed picture of how much each subpopulation contributed to the government's budget.

Differences in those contributions across the three populations are consistent with differences in labor income shown in Figure 4. This to be expected given that mandatory health and pension taxes are a fixed percent of income. Likewise, per capita outflows on consumption tax also rises with household income. This consumption tax is 17 % on almost all products and services—exceptions are fruits and vegetables and flights—so in absolute terms, higher-income households pay more.

Fiscal support ratio

Current fiscal support ratios

A summary of all aggregated public inflows and outflows in 2018, by population, is shown in Table 2. To ease comparability across settings, we have converted all amounts from the Israeli currency—New Israel Shekels (NIS)—into US dollars.

In the general population, inflows and outflows were relatively balanced. This subpopulation paid almost 100 billion US$ in taxes and received slightly more than 105 billion US$ in benefits and services, resulting in 5 billion US$ of net public transfers and a FSR of 0.95. That is, for every 100 effective beneficiaries, there were 95 effective tax payers.

The equivalent FSRs for Arab and Haredi subpopulations were much lower. Aggregated public inflows to the Arab subpopulation in 2018 summed to 27.1 billion US$ and outflows to 11.9 billion US$, yielding net public transfers of 15.2 billion US$ and a FSR of 0.44. In the Haredi subpopulation, the imbalance was even larger (in relative terms). Aggregated inflows were 17.4 billion US$ and aggregated outflows of only 5.9 billion US$, yielding net public transfers of 11.5 billion US$ and a FSR of 0.34.

Comparing the share of inflows and outflows across the three subpopulations to each one's share of the total population points to the main source of these very different FSRs. It is much more the distribution of outflows than inflows. For example, in 2018, Haredim and Arabs constituted about 12.5 % and 21 % of the total population, respectively, and they received about 11.6 % and 18.1 % of total inflows. This relative parity likely stems from the small share of elderly in these two populations. In contrast, Haredim contributed a mere 5.0 % and Arabs 10.1 % of the total outflows, less than half of their share in population.

Figure 8 places these massive differences in FSRs and the distribution of public transfers in the larger context of aggregated life-cycle deficits (LCDs), that is, the difference between total consumption (private and

[11] Data limitations prevent us from distinguishing premiums on pensions from those associated with other types of national insurance such as disability, child allowance and unemployment.

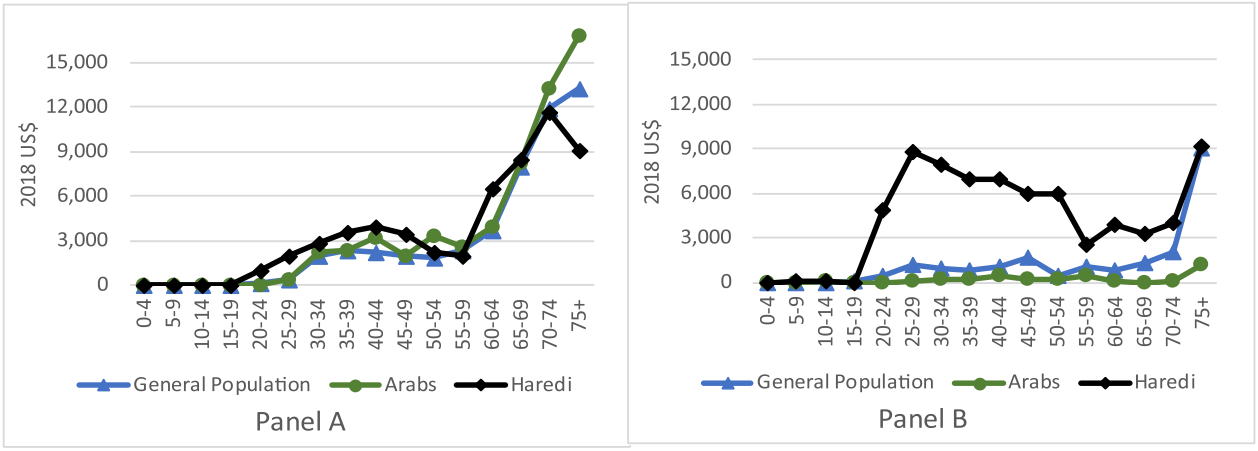

Figure 6. Annual Public Pensions* (Panel A) and Other Cash (Panel B) Inflows, 2018, by subpopulation.

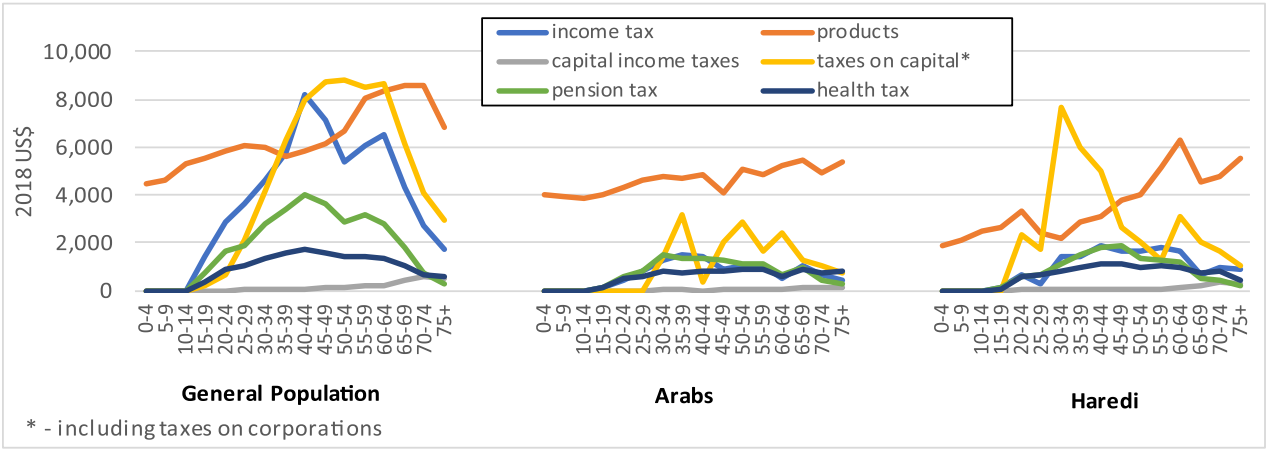

Figure 7. Annual Public Outflows per capita, 2018, by tax type and subpopulation.

Table 2
Aggregated Annual Public Inflows, Outflows, and Fiscal Support Ratio, 2018, by subpopulation.

	General population	Arabs	Haredim	Total
Inflows (billions US$)	105.03	27.12	17.42	149.57
Share of total inflows (%)	70.2	18.1	11.6	100
Outflows (billions US$)	99.93	11.87	5.90	117.71
Share of total outflows (%)	84.9	10.1	5	100
Fiscal support ratio (outflows to inflows)	0.95	0.44	0.34	0.79

public) and labor income (YL). Those deficits amount to 58.6, 29.6 and 13.1 billion US$ across the general, Haredi and Arab subpopulations, respectively. However, the share of life-cycle deficit that was financed by net public transfers across these subpopulations was 8.7 %, 51.5 % and 87.9 %. In other words, given the labor income, consumption and transfers patterns in 2018, the general population financed more than 90 % of its LCD with asset-based reallocations. The Arab population asset-based reallocation financed 50 % of its LCD, and the Haredi population a mere 12 %. The latter was almost completely reliant on public funds to cope with their LCD.

Projected fiscal support ratios, 2018–2050

To see how these ratios shift in line with anticipated changes in age composition, we project the FSR of each subpopulation from 2018 to 2050, allowing for anticipated changes in the age composition alongside 15 % net movement away from the Haredi toward the general subpopulation between birth and age 25 (Weinreb & Blass, 2018). In order to isolate the effects of shifting age composition within each subpopulation on its unique discrete FSR, we hold constant age-specific patterns of economic activity and public inflows and outflows.

We also project the national FSR, whose 2018 values were shown in the final column of Table 2. That national FSR takes into account the shifting composition within the national population, especially as the share of the Haredi subpopulation within the total population continues to rises, giving more statistical weight to their extremely low FSR in the national measure.

Figure 9 portrays both the subpopulations and national trends in the FSR. Note that since our focus is on trends—differences in the absolute levels were discussed in relation to Table 2—we index the projected FSR, for each subpopulation and national, relative to 2018.

The main finding is that anticipated shifts in the age composition of each of Israel's three subpopulations will marginally improve the FSR of the Arab and Haredi subpopulation, while in the general population the FSR will deteriorate significantly.

In the Arab population, there is an initial improvements until 2028. This appears to be driven by the reduction in fertility, which reduces education-related expenditures. Rising aging-related expenditures then flatten the curve. Recall that the share of the Arab population aged 70+ will increase from around 3 % of the population in 2018 to around 9 % in 2050. The light decrease in FSR after 2030 is driven by the extra public expenditures on health and public pensions associated with aging. They

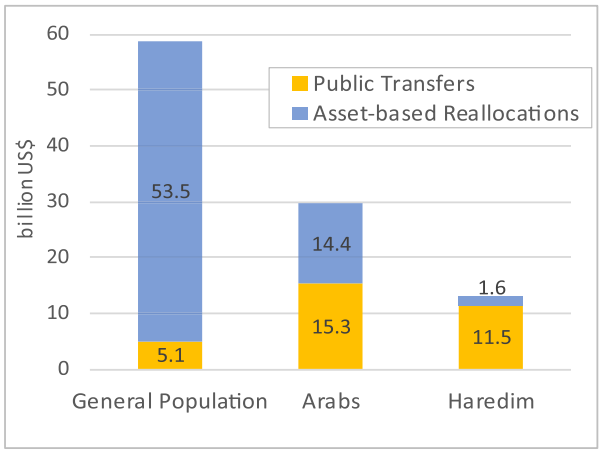

Figure 8. Aggregated Annual Life-cycle Deficit, 2018, by source of finance and by subpopulation.

outweigh any reduction in public expenditures on education associated with falling fertility.

In the Haredi subpopulation, the trends are flat for the first ten years and they then climb slowly towards 102.5. This also reflects anticipated minor reductions in fertility alongside generally "stable population" characteristics (Preston et al., 2000). We saw earlier that by 2050, only around 3.5 % of the Haredi population will be aged 70+. In the Haredi subpopulation, ongoing high fertility implies a constant rise in the number of people entering employment years which, even at lower levels of labor income, will attenuate the impact of aging on the FSR.

Among Israel's three major subpopulations, the most dramatic change in the FSR will occur in the general population. Here the trend is notably downward: to 94.9 by 2030 and then to 91.8 by 2050. This, too, reflects anticipated reductions in fertility and an especially rapid increase over the current decade in the absolute size of population aged 70+, with ongoing increases to 15 % of the total by 2050. Here, too, the extra public expenditures on health and public pensions associated with these increases will substantially outweigh any reduction associated with falling fertility.

The bottom line in Figure 9 is the trend in Israel's national FSR. Compositional shifts alone will lead to a 12 % deterioration in Israel's FSR by 2050. A simple decomposition implies that 68 % of this deterioration is associated with shifting age composition within Israel's population, aging in particular. The remaining 32 % is the product of the shifting composition within the national population as the share that is Haredi continues to rise. By 2050, around 20.5 % of Israel's population will be Haredi, up from 12.4 % in 2020.

Discussion

Like any other analysis anchored in a demographic projection, this paper makes no formal predictions about what will be. Rather, its goal has been to illuminate how shifts in age structure and the relative composition of its three major subpopulations, will affect Israel's FSR over the next three decades, with these effects occurring in the context of rapid growth in the overall size of the population. In that regard, our core finding is that the anticipated demographic shifts within Israel's will depress its FSR substantially. This deterioration will be concentrated in the general population, whose FSR until now was relatively balanced. Demographic shifts will push down its FSR by roughly 8.1 percentage points. In both the Arab and Haredi populations, the FSR, which was already very low, will only marginally improve.

These findings are important in general. We argued above that Israel's demographic profile is unusual for a high-income country. Two contextual factors are worth noting in this regard. First, Israel is the only high-income country in the OECD whose labor force, as currently defined in terms of age-range, is projected to grow into the late decades of the current century. Second, Israel is also the only high-income OECD country that has yet to experience the full benefits of a first demographic dividend, that is, that multi-decade period of low rates of combined child and old-age dependency that follows the reduction of fertility to around replacement-level (Total Fertility Rate≈ 2.1). The fact that Israel's FSR is projected to deteriorate in spite of above-replacement level fertility rates, and in spite of an ever-growing labor force, confirms how powerfully shifting age structures, in particular aging, can affect overall inflows and outflows, especially in welfare states that spend substantial sums on their elderly.

The differences across Israel's three major subpopulations are also important. In general, they confirm how critical it is for wealthy welfare states to enable and encourage all subpopulations to be full economic participants. More specifically, the extremely low FSR of the Haredi population shows that a young age structure alone is not sufficient to reach FSR parity, even with very high rates of female employment. Likewise, the very low FSR of the Arab population shows that even a flattening age structure at younger ages will not substantially raise the FSR absent shifts in employment patterns. In each of these cases, the indispensible mediating factor linking age structure to improved FSR appears to be education: low educational levels lead to low or low-quality employment, which in turn depresses outflows to the state and drags down the FSR.

We reiterate that our projections assume that the 2018 age-specific per capita patterns of inflows and outflows in each of Israel's three core subpopulations remain constant. This is clearly an unrealistic assumption, but it is a necessary heuristic device that isolates the effects of demographic change on the FSR. Moreover, it is also not immediately

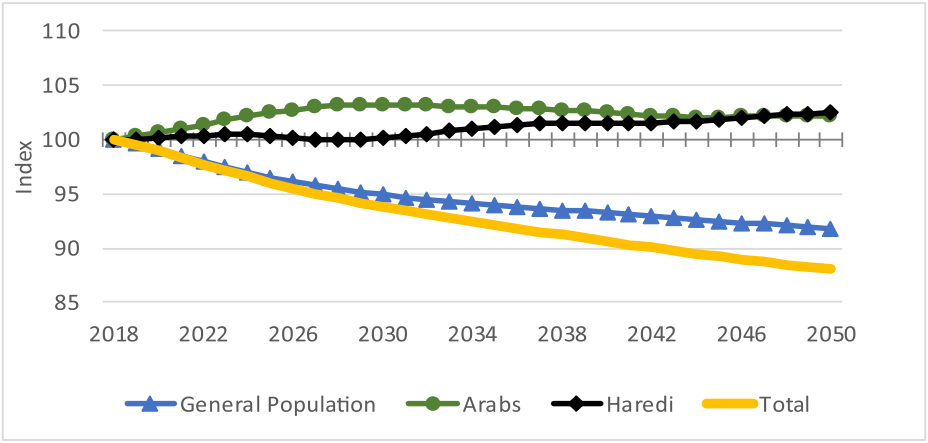

Figure 9. Fiscal Support Ratios, 2018–2050, by subpopulation and total.

clear whether more realistic expectations would mitigate or exacerbate these conditions.

For one thing, our estimates ignore emerging research on the future labor market in general, and the complex interaction between demographic structures and robotics and AI in particular (Acemoglu & Resrepo, 2022). Instead, we implicitly assume that a given society's ability to take advantage of these technological innovations will be correlated with existing and future levels of human capital; and that a given society's readiness to share the fiscal benefits of these innovations, at least over the next couple of decades, will be correlated with prior patterns of sharing, which are in part embodied in contemporary patterns of public outflows. If these assumptions are valid, the core structural effects that we have identified here will remain largely immune to the emerging shifts in the labor market.

Perhaps more significant, our estimates also ignore endogenous processes, ranging from government policies to individual behavior, that could improve the FSRs, especially in the Arab and Haredi subpopulations, where levels of human capital are relatively low. For example, the Israeli government has initiated a number of five-year plans to pull these populations into higher education and more skilled areas of the labor market. The economic justification for these interventions is that they will result in higher labor incomes and net taxes paid, alongside reduced health expenditures that often result from higher education. Those benefits will far outweigh the greater educational investments required to jumpstart them.

In our review of transitions within Israel's Arab population, we pointed to rapid increases in terms of education, especially among women, that are consistent with the aspirations underlying these five-year plans. We anticipate increased public outflows from these more educated cohorts as they reach peak earning ages over the 2030s and 2040s. That will raise the FSR in the Arab population. It should also increase the share of the Arab population that can draw on age reallocations, especially at older ages, rather than having to rely on more meagre public transfers. Together, these shifts suggest that our estimates likely underestimate improvements in the FSR in Israel's Arab subpopulation.

In contrast, such efforts have thus far been the least successful with Haredi men, whether because of deeper ideological commitment to a life of Jewish learning, strengthened by strong community norms, or because of the strong public financial support, as in the allowances for married Haredi men who are involved in religious studies, discussed in relation to Figure 6b. In either case, we see few signs of positive change, and certainly nothing on the magnitude of Israel's Arab population. For example, there are signs of increasing interest in core secular studies among some Haredi parents, reflected in the growing share of Haredim sending their sons to State Haredi schools that teach them math and English beyond age 12. However, this remains a very small minority, and it continues to be condemned by many religious leaders (e.g., Farkash, 2022). Likewise, over the 2014–2021 period there was no shift in overall male Haredi employment rates: rises among Haredi men above age 40 were offset by reductions below age 30. Finally, the Likud-led coalition's budget for 2023–2024 in the period prior to the Israel-Hamas War of 2023 added at least two billion shekels (around 500 million USD) to the national budget to finance Haredi educational institutions, while cutting elsewhere.[12] As of the time of writing, these budgetary agreements have been suspended and will be revised given the economic impact of the 2023 War. However, the readiness to enact such changes suggests that it is politically unrealistic to expect a shift in public expenditures that will reduce inflows to the Haredi population, in particular, especially monetary support, and even less realistic to expect substantial increases in outflows, which could arise from substantial movement towards more skilled and higher-paying employment.

Here we confront the core barrier to mitigating these problems. Israel has a delicately-balanced parliamentary system comprising several sectorally-specific political parties, including dedicated Haredi and Arab parties. The proportional representation system gives disproportionate political influence to small parties, since ruling coalitions rely on their votes. Haredi parties, in particular, which have sat in almost every government for the last 30 years, have skillfully protected their sectoral interests (Neuberger, 2024). There is no reason to think that they will stop trying to do so. Given that the Haredi population has the most profoundly imbalanced FSR, and is the fastest growing of these three major populations, this political-structural issue is a concern.

There are additional ways to improve Israel's national FSR by either reducing public inflows and increasing outflows. The ongoing rises in life expectancy point to the importance of increasing official retirement age in order to both maintain outflows for a longer period and postpone public inflows associated with public pensions. Improving preventative healthcare in order to increase healthy life expectancy, especially by reducing Israel's high levels of obesity and Type-II Diabetes, will also reduce expected health costs in the future. Abolishing tax exemptions and broadening the tax base, especially in asset-related incomes, will also increase public outflows.

In summary, even if the negative impact of aging on FSRs is already built-in to Israel's population dynamics, especially in the general population, and even if the effects of aging are compounded by growth in Israel's least economically productive subpopulation, Israel has ways to improve its long-term fiscal stability, and it has been taking some steps in that direction, though not all have been successful.

Conclusions

Over and above the importance of providing an NTA-based analysis for understanding Israel, we have highlighted the value of disaggregating national populations into their core subpopulations, especially when the sociocultural borders between those subpopulations also index differential demographic growth and economic behavior. That is the case in Israel. Barring changes in policy or unrelated shifts in economic behavior, those anticipated shifts will weaken the country's fiscal health. Disaggregating Israel's NTA into three subpopulations allows us to pinpoint core structural sources of that deterioration. In the general and Arab populations, the rapid rise in the share of the population that is elderly is similar to other high income countries, pointing to coming increases in health and pension-related expenditures associated with old age. Only among Haredim will this growth in the elderly population be largely offset by growth in the working age population (aged 30–59). This undercores the importance of pulling more Haredi men into the labor force, including by providing more apposite educational pathways.

Similar structural characteristics, albeit quite different in their particulars, appear to exist in other countries. We can imagine a similar disaggregation being conducted across language minority groups in Western Europe, Latin America or India; or across different tribal coalitions in many countries in sub-Saharan Africa or in some Arab societies. In each of these cases, some combination of longstanding patron-client networks, discriminatory practices, and cultural factors have generated and then entrenched differences in educational and employment characteristics. In either case, where age-related patterns of employment, income and social benefits covary with identity, the NTA analytic framework provides a clear analytic pathway to exploring the long-term consequences of differential growth, since it carefully links

[12] This would have further entrenched lower employment and earnings in the Haredi sector in the future in two ways: (a) by fully funding those streams of Haredi schools irrespective of whether they teach any math, English or science; and (b) by providing extra welfare payments which disproportionately favor Haredi families by increasing per child payments beyond the fourth child (Gal et al., 2023). Additionally, since these added expenditures were to have been funded, in part, by cutting welfare and education, some of the planned social investments that would have yielded economic benefits down the line, would also not occur.

age with socially and economically meaningful types of public and private expenditures, and public and private receipt of benefits. In a country like Israel, where subpopulations are also connected to sectoral political parties, exploring the long-term consequences of differential growth is also politically meaningful.

There is, of course, a danger in this type of exercise, since it is not difficult to imagine either how such information can be used to rank groups based on how much they contribute to the public purse, or how this type of ranking can be misused. In Israel, this issue, captured in the emotive phrase "an equal burden" ("*shivyon ba'netel*"), lies at the center of much political discourse.

On the flipside, in places where such discourse is already circulating widely, as is the case in Israel, unless that discourse is based on high-quality data and an NTA framework, it will likely be misleading. Under those circumstances, providing accurate estimates and framing them responsibly is imperative. It can provide a robust empirical anchor for subsequent policy that will be designed to increase the well-being of the population as a whole, while tailoring interventions to sub-populations' specific demographic and economic challenges and constraints. It is our hope that the empirical estimates presented in this paper are accepted in that light.

CRediT authorship contribution statement

Kyrill Shraberman: Conceptualization, Data preparation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing.. **Alexander A. Weinreb:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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