



DEMOGRAPHICS TO DEMAND

How Aging and Declining Populations Will Drive Product and Company Demand Tailwinds/Headwinds

In the latest installment of our Demographic Dilemma series, we evaluate the growing influence of spending shifts in aging populations and how they will impact product, industry, and company demand. We introduce our **Demographic-Driven Demand (DDD) framework -- covering ~3,000 companies -- to identify** which industries/companies have the greatest demographic-driven demand impact vs. a 2023 baseline before accounting for product differentiation or shifts in corporate strategy.

While the demographic shifts of aging, rapidly falling fertility rates, and declining young populations -- **developed economies are set to experience retiree growth (ages 65+) of 4 million annually, while core consumers aged 35-55 are set to see accelerated declines of 3 million p.a. starting in 2030 (UN)** -- have long been topical, we see potential for a material impact by the end of the decade that could drive headwinds/tailwinds for product demand and influence corporate strategies around regional mix, product mix and integration/consolidation.

- Our bottom-up analysis implies a 0.6 percentage point advantage in annual demand growth for sectors with the greatest demographic tailwinds vs. those with the greatest headwinds.
- Over the last three years, we have seen companies with better demographic outlooks as implied by our framework witnessing larger consensus revenue beats and smaller EPS misses at their results relative to those with poorer demographic outlooks.

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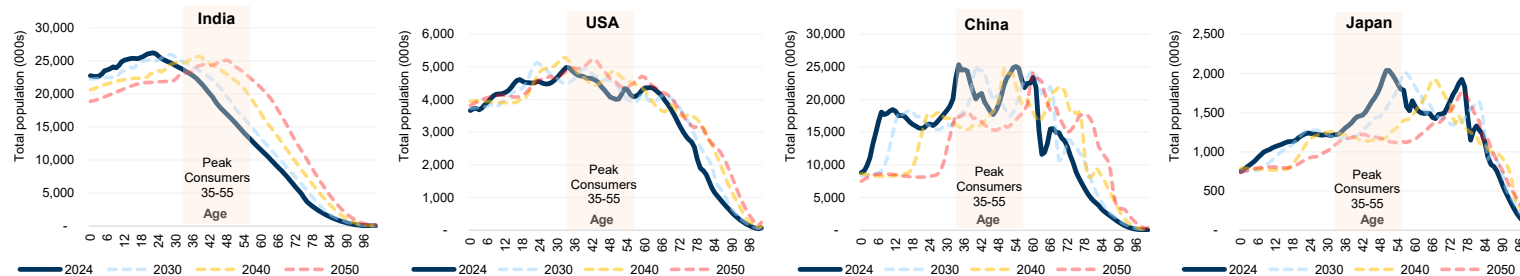
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Demographics to Demand - Investable Conclusions

Top 5 largest industries with the greatest tailwinds include Pharma & Biotech, Utilities, Med Tech, Staples Retail, Multiline Retail, and **Bottom 5 industries with the greatest headwinds** include Public Transit (Vehicle/Rail), Airports, Tech Hardware, Autos, Consumer Capital Goods could see Demographic Demand impact of an avg. +4.2%/-0.3% through 2030 and +8.7%/-1.7% through 2040 (UN base case).

Exhibit 1: Countries are at different points on the Demographic Wave for peak consumers (ages 35-55) with India pre peak, US early peak, China mid peak, and Japan post peak

Total population by single age 0-100+ by country UN base case by estimate year, 2024-2050



Source: UN, Data compiled by Goldman Sachs Global Investment Research

Executive Summary - Demographics to Demand

The world is already witnessing peak populations among individuals under the age of 19, which are now in decline globally and seeing an accelerated drop amid rapidly falling fertility rates — contributing to earlier and earlier expected peaks for global populations. The developed world has likely reached peak population for core consumers aged 35–55, even in the UN's base case scenario. UN estimates imply 20% growth in global populations by 2050, led by a 100% increase in the population of seniors over the age of 65 to 1.6 billion from 800 million. The starkest shift in populations is being felt in developed markets, where retirees aged 65+ are set to grow by 4mn annually, while main consumers aged 35–55 are set to see accelerated declines of 3 million (~-0.75%) p.a. starting in 2030 (UN). **As a result of aging and declining populations, we see notable demographic tailwinds and headwinds forming for products, industries, and companies, requiring greater investor attention by the end of this decade.** We come away with three key takeaways.

1) Products and Industries most exposed to shifting spending from demographic changes by analyzing consumer spending propensity by age cohort across the US, Europe, and Japan.

- **Product Spending Tailwinds Skewing Older (65+):** Home Improvement & Repair 1.92x vs. median consumer, Health Care 1.54x, Reading 1.61x, Utilities (Electric & Gas) 1.34x, Home Textiles & Decorations 1.23x ([Exhibit 3](#)).
- **Product Spending Headwinds from Lower Consumption for 65+:** Education 0.24x vs. median, Food Outside the Home 0.69x, Apparel & Footwear 0.72x, General Electronics 0.77x, Vehicle Purchases 0.82x ([Exhibit 4](#)).

2) Top 50 economies exposed to demographic headwinds and tailwinds for future consumption ([Exhibit 66](#)):

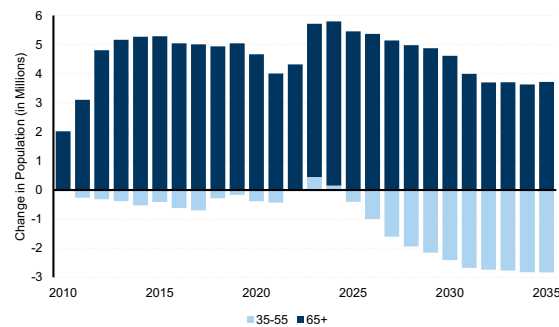
- **Headwinds:** Hong Kong, Korea, Japan, China, Poland, Spain, Italy, Germany, Austria, and Portugal all set to enter or remain in the top 10 aging economies by 2050.
- **Tailwinds:** USA, India, Australia, France, Sweden, the Middle East, Israel, and Argentina are set to see a relative improvement in their aging profile relative to the top 50 economies.

3) Demographic demand tailwinds/headwinds of +4.2%/-0.3% by 2030 and +8.7%/-1.3% by 2040 vs. 2023 for the top-5 most impacted industries in our new GS SUSTAIN Demographic-driven demand (DDD) framework that measures ~3,000 companies' exposure to demographic headwinds and tailwinds based on detailed product and geographic revenue exposure.

Demographics to Demand - Summary in charts

Exhibit 2: In developed economies, retirees are growing ~4 mn pa, while peak consumers (35-55) are set to decline ~3 mn a year over the next decade

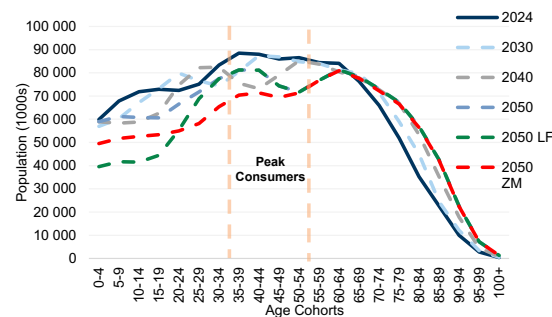
Annual change in population (millions) by age cohort in More Developed Regions, 2010-2035E; medium variant estimate 2024 onwards



Source: UN Population Prospect, Data compiled by Goldman Sachs Global Investment Research

Exhibit 5: The developed world has likely reached peak consumer population aged 35-55, and will be significantly lower under zero migration / low fertility scenarios in the future

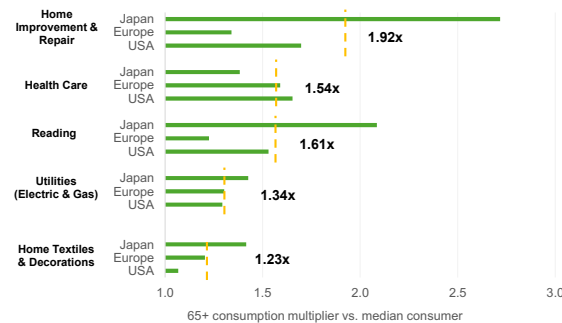
Population distribution by age cohorts 0-100+, 2024-2050 medium variant



Source: UN Population Prospects, Data compiled by Goldman Sachs Global Investment Research

Exhibit 3: 65+ spend more on Home Improvement, Healthcare, Reading, Utilities, and Decorations...

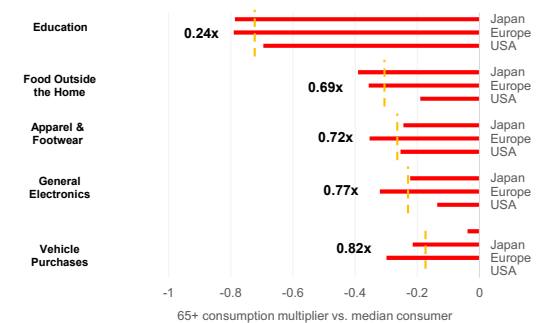
Top 5 categories with highest 65+ consumption multiplier vs. median consumer by region



Source: BLS, Eurostat, SBJ, Data compiled by Goldman Sachs Global Investment Research

Exhibit 4: ..while spending less on Education, Food Outside the Home, Apparel & Footwear, Electronics, and Vehicle Purchases

Bot. 5 categories with lowest 65+ consumption multiplier vs. median consumer by region



Source: BLS, Eurostat, SBJ, Data compiled by Goldman Sachs Global Investment Research

Exhibit 6: Our DDD framework can provide insights into company's demographic headwinds and tailwinds

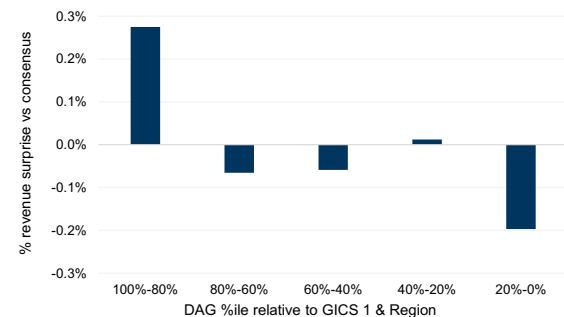
Headline and country level demographic-driven demand growth, 2030-2050 vs 2023

Demographic-Driven Demand				
		2030	2040	2050
UN Base Case		0.9%	1.6%	1.5%
Country Level Demographic-Driven Demand Impact				
Country	% of Revenue	2030	2040	2050
United States of America	36%	2.6%	6.0%	8.5%
China	13%	-3.7%	-10.3%	-17.5%
Canada	6%	5.0%	9.7%	13.1%
Japan	2%	-4.6%	-11.2%	-16.7%
India	2%	5.4%	10.8%	12.7%
Others	22%	0.8%	0.9%	0.6%

Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 7: Companies with better demographic outlooks have seen higher average revenue surprises over the past three years

Trimmed mean (80%) % revenue surprise vs. consensus estimates by DDD quintile (GICS 1 & Region relative), 2023-2025



Source: FactSet, Goldman Sachs Global Investment Research

Demographics to Demand In Numbers

The Macro Shift: A Graying World



The Demographic Wave: Peak Consumers (Ages 35–55)

Geographies are positioned at different stages of the demographic wave for peak consumers:



Country Inflection Points

- 2030** – The year deaths are projected to exceed births (pulled forward from 2039).
- 2056** – Projected peak of the US population (pulled forward from 2080).
- +55%** – Extra electricity consumed per person by the 55+ cohort compared to those under 45.

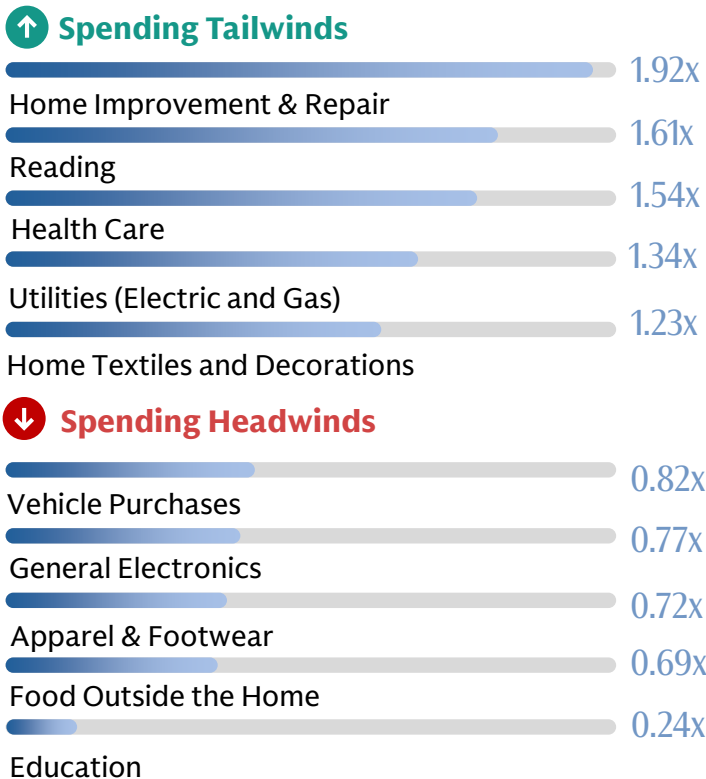
0.80 – Total Fertility Rate (TFR) in 2025 (the lowest among developed nations, though rebounding slightly toward >0.9 in 2026).

- 3.39 million** – Population decline in 2025 (accelerating from a 1.39 million decline in 2024).
- 17%** – Year-over-year drop in registered births in 2025 (7.92 million vs. 9.54 million in 2024).
- 55%** – Projected population collapse by 2100 under the UN base case (shrinking to 639 million from 1.4 billion).

0.87 – Record-low TFR reached in 2025.

Consumption Multipliers: How the 65+ Cohort Spends

Older demographics shift demand significantly. The table below shows spending propensity relative to the median consumer (1.00x):



Introducing our Demographic-Driven Demand (DDD) framework to measure company exposure to demographic headwinds and tailwinds

We combine global consumer spending and engagement data (across the US, Europe, and Japan) with corporate product and geographic revenue exposure to provide a view of companies facing demographic headwinds and tailwinds to demand in the years ahead. Our **Demographic-Driven Demand model** combines the following steps:

1. **Use consumer spending / engagement data** to evaluate spending propensity by different age cohorts in the US, Europe, and Japan to build a view of an average global consumer.
2. **Build consumer spending multipliers by product and age range** (0-24, 25-34, 35-44, 55-65, 65+) to measure product type spending propensity by age vs. the median.
3. **Apply country population change by age cohorts** (0-24, 25-34, 35-44, 55-65, 65+) over the coming decades (2030, 2040, 2050) by population scenario (base case, low fertility, zero migration) using UN forecasts.
4. **Calculate Demographic-Driven Demand (DDD)** - Map consumer preference by product and age range multipliers and country-level population change by age cohort data with detailed company product/service and geographic revenue exposure to measure companies' demand headwinds and tailwinds by 2030, 2040, and 2050 vs. a 2023 base.

Exhibit 8: Our Demographic-Driven Demand framework highlights where companies have product and geographic exposure to demographic challenges or opportunities

Steps for our DDD model: Example - UN Base Case, 2030

UN Base Case 2030 Horizon		Country 1 USA, 51.7% Revenue						Country 2 Japan, 11.4% Revenue						Country 3... + China, 11% Revenue					
Demographic-Driven Demand (DDD) %		Age Cohort						Age Cohort						Age Cohort					
Segment 1	Revenue % from Segment	0-24	25-34	35-44	45-55	55-64	65+	0-24	25-34	35-44	45-55	55-64	65+	0-24	25-34	35-44	45-55	55-64	65+
Step 1 & 2 - Multiplier for Product Segment -		0.89	0.99	1.03	1.07	1.08	0.86	0.89	0.99	1.03	1.07	1.08	0.86	0.89	0.99	1.03	1.07	1.08	0.86
Step 3 - Population Change by Age Cohort from 2023		-1.1%	-0.7%	3.0%	6.0%	-6.6%	21.0%	-8.4%	0.2%	-15.3%	-17.6%	15.7%	1.3%	-13.6%	-19.2%	3.6%	-13.0%	19.3%	25.9%
Step 4 - Demographic-Driven Demand Growth % (DDD = Pop. Growth Rate * Multiplier)		-1.0%	-0.7%	3.1%	6.4%	-7.1%	18.1%	-7.5%	0.2%	-15.8%	-18.8%	17.0%	1.1%	-12.1%	-19.0%	3.7%	-14.0%	21.0%	22.3%
% share of age cohort (2023)		31%	14%	14%	12%	12%	17%	21%	10%	12%	15%	13%	30%	28%	14%	15%	16%	13%	14%
Population - Weighted DDD %		-0.3%	-0.1%	0.4%	0.8%	-0.9%	3.2%	-1.6%	0.0%	-1.8%	-2.9%	2.1%	0.3%	-3.4%	-2.7%	0.5%	-2.2%	2.8%	3.2%
Final Country & Segment DDD %, 2030		3.1%						-3.8%						-1.7%					
Segment 2		3.7%						-3.6%						0.1%					
Segment 3		2.6%						-3.8%						-1.9%					
Segment 4... +		2.9%						-4.2%						-3.0%					
		...+						...+						...+					

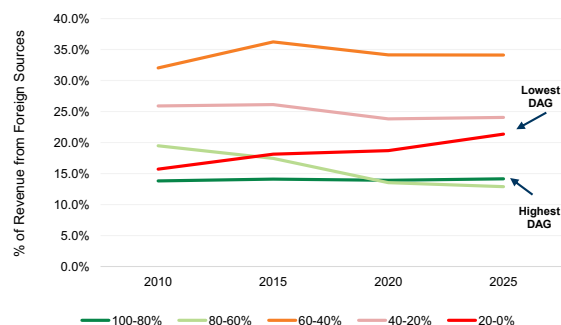
Source: UN, FactSet, Goldman Sachs Global Investment Research

How could companies with Demographic Demand headwinds respond, and what have we seen?

- **Product Redesign, ReFormulation, and Products-as-a-service offerings will likely be necessary strategies to adjust to changing demographics**, especially for industries/companies witnessing declining volumes, to maintain customer relationships and revenue over time.
- **Expanding geographic exposure is likely to be a key remedy for declining domestic demographic profiles.** Over the last 15 years, companies that our analysis suggests have the least favourable demographic demand profiles have shown the largest increase in share of foreign revenue, while companies implied by our analysis as having the best demographic profile showed no increase over the last 15 years ([Exhibit 10](#)).
- **Companies with better Demographic-Driven Demand based on our analysis of forward expectations have seen more positive revenue surprises and fewer EPS misses over the past three years** ([Exhibit 12](#), [Exhibit 11](#)).

Exhibit 10: Companies implied by our analysis to have the greatest Demographic-Driven Demand profile have shown the lowest and flat exposure to foreign revenue, while the worst DDD shows a rising share of foreign revenue

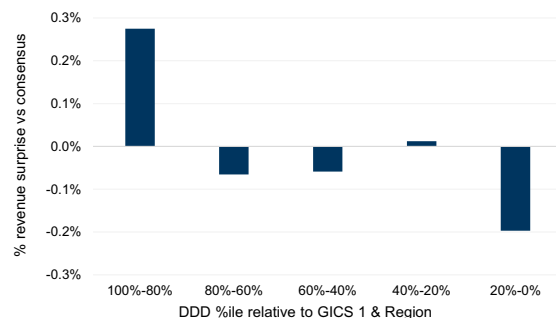
% of foreign revenue by current DDD percentile, 2010-2025



Source: UN, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 11: Companies with better demographic outlooks have seen higher average revenue surprises over the past three years...

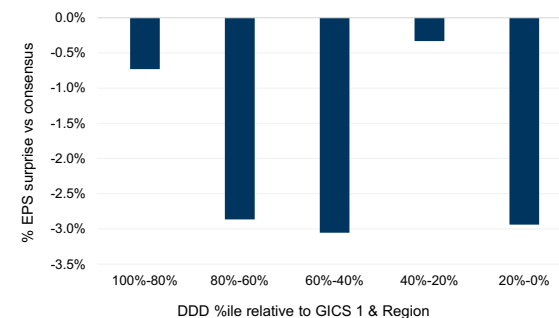
Trim mean (80%) % revenue surprise vs. consensus estimates by DDD quintile (GICS 1 / Region relative), 2023-2025



Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 12: ... and lower earnings misses over the past three years

Trim mean (80%) % EPS surprise vs. consensus estimates by DDD quintile (GICS 1 / Region relative), 2023-2025



Source: FactSet, Goldman Sachs Global Investment Research

Industries where we expect the greatest Demographic-driven tailwinds and headwinds

■ Industries with Headwinds:

- **Apparel and Footwear** face significant headwinds associated with declining youth populations, some of the largest historical spenders on new apparel ([Exhibit 60](#)).
- **Autos are at a strategic crossroads** amid declining prime new driving age populations ([Exhibit 43](#), [Exhibit 44](#)), and declining spending among older age cohorts ([Exhibit 42](#)).
- **Other notable industries facing headwinds:** Education, Electronics (PCs, tablets, TVs), Food Away From Home ([Exhibit 55](#)), Airports, Public Transportation (vehicle / rail) ([Exhibit 30](#)).

■ Industries with Tailwinds:

- **Healthcare, in our view, will see the strongest demographic demand from aging. However, Healthcare and Medtech are not immune to demographic shifts as growth in older populations is set to decelerate from prior decades** ([Exhibit 39](#)). See 'The Healthcare Growth Paradox - Decelerating Momentum' section below.
- **Leisure and Entertainment:** Home Improvement & Furnishings, Reading ([Exhibit 3](#)), Television watching ([Exhibit 51](#)), Cruise Lines, Discount Retailers, and Pets ([Exhibit 25](#)).
- **Residential Electricity Consumption:** Spending data shows older age cohorts spend more on utilities and use

more electricity, likely given excess time at home ([Exhibit 53](#)).

- **Senior Living & Aging at Home:** 70% of individuals over 65 prefer to age in their home, presenting opportunities for home healthcare, telemedicine and digital devices ([Exhibit 48](#)).
- **Other notable industries facing tailwinds:** Include Home Improvement & Furnishings, Reading, ([Exhibit 23](#)), Retail – Staples, and Multiline ([Exhibit 30](#)).

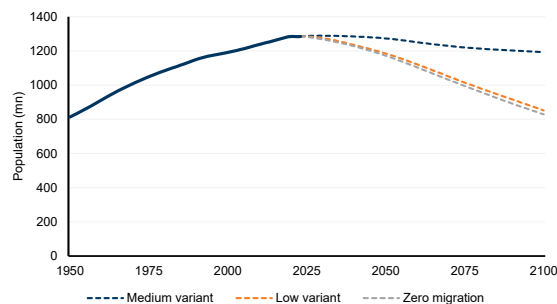
Population shifts: The world is aging faster than expected

Rapidly falling fertility rates have accelerated expectations for when populations peak, while assumptions around immigration will significantly impact developed economy population outlooks. UN base case estimates for future fertility have proven consistently too optimistic ([Exhibit 14](#)), while immigration in developed economies is expected to remain constant ([Exhibit 15](#)) — assumptions that will have a significant impact on future population trajectories — where low fertility and zero migration scenarios could drive population peaks in developed economies in the 2030s ([Exhibit 13](#)).

Emerging economies are no longer bastions of population (or labour growth), as many EMs are seeing birth rates decline faster than in developed economies. For example, some estimates suggest that Mexico now has a lower fertility & birthrate (~1.60 TFR) than the US (1.62) according to the latest data. According to official India statistics, India's fertility has dropped well below replacement levels, with a TFR of 1.90 in 2024. According to the UN, other emerging economies with low and declining TFRs include Thailand (1.21), Chile (1.17), Brazil (1.62) and Colombia (1.65).

Exhibit 13: In the Developed World, population peaks and declines depend heavily around assumptions for fertility rates and immigration

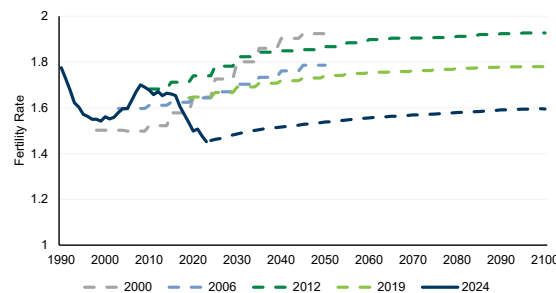
Developed regions population estimates by scenario (1950–2100E); we use Medium variant in our base case



Source: UN, Goldman Sachs Global Investment Research

Exhibit 14: Fertility rates have consistently come in lower than expectations which assume a constant or gradual increase in future TFR...

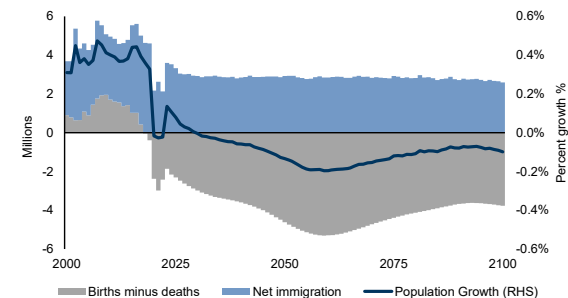
Developed world TFR and estimates, 2000–2024



Source: UN, Goldman Sachs Global Investment Research

Exhibit 15: ... and assumptions around immigration which the UN expects in its base case to stabilize to 2100

Developed World Population change by births - deaths and net immigration, 2000–2100E

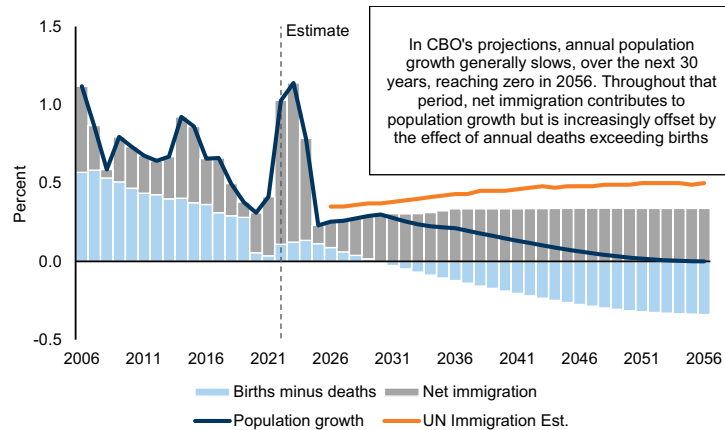


Source: UN, Goldman Sachs Global Investment Research

US Population peak estimates have been pulled forward significantly to 2056 — CBO now estimates deaths to surpass births in 2030 vs. in 2039 just two years prior — however, the US remains relatively better positioned than the rest of the developed world. On our country aging ranking, the US currently sits 23rd relative to the top-50 economies, improving to 29th overall by 2050. However, a zero-migration scenario would see the US population peak in the 2030s ([Exhibit 17](#)).

Exhibit 16: The CBO expects deaths to exceed births starting in 2030 in the US and peak pop. in 2056

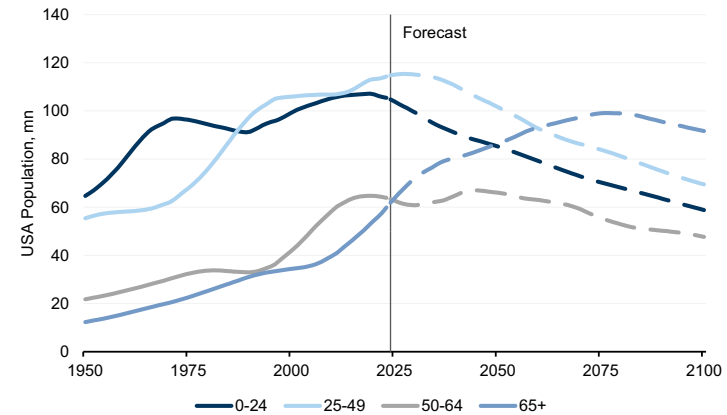
Population growth and contributing factors



Source: CBO, Data compiled by Goldman Sachs Global Investment Research

Exhibit 17: Under scenarios limiting immigration, the US population <65 would peak much earlier than expected in the 2030s

Current population (mn) by age demographic, forecasts after 2023 UN zero migration



Source: UN

Spending Shifts: Implications for Industries, and Companies — Detail on our Demographic-Driven Demand (DDD) framework

Spending dynamics of aging populations are likely to have a significant impact on industry and company growth profiles. As people age there is a natural change in propensity to consume certain products. Mostly obviously, a decline in fertility rates will naturally follow a decline in the need for baby/children's clothing, diapers, infant formula, etc. While older individuals tend to spend significantly more on healthcare, home repair, reading ([Exhibit 23](#)) and less on education, vehicle purchases, clothing, restaurants and hotels, and general electronics ([Exhibit 24](#)).

Introducing our Demographic-Driven Demand Framework: Measuring Demographic Headwinds and Tailwinds to Revenue

We develop a framework that combines consumer spending and/or engagement data by demographic by product across the US, Europe, and Japan with company-specific product & geographic revenue exposure to provide insights into how companies could face demographic headwinds and tailwinds to demand in the years ahead — assuming no management-driven strategic mix/geographic changes. Our new **Demographic-Driven Demand** framework combines the following steps:

- 1. Use consumer spending / engagement data** to evaluate spending propensity by different age cohorts in US, Europe, and Japan to build a view of an average global consumer.
- 2. Build consumer preference by product by age range multipliers** (0-24, 25-34, 35-44, 55-65, 65+) to measure product type spending propensity by age vs. the median.
- 3. Apply country population change by age cohorts** (0-24, 25-34, 35-44, 55-65, 65+) over the coming decades (2030, 2040, 2050) by population scenario (base case, low fertility, zero migration) using UN forecasts.
- 4. Calculate Demographic-Driven Demand % (DDD)** — Map consumer preference by product by age range multipliers and country population change by age cohorts data with detailed company product/service and geographic revenue exposure to measure companies' headwinds and tailwinds to demand impact by 2030, 2040, and 2050 vs. a 2023 base.

More detail on each step below.

(1) Consumer Spending Data — Measuring Spending Propensity by Age Cohort

We evaluated the latest consumer/household spending survey data from the [US](#) (2024), [Europe](#) (2024), and [Japan](#) (2025) to measure average spending per adult across different age cohorts and product categories helping to providing insights into spending propensity by age cohorts to build a view of an average global consumer. Spending by age cohorts has appeared fairly **persistent** over time as consumption habits and preferences remain sticky, with some notable exceptions where habits

Persistent Spending: Spending propensity by age cohort that remains consistent by generation over time. e.g. Less vehicle purchases, more reading, home improvement

Dynamic Spending: Spending that changes by generation as tastes and habits change. e.g. Declining Alcohol & Tobacco consumption, greater spending on eating out & delivery services amongst younger generations.

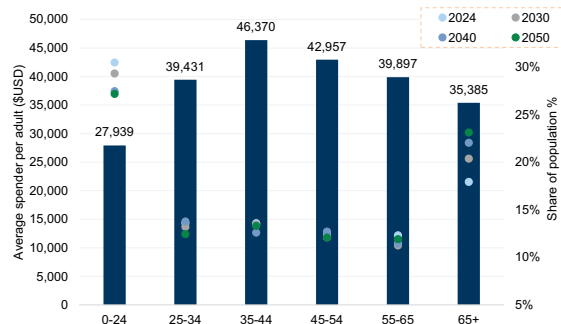
appear **dynamic** with significant declines in consumption of tobacco and alcohol for young cohorts vs. 12 years prior ([Exhibit 56](#)). Key highlights on adult spending by region:

- **US:** Consumption per adult (treating kids as dependents) peaks ages 35-54 and then declines by -21% for ages 65+, the only growing share of population (18% in 2024) to 20.4% by 2030, 22% by 2040, 23.1% by 2050 ([Exhibit 20](#)).
- **Europe** (Germany, France, Italy, Spain): Older age cohorts spend more on average than younger cohorts, but meaningfully less on education, clothing and footwear, restaurants and hotels and vehicle purchases ([Exhibit 21](#)).
- **Japan:** Latest average spending per adult shows peaks for <29, in part driven by rising wages & income amongst young workers, while the majority of population growth will come from 60+ ([Exhibit 22](#)).

For more detail and case studies by region see the section **‘Regional Case Studies - US, Europe, Japan’**

Exhibit 20: US - Average spending peaks ages 35-44 and declines sharply for 65+, the only growing share of US population

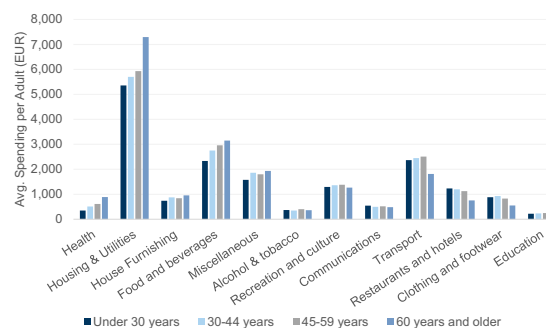
Total Average Adult Annual Spending by Age Group (USA, 2023-2024) (LHS); % Share of population by age cohort, 2024-2050 (RHS)



Source: US Bureau of Labor Statistics

Exhibit 21: Europe - 60+ spend more on health, housing / utilities, furnishing, F&B, and less on transport (vehicle purchases), restaurants & hotels, and apparel

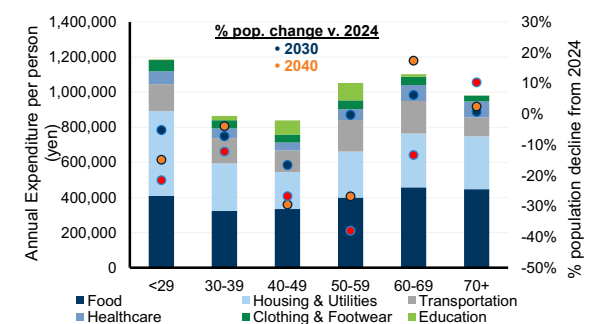
Avg. spending by adult by age cohort across Germany, France, Italy, Spain, 2024



Source: Eurostat

Exhibit 22: Japan - <29s spend the most per person overall, on rent, and clothing, but are set to decline with 70+ set to be the only demographic growing long term

Avg. yearly expenditure per person (Yen) by age cohort, 2024-2025 (LHS); % population decline by age cohort vs. 2024, 2030-2050 (RHS)



Source: Statistics Bureau of Japan, UN, Data compiled by Goldman Sachs Global Investment Research

(2) Establish Consumption / Engagement Multipliers by Age Cohort

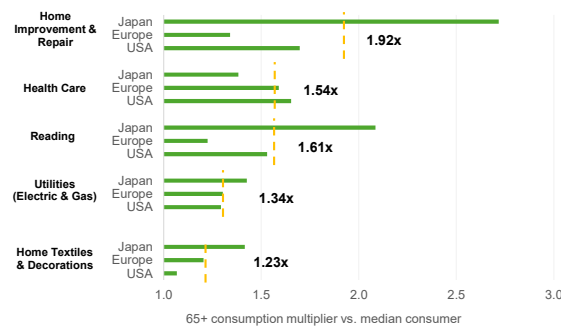
Spending propensity on specific products is fairly consistent across age cohorts and regions. Using the US, Europe, and Japan spending data by age cohort (per adult), we calculate spending multipliers by products / services for each age cohort relative to the median consumer and supplement with engagement survey data by HundredX to fill in gaps for products / services where government survey data is not granular enough (eg. Cruise Lines, etc). Key consumption highlights for older

demographics:

- **Areas of Higher Consumption for 65+:** Home Improvement & Repair 1.92x vs. median, Health Care 1.54x, Reading 1.61x, Utilities (Electric & Gas) 1.34x, Home Textiles & Decorations 1.23x ([Exhibit 23](#)).
- **Areas of Lower Consumption for 65+:** Education 0.24x vs. median, Food Outside the Home 0.69x, Apparel & Footwear 0.72x, General Electronics 0.77x, Vehicle Purchases 0.82x ([Exhibit 24](#)).
- **HundredX Engagement Data for ages 18-29 and 60+:** Engagement data for ages 18-29 skews towards Robotics 2.8x vs. median 18-29 respondents, Video Games 2.7x, Digital Brokers 2.4x, Cryptocurrencies 1.9x, Online Sports Betting 1.7x, Motorcycles 1.7x, Social Media & search 1.6x. Engagement data for 60+ skews towards Home Improvement 1.6x vs. median 60+ respondent, Appliances 1.4x, Pharmacies 1.4x, Auto Repair 1.3x, Department Stores 1.3x, Home Furnishing 1.2x, Discount Stores 1.2x, Banks 1.2x, Cruise Lines 1.2x ([Exhibit 25](#)).

Exhibit 23: Ages 65+ spend more on Home Improvement, Healthcare, Reading, Utilities, and Decorations...

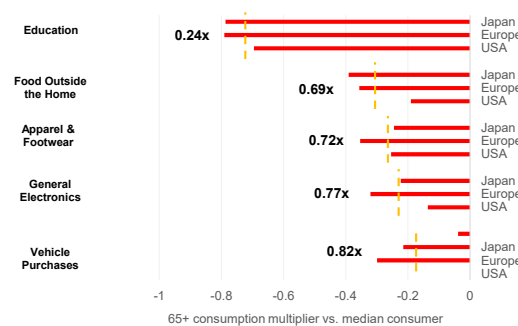
Top 5 categories with highest 65+ consumption multiplier vs. median consumer by region



Source: BLS, Eurostat, SBJ, Data compiled by Goldman Sachs Global Investment Research

Exhibit 24: ... While spending less on Education, Food Outside the Home, Apparel & Footwear, Electronics, and Vehicle Purchases

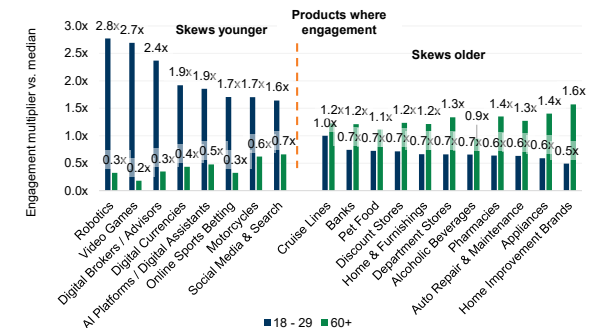
Bot. 5 categories with lowest 65+ consumption multiplier vs. median consumer by region



Source: BLS, Eurostat, SBJ, Data compiled by Goldman Sachs Global Investment Research

Exhibit 25: US consumer survey data shows clear product engagement skews for younger vs. older age cohorts

Multiple of select products survey responses relative to the median by age cohort



Source: HundredX

Addressing Changing Tastes and Habits — The difference between ‘Dynamic’ and ‘Persistent’ consumption — Notes from Alcohol and Tobacco spending. Spending patterns by age cohort for most products and services (as % of total spending) has remained fairly **persistent** over the past decade, while some product categories show **dynamic** spending levels with shifting tastes and preferences changing consumption rates for specific age cohorts vs. history and relative to other age groups ([Exhibit 56](#)). For example, in the US for the age group <25, Alcohol and Tobacco spending in 2024 as a % of total spending has declined from 1.3% and 0.9% to 0.8% and 0.5% respectively from 2012 levels, with limited change in spending

for consumers 45+. For the consumption multiplier for Alcohol in our model, we assume a roll forward of current consumption rates from younger age cohorts (0.66x) over the next two decades to account for this dynamic shift in spending.

A 'Demographic Dividend'

arises when a country's dependency ratios (children & elderly pop. vs. working age population 15–64) decline as the working age population increases as a share of total population — this typically corresponds with a rising productive workforce and growth in consumers that drivers economic growth.

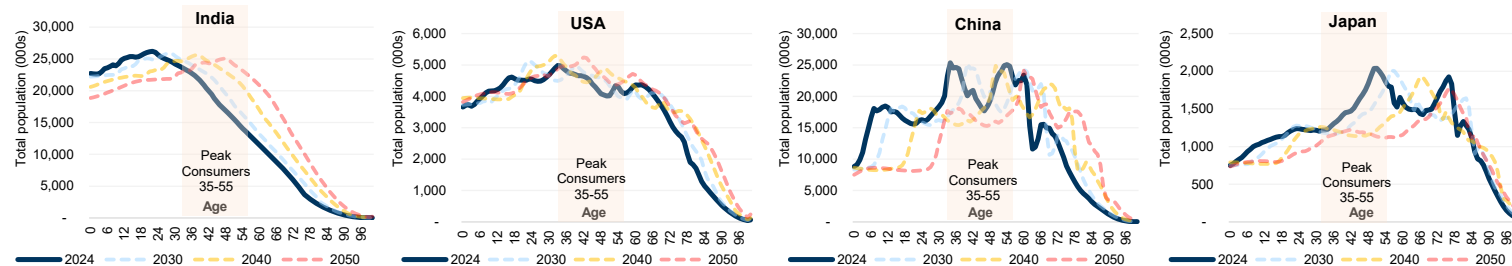
(3) Evaluate Countries Population Changes by Age Cohort and by Population Scenario by 2030, 2040, 2050

Countries are at different points on the Demographic Wave, which is likely to present spending headwinds and tailwinds as consumption habits shift some products / services more in vs. out of favour. In many countries, the UN forecasts imply that populations of consumers aged 35–55 have reached peak. For example, in Japan this age range of the population has already peaked and is set to rapidly decline based on UN expectations, while in China there is a double peak driven by the one-child policy, but is forecast by the UN to decline in future periods. The US and India are still projected by the largest portion of their populations entering peak consuming ages in the coming years. **Key countries set to face headwinds and tailwinds takeaways amongst the top 50 economies** ([Exhibit 66](#)):

- **Headwinds:** Hong Kong, Korea, Japan, China, Poland, Spain, Italy, Germany, Austria, Portugal all set to enter or remain in the top 10 aging economies by 2050.
- **Tailwinds:** USA, India, Australia, France, Sweden, Middle East, Israel, Argentina are set to see a relative improvement in their aging profile relative to the top 50 economies.
- **Emerging economies are no longer bastions of population (or labor growth) as many EMs are seeing birthrates declining faster than developed economies.** For example, some estimates highlight that Mexico now has a lower fertility & birthrates (~1.60 TFR) than the US (1.62) according to the latest data. Other emerging economies with low and declining TFRs include, Thailand 1.21, Chile 1.17, Brazil 1.62, Colombia 1.65.
- **The economies of aging societies with low fertility rates can benefit economically for a period through the 'Demographic Dividend' — Insights from Poland and South Korea.** Despite South Korea's record low fertility rate amongst developing economies, the country maintains one of the highest shares of working age population at 71%, and currently one of the lowest old-age dependency ratios 0.26 (3.8 working age per 65+) amongst advanced economies. However, this is set to decline rapidly in the coming years with Korea becoming one of the fastest aging societies. Poland has seen similar benefits over the past few years from its growing working consumers with low dependency.

Exhibit 26: Countries are at different points on the Demographic Wave for peak consumers (ages 35-55) with India pre peak, the US in early peak, China in mid peak, and Japan post peak

Total population by single age 0-100+ by country, 2024-2050



Source: UN, Data compiled by Goldman Sachs Global Investment Research

Granular population data can show which consumer age cohorts are expected to decline and grow the most by country under different population scenarios. In the US, under the base case scenario, individuals aged 65+ are set to grow 10.5 mn (17%) from 61.9 mn in 2024 to 72 mn in 2030, and grow an additional 15.5 mn by 2050 (net +26 mn). Under low fertility (LF) and zero migration scenarios (ZM) young populations aged 0-24 are expected to decline by -27.6 mn (-26% LF) or -19.5 mn (-19%) by 2050. **In our framework, we apply the UN projections for population growth by country by age cohort across three scenarios (UN medium variant, low fertility, zero migration).**

Exhibit 27: Granular age cohort data can show which age cohorts are declining or growing the most by country - giving insights into declining or growing target markets

USA population estimates by age cohorts and % change, 2024-2050 by population scenario

	UN Base Case (Medium Variant)						United States Population Change - 2024-2050						UN Zero Migration					
	UN Base Case (Medium Variant)						UN Low Fertility						UN Zero Migration					
	0-24	25-34	35-44	45-54	55-65	65+	0-24	25-34	35-44	45-54	55-65	65+	0-24	25-34	35-44	45-54	55-65	65+
2024	105,254	46,939	46,925	41,858	42,520	61,931	104,973	46,939	46,925	41,858	42,520	61,931	104,771	46,856	46,906	41,839	42,501	61,910
2030	104,292	46,907	47,808	44,173	40,018	72,452	100,118	46,907	47,808	44,173	40,018	72,452	99,320	44,521	47,614	43,973	39,806	72,163
2040	101,661	50,952	46,635	47,025	42,350	81,587	86,617	50,952	46,635	47,025	42,350	81,587	90,655	43,011	43,904	46,554	41,842	80,693
2050	103,488	47,349	50,653	46,004	45,336	88,017	77,338	46,514	50,653	46,004	45,336	88,017	85,219	37,548	42,468	43,050	44,567	86,434
	% change vs. 2024						% change vs. 2024						% change vs. 2024					
	% change vs. 2024						% change vs. 2024						% change vs. 2024					
	0-24	25-34	35-44	45-54	55-65	65+	0-24	25-34	35-44	45-54	55-65	65+	0-24	25-34	35-44	45-54	55-65	65+
2030	-0.9%	-0.1%	1.9%	5.5%	-5.9%	17.0%	-4.6%	-0.1%	1.9%	5.5%	-5.9%	17.0%	-5.2%	-5.0%	1.5%	5.1%	-6.3%	16.6%
2040	-3.4%	8.5%	-0.6%	12.3%	-0.4%	31.7%	-17.5%	8.5%	-0.6%	12.3%	-0.4%	31.7%	-13.5%	-8.2%	-6.4%	11.3%	-1.6%	30.3%
2050	-1.7%	0.9%	7.9%	9.9%	6.6%	42.1%	-26.3%	-0.9%	7.9%	9.9%	6.6%	42.1%	-18.7%	-19.9%	-9.5%	2.9%	4.9%	39.6%

Source: UN, Data compiled by Goldman Sachs Global Investment Research

(4) Demographic-Driven Demand % (DDD) - Combine Detailed Company Product and Geographic Revenue Exposure Data to Measure Demographic Headwinds and Tailwinds
Our Demographic-Driven Demand framework can provide insights into:

- **Companies exposure to products facing demographic headwinds from aging & declining population of key target demographics.** For example, ages 65+ in our model spend 14% less on new vehicles than the median consumer vs. the key vehicle spending demographic age cohorts of 45-54 at 7% above median and 55-64 at 8% above median — posing demographic headwinds for vehicle manufacturers amidst an aging population ([Exhibit 28](#)).
- **Peer analysis for companies within industry best positioned for Demographic Opportunities or Challenges.** Our framework can help signal which companies within a sector have the best demographic profile based on 1) product portfolio and 2) geographic revenue exposure across population scenarios (UN Base Case, Low Fertility, Zero Migration).

Exhibit 28: Our Demographic-Driven Demand framework highlights where companies have product and geographic exposure to demographic challenges or opportunities

Steps for our DDD framework: Example - UN Base Case, 2030

UN Base Case 2030 Horizon		Country 1 USA, 51.7% Revenue Age Cohort						Country 2 Japan, 11.4% Revenue Age Cohort						Country 3... + China, 11% Revenue Age Cohort					
Segment 1	Revenue % from Segment	0-24	25-34	35-44	45-55	55-64	65+	0-24	25-34	35-44	45-55	55-64	65+	0-24	25-34	35-44	45-55	55-64	65+
Demographic-Driven Demand (DDD) %	2.1%																		
Step 1 & 2 - Multiplier for Product Segment	72.9%	0.89	0.99	1.03	1.07	1.08	0.86	0.89	0.99	1.03	1.07	1.08	0.86	0.89	0.99	1.03	1.07	1.08	0.86
Step 3 - Population Change by Age Cohort from 2023		-1.1%	-0.7%	3.0%	6.0%	-6.6%	21.0%	-8.4%	0.2%	-15.3%	-17.6%	15.7%	1.3%	-13.6%	-19.2%	3.6%	-13.0%	19.3%	25.9%
Step 4 - Demographic-Driven Demand Growth % (DDD = Pop. Growth Rate * Multiplier)		-1.0%	-0.7%	3.1%	6.4%	-7.1%	18.1%	-7.5%	0.2%	-15.8%	-18.8%	17.0%	1.1%	-12.1%	-19.0%	3.7%	-14.0%	21.0%	22.3%
% share of age cohort (2023)		31%	14%	14%	12%	12%	17%	21%	10%	12%	15%	13%	30%	28%	14%	15%	16%	13%	14%
Population - Weighted DDD %		-0.3%	-0.1%	0.4%	0.8%	-0.9%	3.2%	-1.6%	0.0%	-1.8%	-2.9%	2.1%	0.3%	-3.4%	-2.7%	0.5%	-2.2%	2.8%	3.2%
Final Country & Segment DDD %, 2030		3.1%						-3.8%						-1.7%					
Segment 2	16.7%	3.7%						-3.6%						0.1%					
Segment 3	8.6%	2.6%						-3.8%						-1.9%					
Segment 4... +	0.5%	2.9%						-4.2%						-3.0%					
		...+						...+						...+					

Source: UN, FactSet, Goldman Sachs Global Investment Research

A word on our methodology and caveats to our Demographic-Driven Demand (DDD) model

This data should be viewed as representative of demographic headwinds and tailwinds based on current consumer spending / engagement, product category and geographic exposure — providing a signal for industries and companies that may require greater or fewer adjustments in business strategy, product design / formulation, or geographic exposure to capture shifting demographic profiles. For example, in the case of Chinese OEMs they face the largest demographic headwind driven by the vast majority of their exposure to China, but also signals which companies may be the most aggressive in pursuit of new markets.

- **Potential lack of uniformity in spending habits across geographies.** We attempt to build a picture of the global consumer using a mix of consumer spending survey data and engagement data across age cohorts by using data from the US, Europe, and Japan.
- **Taste, Habits, and Technological lock-in.** Representative of current spending levels, consumer tastes, and innovation, which does not factor in potential change in tastes, habits over time, technological advancement which can impact product demand across age cohorts over time OR
- **While demographic profiles may be positive these are just one factor effecting overall spending and revenue -** for example, older individuals tend to spend more on appliances, posing a demographic tailwind. However, other macrofactors significantly influence spending such as interest rates, home sales, and consumer confidence that can override potential tailwinds.
- **Where revenue is not fully captured by spending multipliers we gross up revenue to normalize to 100%.**

outputs may not fully reflect the weighted average demographic shifts over the entirety of the revenue of the business.

- **Geographic exposure of overall revenue may not necessarily reflect underlying product / business segments geographic exposure.** Given lack of geographic detail at the product level for a company, we assume a proportionate share of company's product revenue across each geographic region.
- **UN population projections like many projections, are heavily debated,** in particular regarding expected levels of immigration. We note, however, that the UN has multiple scenarios which we are able to apply in our framework.

We would like to thank Shubham Jain for his contributions to our analysis.

Industry Case Studies: Lessons from Sector Demographic Trends

Industry implications: Industries with notable headwinds and tailwinds

- **Healthcare and Medtech are not immune to demographic headwinds, as growth in older populations is set to decelerate from prior decades** ([Exhibit 39](#)). See 'The Healthcare Growth Paradox – Decelerating Momentum' section below.
- **Brands — Apparel and Footwear face significant headwinds associated with declining youth populations, some of the largest spenders on new apparel.** For example, in Japan, the <29 age cohort spends 1.3x the median consumer on apparel vs. 0.7x for ages 70+, the main growing demographic in Japan.
- **Autos at a strategic crossroads amidst declining prime new driving age populations.** In mature markets, Japan and Germany, declining populations of typical first-time new car buyers (ages 20–55) has tracked with falling vehicle registrations ([Exhibit 43](#), [Exhibit 44](#)). Spending data shows new vehicle purchases decline significantly as consumers age ([Exhibit 42](#)), while auto repairs increase. *For more detail, please see the Global Auto case study below.*
- **Discount retailers in the US appear to be potential winners**, as older consumers show higher levels of engagement according to HundredX engagement data (1.2x for 60+ vs. 0.7x for ages 18–29) ([Exhibit 25](#)).
- **Meals away from home headwinds:** spending declines as consumers age. Potential beneficiaries: Traditional grocery / retail staples and meal delivery services.
- **Home improvement / furnishings could be a significant trend of an aging population.**
- **From our Demographic-Driven Demand framework the top 5 largest industries with the greatest tailwinds** include Pharma & Biotech, Utilities, Med Tech, Staples Retail, Multiline Retail and **Bottom 5 industries with the greatest headwinds include** Public Transit (Vehicle/Rail), Airports, Tech Hardware, Autos, Consumer Capital Goods could see Demographic Demand impact of an avg. +4.2%/–0.3% through 2030 and +8.7%/–1.7% through 2040 (UN base case) ([Exhibit 30](#)).

Exhibit 30: Our DDD framework highlights Healthcare, Utilities, and Staples exposed to demographic tailwinds, while Apparel, Autos, Tech Hardware, Airports and Public Transit (bus & rail) set to face headwinds

Industry DDD % (median) by population scenario, 2030-2050

GS SUSTAIN Sector	No. of Comp	Industry DDD % (median)								
		Medium Variant			Low Fertility			Zero Migration		
		2030	2040	2050	2030	2040	2050	2030	2040	2050
Pharma & Biotech	51	5.2%	10.7%	14.4%	4.4%	7.8%	9.1%	4.0%	6.9%	6.4%
Insurance	37	4.6%	9.3%	12.1%	4.2%	7.8%	9.1%	3.3%	5.2%	4.1%
Utilities - Multi	19	4.4%	9.5%	13.1%	3.5%	6.0%	6.9%	2.4%	3.5%	2.4%
Utilities - Water	22	4.4%	9.1%	12.5%	3.5%	6.0%	6.9%	2.6%	3.9%	2.9%
Med Tech	65	4.3%	8.7%	11.2%	3.5%	5.9%	6.2%	2.9%	4.8%	4.1%
Utilities - Electric	80	4.0%	8.2%	10.2%	3.1%	4.8%	4.0%	2.4%	3.5%	2.4%
Retail - Staples	80	3.8%	7.3%	9.8%	2.8%	4.2%	2.8%	1.7%	2.1%	-0.2%
Telecom Services	29	3.6%	7.7%	10.4%	2.5%	4.1%	3.3%	1.5%	1.8%	0.1%
Homebuilders	59	3.5%	7.7%	11.1%	1.6%	0.9%	-1.1%	0.1%	-1.6%	-4.8%
Retail - Multiline & Specialty	111	3.4%	7.3%	10.0%	2.3%	3.3%	3.0%	1.1%	1.1%	-0.8%
Distributors	23	3.3%	7.2%	10.0%	2.3%	3.9%	3.7%	1.4%	1.7%	0.1%
Food & Beverage	48	2.8%	5.8%	6.9%	2.1%	2.9%	1.9%	1.5%	1.6%	-0.4%
Asset Management	16	2.8%	6.6%	8.9%	2.0%	3.8%	3.9%	0.9%	0.9%	-1.2%
Restaurants	56	2.7%	6.1%	8.7%	1.1%	0.6%	-1.1%	-0.2%	-1.8%	-5.1%
Gaming	47	2.7%	3.8%	4.5%	1.4%	-1.1%	-4.4%	1.0%	-0.9%	-5.9%
Diversified Financials	179	2.7%	6.4%	8.7%	1.9%	3.1%	2.9%	1.0%	0.9%	-1.2%
Household & Personal Care	52	2.5%	4.9%	6.1%	1.5%	1.2%	-0.6%	1.0%	0.7%	-1.3%
Professional Services	29	2.4%	5.2%	7.6%	0.5%	0.8%	-0.3%	-0.8%	-2.1%	-6.8%
E-Commerce	54	2.4%	5.0%	6.6%	1.2%	0.8%	-1.0%	0.2%	-1.1%	-4.0%
Software	117	2.4%	5.0%	6.9%	1.1%	0.3%	-1.5%	0.1%	-1.6%	-4.8%
Utilities - Gas	36	2.4%	4.2%	3.7%	1.5%	1.1%	-1.7%	1.6%	2.4%	0.6%
Consumer Durables	121	2.2%	4.5%	5.8%	1.3%	1.2%	-0.5%	0.8%	0.1%	-2.3%
Airlines	90	2.1%	3.3%	3.2%	0.7%	-1.5%	-4.2%	0.2%	-0.8%	-3.2%
Hospitality	70	2.0%	3.8%	4.9%	1.2%	0.5%	-1.7%	0.5%	-0.7%	-3.7%
Internet	13	1.7%	3.2%	3.8%	0.6%	-0.5%	-2.9%	0.0%	-1.6%	-4.5%
Aerospace (Commercial)	368	1.7%	3.5%	4.4%	0.6%	-0.5%	-2.8%	0.0%	-1.5%	-4.4%
Alcohol & Tobacco	28	1.7%	3.3%	3.2%	0.8%	0.0%	-2.1%	0.8%	0.9%	-2.0%
Media	43	1.6%	3.2%	3.2%	0.0%	-2.0%	-5.1%	-0.2%	-1.9%	-4.8%
Real Estate	33	1.6%	4.0%	6.6%	-2.0%	-9.2%	-16.8%	-4.3%	-11.6%	-19.3%
Brands - Clothing / Apparel	82	1.5%	2.8%	3.0%	0.3%	-1.2%	-4.0%	-0.2%	-2.0%	-5.2%
Automobile Manufacturers	122	1.5%	2.9%	3.2%	0.6%	-0.5%	-2.8%	0.1%	-1.4%	-4.7%
Chemicals	31	1.5%	2.4%	1.4%	0.5%	-0.8%	-3.2%	0.9%	-0.6%	-4.2%
Capital Goods	109	0.9%	-0.1%	-2.4%	-0.1%	-3.4%	-8.4%	0.1%	-2.0%	-6.2%
Auto Parts	220	0.5%	0.1%	-1.3%	-0.4%	-3.2%	-7.1%	-0.5%	-2.7%	-6.5%
Tech Hardware	55	0.4%	-0.1%	-1.6%	-0.6%	-3.7%	-8.2%	-0.5%	-2.8%	-6.5%
Airports	51	-1.0%	-2.1%	-3.6%	-2.1%	-6.1%	-10.8%	-1.3%	-4.1%	-7.8%
Transit - Vehicle / Rail	19	-4.0%	-10.7%	-16.4%	-5.1%	-14.0%	-22.3%	-4.0%	-11.6%	-19.0%
Median		2.4%	4.9%	6.6%	1.2%	0.8%	-1.1%	0.8%	-0.7%	-3.7%
Average		2.3%	4.6%	5.7%	1.2%	0.6%	-1.4%	0.6%	-0.3%	-3.2%

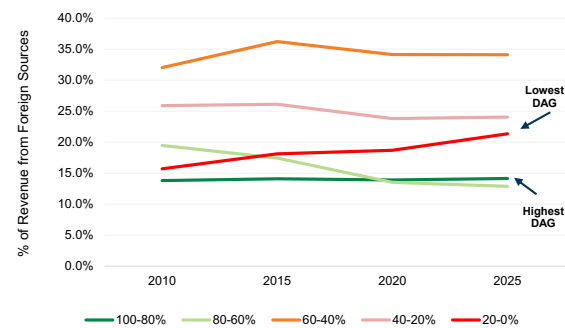
Source: UN, Goldman Sachs Global Investment Research

How Demographic shifts could impact corporate, industry and investor behaviour
Product Redesign, ReFormulation, and Products-as-a-service offerings will likely be necessary strategies for industries/companies where demographic headwinds could otherwise drive declining volumes in order to maintain customer relationships and revenue over time. Where companies' demographic profiles are declining, attaching more digitally delivered experiences & services to the installed base of existing users may help retain market share, provide stickier revenue, and improve the lifetime value of existing customers.

Demographic shifts could impact investor views on terminal growth rates for companies. Terminal growth rates are typically a reflection of long-term GDP growth, mainly driven by 1) population / labor force growth and 2) productivity. In the US, according to the Federal Reserve, GDP growth is expected to come entirely from productivity gains given the decline in labor growth setting the stage for a potential re-evaluation of terminal growth rates amidst deteriorating demographic profiles.

Companies with strong domestic demographic growth appear to be 'riding the demographic wave', while those with the poorest outlooks show growth in share of foreign revenue — a key antidote to slower domestic sales. From our analysis of companies' Demographic-Driven Demand (DDD), companies ranking in the bottom quintile of their DDD outlook to 2030 have shown the largest rise in revenue from foreign sources over the trailing 15 years, while companies with the best (top quintile) DDD outlook have shown the lowest share of revenue from foreign sources and no change over the last 15 years

Exhibit 33: Companies with the best demographic growth profile have shown the lowest and flat exposure to foreign revenue sources, while the worst DAG show a rising foreign revenue
% of foreign revenue by current DAG percentile, 2010-2025



Source: UN, Bloomberg, Goldman Sachs Global Investment Research

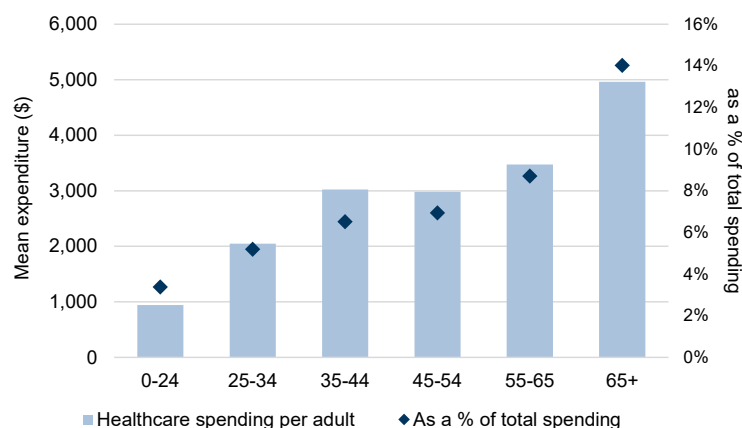
The Healthcare Growth Paradox: Decelerating Momentum

The Healthcare sector is often viewed as the primary beneficiary of an aging population. In the US, people over the age of 65 account for 36% of health spending according to the Medical Expenditure Panel Survey, despite making up only 18% of the population. These individuals tend to dedicate over 14% of their total spending in a year to healthcare, significantly higher than younger age groups (Exhibit 36). With an additional 590mn individuals over the age of 65 expected by 2040, increases in both personal and public spending on healthcare will be required to treat common health issues for an aging population.

However, healthcare demand is not insulated from the broader demographic headwinds. While healthcare remains a relative growth category compared to other consumer industries, the rate of growth is slowing. Our analysis on hip and knee replacements suggests a more nuanced reality – even in one of the most age-sensitive categories of healthcare, the pace of demand growth is set to slow materially in the coming decades.

Exhibit 36: Older populations dedicate a significantly higher portion of their spending to healthcare than younger age groups

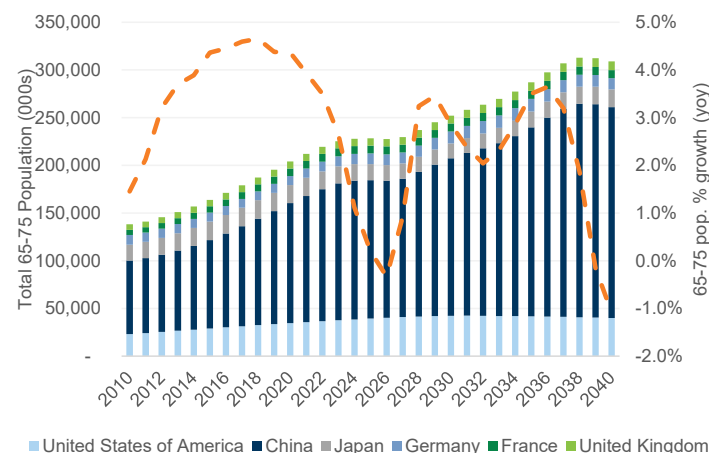
Average spending on Healthcare per adult and as a % of total spending, 2024



Source: BLS, Goldman Sachs Global Investment Research

Exhibit 37: However, growth for older prime age procedure populations (65-75) is slowing

Total 65-75 population by country, 2010-2040E



Source: UN Population Prospect, Data compiled by Goldman Sachs Global Investment Research

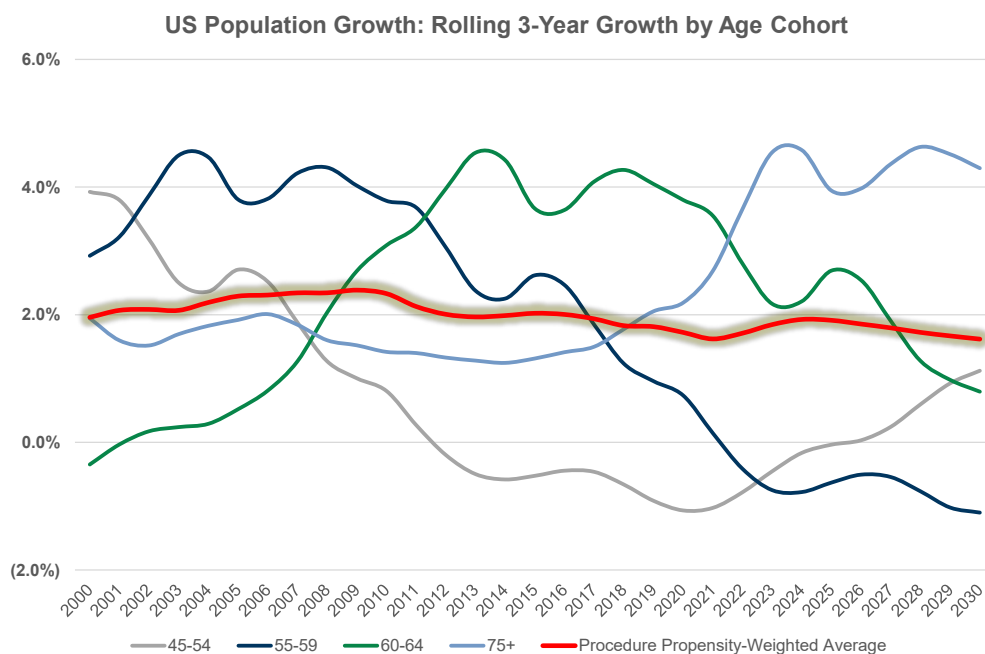
Comments from our US Medical Technology Team - a procedure overlay on Demographic Trends

Our US Medical Technology Team's overlay on demographic trends, in aggregate, is supportive of US healthcare utilization growth. When taking a closer look at procedure categories that drive MedTech-related volumes and revenue, the outlook through 2028 looks to be roughly stable in aggregate. However, with the average baby boomer — the key demographic driving healthcare utilization shifts today — now ~70 years old, the categories they are likely to consume over the next five

years may differ from those that they have consumed in the past five years. As a result, despite the overall positive utilization backdrop from demographics, there are shifts in relative procedure demand, based on a more precise view of growth trends for specific age cohorts, favouring cardiology over orthopedic procedures.

To isolate this phenomenon, the US Medical Technology Team break down demographic growth trends into 10-year age brackets from 45-54, 55-64, 65-74 and 75+. We note that over the period 2026-30E, growth is highest in the older brackets of patients (75+) and still relatively high but moderating in the second-oldest segment of patients (65-74). These older patient cohorts tend to require more cardiology procedures, relative to orthopedic procedures, with the average age of TAVR in the US ~81 compared to Knee replacement at ~64.

Exhibit 38: US Population Growth: Rolling 3-Year Growth by Age Cohort



Age Cohorts	Population CAGR				Procedure Categories
	'10 - '15	'15 - '20	'20 - '25	'25 - '30	
45-54	(0.5%)	2.6%	4.0%	1.3%	
55-64	(0.8%)	0.9%	4.2%	1.9%	• Spinal Fusion: 61 years • Prostatectomy: 62 years • AFIB procedure: 64 years • Knee Replacement: 64 years
65-74	(0.3%)	(0.7%)	2.5%	4.2%	• PCI: 65 years • de novo Pacemaker: 66 years • Colorectal Cancer: 66 years • Hip Replacement: 68 years • Mitral Valve Surgery: 68 years • Angioplasty: 68 years • CABG: 69 years • de novo ICD: 69 years • Surgical Aortic Valve Replacement: 72 years
75+	0.8%	(0.9%)	1.0%	4.5%	• TAVR: 81 years

Source: Goldman Sachs Global Investment Research, US Census Bureau

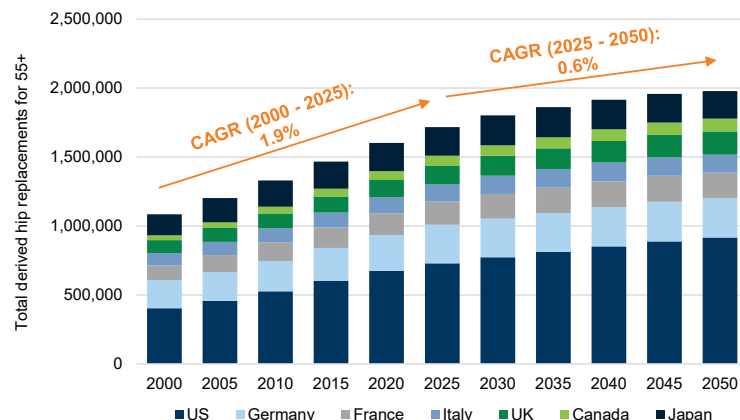
Case study: Decelerating joint replacement demand. To understand the future of healthcare demand, we analyzed historical and projected data for hip and knee replacement surgeries across G7 countries. By isolating the 55+ demographic and holding their propensity for surgery constant (as of 2023 levels), we observe the specific impact from demographic shifts on procedure volumes from the prior 25 years ('20 to '25) vs. the next 25 years ('25 to '50). **Our analysis reveals a distinct two-phase growth trajectory (Exhibit 39 - Exhibit 40):**

- **Historical Surge (2000 - 2025):** Driven by the entry of the Baby Boomer cohort into their peak surgical years, the demographic impact on hip replacement annual volume growth across the G7 was 1.9% from 2000 to 2025 (when applying 2023 intensity levels historically), with the demographic impact on total procedure volume +600,000 over the period. Applying a similar framework, the demographic impact on knee replacement annual volume growth across the G7 was 2.1% from 2000 to 2025, with the demographic impact on total procedure volume +800,000 over the period.
- **Future Moderation (2025 - 2050):** The rapid demographic driven acceleration seen in previous decades will temper based on estimates for slowing 55+ population growth, with the projected demographic driven CAGR for hip replacements dropping to 0.6%, and knee replacements slowing to 0.7% per year through 2050. Total demographic driven impacts on procedure volume is estimated to see an increase of c. 262,000 and 400,000 for hip and knee (carrying forward 2023 intensity levels).

Our analysis suggests even healthcare will face a more nuanced growth reality. As the demographic dividend of the Baby Boomer generation, which fueled significant growth in recent decades, is progressively absorbed, and as G7 populations plateau or decline, the tailwind that has underpinned procedure volume growth for the past two decades should moderate.

Exhibit 39: Demographic impact on hip replacement procedures among the 55+ was +1.9% annually (2000-2025), but is expected to slow down...

Demographic-adjusted hip replacements among the 55+ population for G7 relative to 2023 procedure rates, 2000-2050E

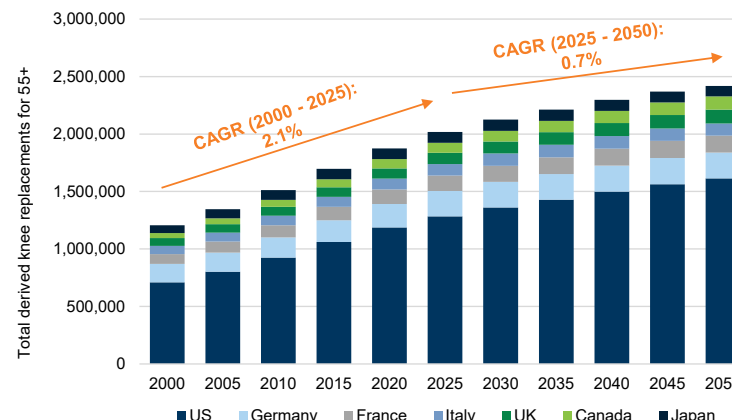


*Hip replacement rate for 55+ assumes rates consistent with UK data in 2021

Source: OECD, United Nations, Orthopedic Network News, Goldman Sachs Global Investment Research

Exhibit 40: ...similarly with knee replacement procedures among the 55+

Demographic-adjusted knee replacements among the 55+ population for G7 relative to 2023 procedure rates, 2000 - 2050E



*Knee replacement rate for 55+ assumes rates consistent with UK data in 2021

Source: OECD, United Nations, Orthopedic Network News, Goldman Sachs Global Investment Research

A word on our methodology

To estimate replacement procedure volumes among the 55+ population across G7 countries:

1. Using OECD data on replacement procedures across G7 countries as of 2023, we applied age-attribution rates (92% for hip replacements and 96% for knee replacements), to isolate the volume of procedures performed on patients aged 55+ using data from the UK.
2. We divided these procedure volumes by the share of the G7 population aged 55+ (from UN) to derive the implied propensity rate of the number of procedures among the 55+ cohort.
3. We held this propensity constant and projected total procedure volumes forward and backward in 5-year intervals from 2000 to 2050, using UN historical and projected population data for the 55+ cohort.

Our approach isolates the pure demographic contribution to replacement procedure growth, stripping out changes in clinical practice, access, technology, or other relevant health trends. We note that we do not account for potential increases in surgical access, evolving clinical guidelines, or a rising propensity for intervention among younger cohorts.

Global Autos at a strategic crossroads amidst aging and declining driver populations, but opportunities in AVs ahead

The Global Auto industry is confronting a demographic dilemma of a declining driver population. In mature markets, Japan and Germany, declining populations of typical first time new car buyers (ages 20-55) have tracked with falling vehicle registrations ([Exhibit 43](#), [Exhibit 44](#)).

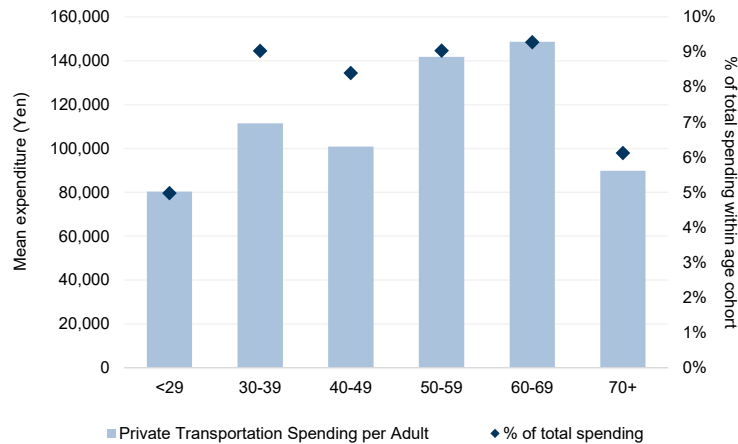
Spending data from both Japan and Europe shows a meaningful decline in new vehicle purchases for older age cohorts. While older consumers (ages 60-69) exhibit the highest absolute transportation spending in Japan, the proportion of that spending directed at vehicle purchases falls sharply for those aged 70+ ([Exhibit 41](#)). In Europe, the latest spending shows peak vehicle purchase spending from ages 30-59 and declining by -26% for those aged 60+ ([Exhibit 42](#)).

Product innovations, service-oriented business models, and geographic expansion becoming key differentiators. These demographic headwinds present risk and opportunity, requiring a realignment of companies' value propositions to protect revenues and market share. Success will likely depend on multiple strategies including:

- 1. Evolving product design & role of AVs** (e.g., EVs, hybrids, and autonomous features) to maintain attractiveness for new buyers and utility for aging drivers. **According to our US Auto team's work analyzing AI & AVs profit pools, they now estimate AV robotaxi market in the US will reach \$19 bn in 2030, up from \$7 bn prior, and forecast a \$45 bn market by 2035 or \$415 bn globally.**
- 2. Service-oriented models.** As driver populations start to decline, developing closer connectivity with the customer has become a solution to retain relationships (connected-car) and grow potential service offerings.
- 3. New demographic targeting of older, higher-value consumers or expansion into new geographic markets.** Many Western auto companies have expanded beyond mass market offerings to target higher-value consumers through hyper-customization, higher priced models, and technology upgrades. Expansion into new markets with better demographic profiles will also likely evolve as a strategy.

Exhibit 41: Japan's private transport spend by age peaks late but falls sharply vs younger cohorts

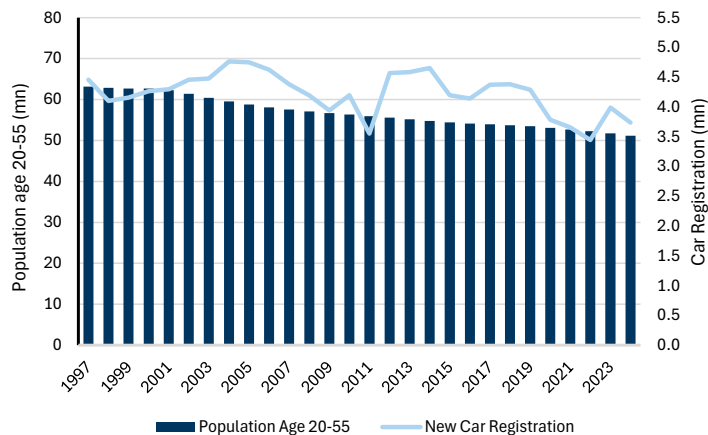
Private Transportation Spending per Adult by Age Group & Share of Total Spend



Source: Japan Consumer Spending Survey, Data compiled by Goldman Sachs Global Investment Research

Exhibit 43: In Japan, declines in 20-55 population has coincided with declining vehicle registrations...

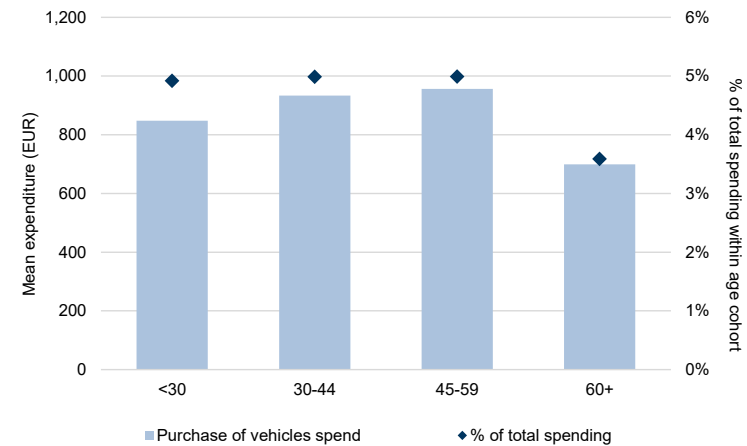
Total 20-55 aged population vs. Annual New Car Registrations, 1997-2024



Source: LSEG Data & Analytics, UN Population Prospects 2024

Exhibit 42: In Europe, vehicle purchases spending declines for 60+

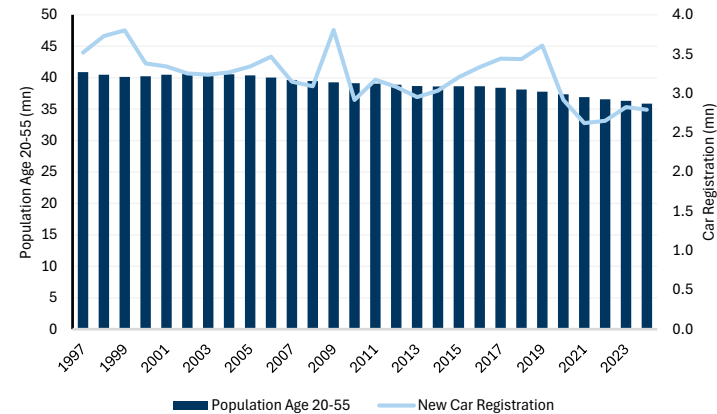
Average Vehicle Purchase Spending per Adult by Age Group & Share of Total spend



Source: Eurostat, Data compiled by Goldman Sachs Global Investment Research

Exhibit 44: ... as well as for Germany

Prime-Age Population (20-55) vs Annual New Car Registrations, 1997-2024



Source: LSEG Data & Analytics, UN Population Prospect 2024

Demographics Tailwinds & Headwinds: Projected County-Level Revenue Impact for Major OEMs (2030-2050). Our

Demographic-Driven Demand estimates show significant divergence for OEMs across India, the US, Europe/Germany, and China. OEMs with concentrated revenue exposure to demographically challenged markets (China / Europe / Germany) face compounding pressure, while those with significant presence in younger, growing markets, particularly India, are positioned to benefit from volume tailwinds. US OEMs are still expected to see demographic tailwinds through the 2030s-2050, while Europe / German OEMs and Chinese OEMs face demographic headwinds. However, Chinese OEMs remain significantly geographically concentrated offering greater opportunity (alongside higher execution risk) for geographic expansion — presenting opportunities for higher ASPs and profit outside China.

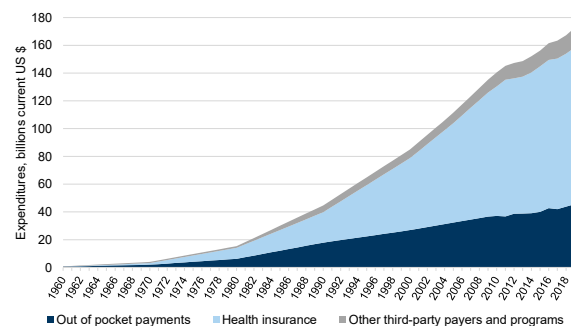
Senior Living & Aging at Home

Spending on nursing care facilities in the US has continuously risen since the 1960s (Exhibit 46). As populations age, we expect continued increases in expenditures on nursing care facilities, residential long-term care facilities, home care and rehabilitation services, particularly as life expectancy continues to rise, in many cases extending the longevity of managing chronic health conditions and supporting overall well-being. In countries like Italy, Germany and France, where dependency ratios (measured by individuals over 65 years of age per 100 working age people) in 2023 were 41, 38 and 39, respectively, nursing facility beds are insufficient to fully accommodate the aging population, with only 0.5, 1.2, and 1.0 nursing facility beds per 100 total inhabitants (Exhibit 47). Senior housing shortages are also emerging amidst growing demand from aging populations and health issues, as reports from the NIC estimate a \$275 bn investment and 500,000 unit shortage for senior living by 2030, while the UK is expected to see a shortfall of 31,500 units by 2029, according to JLL.

With the vast majority of senior individuals aging at home (Exhibit 48), the market for homecare services and technologies should grow. For older individuals who prefer independent living, different technology and health options will be required for support, such as fall detection, telehealth services, telemedicine, medication management, alarms, and hygiene technologies.

Exhibit 46: Spending on nursing care facilities has consistently risen over time

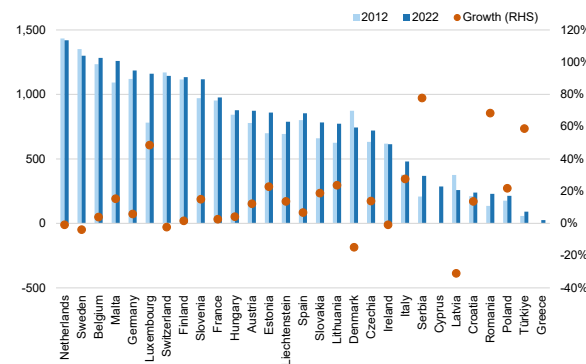
US nursing care facilities and continuing care retirement communities expenditures (linear increases used for years with missing data) 1960-2019



Source: CDC National Center for Health Statistics

Exhibit 47: For most European countries, nursing facilities beds per capita have increased over the last decade

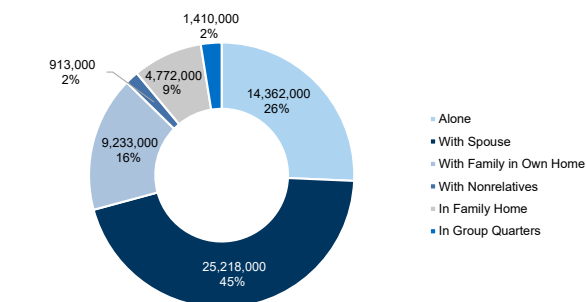
Beds in nursing and other residential long-term care facilities per 100,000 inhabitants, 2022 vs 2012



Source: Eurostat

Exhibit 48: Most individuals age 65+ live at home with a spouse or alone

Living situations for US individuals age 65+, 2021



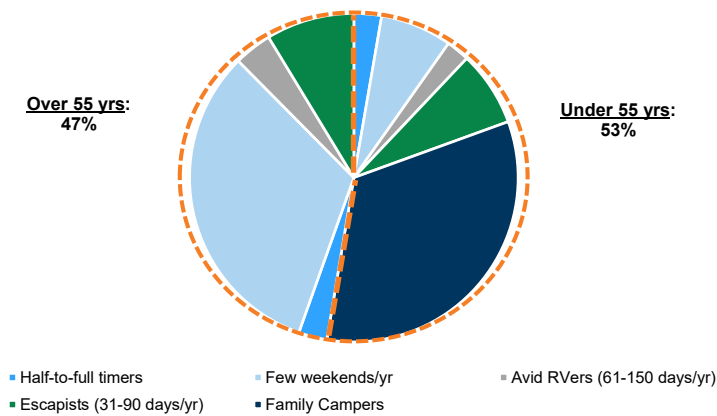
Source: Joint Center for Housing Studies of Harvard University, US Census Bureau 2021 American Community Survey 1-Year Estimates

Leisure & Entertainment - Spending habits of older population

Older generations today spend wealth and time differently than younger counterparts:

- **Leisure activities**, including the use of recreational vehicles (RVs) ([Exhibit 49](#)), going on cruises ([Exhibit 50](#)), are more common amongst those nearing retirement age and older. Tourism spending by those aged 55+ is projected to more than double in the EU, reaching €369.5 billion by 2040. Additionally, older population is expected to drive multi-generational growth of tourism spending. According to the [2025 Cruise Lines International Association report](#), 31% of baby boomers are now booking cruises specifically to travel with 3 to 5 generations of their family, acting as the primary financiers of these experiences.
- **Consumption of media differs**, with older individuals spending more time watching videos and spending a higher proportion of their time in front of screens watching broadcast television vs. streaming services or video-sharing ([Exhibit 51](#)). Older population also spends more time reading. Based on the latest [American Time Use Survey](#), On average, individuals aged 75 and over spend 46 minutes per day reading while those ages 15-19 read for 9 minutes per day.
- **Finally, older individuals dedicate a higher proportion of their spending to their pets** ([Exhibit 52](#)) and maintain high levels of pet ownership in their early senior years (65 to 74).

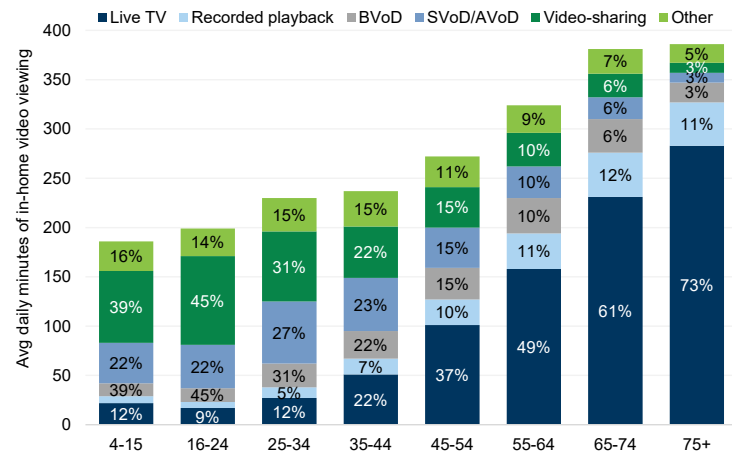
Exhibit 49: Older individuals are more avid users of recreational vehicles (RVs), making up 47% of RV users while only representing around 30% of the US population today



Source: RV Industry Association, United Nations (UN), Goldman Sachs Global Investment Research

Exhibit 51: Older individuals tend to spend more time watching videos, while millennials spend a higher % of their screentime using streaming services

Average daily minutes of in-home video viewing in UK, 2024

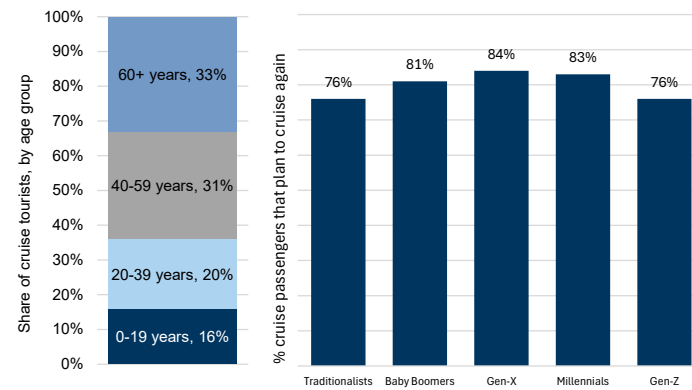


BVoD: Broadcaster Video on Demand; SVoD: Subscription Video on Demand; AVoD: Advertising-based Video on Demand

Source: Ofcom, Goldman Sachs Global Investment Research

Exhibit 50: Older individuals make up a higher percentage of cruise tourists

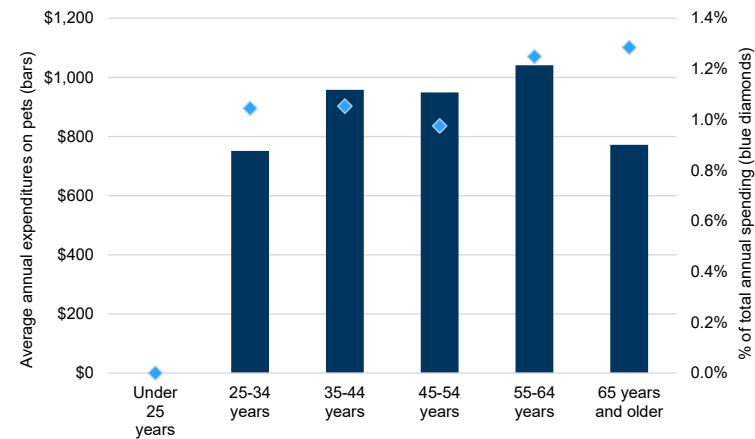
Share of cruise tourists by age group, 2024; % of current cruise tourists that plan to cruise again



Source: Cruise Lines International Association

Exhibit 52: Older individuals dedicate a higher percentage of their total annual spending to pets

Average annual expenditures on pets, and % of total annual spending by US individuals by age demographic



Source: US Bureau of Labor Statistics, Data compiled by Goldman Sachs Global Investment Research

Electricity Consumption - Residential electricity consumption set to rise amidst aging population

Aging populations sending signals higher residential electricity consumption. On average, 55+ population consumes 55% more electricity per person than those under 45 ([Exhibit 53](#)). According to a [recent academic study](#), per capita energy consumption increased by 11.3% between 1990 and 2020 in the U.S. due to an aging population. In China, researchers [noted](#) a 20%-32% of average increase in residential electricity consumption after retirement.

Key drivers of increased consumption:

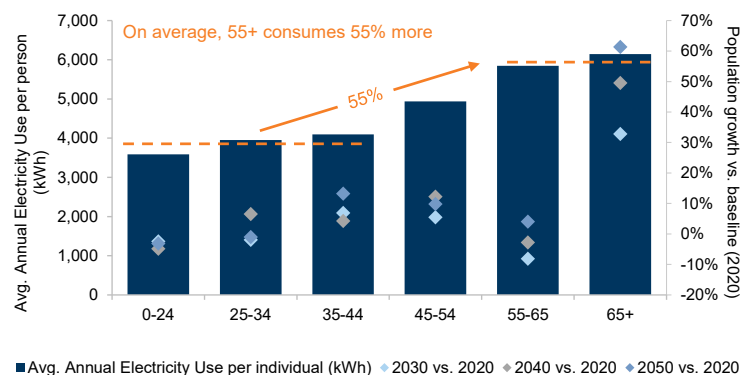
1) Increased Time Spent at Home: Older individuals spend a significantly higher percentage of their day at home relative to the working-age population, leading to higher usage intensity for lighting, appliances, and entertainment.

2) Thermal Comfort and Vulnerability: Older individuals are more vulnerable to temperature extremes and often require a more consistent and controlled indoor environment, leading to increased energy demands for heating and cooling. This is exacerbated by older adults living in older houses with inadequate thermal insulation. In warmer climates, a [Harvard study](#) highlighted that electricity use spikes significantly for those 70 and older, driven by increased cooling needs to mitigate health risks from heatwaves.

3) Digital Connectivity as a Lifeline: As we have [highlighted previously](#), many senior individuals have a strong desire to age at home, and different technologies will be needed to fill the support gap as the supply of home healthcare workers continues to face shortages. Some continuous-power medical devices, including oxygen concentrators, smart wearables, and smart home sensors that monitor safety and internal comfort, are becoming standard in senior households.

Exhibit 53: 55+ consumes 55% more electricity on average than under 45s...

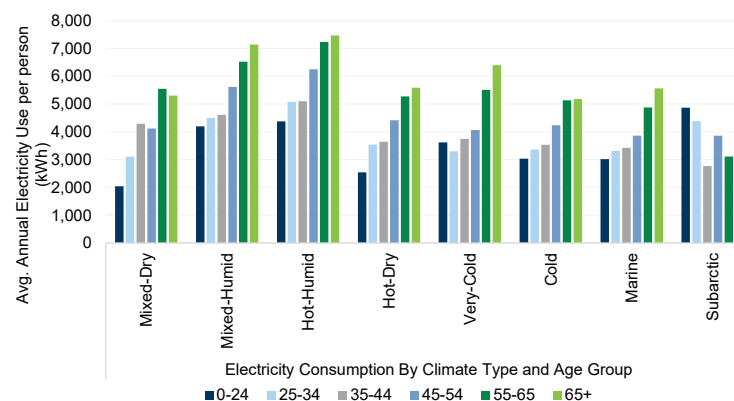
Average annual electricity use per individual, by age group



Source: EIA, Goldman Sachs Global Investment Research

Exhibit 54: ...and this generally holds true for all climates

Average annual electricity use per individual, by age group and by climate, 2020



Source: EIA, Goldman Sachs Global Investment Research

Regional Case Studies: US & Japan

United States

In the US, consumer spending per adult tends to peak in middle age at 35-44 and 45-54 and falls sharply into 65+, the age cohort seeing the only growing share of total population. Evaluating consumption by product category across age cohorts can show when spending tends to peak for certain age cohorts and how spending changes as consumers age — for example vehicle purchases, apparel and services show meaningful declines in consumption propensity after peak consumption amongst ages 35-44 ([Exhibit 55](#)).

Population scenarios play a big role in expected consumption trends with low fertility and zero migration showing significant declines in spending for certain products vs. 2024 spending levels. Carry forward spending per adult (2024 levels) into future periods alongside expected population changes under different UN scenarios (base case, low fertility, and zero migration) shows:

- **UN Base Case:** continued cumulative growth across all major product categories in 2030, 2040, and 2050 vs. 2024 spending levels ([Exhibit 57](#)).
- **Low Fertility:** notable moderation of growth across most categories relative to a UN base case scenario, with declines in education spending in 2030, 2040, 2050 vs. 2024 levels ([Exhibit 58](#)).
- **Zero Migration:** shows the most dramatic difference in future spending outcomes with near **flat spending** across toys, apparel, healthcare, personal care by 2040s and **spending declines** in education, vehicle purchases, retirement and savings, food away from home, shelter vs. 2024 levels ([Exhibit 59](#)).

Exhibit 55: Latest BLS Household surveys shows very clear spending preferences and progression by age cohort

BLS Household Survey data 2023-2024

Categories	Mean Expenditure (per adult)						% change from previous age group				
	0-24	25-34	35-44	45-54	55-65	65+	25-34	35-44	45-54	55-65	65+
Food at home	2,147	3,126	3,848	3,487	3,125	3,196	46%	23%	-9%	-10%	2%
Food away from home	1,712	2,245	2,591	2,357	1,946	1,697	31%	15%	-9%	-17%	-13%
Personal care products and services	389	489	598	558	496	486	26%	22%	-7%	-11%	-2%
Alcoholic beverages	209	348	371	376	344	321	67%	6%	2%	-9%	-7%
Tobacco products and smoking supplies	120	171	205	206	240	168	43%	20%	1%	16%	-30%
Shelter	7,145	9,472	9,752	8,426	7,896	7,983	33%	3%	-14%	-6%	1%
Household furnishings and equipment	885	1,257	1,459	1,286	1,426	1,293	42%	16%	-12%	11%	-9%
Household operations	442	1,093	1,557	890	794	1,086	147%	42%	-43%	-11%	37%
Electricity	599	905	1,021	955	965	1,044	51%	13%	-6%	1%	8%
Telephone services	494	678	839	835	792	753	37%	24%	0%	-5%	-5%
Housekeeping supplies	244	350	507	435	466	531	43%	45%	-14%	7%	14%
Water and other public services	178	349	449	432	442	508	97%	28%	-4%	2%	15%
Natural gas & oil	134	250	346	337	374	442	87%	39%	-3%	11%	18%
Vehicle purchases (net outlay)	2,749	3,066	3,402	3,203	3,088	2,156	11%	11%	-6%	-4%	-30%
Other vehicle expenses	1,525	2,110	2,426	2,384	2,250	1,944	38%	15%	-2%	-6%	-14%
Gasoline and other fuels	1,173	1,457	1,666	1,650	1,420	1,135	24%	14%	-1%	-14%	-20%
Public and other transportation	408	516	656	622	642	588	26%	27%	-5%	3%	-8%
Apparel and services	870	1,197	1,475	1,164	990	776	38%	23%	-21%	-15%	-22%
Health insurance	535	1,361	1,996	1,939	2,181	3,313	154%	47%	-3%	12%	52%
Retirement, pensions, and Social Security	2,754	5,678	6,721	6,445	5,459	1,748	106%	18%	-4%	-15%	-68%
Life and other personal insurance	35	148	303	334	367	364	327%	104%	10%	10%	-1%
Medical services	255	452	664	635	733	877	77%	47%	-4%	15%	20%
Drugs	82	157	251	271	421	542	92%	60%	8%	55%	29%
Medical supplies	73	79	110	136	140	231	8%	39%	24%	3%	65%
Education	1,648	692	767	1,407	960	263	-58%	11%	83%	-32%	-73%
Reading	49	51	71	65	46	89	4%	41%	-8%	-30%	95%
Audio and visual equipment and services	318	409	496	506	548	639	29%	21%	2%	8%	17%
Pets	264	440	480	503	500	476	67%	9%	5%	-1%	-5%
Other entertainment supplies, equipment, and services	219	341	439	358	348	298	55%	29%	-18%	-3%	-15%
Fees and admissions - Outdoor	214	409	759	654	431	373	91%	86%	-14%	-34%	-14%
Toys, hobbies, and playground equipment	73	135	145	100	74	66	85%	8%	-31%	-26%	-10%
Total	27,939	39,431	46,370	42,957	39,897	35,385	41%	18%	-7%	-7%	-11%

Source: BLS, Data compiled by Goldman Sachs Global Investment Research

Exhibit 56: Spending by age cohorts has remained fairly consistent over time since 2012, except for alcohol and tobacco amongst young groups

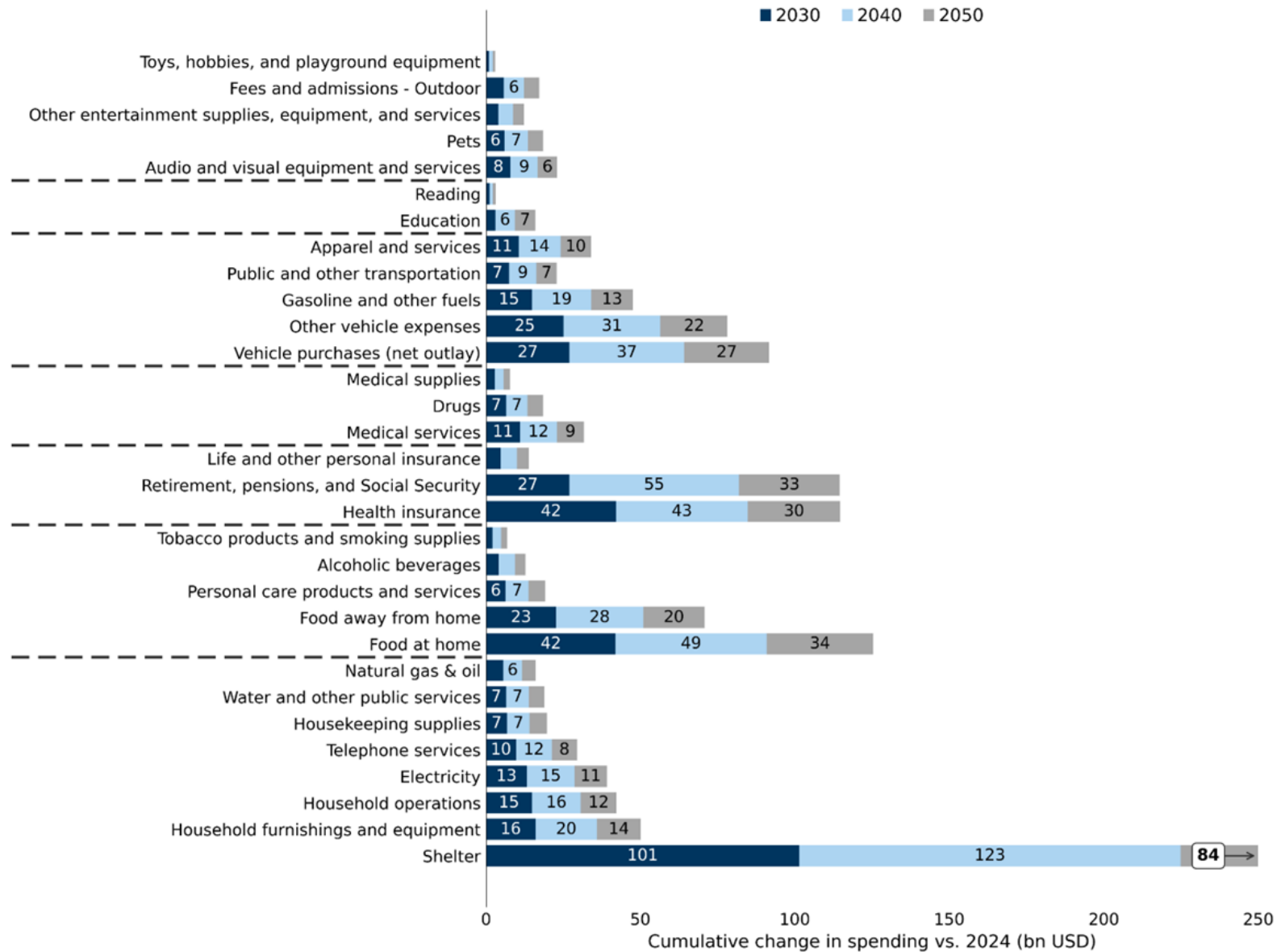
How America Spends by Age: 2012 Baseline and the 2024 Shift

Categories	2012						2024 vs 2012					
	% of Total Spend by Categories						Change in Percentage Points (pp)					
	Under25	25-34	35-44	45-54	55-64	65+	Under25	25-34	35-44	45-54	55-64	65+
Food at home	8.2%	7.6%	8.2%	8.0%	7.7%	9.0%	-0.5	0.4	0.1	0.1	0.1	0.0
Food away from home	6.4%	5.9%	5.8%	5.4%	5.2%	5.0%	-0.3	-0.3	-0.2	0.0	-0.4	-0.2
Personal care products and services	1.1%	1.2%	1.3%	1.2%	1.3%	1.6%	0.2	0.0	0.0	0.1	-0.1	-0.2
Alcoholic beverages	1.3%	1.1%	0.9%	0.8%	0.9%	0.9%	-0.5	-0.3	-0.1	0.0	-0.1	0.0
Tobacco products and smoking supplies	0.9%	0.8%	0.6%	0.8%	0.7%	0.6%	-0.4	-0.3	-0.2	-0.3	-0.1	-0.1
Shelter	23.5%	22.2%	21.6%	19.6%	18.9%	20.2%	2.1	1.8	-0.6	0.0	0.9	2.3
Household furnishings and equipment	3.0%	3.4%	3.1%	3.0%	3.3%	3.5%	0.1	-0.2	0.1	0.0	0.2	0.2
Household operations	1.7%	2.9%	2.8%	1.8%	1.9%	3.0%	-0.2	-0.1	0.6	0.3	0.1	0.1
Electricity	2.5%	2.6%	2.8%	2.8%	3.0%	3.7%	-0.4	-0.3	-0.6	-0.6	-0.6	-0.7
Telephone services	2.6%	2.6%	2.6%	2.6%	2.5%	2.5%	-0.8	-0.8	-0.8	-0.7	-0.5	-0.4
Housekeeping supplies	1.0%	1.0%	1.2%	1.2%	1.4%	1.7%	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
Water and other public services	0.6%	0.9%	1.0%	1.0%	1.1%	1.4%	0.0	0.0	0.0	0.0	0.0	0.0
Natural gas & oil	0.6%	0.8%	1.0%	1.1%	1.2%	1.7%	-0.2	-0.2	-0.2	-0.3	-0.2	-0.4
Vehicle purchases (net outlay)	8.3%	7.8%	6.4%	5.4%	5.7%	5.3%	1.6	-0.1	1.0	2.1	2.1	0.8
Other vehicle expenses	4.3%	4.9%	4.6%	5.3%	5.6%	5.5%	1.1	0.4	0.6	0.3	0.0	0.0
Gasoline and other fuels	6.3%	5.9%	5.9%	5.9%	5.4%	4.8%	-2.1	-2.2	-2.3	-2.0	-1.9	-1.6
Public and other transportation	1.0%	1.1%	0.9%	1.1%	1.2%	1.2%	0.5	0.2	0.5	0.3	0.4	0.4
Apparel and services	4.5%	4.1%	4.1%	3.5%	3.2%	2.9%	-1.4	-1.1	-0.9	-0.8	-0.8	-0.7
Health insurance	1.5%	2.6%	3.0%	3.4%	4.3%	8.6%	0.4	0.8	1.3	1.1	1.1	0.8
Retirement, pensions, and Social Security	7.4%	11.0%	12.2%	13.0%	12.4%	4.5%	2.4	3.4	2.3	2.0	1.2	0.4
Life and other personal insurance	0.2%	0.3%	0.6%	0.7%	1.0%	0.9%	-0.1	0.1	0.1	0.0	-0.1	0.1
Medical services	1.1%	1.1%	1.3%	1.6%	2.2%	2.4%	-0.2	0.0	0.2	-0.1	-0.3	0.1
Drugs	0.3%	0.5%	0.7%	0.9%	1.4%	2.1%	-0.1	-0.1	-0.1	-0.3	-0.3	-0.5
Medical supplies	0.1%	0.2%	0.2%	0.3%	0.3%	0.5%	0.1	0.0	0.0	0.0	0.0	0.1
Education	6.9%	2.2%	1.7%	3.8%	1.9%	0.7%	-1.0	-0.4	0.0	-0.5	0.5	0.1
Reading	0.1%	0.2%	0.2%	0.2%	0.3%	0.4%	0.0	0.0	0.0	-0.1	-0.2	-0.2
Audio and visual equipment and services	2.0%	2.0%	2.0%	1.9%	2.0%	2.3%	-0.9	-1.0	-0.9	-0.8	-0.7	-0.5
Pets, toys, hobbies, and playground equipment	1.0%	1.2%	1.2%	1.3%	1.6%	1.5%	0.2	0.2	0.1	0.1	-0.1	0.1
Other entertainment supplies, equipment, and services	0.5%	0.7%	0.9%	0.9%	0.7%	0.7%	0.3	0.1	0.1	0.0	0.2	0.2
Fees and admissions - Outdoor	0.9%	1.1%	1.5%	1.4%	1.2%	1.1%	-0.1	-0.1	0.1	0.2	-0.1	-0.1

Source: BLS, Data compiled by Goldman Sachs Global Investment Research

Exhibit 57: Shelter, retirement, and health insurance account for the largest projected spending increase under the UN Base Case population scenario

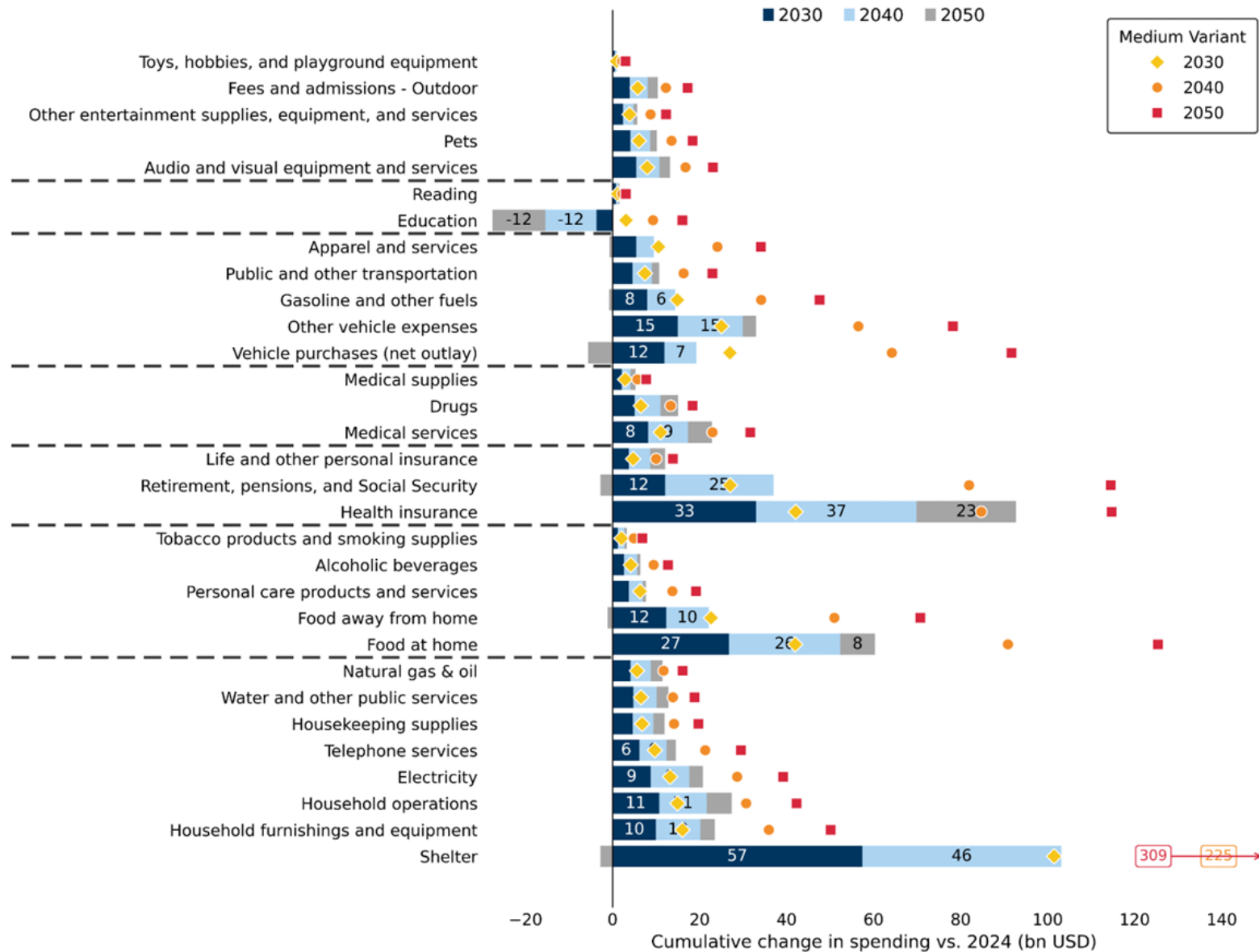
Cumulative Spending change vs. 2024 spending levels, 2030-2050, UN Base Case



Source: BLS, United Nations, Data compiled by Goldman Sachs Global Investment Research

Exhibit 58: Low Fertility Scenarios will drive significantly lower spending increases vs. the base case

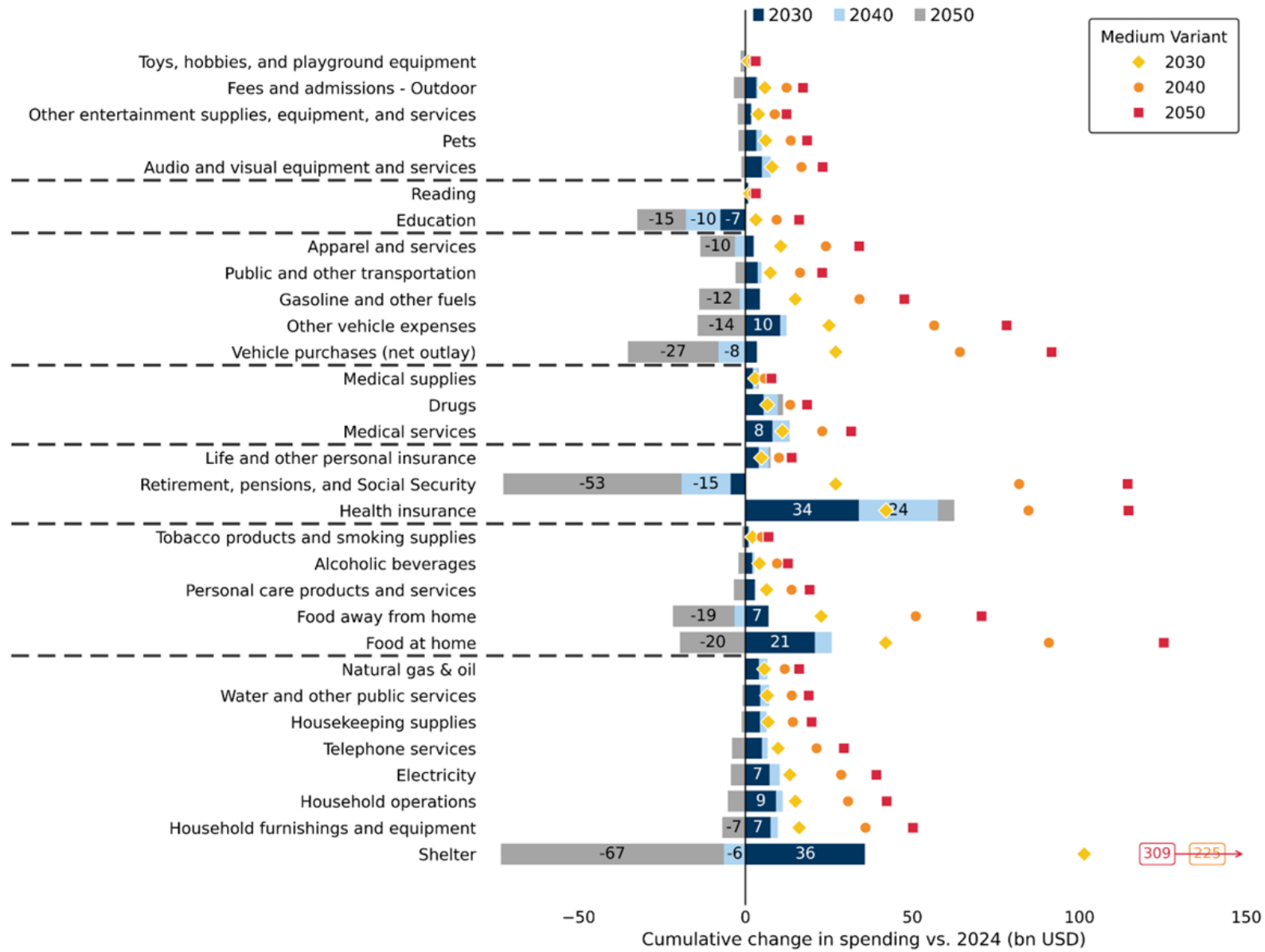
Cumulative Spending change vs. 2024 spending levels, 2030-2050, UN Low Fertility



Source: BLS, United Nations, Data compiled by Goldman Sachs Global Investment Research

Exhibit 59: Zero Migration scenarios will see spending levels flat to down for most categories relative to 2024 spending levels

Cumulative Spending change vs. 2024 spending levels, 2030-2050, UN Zero Migration



Source: BLS, United Nations, Data compiled by Goldman Sachs Global Investment Research

Lessons from Japan's demographic shift and impact on spending

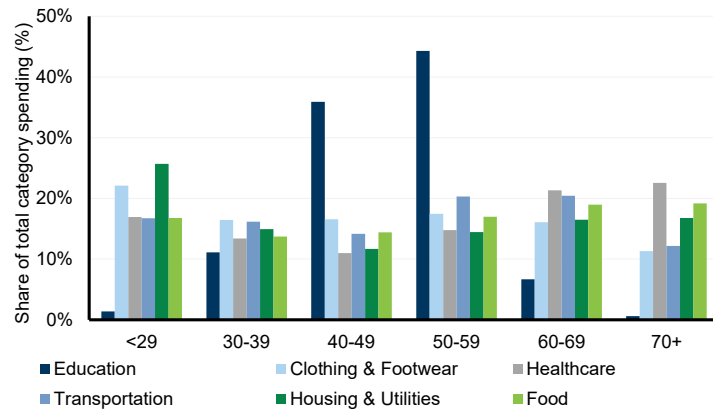
Japan's aging serves as a useful guide for other developed economies as its population has aged the fastest ([Exhibit 66](#)) and already reached its peak in 2009–2010 at around 128.2mn people. The population is now declining by 600k per annum in recent years and moving towards a decline of 700k a year starting in 2028 and beyond. **Japan's total population is set to decline from 124 mn in 2023 to 119.5 mn in 2030, 112 mn in 2040 and 105 mn in 2050, with the 60+ as the only growing age-cohort from 43.3 mn in 2023 to 45.6 mn in 2030, 47.8 mn in 2040, and 45.5 mn in 2050.** Below we highlight key population and consumption trends across Apparel, Food & Beverage, Automotive highlighting the significant headwinds for domestic addressable markets:

Key Implications:

- **Retail & Apparel** faces significant demographic headwinds as the largest share of clothing & footwear spending comes from <29 year olds ([Exhibit 60](#)). Since 1994, declines in consumer spending on clothing and footwear have followed the decline in <29 population. Under 29s are set to decline from 32.3mn in 2023 and by a further by -6% in 2030, -16% by 2040, and -22.3% by 2050. This has come amidst a [rise in demand for second-hand / thrift options](#). **Caveat:** A significant portion of spending has shifted due to declining ASPs (rather than volume / demographics) due to 1) macroeconomic deceleration and consumers' increased preference for value-for-money products, and 2) the shrinking of the mid-high end market due to price deflation by a shift to cheaper global production ([particularly China](#)).
- **Food & Beverage** companies face volume decline as the largest calorie consumers under age 50 have been declining. Many key staple categories like rice (-14%), dairy (-23%) and alcohol (-19%) have fallen highlighting not just a potential shift in tastes but a structural decline in demand from lower consumption ([Exhibit 62](#)).
- **Automotive:** Declines in light vehicle sales in Japan have mirrored the decline in the 20–69 driving-age cohort ([Exhibit 63](#)).
- **Healthcare & Housing** (furnishings) appear as the main beneficiaries of an aging population. [Exhibit 60](#) shows these dominate spending for 60+ cohort, which is the only growing demographic segment in Japan.

Exhibit 60: Younger demographics spend more on clothing, housing (rent) and older spends more on healthcare and food

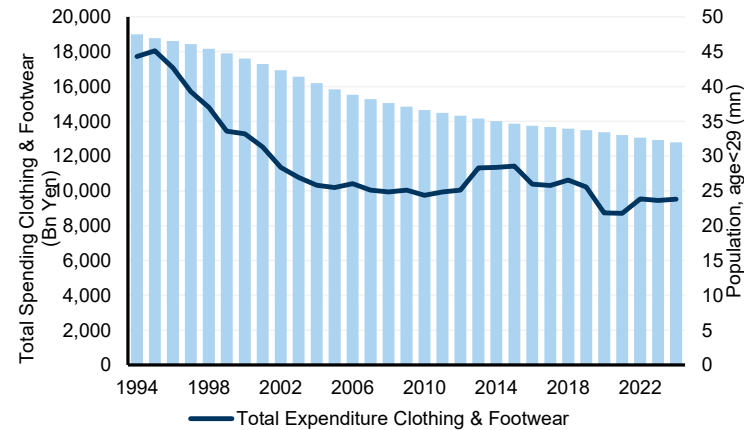
Share of category spending by age cohort, 2025



Source: Statistics Bureau of Japan, Data compiled by Goldman Sachs Global Investment Research

Exhibit 61: Fashion Fading: While some of this is driven by lower ASPs, Japan sees a shrinking fashion consumer

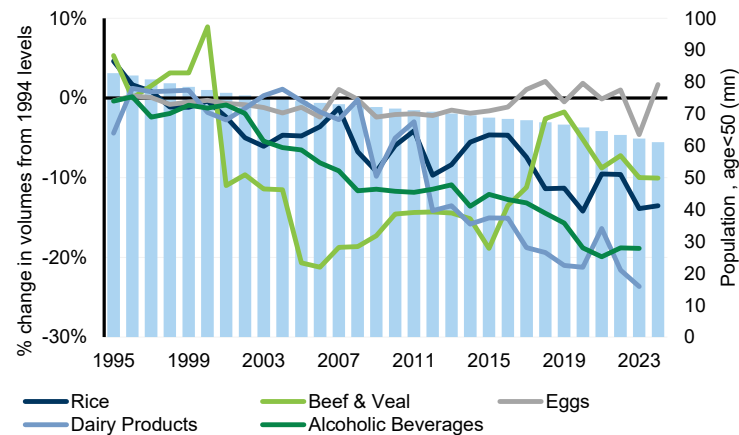
Total spending on clothing & footwear (LHS), and population <29



Source: Statistics Bureau of Japan, Data compiled by Goldman Sachs Global Investment Research

Exhibit 62: Japan's staples volume is declining

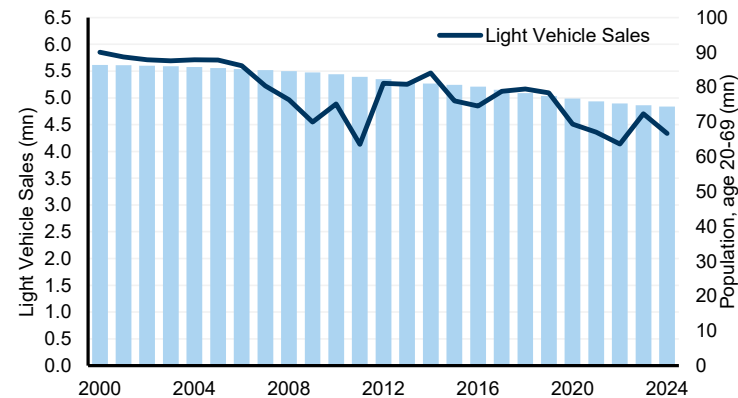
% change in rice, beef, eggs dairy and alcohol consumption volumes from 1994 levels (LHS), and population <50



Source: Statistics Bureau of Japan, Data compiled by Goldman Sachs Global Investment Research

Exhibit 63: Japan's Auto Market is Downshifting

Light vehicle sales (LHS), and population age 20-69



Source: Statistics Bureau of Japan, Data compiled by Goldman Sachs Global Investment Research

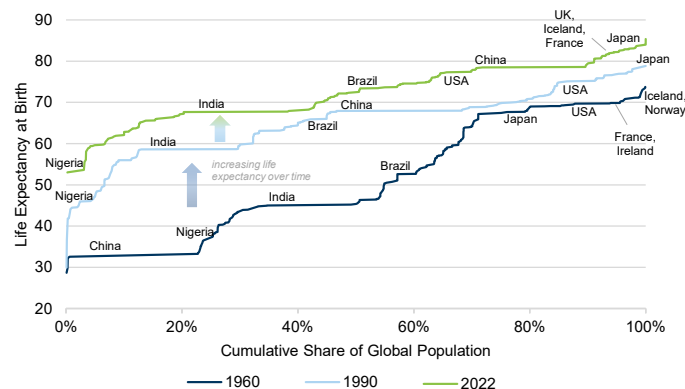
Why Aging Populations Impact Sustainable Development Goals

Sustainable Development Goal implications. As we highlighted in November 2024, we believe corporate and/or government responses to the Demographic Dilemma will drive significant investment opportunities and will introduce both new challenges and opportunities to solving Sustainable Development Goals (SDGs), particularly focusing on Good Health and Wellbeing (SDG 3), Quality Education (SDG 4), Gender Equality (SDG 5), Decent Work and Economic Growth (SDG 8), and Reduced Inequalities (SDG 10).

- **Challenges:** The health and well-being of an increasing aging population; rising social costs to support an aging population (SDG 3); corporate management of human capital and attracting and retaining key talent; the threat of automation displacing productive workers (SDG 8).
- **Opportunities:** Services, support and technology to support longer lifespans and periods of wellness (SDG 3) ([Exhibit 65](#)); Provide opportunity for greater participation by women and an older workforce (SDG 5); opportunities for productive labour and legal migration to fill labor gaps (SDG 10); support re-skilling and education for older and younger populations to meet future jobs in demand (SDG 4 & 8).

Exhibit 64: Life expectancy has increased in nearly all countries of the world since 1960s, with the largest increases in China, the Arab World and Upper middle income countries

Life expectancy per country, shown with countries' cumulative share of the global population on x-axis, 1960 vs 1990 vs 2022



Source: World Bank, Goldman Sachs Global Investment Research

Exhibit 65: Sustainable Development Goals that could be affected by the implications of Aging Populations to healthcare, labor, and broader markets



Source: United Nations, Goldman Sachs Global Investment Research

Appendix: Country Aging Profiles and Lower Fertility Rates overview

While all top 50 economies are aging, the rate and final aging profile of countries will not change evenly. While Japan maintains the oldest population profile today based on median age, total fertility rate, % of working age population, and old age dependency ratios, Korea (21st to 2nd) and Hong Kong (11th to 1st) will surpass Japan's aging profile by 2050 (1st to 3rd). **Similar many of the oldest economies today will see their societies age slower relative to others as their ranks improve by 2050**, based on latest estimates. For example, Germany will move from 5th to 10th, Finland from 2nd to 14th, Denmark 10th to 25th, the USA from 23rd to 29th. **Other countries will see their relative ranks fall as their societies age faster**, for example China (26th to 8th), Spain (12th to 5th), Poland (17th to 6th), Thailand (27th to 12th), and Switzerland (18th to 11th). Countries primarily in the Middle East and Southeast Asia will retain their younger demographic profiles. **Evaluating Gross National Income per capita relative to total fertility rates, as a potential signal for countries with a more robust pipeline of wealthy consumers**, Israel, the USA, Ireland, Norway, Switzerland, and Saudi Arabia maintain the highest income and fertility profiles ([Exhibit 66](#)).

The economies of aging societies with low fertility rates can benefit significantly for a period of time through the 'Demographic Dividend' — Insights from South Korea. A 'Demographic Dividend' arises when a country's dependency ratios (children & elderly pop. vs. working age population 15-64) decline as the working age population increases as a share of total population — this typically corresponds with a rising productive workforce and growth in consumers that drives economic growth. Despite South Korea's record low fertility rate amongst developing economies, the country maintains one of the highest shares of working age population at 71%, and currently one of the lowest old-age dependency ratios 0.26 (3.8 working age per 65+) amongst advanced economies, however this is set to declining rapidly in the coming years driving Korea as one of the fastest aging countries.

Exhibit 66: Top 50 largest countries by GDP shows shifting demographic profiles based on Aging, Fertility Rate and Income

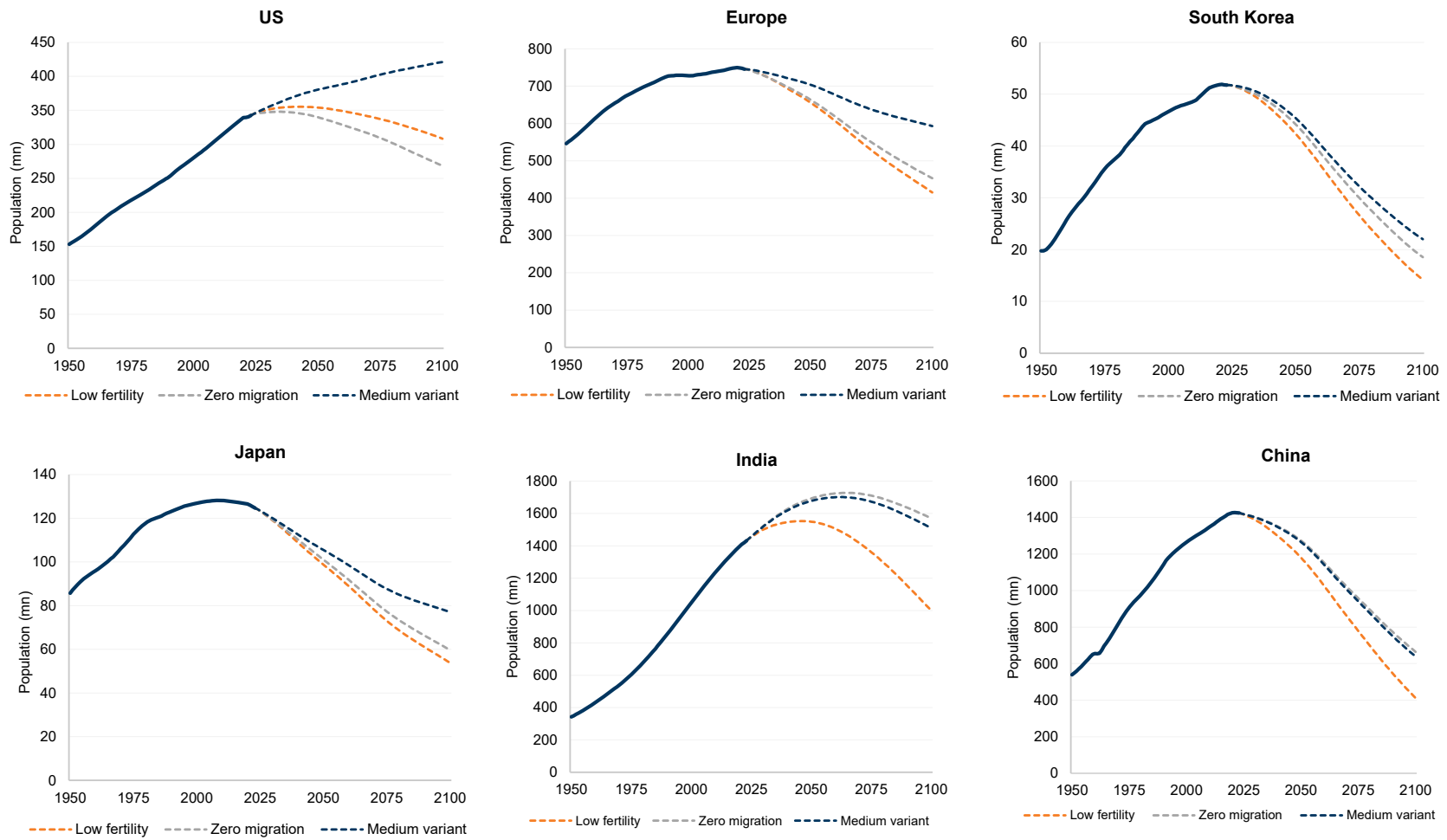
Top 50 largest countries by GDP ranked by blended median age, total fertility rate, working age population and old age dependency ratio ranks

Countries	Raw Data												Aging Score			Rank Change 2050 v 2023	Baby Money Index			
	Median Age			Total Fertility Rate			Working-Age Population %			Old Age Dependency Ratio							Countries	GNI 2023	TFR 2023	BMI
	2023	2030	2050	2023	2030	2050	2023	2030	2050	2023	2030	2050	2023	2030	2050					
Japan	49.0	51.5	52.8	1.21	1.26	1.35	59%	58%	51%	0.50	0.53	0.73	90%	91%	93%	1 → 3	Israel	54,280	2.8	435
Finland	42.8	44.3	46.5	1.28	1.33	1.41	61%	61%	59%	0.38	0.42	0.48	83%	83%	80%	2 → 14	USA	80,000	1.6	211
Italy	47.5	50.0	52.9	1.20	1.25	1.35	64%	61%	52%	0.38	0.46	0.70	81%	86%	93%	3 → 4	Ireland	79,280	1.6	202
Portugal	46.2	48.3	48.3	1.51	1.53	1.57	63%	60%	53%	0.38	0.45	0.62	80%	85%	87%	4 → 7	Norway	101,640	1.4	201
Germany	45.1	46.3	47.9	1.44	1.48	1.54	63%	60%	57%	0.36	0.44	0.54	79%	85%	83%	5 → 10	Switzerland	95,740	1.4	197
France	41.8	43.0	43.5	1.64	1.64	1.65	61%	60%	57%	0.35	0.40	0.48	79%	80%	77%	6 → 17	Saudi Arabia	36,330	2.3	189
Sweden	39.9	41.3	44.1	1.43	1.46	1.52	62%	63%	60%	0.33	0.35	0.43	77%	75%	72%	7 → 23	Australia	63,320	1.6	170
Czechia	42.7	45.4	46.0	1.45	1.50	1.57	64%	63%	56%	0.32	0.35	0.52	76%	76%	82%	8 → 13	Denmark	72,080	1.5	165
Belgium	41.4	43.0	45.2	1.38	1.42	1.49	64%	62%	58%	0.32	0.37	0.48	76%	78%	78%	9 → 15	New Zealand	49,020	1.7	136
Denmark	41.2	41.6	44.3	1.51	1.54	1.57	64%	62%	60%	0.32	0.37	0.43	75%	77%	72%	10 → 25	Netherlands	62,550	1.4	128
Hong Kong	46.2	50.4	62.0	0.72	0.79	0.96	68%	62%	48%	0.32	0.46	0.96	75%	87%	98%	11 → 1	Sweden	60,300	1.4	123
Spain	44.9	48.0	51.8	1.21	1.26	1.36	66%	64%	52%	0.31	0.38	0.69	74%	79%	92%	12 → 5	France	45,770	1.6	123
Austria	43.1	45.1	49.2	1.32	1.36	1.43	66%	62%	57%	0.31	0.39	0.54	74%	80%	85%	13 → 9	UK	48,830	1.6	119
Netherlands	41.4	42.0	45.5	1.43	1.46	1.52	65%	62%	60%	0.31	0.37	0.44	74%	77%	74%	14 → 20	Germany	55,420	1.4	115
United Kingdom	39.8	40.7	42.9	1.56	1.53	1.55	63%	63%	60%	0.30	0.33	0.41	74%	72%	69%	15 → 26	Belgium	55,520	1.4	106
Romania	42.6	44.1	46.2	1.71	1.70	1.68	64%	65%	58%	0.31	0.32	0.48	73%	70%	77%	16 → 16	Canada	54,660	1.3	99
Poland	41.3	45.0	51.8	1.30	1.33	1.40	65%	65%	57%	0.30	0.35	0.56	73%	75%	87%	17 → 6	Kazakhstan	10,690	3.0	97
Switzerland	42.3	44.4	47.8	1.43	1.46	1.52	65%	63%	57%	0.30	0.37	0.53	72%	78%	83%	18 → 11	Austria	55,890	1.3	97
Canada	40.3	41.7	45.1	1.35	1.33	1.39	65%	63%	61%	0.30	0.36	0.42	72%	76%	73%	19 → 22	Finland	52,990	1.3	87
Norway	39.5	41.3	45.5	1.41	1.44	1.50	65%	64%	59%	0.29	0.33	0.45	71%	71%	76%	20 → 18	UAE	51,100	1.2	74
South Korea	44.5	48.5	56.7	0.72	0.82	1.03	71%	67%	52%	0.26	0.38	0.76	68%	76%	97%	21 → 2	Angola	2,700	5.1	71
Australia	37.8	39.5	42.0	1.64	1.64	1.64	65%	63%	60%	0.27	0.31	0.39	68%	69%	66%	22 → 28	Iraq	5,920	3.2	62
USA	38.0	39.6	41.9	1.62	1.63	1.64	65%	63%	61%	0.27	0.32	0.38	67%	70%	64%	23 → 29	Singapore	69,850	0.9	62
Russia	39.5	42.2	41.7	1.45	1.49	1.54	66%	65%	61%	0.25	0.30	0.39	67%	68%	67%	24 → 27	Portugal	26,340	1.5	60
Ireland	38.4	39.9	42.9	1.60	1.60	1.60	65%	66%	58%	0.24	0.27	0.45	65%	63%	74%	25 → 21	Czechia	28,540	1.4	60
Mainland China	39.1	42.9	52.1	1.00	1.06	1.18	69%	70%	59%	0.21	0.26	0.52	61%	63%	85%	26 → 8	Japan	39,360	1.2	57
Thailand	39.7	42.6	48.6	1.21	1.20	1.29	70%	68%	59%	0.21	0.29	0.50	60%	65%	83%	27 → 12	Italy	38,770	1.2	56
Chile	36.0	39.5	48.9	1.17	1.13	1.24	69%	69%	62%	0.20	0.25	0.43	58%	60%	75%	28 → 19	Slovakia	22,710	1.6	55
Argentina	32.1	34.9	41.9	1.50	1.51	1.54	66%	68%	65%	0.19	0.20	0.31	56%	50%	55%	29 → 34	Nigeria	2,590	4.5	52
Israel	29.2	29.5	32.2	2.83	2.64	2.31	60%	61%	61%	0.21	0.22	0.26	53%	48%	38%	30 → 41	Dominican Republic	9,700	2.2	49
Singapore	35.1	39.1	50.9	0.94	1.01	1.15	75%	71%	64%	0.17	0.24	0.42	52%	57%	72%	31 → 24	Romania	16,590	1.7	49
Brazil	33.9	36.9	43.9	1.62	1.58	1.56	69%	68%	63%	0.15	0.20	0.36	49%	51%	63%	32 → 30	Spain	32,980	1.2	49
Türkiye	32.5	35.8	44.3	1.63	1.61	1.62	68%	69%	63%	0.15	0.18	0.35	48%	48%	62%	33 → 32	Turkmenistan	6,270	2.7	45
Viet Nam	32.4	35.7	40.2	1.91	1.82	1.75	68%	68%	63%	0.13	0.17	0.32	45%	46%	54%	34 → 35	Mexico	12,020	1.9	44
Iran	32.9	36.7	43.5	1.70	1.63	1.63	69%	70%	62%	0.11	0.15	0.36	44%	45%	62%	35 → 31	Hungary	19,840	1.5	44
Colombia	31.6	34.8	43.7	1.65	1.58	1.58	70%	69%	65%	0.13	0.18	0.32	44%	48%	56%	36 → 33	Bulgaria	14,240	1.7	44
Peru	29.5	32.0	39.1	1.98	1.87	1.74	67%	67%	65%	0.13	0.16	0.27	44%	43%	47%	37 → 36	Congo	2,310	4.2	40
Kazakhstan	29.5	29.5	31.2	3.01	2.81	2.39	62%	62%	62%	0.13	0.17	0.22	43%	42%	33%	38 → 44	Greece	22,300	1.3	40
Mexico	28.9	31.5	38.7	1.91	1.79	1.70	67%	68%	66%	0.12	0.15	0.26	42%	41%	46%	39 → 38	Algeria	4,950	2.8	38
Malaysia	30.1	33.0	40.1	1.55	1.51	1.53	70%	71%	67%	0.11	0.13	0.25	41%	40%	47%	40 → 37	Paraguay	6,210	2.4	36
Indonesia	29.8	31.8	36.8	2.13	2.01	1.85	68%	69%	66%	0.10	0.13	0.23	39%	37%	40%	41 → 39	Chad	960	6.1	36
India	28.1	30.8	38.3	1.98	1.88	1.77	68%	69%	68%	0.10	0.12	0.22	38%	37%	39%	42 → 40	Zimbabwe	2,550	3.7	35
Bangladesh	25.3	27.7	35.6	2.16	2.01	1.81	65%	66%	67%	0.10	0.11	0.20	38%	36%	36%	43 → 42	Libya	6,160	2.4	34
Philippines	25.3	28.2	35.9	1.92	1.82	1.74	66%	69%	69%	0.08	0.10	0.16	37%	33%	34%	44 → 43	Uzbekistan	2,750	3.5	34
South Africa	28.2	29.6	32.3	2.22	2.10	1.89	67%	67%	67%	0.10	0.12	0.17	37%	36%	30%	45 → 46	Poland	19,890	1.3	34
UAE	31.2	31.8	32.6	1.20	1.23	1.33	82%	82%	80%	0.02	0.03	0.03	36%	34%	30%	46 → 45	South Africa	6,490	2.2	32
Egypt	24.0	25.6	31.0	2.75	2.59	2.21	63%	65%	66%	0.08	0.09	0.15	35%	30%	25%	47 → 47	Mali	1,010	5.6	32
Iraq	20.3	22.1	27.8	3.25	2.97	2.45	60%	63%	65%	0.06	0.06	0.11	33%	27%	19%	48 → 49	Türkiye	11,980	1.6	32
Pakistan	20.3	21.6	26.3	3.61	3.25	2.58	59%	61%	65%	0.07	0.08	0.10	32%	29%	17%	49 → 50	Cameroon	1,680	4.3	31
Saudi Arabia	29.2	29.7	32.0	2.28	2.17	1.88	73%	74%	72%	0.04	0.05	0.11	28%	26%	25%	50 → 48	Jordan	4,450	2.6	31

Source: UN Population Prospects 2024, World Bank, Data compiled by Goldman Sachs Global Investment Research

Exhibit 67: Under the UN's scenarios, population is plateauing or declining in Europe, South Korea, Japan and China with rates of decline depending heavily on assumptions around fertility and migration

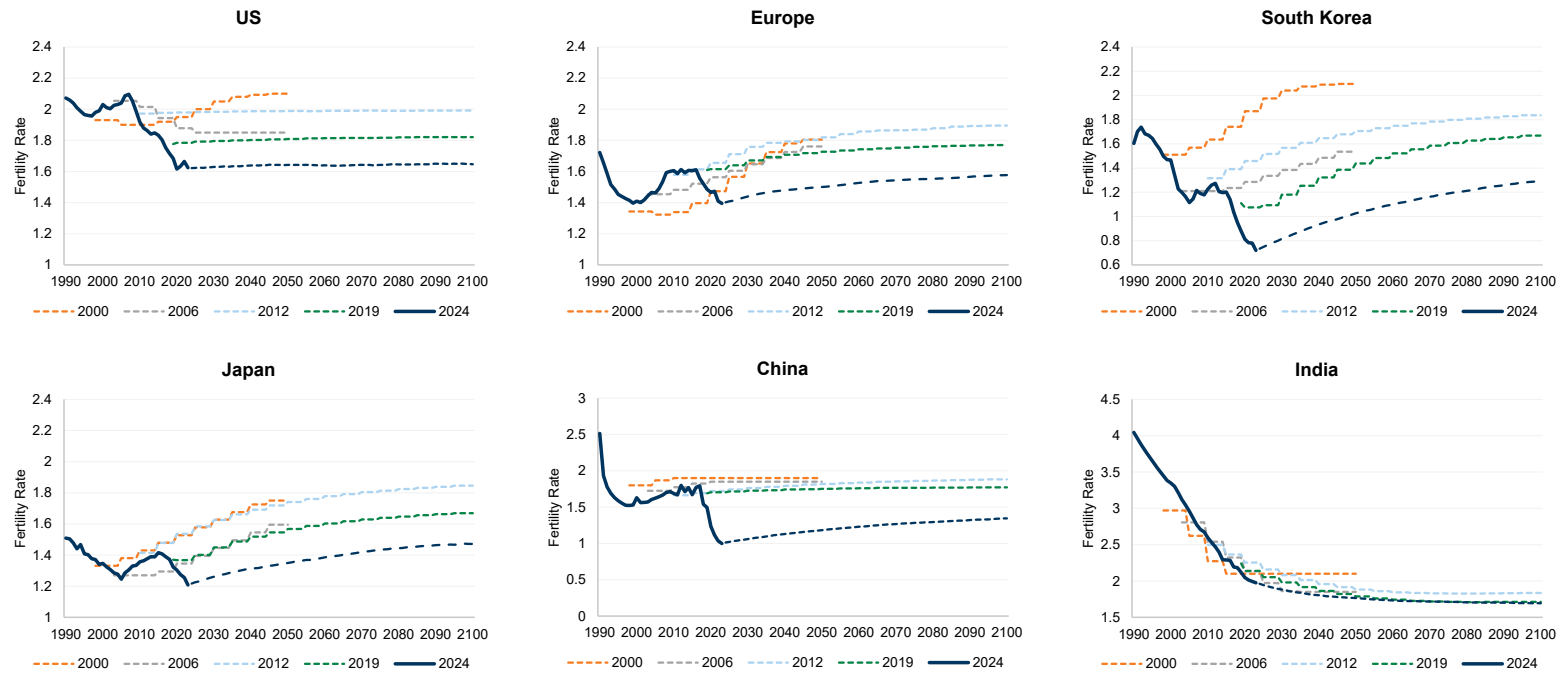
Population projection under different scenarios



Source: United Nations, data compiled by Goldman Sachs Global Investment Research

Exhibit 68: The UN's birthrate estimates have been continuously adjusted down across major economies yet are still projected to rebound

Total Fertility Rate actual and projection over years



Source: United Nations, data compiled by Goldman Sachs Global Investment Research

Exhibit 69: Summary of UN Population and Fertility Rates projections under different scenarios

	Population (mn) / TFR	2023	2025	2030	2040	2050	2060	2070	2080	2090	2100
United States of America	Medium Variant	342	346 (1%)	355 (4%)	370 (8%)	380 (11%)	389 (13%)	398 (16%)	407 (19%)	414 (21%)	421 (23%)
	Low Fertility	342	346 (1%)	351 (3%)	355 (4%)	354 (3%)	349 (2%)	342 (0%)	332 (-3%)	321 (-6%)	308 (-10%)
	Zero-Migration	342	345 (1%)	347 (1%)	347 (1%)	340 (-1%)	328 (-4%)	316 (-8%)	302 (-12%)	285 (-17%)	268 (-22%)
	Fertility Rate (TFR)	1.62	1.62	1.63	1.64	1.64	1.64	1.64	1.65	1.65	1.65
Canada	Medium Variant	39	40 (2%)	42 (6%)	44 (12%)	46 (17%)	47 (20%)	49 (25%)	50 (29%)	52 (33%)	54 (37%)
	Low Fertility	39	40 (2%)	41 (5%)	42 (8%)	42 (9%)	42 (9%)	42 (8%)	42 (7%)	41 (6%)	41 (4%)
	Zero-Migration	39	40 (1%)	40 (1%)	39 (0%)	37 (-5%)	35 (-11%)	32 (-17%)	30 (-24%)	27 (-31%)	24 (-38%)
	Fertility Rate (TFR)	1.35	1.33	1.33	1.36	1.39	1.42	1.45	1.47	1.48	1.49
France	Medium Variant	66	67 (0%)	67 (1%)	68 (2%)	68 (3%)	68 (2%)	68 (2%)	68 (2%)	68 (3%)	68 (3%)
	Low Fertility	66	67 (0%)	66 (0%)	65 (-2%)	64 (-4%)	61 (-8%)	58 (-13%)	55 (-17%)	52 (-21%)	49 (-26%)
	Zero-Migration	66	67 (0%)	66 (0%)	66 (-1%)	64 (-3%)	62 (-7%)	59 (-10%)	57 (-14%)	55 (-18%)	52 (-22%)
	Fertility Rate (TFR)	1.64	1.64	1.64	1.64	1.65	1.65	1.65	1.65	1.65	1.65
Germany	Medium Variant	84	84 (0%)	83 (-2%)	81 (-4%)	78 (-7%)	76 (-10%)	74 (-13%)	72 (-14%)	71 (-16%)	71 (-16%)
	Low Fertility	84	84 (0%)	82 (-3%)	78 (-8%)	73 (-13%)	68 (-19%)	63 (-25%)	59 (-31%)	54 (-36%)	51 (-40%)
	Zero-Migration	84	84 (0%)	83 (-2%)	78 (-7%)	74 (-13%)	68 (-19%)	63 (-25%)	58 (-31%)	54 (-36%)	50 (-40%)
	Fertility Rate (TFR)	1.44	1.46	1.48	1.51	1.54	1.56	1.56	1.58	1.59	1.60
Italy	Medium Variant	60	59 (-1%)	58 (-2%)	55 (-7%)	52 (-13%)	48 (-20%)	44 (-27%)	40 (-32%)	38 (-36%)	35 (-40%)
	Low Fertility	60	59 (-1%)	58 (-3%)	53 (-10%)	49 (-18%)	43 (-27%)	37 (-37%)	33 (-45%)	28 (-52%)	25 (-59%)
	Zero-Migration	60	59 (-1%)	58 (-3%)	54 (-9%)	50 (-16%)	45 (-24%)	40 (-33%)	36 (-40%)	32 (-46%)	29 (-52%)
	Fertility Rate (TFR)	1.20	1.21	1.25	1.30	1.35	1.39	1.42	1.43	1.46	1.48
Japan	Medium Variant	125	123 (-1%)	120 (-4%)	113 (-10%)	105 (-15%)	98 (-21%)	91 (-27%)	85 (-32%)	81 (-35%)	77 (-38%)
	Low Fertility	125	123 (-1%)	119 (-5%)	109 (-13%)	99 (-21%)	89 (-29%)	78 (-37%)	69 (-45%)	61 (-51%)	54 (-57%)
	Zero-Migration	125	123 (-1%)	119 (-4%)	110 (-12%)	101 (-19%)	92 (-26%)	82 (-34%)	73 (-41%)	66 (-47%)	60 (-52%)
	Fertility Rate (TFR)	1.21	1.23	1.26	1.31	1.35	1.39	1.42	1.44	1.46	1.47
United Kingdom	Medium Variant	68	69 (1%)	71 (4%)	74 (8%)	75 (10%)	76 (11%)	76 (11%)	76 (11%)	75 (10%)	74 (9%)
	Low Fertility	68	69 (1%)	70 (3%)	71 (4%)	70 (3%)	68 (0%)	65 (-5%)	62 (-10%)	58 (-15%)	53 (-22%)
	Zero-Migration	68	69 (1%)	69 (1%)	68 (-1%)	66 (-3%)	64 (-7%)	60 (-12%)	57 (-17%)	53 (-22%)	50 (-27%)
	Fertility Rate (TFR)	1.56	1.54	1.53	1.53	1.55	1.56	1.57	1.58	1.59	1.60
China	Medium Variant	1424	1418 (0%)	1400 (-2%)	1346 (-5%)	1265 (-11%)	1142 (-20%)	1005 (-29%)	877 (-38%)	751 (-47%)	639 (-55%)
	Low Fertility	1424	1416 (-1%)	1387 (-3%)	1297 (-9%)	1180 (-17%)	1027 (-28%)	860 (-40%)	699 (-51%)	547 (-62%)	412 (-71%)
	Zero-Migration	1424	1418 (0%)	1402 (-2%)	1351 (-5%)	1273 (-11%)	1154 (-19%)	1021 (-28%)	896 (-37%)	774 (-46%)	665 (-53%)
	Fertility Rate (TFR)	1.00	1.02	1.06	1.13	1.18	1.23	1.27	1.30	1.32	1.35
India	Medium Variant	1432	1457 (2%)	1519 (6%)	1619 (13%)	1678 (17%)	1701 (19%)	1691 (18%)	1648 (15%)	1584 (11%)	1509 (5%)
	Low Fertility	1432	1455 (2%)	1500 (5%)	1546 (8%)	1549 (8%)	1506 (5%)	1417 (-1%)	1297 (-9%)	1153 (-19%)	999 (-30%)
	Zero-Migration	1432	1458 (2%)	1522 (6%)	1628 (14%)	1693 (18%)	1724 (20%)	1723 (20%)	1690 (18%)	1636 (14%)	1570 (10%)
	Fertility Rate (TFR)	1.98	1.94	1.88	1.80	1.77	1.73	1.72	1.71	1.70	1.69
South Korea	Medium Variant	52	52 (0%)	51 (-1%)	49 (-5%)	45 (-12%)	40 (-22%)	35 (-33%)	30 (-42%)	26 (-50%)	22 (-57%)
	Low Fertility	52	52 (0%)	51 (-2%)	47 (-9%)	42 (-18%)	36 (-30%)	30 (-43%)	24 (-54%)	19 (-64%)	14 (-73%)
	Zero-Migration	52	52 (0%)	51 (-2%)	48 (-7%)	44 (-15%)	39 (-26%)	33 (-37%)	27 (-47%)	23 (-56%)	19 (-64%)
	Fertility Rate (TFR)	0.72	0.75	0.82	0.93	1.03	1.10	1.16	1.21	1.26	1.30
	Pop. Peak										

Source: United Nations, data compiled by Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

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