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Methology Appendix to
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What are the Potential Benefits of Universal Access to Retirement Savings?

An Analysis of National Options to Expand Coverage

Methodology Appendix

ESI ECONSULT SOLUTIONS INC.
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Methodology Appendix

This methodology appendix provides supporting documentation for data sources and methods used to analyze the impact of potential universal access retirement savings models discussed in the December 2020 report entitled *What are the Potential Benefits of Universal Access to Retirement Savings? An Analysis of National Options to Expand Coverage.*

This Appendix is organized in three sections that mirror the content of the report. Information contained in the Appendix is not meant to convey the findings of the study independently, but rather to support the findings of the main report through a comprehensive documentation of sources and methods.

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1. Closing the Gaps in Access to Retirement Savings

Section 1 of the *Potential Benefits of Universal Access* report covers the current gaps in access to retirement savings for private sector workers, the policy approaches that have been advanced domestically and internationally to close these gaps, and the policy options modeled in this analysis.

This Appendix provides supporting documentation for the following topics covered in Section 1 of the report:

- **Population and Labor Force Projections**, which form the foundation of modeling of the size and composition of private sector employment over time.
    - This methodology is organized into sub-sections covering Population Projections, Household Projections, and Labor Force Projections.
- **Retirement Access Gaps**, which analyzes which private sector workers lack access to retirement savings coverage through their workplaces under the current policy environment.
- **Policy Scenarios Analyzed**, which provides additional information about how the policy options reviewed in this report are defined and quantified.
    - This methodology is organized into sub-sections covering Baseline Scenario Design, and Policy Options Modeled.
- **Study Timeframe and Key Assumptions**, which provides additional information about the modeling framework that is used to quantify potential impacts from the policy options analyzed.
    - This methodology is organized into sub-sections covering Implementation and Analysis Timeframe and Key Assumptions.

Population and Labor Force Projections

Population Projections

Population growth projections by age cohort form the foundation for estimates of changes in the elderly population and changes in the labor force over time.

Population projections are drawn from forecasts issued by the Demographics Research Group at the University of Virginia's Weldon Cooper Center for Public Service.[1] The projections, issued in 2018, are available for each state and nationally by five-year age cohorts for the years 2020, 2030, and 2040.[2] Projections for 2025 and 2035 are extrapolated through an averaged growth methodology using the 10-year forecasts.

Figure 1.1 shows forecasted changes in the national population composition by age from 2020–2040.

[1] *National Population Projections* (2018). University of Virginia Weldon Cooper Center, Demographics Research Group. <https://demographics.coopercenter.org/national-population-projections>

[2] Note that U.S. Census Bureau population projections are not available at the same level of geographic and age specificity. The website of the UVA Demographic Research Group notes that "[t]he Cooper Center projections have been widely used by many federal agencies and states. Numerous data users were referred by the Census Bureau to the Cooper Center website, including the Congressional Budget Office."

Figure 1.1 – Forecasted U.S. Population by Age, 2020–2040 (Millions)

Age Cohort	2020	2040
0 to 4	20.8	23.5
5 to 9	21.2	24.2
10 to 14	21.8	24.4
15 to 19	21.9	25.0
20 to 24	22.0	24.7
25 to 29	23.3	25.0
30 to 34	22.7	25.2
35 to 39	21.9	24.7
40 to 44	20.1	24.0
45 to 49	19.9	24.4
50 to 54	20.5	22.9
55 to 59	21.8	21.2
60 to 64	20.9	19.0
65 to 69	18.1	18.0
70 to 74	14.3	16.7
75 to 79	9.4	15.2
80 to 84	5.9	11.4
85+	6.1	9.8
Total	**332.5**	**379.4**
65+ Population	53.8	71.1
65 + Share	16.2%	18.7%

Source: University of Virginia Weldon Cooper Center Population Projections.

These age cohorts are matched to commonly used definitions of generations to visualize generational changes in the population over time (in Report Figure 1.4). For the purpose of visualizations, generations are defined based on birth years in the five-year cohorts used in the population forecasts that track as closely as possible with commonly used generational dates.[3] Birth years used for each generation and associated ages as of 2020 and 2040 are shown in Figure 1.2.

[3] See, for example: Michael Dimock (Jan 17, 2019), *Defining generations: Where Millennials end and Generation Z begins*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>

Figure 1.2 – Generational Definitions Used by Age Cohort

	Cohorts Used	Age Bands 2020	Age Bands 2040
Silent Generation	<1945	75+	--
Baby Boomers	1946-1965	55-74	75+
Gen X	1966-1980	40-54	60-74
Millennials	1981-1995	25-39	45-59
Gen Z	1996-2009	10-24	30-44
Gen Alpha	>2010	<10	<30

Household Projections

Population projections are also translated into projections of the number of households headed by a "householder" within each age band. Household rather than population measures are often used to understand demographic changes in the context of their impacts on the tax base. Analysis of savings impacts throughout the report typically tracks workers/savers on an individual basis. However, households also form the base unit of analysis for the modeling of program expenditures.

The translation from population projections to households is undertaken in four different age groups (under 25, 25–44, 45–64, and 65+). American Community Survey (ACS) data from 2018 are used to calculate the average household size by dividing the number of householders by the population for each age cohort.[4] The resulting ratio (also known as the "headship rate") is then held constant for each age cohort across the analysis period to translate population estimates to household estimates for 2020 and 2040.[5] Figure 1.3 shows the projected growth in households from 2020–2040, much of which is concentrated among the elderly population.

Figure 1.3 – Est. US Households by Age Cohort, 2020–2040 (Millions)

	<25	25-44	45-64	65+	Total
2020					
Projected Population (M)	107.8	87.9	83.1	53.8	332.5
Headship Rate %	5.9%	45.5%	55.2%	61.1%	37.6%
Projected Households (M)	**6.3**	**40.0**	**45.9**	**32.8**	**125.0**
2040					
Projected Population (M)	121.9	98.8	87.6	71.1	379.4
Headship Rate %	5.9%	45.5%	55.2%	61.1%	37.9%
Projected Households (M)	**7.2**	**44.9**	**48.4**	**43.4**	**143.9**
Projected HH Growth 2020–2040	**0.9**	**4.9**	**2.5**	**11.6**	**18.9**

[4] ACS population estimates are drawn from Table BO101 (Sex by Age) and Household estimates are drawn from table B19037 (Age of Householder) using 2018 1-Year Estimates.
[5] Note that the national headship rate shifts slightly over time under this approach, due to compositional changes in population by age group.

Household estimates are also used to understand changes in the dependency ratio, a calculation comparing the number of working age households to the number of elderly households. This measure is understood to be an important indicator of fiscal stability, since working age households are the main supporters of the tax base, while elderly households are net recipients of support from public programs. A declining ratio therefore indicates an increasing fiscal burden on the working age population.

The US Census Bureau publishes estimates of the composition of US households by age in a continuous data series that goes back to 1960.[6] This data series can be used to compare the anticipated dependency ratios in future years to historical norms. Figure 1.4 shows the number of working age households, elderly households, and the dependency ratio in five-year increments, using Census Bureau data for 1980–2015 and projections based on the UVA forecasts and the headship rate approach defined above for 2020–2040.

Figure 1.4 – US Households and Dependency Ratio, 1980–2040 (Millions)

Year	Total HH	Working Age (<65)	Elderly (65+)	Dependency Ratio
1980	80.8	64.2	16.5	3.88
1985	86.8	68.6	18.2	3.78
1990	93.3	73.2	20.2	3.63
1995	99.0	77.6	21.4	3.63
2000	104.7	83.0	21.7	3.82
2005	113.3	90.2	23.2	3.90
2010	117.5	92.3	25.3	3.65
2015	124.6	94.6	29.9	3.16
2020 (p)	125.0	92.2	32.8	2.81
2025 (p)	130.4	93.2	37.1	2.51
2030 (p)	135.7	94.3	41.4	2.28
2035 (p)	139.8	97.4	42.4	2.30
2040 (p)	143.9	100.5	43.4	2.31

Source: US Census Bureau (1980-2015), ESI analysis of University of Virginia Weldon Cooper Center Population Projections (2020-2040)

6 US Census Bureau, Historical Household Tables. Table 3: Households by Age of the Householder: 1960 to Present <https://www.census.gov/data/tables/time-series/demo/families/households.html>

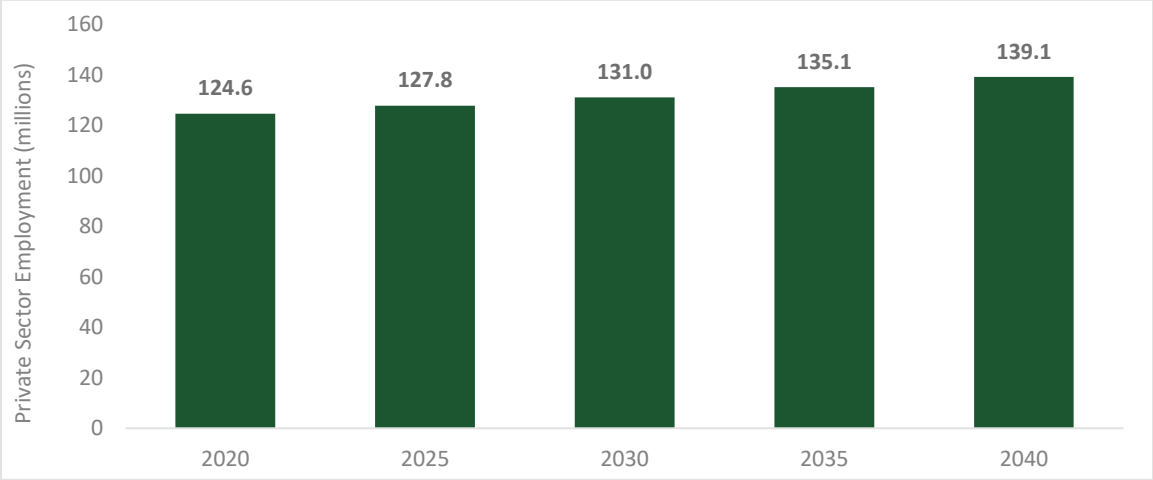
Labor Force Forecasts

The size and composition of the private sector labor force is assumed to grow in parallel to the forecasted composition of the population over the analysis period. To implement this assumption, US Census Bureau data from the Quarterly Workforce Indicators (QWI) program[7] is analyzed to understand the employment to population ratio among private sector workers within each of the age bands used in the study.[8] Employment counts from 2018 are used to align with 2018 population numbers by age cohort from the ACS (which match the inputs used for the headship rate calculation described above).

This employment to population ratio for each age cohort and firm size is then held consistent and applied to the forecasted population in five-year increments to forecast the base of private sector employment across the study period. This approach produces slight variations in the overall ratio of private sector employment to population based on changes in the composition of the population by age, with the aging to the population leading to a slightly lower overall employment to population ratio over time.

This approach effectively assumes a continuity of economic conditions and relative workforce participation as the population grows across the study period. In practice, economic conditions tend to follow a business cycle, where employment participation at times exceeds and at times lags the long-term average. Since the path of the business cycle in unknown, stable modeling conditions are applied to generate a reasonable estimate of results. Stable conditions are also applied to other economic aspects of the calculation, such as earnings and market returns. Figure 1.5 below shows the resulting private sector employment forecasts.

Figure 1.5 – Est. Private Sector Employment, 2020-2040 (Millions)



[7] QWI is one of several data products on employment produced by the US Census Bureau. QWI data is used frequently throughout this study because of the granularity of information it provides about private sector employment, including the ability to "cross-tab" measures like employee age and firm size and the ability to track job turnover over time. For more information on this data product, see: <https://www.census.gov/data/developers/data-sets/qwi.html>. Individual tables are accessed through the QWI explorer, such as annual private sector employment by worker age: <qwiexplorer.ces.census.gov/exp-r/119f02.html>

[8] Notably, employment estimates used for this analysis include only traditional employees, as defined by the Bureau of Labor Statistics and Census Bureau, and includes independent contractors and "gig workers". Any enhanced access among these independent workers would produce additional benefits beyond those modeled.

The projected private sector workforce in each age cohort is further apportioned into firm sizes. Data is drawn from the US Census Bureau QWI on the composition of the workforce by age and employer size, [9] along with Bureau of Labor Statistics data on employment by firm size.[10] This apportionment by employer size is similarly held constant over time for each age cohort through the study period, and applied in five-year increments. Estimates for each interim year are derived by applying the compound annual growth rate in each age and firm size cohort.

This approach produces the distribution of employees by age and firm size for 2020 and 2040 shown in Figures 1.6 and 1.7 below.

Figure 1.6 – Est. Private Sector Employment Distribution, 2020

	Total	15-24	25-34	35-44	45-54	55-64	65+
Adult Population (M)	268.7	44.0	46.0	41.9	40.3	42.7	53.8
Private Sector Emp /Pop %	46.4%	38.1%	62.6%	63.3%	58.2%	49.2%	15.0%
Private Employment (M)	**124.6**	**16.7**	**28.8**	**26.5**	**23.5**	**21.0**	**8.1**
Employer Size (M)							
<10	18.7	2.4	4.0	3.9	3.6	3.4	1.5
10-19	13.9	1.8	3.0	2.9	2.7	2.5	1.1
20-49	21.7	3.4	5.1	4.5	3.8	3.4	1.5
50-99	16.5	2.2	3.9	3.5	3.1	2.7	1.0
100-249	20.3	2.7	4.8	4.3	3.8	3.3	1.3
250+	33.5	4.1	8.1	7.5	6.6	5.7	1.7

Figure 1.7 – Est. Private Sector Employment Distribution, 2040

	Total	15-24	25-34	35-44	45-54	55-64	65+
Adult Population (M)	307.2	49.7	50.2	48.7	47.3	40.2	71.1
Private Sector Emp /Pop %	45.3%	38.1%	62.6%	63.3%	58.2%	49.2%	15.0%
Private Employment (M)	**139.1**	**18.9**	**31.4**	**30.8**	**27.5**	**19.8**	**10.7**
Employer Size (M)							
<10	20.9	2.7	4.3	4.5	4.2	3.2	2.0
10-19	15.6	2.0	3.2	3.3	3.1	2.4	1.5
20-49	24.3	3.9	5.6	5.2	4.5	3.2	1.9
50-99	18.4	2.5	4.3	4.1	3.6	2.6	1.4
100-249	22.6	3.1	5.2	5.0	4.4	3.1	1.7
250+	37.4	4.7	8.8	8.7	7.7	5.4	2.2

[9] US Census Bureau Quarterly Workforce Indicators, Employment by Age and Firm Size, Q3 2018 < qwiexplorer.ces.census.gov/exp-r/116431.html>. Since this data is quarterly, totals by age group vary slightly from annual 2018 estimates used to define the size of the workforce. This information is used for compositional purposes (defining the share of employment by age for each firm size band).
[10] Analysis to define the share of private sector employment by firm size is drawn from the BLS Quarterly Census of Employment and Wages (QCEW), Series ENUUS00010510. Employer size bands are aggregated as shown in Figure 1.6 and Figure 1.7.

Retirement Access Gaps

Millions of private sector workers in the US do not have access to an employer-sponsored retirement savings plan. Estimates of the number of workers who lack access to such plans range significantly based on the data source, definitions specified, and method of analysis. Published estimates of the share of private sector workers lacking coverage ranges from 33% (or about 40 million private sector workers) based on Bureau of Labor Statistics Data from the 2019 National Compensation Survey[11] to 64% (or about 80 million) based on a New School analysis of 2018–2019 Current Population Survey data.[12] Earlier analysis of Current Population Survey data by the Pew Charitable Trusts of full-time, full-year private sectors workers found that 42% lacked access to coverage, and with disparities in access based on characteristics such as gender, earnings, employer size and race.[13]

This analysis does not seek to definitively resolve these differential estimates, but rather to define a realistic estimate consistent with the existing body of research for the purpose of understanding the potential impact of universal access models. It is crucial for this approach to reflect the variations in access rates across employer and employee types, in addition to the overall access level.

Overall access rates are defined by updating analysis of CPS data using 2018–2019 samples (following the methodology defined in the Pew Charitable Trusts study with respect to the specific questions and definitions used) and averaging these national results with nationwide access rates for private sector workers reported in the BLS 2019 National Employment Compensation Survey. This blended approach yields an estimate that 54% of private sector workers have access to retirement savings options through their workplace, while 46% do not have access. These shares are applied to the private sector workforce projections for 2020 to yield an estimated access gap of 57.3 million as of 2020 (as compared to 67.3 million workers with access through their employers).

Next, variation in these rates is estimated by age and employer size. Variation by age band is defined through the CPS analysis outlined above, while variation by employer size is drawn from a Social Security Administration analysis that defines access and participation by employer size based on data from the Survey of Income and Program Participation (SIPP).[14] Variations in access by age and firm size are weighted to the estimated composition of the private sector workforce to ensure that individual estimates by cohort sum to the national estimates when aggregated across all private sector workers.

Figure 1.8 below shows estimated workplace access by employee age and firm size. Estimates of access rates for each cohort are held consistent over time and applied to the estimated size and composition of the private sector workforce in each year over the 2020–2040 analysis period. This approach produces a steady increase in the access gap with population growth, and slight variation in the overall access gap from the 2020 estimate of 46% as the age composition of the workforce changes over time.

[11] 2019 National Compensation Survey from the Bureau of Labor Statistics. <https://www.bls.gov/ncs/> Table 2.
[12] Ghilarducci and Papadopoulos (2020), *Retirement Plan Coverage by Industry, Firm, and Worker Characteristics*. Schwartz Center for Economic Policy Analysis at the New School.
<https://www.economicpolicyresearch.org/images/docs/research/retirement_security/Research_Note_1_2020_Retirement_Plan_Coverage_by_Industry_Firm_and_Worker_Characteristics.pdf>
[13] Scott, John, et al. (2016), Who's In, Who's Out: A look at access to employer-based retirement plans and participation in the states. Pew Charitable Trusts. <https://www.pewtrusts.org/~/media/assets/2016/01/retirement_savings_report_jan16.pdf>
[14] Dushi, Iams, and Lichtenstein (2015), *Retirement Plan Coverage by Firm Size: An Update*. Social Security Administration, Office of Retirement and Disability Policy, *Social Security Bulletin*, Vol. 75, No. 2, 2015. <https://www.ssa.gov/policy/docs/ssb/v75n2/v75n2p41.html>

In 2040, an estimated 64.3 million employees are projected to lack access absent any change in coverage, up from 57.3 million in 2020.

Figure 1.8 – Est. Retirement Savings Access Gap by Employer Size and Employee Age (2020–2040)

Employer Size	Total	15-24	25-34	35-44	45-54	55-64	65+
<10	78%	84%	78%	77%	76%	75%	80%
10-19	60%	72%	60%	58%	55%	55%	63%
20-49	50%	64%	50%	48%	44%	44%	54%
50-99	42%	59%	43%	40%	36%	35%	47%
100-249	31%	51%	32%	28%	24%	23%	36%
250+	31%	52%	32%	29%	24%	24%	37%
Total	**46%**	**62%**	**46%**	**44%**	**40%**	**40%**	**53%**
Workers (M) – 2020	**57.3**	**10.4**	**13.2**	**11.5**	**9.5**	**8.5**	**4.3**
Workers (M) – 2040	**64.3**	**11.7**	**14.4**	**13.4**	**11.1**	**8.0**	**5.6**

These estimates represent the starting point population of workers currently lacking access to coverage through their employers. Policy scenarios described below are analyzed in terms of their impact on this population of workers over time.

Policy Scenarios Analyzed

The study examines the impacts of a "baseline" universal access model, as well as the differential impacts of a few alternative policy options. Most features are retained from one scenario to the next in order to isolate the impact of only those features that have been adjusted on participation, savings, and retirement security for currently uncovered workers. This analysis is not intended to designate a single proposal as optimal, but rather to provide policymakers with insight into the differential impacts of policy variations on access and savings.

Baseline Scenario Design

Baseline Auto-IRA covering all employers ("Baseline Auto-IRA")

A "baseline" universal access model defined in this report uses a payroll deduction Roth Auto-IRA structure that requires participation from employers of all sizes. This approach is used as a baseline because it is comprehensive in expanding access and simple in its structure and implementation. The components of the Baseline Auto-IRA scenario are defined as:

- All firms required to provide coverage to their employees
- Automatic enrollment (with voluntary employee opt out)
- Structured as a Roth IRA savings vehicle (post-tax contributions)
- Default initial employee contribution level set at 5%, with an auto-escalation of 1% per year up to 10%
- No employer contribution
- Coverage requirements implemented in three phases by employer size, starting with the largest employers two years after enactment and covering smaller employers in subsequent years

- *The implementation schedule used across the scenarios modeled is:* large firms — those that employ 100 or more employees — would be required to provide coverage in 2024 (or two years after the potential enactment), mid-size firms that employ 20–99 employees in 2025 (or three years after enactment), and all firms by 2026 (or four years after enactment).

- Existing state Auto-IRA plans "grandfathered in" consistent with the federal requirements
  - *State Auto IRA* programs are active in California, Illinois, and Oregon and are in the implementation process in Colorado, Connecticut, Maryland, and New Jersey, and are understood to represent qualifying approaches for employers to provide coverage (consistent with the federal requirements) in the scenarios envisioned. Alternative program models in states that rely on voluntary participation, multiple-employer plans (MEPs), or marketplace approaches are not factored in because the voluntary structure makes it difficult to assess their impact on access and participation.

- Enhancement of the Saver's Tax Credit to incorporate provisions in the Secure Act 2.0 and a refundable structure provided for matching funds to be deposited directly into savings accounts
  - *Detail of Enhanced Saver's Tax Credit:* The contribution levels and income limits used for modeling the "enhanced" Saver's Tax Credit ("Saver's Credit") across scenarios are based on those envisioned in the SECURE Act 2.0 (shown in Figure 1.9). Households below the initial income threshold ($80,000 for married filing jointly, $60,000 for head of household, and $40,000 for all other filers) are eligible for a 50% credit on qualified contributions up to $3,000. For the next $20,000 in earnings, the maximum qualified contribution decreases on a proportional scale, although the credit remains 50%. Figure 1.9 shows example qualified contribution calculations at additional income levels, although in practice, the design is along a sliding scale.[15]

Figure 1.9 – Income Limits and Qualified Contribution with Enhanced Saver's Credit

Qualified Contributions (50% Credit)	Married Filing Jointly	Head of Household	All Other Filers
$3,000	Up to $80,000	Up to $60,000	Up to $40,000
$2,250	$85,000	$65,000	$45,000
$1,500	$90,000	$70,000	$50,000
$750	$95,000	$75,000	$55,000
Limit	$100,000	$80,000	$60,000

In addition to these eligibility changes, a refundable structure is assumed for the enhanced Saver's Credit in all scenarios. Within this structure, matching contributions are assumed to be made (using the eligibility rules defined above) directly into retirement savings accounts. This refundable structure is not reflected in the SECURE Act 2.0 proposal, but has been suggested by policy experts or organizations, including Brookings and AARP.[16]

[15] These income limits are inflation-indexed over time. This means that limits stay consistent in real terms over time, which aligns with the use of consistent dollars ($2020) throughout this analysis.
[16] Gale, Iwry, and Orszag (2004), *The Saver's Credit: Issues and Options*. Brookings Institution. <https://www.brookings.edu/wp-content/uploads/2016/06/20040503.pdf>

Other Policy Design Options Modeled

Policy variations from this baseline are applied in sequence, retaining most features from scenario to scenario to isolate the impact of specific features on outcomes.

Auto-IRA with employer threshold ("Threshold Auto-IRA")

The first variation envisions the application of a threshold for employer size and age, with firms below this threshold exempted from the requirement to provide their employees with access to coverage. While the report analyzes the impact of various potential size and age thresholds, a consistent threshold is implemented for this scenario and retained in the modeling of subsequent policy options outlined below. This scenario is otherwise identical to the baseline model.

The components of the Auto-IRA with employer threshold (or "Threshold Auto-IRA") scenario are as follows, with variation from the Baseline Auto-IRA scenario in bold:

- **Participation requirement exempted for business below threshold of 10 employees and two years in existence** (based on provisions in federal legislative proposals)
- Automatic enrollment (with voluntary employee opt-out)
- Structured as a Roth IRA savings vehicle (post-tax contributions)
- Default initial employee contribution level set at 5%, with auto-escalation of 1% per year up to 10%
- No employer contribution
- Coverage requirements implemented in three phases by employer size, starting with the largest employers two years after enactment and covering smaller employers in subsequent years
- Existing state Auto-IRA plans "grandfathered in" consistent with the federal requirements
- Enhancement of the Saver's Credit to incorporate provisions in the Secure Act 2.0 and a refundable structure provided for matching funds to be deposited directly into savings accounts

401(k) Voluntary Employer Contribution with employer threshold ("Voluntary Employer Contribution 401(k)")

The next variation envisions a change from a Roth IRA to a Roth 401(k) savings vehicle. This change enables employers to provide voluntary matching contributions but has additional implications for participating businesses. This scenario is otherwise identical to the Threshold Auto-IRA scenario.

The components of the 401(k) Voluntary Employer Contribution scenario are as follows, with variations from the Threshold Auto-IRA scenario in bold:

- Participation requirement exempted for business below threshold of 10 employees and two years in existence (consistent with federal legislative proposals)
- Automatic enrollment (with voluntary employee opt-out)

Brown and John (2017), *Improving the Saver's Credit for Low- and Moderate-Income Workers*. AARP Public Policy Institute. <https://www.aarp.org/content/dam/aarp/ppi/2017/09/improving-the-savers-credit-for-low-and-moderate-income-workers.pdf>

- **Structured as a Roth 401(k) savings vehicle** (post-tax contributions)
- Default initial employee contribution level set at 5%, with an auto-escalation of 1% per year up to 10% percent
- **Voluntary employer contribution**

  While an employer contribution in this scenario would be strictly voluntary, modeling assumes that employers would contribute an average of 5 cents for each dollar contributed by employees.
- Coverage requirements implemented in three phases by employer size, starting with the largest employers two years after enactment and covering smaller employers in subsequent years.
- Existing state Auto-IRA plans "grandfathered in" consistent with the federal requirements
- Enhancement of the Saver's Credit to incorporate provisions in the Secure Act 2.0 and a refundable structure provided for matching funds to be deposited directly into savings accounts

401(k) Mandatory Employer Contribution with Employer Threshold

The next variation envisions a required, rather than discretionary, employer matching contribution in a Roth 401(k) structure. This change is associated with a different schedule of initial default levels and auto-escalation for employee and employer contributions. This change has implications for participating businesses and employees, as well as for existing state-faciltated programs and the private 401(k) market more broadly (which are discussed but not directly modeled in this report). Remaining components of this scenario match the voluntary employer contribution 401(k) scenario.

The components of this scenario are as follows, with variations from the Voluntary Employer Contribution 401(k) scenario listed in bold:

- Participation requirement exempted for business below threshold of 10 employees and two years in existence (consistent with federal legislative proposals)
- Automatic enrollment (with voluntary employee opt out)
- Structured as a Roth 401(k) savings vehicle (post-tax contributions)
- **Default initial employee contribution level set at 4%, with auto-escalation of 0.5% per year up to 7%**
- **Mandatory employer contribution set at 1% initially, with escalation of 0.25% per year up to 3%**
- Coverage requirements are implemented in three phases by employer size, starting with the largest employers two years after enactment and covering smaller employers in subsequent years.
- **Employer contribution requirement extends to those covered by state plans and in existing private sector plans**

  Phase-in of this requirement would parallel the implementation structure for coverage requirements (with differentiation by employer size) to maintain parity between requirements for new and existing coverage.
- Enhancement of the Saver's Credit to incorporate provisions in the Secure Act 2.0 and a refundable structure provided for matching funds to be deposited directly into savings accounts

Study Timeframe and Key Assumptions

Implementation and Analysis Timeframe

The results of the various scenarios are modeled out to the year 2040. Scenario-level outputs are represented as the annual results in 2040, and in some cases as cumulative results over the study period (2021–2040). However, individual examples are shown over the career of a representative employee, which will extend beyond 2040 for younger workers. All results are expressed in consistent real-dollar terms ($2020) to allow for a straightforward comparison of results.

A phased adoption schedule is modeled to reflect necessary implementation time. Requirements to provide access are implemented in phases, starting with the largest employers. State-facilitated programs in California, Oregon, and Illinois are implementing a phased approached (see below), and phasing is also envisioned in the federal Automatic Retirement Plan Act of 2017.[17]

- CalSavers is in the middle of a three-phase implementation process. The largest employers (100+ employees) were required to provide access as of September 30, 2020, with the registration deadlines one year apart for employers of 50+ on June 30, 2021, and employers of five+ on June 30, 2022.[18]
- Illinois Secure Choice was implemented through a similar three-phase schedule, with shorter time gaps between waves. The largest employers (500+ employees) were required to provide access as of November 1, 2018, with requirements for employers of 100+ taking force on July 1, 2019, and employers of 25+ on November 1, 2019.[19]
- OregonSaves has been implemented using a larger number of waves, each covering a smaller increment of employers. Deadlines to offer access by employer size were: 100+ employees: November 15, 2017; 50–99 employees: May 15, 2018; 20–49 employees: December 15, 2018; 10-19 employees: May 15, 2019; five–nine employees: November 15, 2019; four or fewer employees: January 15, 2021 (originally scheduled for May 15, 2020).[20]

For the purpose of modeling, an enactment date of December 31, 2021, is assumed, and coverage requirements are assumed to be active at the beginning of the following calendar years:

- 2024 (two years after enactment): employers of 100+;
- 2025 (three years after enactment): employers of 20+;
- 2026 (four year after enactment): all covered employers

[17] H.R. 4523 envisions that large employers (100+) would be required to participate two years after the enactment of the legislation, and small employers two years later (four years after enactment).
[18] *CalSavers History: From Pioneering Vision to Launch* (2020). California State Treasurer's Office. <https://www.treasurer.ca.gov/calsavers/history.asp> and *CalSavers Retirement Savings Program* (2020). State of California Employment Development Department.
[19] *State-Facilitated Retirement Savings Programs for Private Sector Workers* (2018). National Conference of State Legislatures. <https://www.ncsl.org/research/fiscal-policy/state-facilitated-retirement-savings-programs-for-private-sector-workers.aspx> and Lekel (2019), Mid-Size Employers Must Register for Illinois Secure Choice.
[20] Program Details – Facilitate Oregon Saves (2020). Oregon Saves.

Based on the implementation experience of state-facilitated programs, some degree of early adoption is assumed.[21] Modeling assumes 5% early participation among businesses two years from the implementation of the threshold relevant to their cohort, and 10% participation in the year before implementation. Conversely, participation is assumed to be 90% and 95% respectively in the first two years after the implementation deadline for each business-size cohort.

Combining these assumptions yields the schedule of modeled participation as a proportion of firms and employment by firm size, shown in Figure 1.10.

Figure 1.10 – Modeled Share of Participating Firms by Year (Among Firms Required to Provide Coverage)

	Enactment			Phase 1	Phase 2	Phase 3		
Employer Size	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028+**
<10				5%	10%	90%	95%	100%
10-19				5%	10%	90%	95%	100%
20-49			5%	10%	90%	95%	100%	100%
50-99			5%	10%	90%	95%	100%	100%
100-249		5%	10%	90%	95%	100%	100%	100%
250+		5%	10%	90%	95%	100%	100%	100%

[21] For example, CalSavers has an implementation deadline of June 30, 2021, for "wave 2" businesses with 50–99 employees to sign up and had early participation by approximately 10% of this cohort of employers as of November 2020.

Key Assumptions

Specific modeling components used to define results for the baseline model and policy variations are documented step by step throughout this Appendix. Some additional assumptions are noted here that help to define the analytical framework of the study and apply across all scenarios.

- The analysis assumes a continuity in federal policy, such as continuity of the existing tax code and federal benefit program eligibility guidelines and benefit levels. However, the government expenditure analysis does account for anticipated excess medical cost growth (beyond overall inflation) as documented in the report.
- The study assumes the continuation of the existing state-facilitated retirement savings programs in place as of 2020. These programs are anticipated to align with the parameters of new national models, so employers participating in these programs would offer qualifying access to their workers under the national participation requirements.
- Participation is modeled as universal for firms covered by the mandatory access provisions in each scenario, after an initial implementation period (as outlined in Figure 1.10).
- Analysis is developed based on stable economic conditions. Labor force analysis is generally developed using 2018 or 2019 data, which often reflect the last complete year available and also predate the COVID-19 pandemic and its labor market impacts. Stable labor market conditions are projected forward to 2040, without applying a defined business cycle. This economic stability is generally modeled implicitly, such as through the use of consistent employment-to-population ratios and real earnings of the course of the study period, rather than by imposing an explicit external projection of economic conditions across the study period. However, economic growth estimates are calibrated to the current low-growth environment, using recent CBO forecasts that reflect the pandemic, as well as broader structural factors like the aging population.[22]
- A retirement age of 65 is assumed for all participants (recognizing that in practice, some participants will retire earlier or later than this benchmark). Accordingly, the analysis does not include private sector workers over 65 as potential participants.

[22] 2020 Long-Term Budget Outlook (2020). Congressional Budget Office. <https://www.cbo.gov/publication/56516>

2. Analyzing the Potential Benefits of Universal Access

Section 2 of the *Potential Benefits of Universal Access* report covers potential participation, savings levels, and accumulation of assets under the baseline scenario and various policy options, as well as the potential impact on individual savers participating.

This Appendix provides supporting documentation on the following topics covered within Section 2 of the report:

- **Participation**, which describes the number and composition of additional workers saving in each policy approach.
    - This methodology is organized into sub-sections covering Baseline Auto-IRA Participation; Employer Threshold Impact on Participation; Participation by Scenario; and Employee Turnover and Retirements.
- **Savings Levels,** which describes the annual and cumulative contributions into savings accounts under each policy approach.
    - This methodology is organized into sub-sections covering Contribution Rate, Earnings, and Contribution Level; and Saver's Tax Credit.
- **Asset Accumulation and Decumulation**, which describes the growth in average and total assets over time among participants and retirees, and the annual income stream supported in retirement.
    - This methodology is organized into sub-sections covering Account Fees; Early Withdrawals; and Market Return, Account Balances, and Annual Income Supported by Savings
- **Saver Impacts**, which describes the approach to modeling the impact of participating for an individual under a variety of different conditions (starting age, income, and contribution levels, etc.).

Participation

Baseline Payroll Deduction Auto-IRA Participation

The policy scenarios modeled are all structured as payroll deduction savings options. As such, the potential pool of participations for each scenario starts with the estimates of the portion of the private sector workforce lacking access to coverage through their workplace, as defined in Section 1. These estimates are derived by firm size and age cohort. For the baseline universal access model, all firm sizes are included.[23] Since a retirement age of 65 is assumed throughout the study, workers in the age 65+ cohort are assumed not to participate. Deducting the workers 65 and older, the total pool of 64.3 million private sector workers lacking access as of 2040 is adjusted to a base of 58.7 million workers aged 15–64.

An additional adjustment is made for workers under the age of 21 (in 401(k) models) and under the age of 18 (in IRA models). Within a 401(k) plan, employers have the discretion to set an age threshold (with a maximum allowable age of 21) for employee participation. Data from the IRS indicate that many employers offering a 401(k) use this option, with 64% setting a threshold at age 21, an additional 16% setting a requirement of 18–20 years,

[23] Modeling of additional scenarios that include a threshold excluding some employers from required participation is described below.

and just 20% setting no requirement.[24] The Automatic Retirement Plan Act of 2017 (which uses a 401(k) option) requires employers to provide access only to workers 21 and older, while the Automatic IRA Act of 2019 requires access once an employee reaches the age of 18.[25] Access for workers under these thresholds among newly participating firms is assumed to follow the patterns of existing participants, with 80% of workers under 18 (in both the IRA and 401(k) scenarios) and 64% of workers 18–20 (in the 401(k) scenarios) assumed to be excluded from access based on the discretion of their employers.

Next, an opt-out rate is estimated to account for workers who decline to participate. Based on benchmarks, including initial data from state Auto-IRA programs,[26] an opt-out rate of 30% across the pool of workers under 65 at employers newly providing access is assumed.

Data on existing savings behavior indicate that there are significant disparities in participation rates by age and employer size that must be accounted for. Replicating the approach used to define disparities in access by age and employer size, analysis is undertaken of disparities in participation among employees with access. Custom analysis of CPS data[27] is used to define participation levels among workers with access by age, while Social Security Administration analysis of SIPP data[28] is used to define participation levels relative to access by employer size. These variations are weighted back to the estimated composition of workers lacking access as of 2020 to ensure that overall participation matches the target of 70% (equating to an opt-out rate of 30% among the overall base of workers gaining access). Significant variation in participation is estimated between cohorts, with age serving as a stronger determinant of participation than firm size (see Figure 2.1).

This matrix of participation levels by employee age and firm size is then applied to the estimates of private sector employment by employee age and firm size as the population grows over time. Employer participation is assumed to remain consistent within each cohort over time, leading to slight variation in the overall participation rate as the composition of the population of workers changes over time.

As of 2040, the estimated workforce of private sector workers ages 15–64 totals 58.7 million. Active participation (workers making payroll deduction contributions in 2040) among this group in the baseline Auto IRA scenario (in which all employers are required to offer access) is estimated at 40.4 million (see Figure 2.1).

[24] Section 401(k) Compliance Check Questionnaire: Interim Report, Figure 2 (2012). Internal Revenue Service, Employee Plans Compliance Unit. <https://www.irs.gov/pub/irs-tege/401k_interim_report.pdf>
[25] Automatic Retirement Plan Act of 2017, H.R.4523, 115th Cong. (2017). <https://www.congress.gov/bill/115th-congress/house-bill/4523/text> and Automatic IRA Act of 2019, S.2370, 116th Cong. (2019). <https://www.congress.gov/bill/116th-congress/senate-bill/2370/text>
[26] For example, the reported opt-out rate for state-facilitated programs including small employers as of fall 2020 is 33.4% in Oregon and 30.8% in California, according to state information (see Figure 2.7).
[27] Like the analysis of access rates above, this analysis relies on microdata from the 2018–2019 Annual Social and Economic Supplement (ASEC) to the US Census Bureau's Current Population Survey (CPS).
[28] Dushi, Iams, and Lichtenstein (2015)

Figure 2.1 – Est. Active Participants, 2040 (Baseline Auto-IRA Scenario)

	Total Participants <65 (M)	15-24	25-34	35-44	45-54	55-64	65+
Uncovered Workers	**58.7**	**11.7**	**14.4**	**13.4**	**11.1**	**8.0**	**5.6**
<10	**10.7**	33%	72%	81%	84%	82%	--
10-19	**6.0**	33%	72%	81%	84%	82%	--
20-49	**7.6**	33%	71%	79%	82%	81%	--
50-99	**4.8**	31%	68%	77%	79%	78%	--
100-249	**4.4**	33%	71%	80%	83%	82%	--
250+	**7.5**	33%	71%	80%	83%	82%	--
Participation (%)	**69%**	**33%**	**71%**	**80%**	**83%**	**81%**	
Active Participants (M)	**40.4**	**3.8**	**10.2**	**10.7**	**9.2**	**6.5**	

Employment Threshold Impact on Participation

Some universal access models include exemptions from the requirement to provide access to coverage for firms below a size or age threshold. Modeling the impact of potential thresholds on retirement savings access and participation begins with analysis of the composition of private sector employment by firm age and firm size, which sets the basis to understand the coverage implications of potential thresholds.

The US Census Bureau tracks business dynamic statistics through longitudinal surveys that generate measures of business dynamics (births, deaths, aging) and employment flows. Periodic releases of these data include aggregated estimates of the composition of private sector employment by firm size and firm age.[29] These data are used to define, for each business-size cohort, the proportion of employment at firms at various ages (grouped by <1 year, 1 year, 2 years, 3+ years). These proportions are then matched back to the estimated distribution of private sector firms by size for 2020 to model the current composition of private sector firms by size and age. It is estimated that 114.1 million of the 124.6 million jobs are in firms in existence for three years or more, with 10.5 million at firms within their first three years (see Figure 2.2).

The estimated retirement access gap by firm size is then applied to all firms within a size band to estimate the number of uncovered workers associated with each firm size and age (see Figure 2.2). Since coverage rates are correlated positively with firm size, smaller firms represent a larger share of workers lacking access relative to their overall share of the workforce.

[29] This analysis relies on the September 2016 data release, which represented the most-recent data set at the time of analysis, covering business activity from 1976–2013. <https://www.census.gov/data/tables/time-series/adrm/bds-firm-establishment-characteristics.html#par_list>.

Figure 2.2 – Est. Private Sector Workforce by Employer Size and Firm Age (2020)

Employer Size	Est. Access Gap (%)	Est. Access Gap (Workers - M)	Private Sector Employment (M)	Firm Age (Years) <1 yr (M)	1 yr (M)	2 yrs (M)	3+ yrs (M)
<10	78%	14.5	18.7	1.8	1.2	1.0	14.7
10-19	60%	8.3	13.9	0.6	0.6	0.6	12.1
20-49	50%	10.9	21.7	0.6	0.8	0.8	19.5
50-99	42%	6.9	16.5	0.3	0.4	0.5	15.3
100-249	31%	6.3	20.3	0.3	0.3	0.4	19.2
250+	31%	10.4	33.5	0.1	0.1	0.1	33.2
Total	**46%**	**57.3**	**124.6**	**3.6**	**3.5**	**3.5**	**114.1**

The matrix of uncovered workers by firm age and firm size in Figure 2.2 is then used to estimate the number of workers at firms required to prove access under various specifications of a threshold for exemptions from required coverage.

For this analysis, firms with fewer than 10 employees are broken into firms with zero to four employees and firms with five to nine employees, based on differentiated Census (QWI) and BLS (QCEW) data on the employment by firm age within these two categories. Since differentials in access rates are not available at this granularity, the estimated access gap (78%) is applied to all firms with fewer than 10 employees to estimate uncovered workers out of the base of total private sector workers in these two categories.

Potential thresholds are applied as:

- Firm size: all firms (no threshold), requirement for firms with five+ employees, 10+ employees, or 20+ employees
- Firm age: all firms (no threshold), requirement for firms in existence greater than one year, two years, or three years

For each potential combination of firm size and firm age, the number of private sector workers at firms above the threshold (i.e., covered under the requirement) and below the standard (the remaining access gap) is calculated, based on the application of existing access rates by firm size. This yields an estimate of the number of workers at firms required to provide coverage, and the number of workers at exemption firms below the threshold under each potential specification if implemented as of 2020 (see Figure 2.3).

Figure 2.3 – Private Sector Workforce at Firms Required to Provide Access to Coverage by Employer Requirement Threshold, 2020 (in Millions)

Firm Size	**Firm Age**			
Firms Required to Participate	**ALL**	**>1 yrs**	**>2 yrs**	**>3 yrs**
ALL	57.3	55.1	53.1	51.2
5+	50.5	49.2	47.6	46.1
10+	42.8	41.9	**40.8**	39.7
20+	34.5	34.0	33.3	32.5
Exempted Firms	**ALL**	**>1 yrs**	**>2 yrs**	**>3 yrs**
ALL	--	2.2	4.2	6.2
5+	6.9	8.2	9.7	11.3
10+	14.5	15.4	**16.5**	17.6
20+	22.8	23.3	24.1	24.8

The threshold Auto-IRA, voluntary employer contribution 401(k), and mandatory employer contribution 401(k) scenarios modeled in this analysis all use a threshold exemption firms with fewer than 10 employees and/or with less than two years in existence from participation. If fully implemented among the current private sector workforce (as of 2020), required participation above this threshold would apply to firms employing an estimated 40.8 million workers, with 16.5 million workers at exempted firms.

Participation by Scenario

Each of the modeled policy variations on the baseline payroll deduction Auto-IRA scenario is assumed to include an employee threshold exempting from the coverage requirement businesses with fewer than 10 employees and business with a tenure of less than two years. Estimates derived of the proportion of the private sector workforce below this threshold serve as the starting point for estimating participation for each policy variant.

Following the phase-in of coverage requirements, employer participation is assumed to be 100% among firms subject to the requirement to provide coverage (with the ability for employees to opt-out of participation at firms offering coverage). Therefore, the initial base of firms and employees covered by the requirement is identical across each of the three policy variations.

Employers below the size or tenure threshold are assumed to have the ability to provide access to coverage at their discretion. The level of voluntary participation (or "opt-ins") among exempted firms represents the differential in anticipated coverage between the policy variations featuring an employer threshold. Auto IRA approaches can be designed with limited imposition on employers. By contrast, 401(k) are retirement plans covered by the Employee Retirement Income Security Act (ERISA) of 1974 and have to meet the administrative and regulatory requirements of this law, creating a certain degree of legal risk and associated cost for participating employers. It is assumed that the costs to an employer of administering a 401(k) ERISA plan would be greater than for an IRA. For these reasons, voluntary participation (opt-ins) among exempted firms below the required threshold also are expected to be largest under the Auto IRA scenario, to diminish under the voluntary employer contribution 401(k) model, and to diminish further under the mandatory employer contribution 401(k) model.

Differences by employer size in "opt-ins" are also anticipated. By definition, firms with fewer than 10 employees are exempted based on the size (and potentially by their tenure as well), while firms 10 ten or more employees can be exempted based on their tenure only. Among firms larger than 10 employees, exemptions are therefore time-

limited, since the participation requirement will take effect in their third year in business. It is estimated that among firms of this type not currently providing access, voluntary participation will be limited, and access gains among these firms will largely be captured as they mature and participation becomes required.

Among small firms (those exempted based on a size of fewer than 10 employees), exemptions are not time-limited, but two market-based factors may change behavior: competitiveness and availability. As overall access increases due to the requirement for firms above the threshold to provide coverage, smaller firms that do not provide access may find themselves at a competitive disadvantage relative to a broader set of competitors (as retirement savings access becomes a more-standard component of an employee benefits package). The requirement will also encourage the development of more-robust options targeted to smaller employers that previously did not offer access. This wider availability should reduce complexity and search costs for smaller exempted firms considering offering access voluntarily. For these reasons, the smallest firms are anticipated to have the highest levels of optional participation, with larger firms exempted due to their tenure of less than two years expected to participate at lower levels.

Voluntary participation among exempted employers with fewer than 10 employees is estimated at 10% of firms that currently do not provide access to coverage.[30] Voluntary participation is modeled to decline proportionally by one-half for each of the subsequent larger employer size bands, and to be 1% among firms with 100 or more employees not currently providing access. For each employer size band, voluntary participation for exempted firms within the voluntary employer contribution 401(k) scenario is estimated to be one-third the level of the threshold Auto-IRA model. Participation for exempted firms within the mandatory employer contribution 401(k) scenario model is then estimated to be one-third the level estimated in the voluntary employer contribution 401(k) model.

These proportions are applied to the access gap from exempted firms below the threshold to estimate the number of workers gaining access through the voluntary participation of exempted employers. This estimate is summed with the estimated workforce gaining access through the requirement for their firms required to participate (40.84 million as of 2020 in all three scenarios with a threshold) to develop an estimate of the total number of workers gaining access. Figure 2.4 shows this estimate in each scenario as applied to the private sector workforce as of 2020 (with full implementation required in that year).

Increases in access for future years are developed using the same methodology for access outlined in the baseline scenario. Once access increases are estimated, subsequent modeling steps with respect to employee opt-outs and participation, employee turnover, savings, and asset accumulation are applied as described to all potential participants, without distinction as to whether their access came through required or voluntary participation on the part of their employers.

[30] This estimate is based in part on indicators of voluntary demand such as early sign-ups for AutoIRA program from firms not yet subject to requirements. For example, CalSavers information from CalSavers indicates that as of November 2020, 10% compliance of Wave 2-eligible employers with the June 30, 2021, deadline had been observed.

Figure 2.4 – Est. Employment at Firms Newly Offering Access to Coverage by Scenario, 2020 (if implementation was Required)

			Voluntary Participation among Exempted Firms (%)			Employment at Exempted Firms Participating Voluntarily (M)		
Employer Size	**Exempted Share**	**Est. Employees at Exempted Firms (M)**	**Threshold Auto-IRA**	**Voluntary Employer Contribution 401(k)**	**Mandatory Employer Contribution 401(k)**	**Threshold Auto-IRA**	**Voluntary Employer Contribution 401(k)**	**Mandatory Employer Contribution 401(k)**
<10	100.0%	14.53	10.0%	3.3%	1.1%	1.45	0.48	0.16
10-19	8.6%	0.71	5.0%	1.7%	0.6%	0.04	0.01	0.00
20-49	6.5%	0.71	2.5%	0.8%	0.3%	0.02	0.01	0.00
50-99	4.3%	0.30	1.0%	0.3%	0.1%	<0.01	<0.01	<0.01
100-249	2.9%	0.18	1.0%	0.3%	0.1%	<0.01	<0.01	<0.01
250+	0.5%	0.05	1.0%	0.3%	0.1%	<0.01	<0.01	<0.01
Total	**18.3%**	**16.49**	**9.2%**	**3.1%**	**1.0%**	**1.51**	**0.50**	**0.17**
			Employment at Firms Required to Participate (M)			**40.84**	**40.84**	**40.84**
			Total Employ at Participating Firms (M)			**42.35**	**41.34**	**41.01**

Employee Turnover and Retirements

Annual participation estimates within each scenario are based on the estimated rates of employee participation (or in the inverse, employee opt-out) by age and firm size defined above among those workers gaining access in each scenario. While this method defines estimates of the number and distribution of participants for each year and scenario (by firm size/employee age cohort), additional modeling is needed to understand the degree to which participation comprises employees retained from year to year and the degree to which it comprises new participants. These "inflows" and "outflows" are estimated by modeling employee turnover and retirements by employee age and firm size, yielding unique estimates of retention and turnover for each year and scenario.

First, data are drawn from the US Census Bureau Quarterly Workforce Indicators (QWI) data set on the proportion of annual employee turnover at private sector age and firm size.[31] Employer size and employee age bands available in this data set are matched by the size and age bands used in this analysis.[32]

Next, an adjustment is made to account for the potential continuation of savings for workers moving between employers. A portion of employees leaving their jobs in a given year will fall out of the workforce, in which case, they become "inactive" accounts. Another portion will join a new employer that currently offers retirement savings options (before the universal access models being studied). These employees are also considered

[31] Proportional estimates are drawn from Q1 2018 to Q3 2019 data (the most-recent available quarter). <qwiexplorer.ces.census.gov/exp-r/116430.html>

[32] Available employer size band estimates for firms with 0–19 employees are applied to both the zero to nine and 10–19 employee size bands used in this analysis; similarly, 50–249 employee estimates are applied to both 50–99 and 100–249 employee firms. Data by employee age match precisely with the age bands used in this analysis with the exception of workers under 25, where estimates are provided separately for workers ages 14–18, 19–21, and 22–24. These proportions are combined, weighted by employment estimates, and applied to the 15–24 age group used in this analysis.

"inactive" within this analysis, since savings at their new employers does not represent "net new" saving activity related to the universal access options being studied.

However, the portion of workers who switch from one employer to another that is offering access is assumed to continue their savings behavior as they transition from one employer to another, and thus treated as a retained account, rather than a new or inactive one.[33] Retention assumptions within the pool of savers are modeled by employee age as a function of the share of workers currently lacking access within each age band. This approach yields a higher chance (among the subset of workers experiencing job turnover in a given year) of a younger worker than an older worker of finding new employment at another firm that has added access due to the universal access policy and its requirements.

An additional form of employee turnover is accounted for among the oldest cohort in the form of retirements. For simplicity, a retirement age of 65 is assumed for all participants in each of the models. In practice, it is understood that retirement ages will vary by individual, with broad trends in recent years pointing toward greater workforce participation among the elderly.[34] Modeling should be understood to reflect the assets with which participants would arrive at age 65, whether or not they choose to exit the workforce at that time. Annual retirements are modeled by assuming an even distribution of birth years within each 10-year age cohort, meaning that one-tenth of each relevant cohort of participants (for example, in 2031, the 55–64 age cohort as of the year 2030) reach the age of 65 each year.

Cohorts of participants are tracked over time by employer size and employee age within each scenario to develop retention estimates. Annual turnover is modeled as a series of independent events, with each employee assigned the probability of retention reflective of the average for their cohort each year, regardless of their number of years saving. Accordingly, retention estimates diminish at a consistent rate over time.

Figure 2.5 shows annual retention estimates by employer size and employee age used in the analysis. Retirements are applied to the oldest cohort separately from this turnover analysis.

Figure 2.5 – Est. Annual Retention of Savers

Employer Size	15-24	25-34	35-44	45-54	55-64
<10	93.9%	93.9%	94.9%	95.3%	95.6%
10-19	93.9%	93.9%	94.9%	95.3%	95.6%
20-49	93.8%	93.8%	94.7%	95.1%	95.6%
50-99	93.7%	94.0%	94.9%	95.1%	95.6%
100-249	93.7%	94.0%	94.9%	95.1%	95.6%
250+	93.6%	94.6%	95.6%	95.9%	96.2%

[33] In practice, the design may be able to directly allow for portability between employers, or workers may implement this continuity through their ability to set their contribution rate at their new employer. On balance, it is assumed that workers shifting to a new employer are likely to earn equivalent or higher salaries, enabling them to support (at minimum) a continued level of savings.

[34] See for example: *Labor force participation: what has happened since the peak?* (September 2016). Bureau of Labor Statistics, *Monthly Labor Review*. <https://www.bls.gov/opub/mlr/2016/article/labor-force-participation-what-has-happened-since-the-peak.htm>. Notably, retirement decisions are not made independent of available assets, meaning that retirement savings associated with universal access may in practice affect pre-existing patterns of retirement ages.

Retention estimates by year are then matched with participation estimates across years. For each year, the number of new participants within each cohort is estimated as the net difference between total participants and retained participants from the prior year. By repeating this method across years, cohorts, and scenarios, models are developed for each year of the composition of participants based on their tenure, as well as the number of inactive accounts for former participants no longer contributing to their accounts due to job turnover. Assets within these inactive accounts continue to gain market returns (net of fees and withdrawals) until the assumed retirement age of 65, but do not see any additional contributions.

Total accounts for each scenario for each year are calculated by summing the number of active participants and the number of inactive participants. Figure 2.6 shows this calculation by scenario as of the year 2040, as well as the number of participants estimated to have reached the retirement age of 65 (cumulatively) by the year 2040.

Figure 2.6 – Est. Total Accounts by Scenario, 2040 (in Millions)

	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
Workers <65 (2040)				
Active Participants	40.4	29.6	28.3	28.1
Inactive Participants	30.9	23.0	22.0	21.8
Total Accounts	71.4	52.6	50.3	49.9
Workers 65+				
Retiree Accounts	9.6	6.9	6.7	6.6

Modeling of participation and retention is incorporated into the savings level modeling described below.

Savings Levels

Earnings

Earnings for participants are estimated by employer size and employee age. These results are then applied to the weighted contribution rate estimates developed below for each cohort to yield estimates of annual contributions to retirement savings accounts.

As reviewed above, the population of private sector workers lacking access to retirement savings is disproportionately concentrated among smaller employers and is younger than private sector workers overall. Each of these factors tends to reduce average incomes of participants relative to private sector median earnings. Initial data from state-facilitated programs indicate that even accounting for these factors, participants are likely to have lower-than-average earnings for their age and employer size cohorts, probably due to additional factors correlated with lower access, such as the composition of industries and demographics of the employees.

Participant earnings estimates are derived based on implied post-tax earnings from participant data in Oregon and California (which resemble the proposed baseline universal access Auto-IRA most closely). Figure 2.7 shows state data as of the end of fall 2020. The reported average contribution rate and average monthly contribution in these

states implies annualized post-tax income levels for participants of around $30,000.[35] Based on analysis of the effective tax rates in these two states (accounting for both state and federal taxes),[36] the implied pre-tax income for participants averages around $38,100.

Figure 2.7 – Contribution Levels, State Auto-IRA Programs

	OregonSaves	Illinois Secure Choice	CalSavers
Total Assets ($M)	$71.3	$42.8	$19.8
Average Contribution Rate	5.3%	5.02%	5.01%
Average Monthly Contribution	$128	$90	$100
Effective Opt-Out Rate	33.4%	36.4%	30.8%

Source: CRI Aggregation of State Data, fall 2020[37]

Next, variation is applied to this average by incorporating data from the Census Bureau QWI on wages by age and firm size.[38] Parallel to the approach to other aspects of this calculation, wages by age and firm size cohort are adjusted through a uniform scalar to ensure that average wages across the population of workers lacking access aligns with the targeted participant income described above. This approach retains variation in earnings by employer size and age while achieving the anticipated average income level.

Estimated pre-tax earnings by employer size and employee age as of 2020 are shown in Figure 2.8.

Figure 2.8 – Est. Average Pre-Tax Earnings for Private Sector Workers Lacking Access by Employer Size and Employee Age, 2020

		Employee Age				
Employer Size	**Total**	**15-24**	**25-34**	**35-44**	**45-54**	**55-64**
<10	$32,112	$14,148	$27,639	$34,489	$36,493	$35,960
10-19	$31,865	$14,148	$27,639	$34,489	$36,493	$35,960
20-49	$37,263	$14,846	$31,482	$41,458	$45,531	$45,458
50-99	$41,634	$16,974	$35,316	$46,405	$50,478	$49,356
100-249	$40,732	$16,974	$35,316	$46,405	$50,478	$49,356
250+	$48,945	$18,036	$40,509	$55,977	$62,194	$58,430
Total	**$38,130**	$15,832	$32,729	$42,433	$45,358	$43,884

[35] For example, the monthly contribution in Oregon ($128) divided by the contribution rate (5.3%) implies monthly post-tax earnings of more than $2,400, which annualizes to close to $30,000. These estimates represent post-tax earnings, since the post-tax Roth IRA is the predominant savings vehicle used in these programs.
[36] Effective rates are drawn from analysis of data at different earnings levels from the online Tax Form Calculator. <https://www.taxformcalculator.com/>. See below for further discussion of effective tax rates.
[37] OregonSaves data as of October 2020, Illinois Secure Choice data as of November 2020, CalSavers data as of November 2020.
[38] Census Bureau QWI, Q3 2018 data <qwiexplorer.ces.census.gov/exp-r/1163bd.html>

Pre-tax earnings estimates are then translated into post-tax earnings estimates, which form the base against which the contribution rate is applied in the Roth IRA/Roth 401(K) post-tax savings vehicle. This step is undertaken by establishing the relationship between gross earnings and post-tax "take home" pay by income level.

The share of gross income subject to federal and state taxes generally grows as income levels increase, based on the progressive nature of federal income tax rates, as well as income tax rates in some states. Through analysis of effective take-home rates at different income levels in different tax environments, an equation is developed to describe post-tax income as a function of pre-tax income for workers within the income ranges reflected in Figure 2.8.[39] This equation is applied to the estimated average pre-tax earnings for each cohort to estimate post-tax incomes, shown in Figure 2.9.[40] Post-tax incomes among the base of workers lacking access to retirement savings at work are estimated to average $31,750 as of 2020, with variation by employer size and employee age cohort.

Figure 2.9 – Est. Average Post-Tax Earnings for Private Sector Workers Lacking Access by Employer Size and Employee Age, 2020

		Employee Age				
Employer Size	**Total**	**15-24**	**25-34**	**35-44**	**45-54**	**55-64**
<10	$27,191	$12,767	$23,777	$29,086	$30,616	$30,210
10-19	$26,996	$12,767	$23,777	$29,086	$30,616	$30,210
20-49	$31,079	$13,360	$26,773	$34,377	$37,444	$37,388
50-99	$34,413	$15,151	$29,719	$38,100	$41,165	$40,320
100-249	$33,715	$15,151	$29,719	$38,100	$41,165	$40,320
250+	$39,963	$16,035	$33,660	$45,325	$50,097	$47,197
Total	**$31,750**	$14,186	$27,706	$35,096	$37,320	$36,197

Post-tax earnings within each age and firm size cohort are held constant in real terms over the time frame of the analysis and across the policy scenarios analyzed.[41] Individual participants will see their incomes change over time as they age or move between employer size bands. Average earnings will vary slightly over time, based on the changing composition of the workforce.

Average earnings also vary across the policy options modeled. Participation levels vary due to exemptions to the requirement to provide access for firms below an age or size threshold under certain scenarios, as well as differentials in access for the youngest workers in IRA and 401(k) models. Within scenarios that include an exemption below a threshold or reduced access among the youngest workers, average earnings among participants are typically higher, reflecting that the youngest workers and workers at the smallest and newest firms tend to have below-average earnings levels.

[39] This relationship is specified as a polynomial equation that describes the percentage of post-tax income as a share of pre-tax income for earnings levels in $5,000 increments up to $60,000, based on the average of estimates of the federal and state tax burden in a low-tax (Texas) and high-tax (California) environment. This equation is then applied to estimate the effective tax rate at each of the average incomes specified in Figure 2.8. Effective rates are estimated based on data from the online Tax Form Calculator <https://www.taxformcalculator.com/>.
[40] The gap in average post-tax incomes between national estimates and program participants in Oregon and California, which form the basis for pre-tax income estimates, is a function of the higher-than-average tax environment in these two states.
[41] This, in effect, assumes that incomes for participating workers rise at the same rate as overall inflation. This assumption is conservative with respect to potential earnings, since wage growth among lower- and middle-income workers has historically been somewhat faster than inflation.

Impact of Mandatory 401(k) Employer Contributions on Earnings

Additional analysis of earnings is needed within the policy option that envisions mandatory employer contributions into Roth 401(k) accounts. While the direct expenditures from a required match are made by employers, labor market dynamics will dictate how the true economic cost of this requirement is shared, and its potential impact on employee earnings.

Traditional economic models often assume that dollars allocated to fringe benefits are paid for by reductions in another component of labor expenditure.[42] A broader question is to what degree the direct cost to the employers of required contributions will be shifted back to employees through reduced compensation (such as direct salary, benefits, etc.) and what portion of the cost will be borne by businesses. Faced with an increase in direct costs through mandatory retirement contributions, employers can seek some combination of cost reductions by offsetting fringe benefits and reductions in salaries or absorb the increase in labor costs.

Employers could reduce the number or scope of existing employee benefits to offset the cost of implementing a 401(k) match. In theory, a firm could completely offset the increased cost by adjusting its existing benefits packages. However, those firms that do not currently offer retirement savings access also tend to offer lower levels of benefits coverage from which they could potentially recoup the cost of 401(k) matches. According to the Bureau of Labor Statistics' National Compensation Survey, 52% of private firms with fewer than 50 employees offer some form of retirement benefits compared to 95% for firms with more than 100 employees.[43]

If the increase in retirement benefits costs is not offset by a decrease in another component of the benefits package, then it will potentially increase the total cost of labor. Viewing this cost requirement as effectively a tax on labor, the cost is directly imposed on firms, but the burden of the tax can fall on either the employer or the employee. The basic principle of tax incidence modeling is that the short-run tax burden falls on the group that is the least sensitive to price.

Workers have varying sensitivities to wage depending on their economic circumstances, the tax benefits received, and their preference between present or future consumption. Empirical research shows that low-income workers are more sensitive to changes in wage earnings relative to other types of compensation than high-income workers, creating a positive bargaining position for low-income workers in terms of their unwillingness to accept reductions in take-home pay. For example, Smith and Toder calculate use data from the Survey of Income and Program Participation (SIPP), matched with Detailed Earnings Records (DER) from the Social Security Administration, to estimate that the elasticity of wage impacts for each dollar of additional retirement benefits is higher for high-income than low-income workers, with further variation by gender (see Figure 2.10).[44] In each case, cash wages fall to some extent as employer retirement savings contributions increase (reflected in the negative elasticity values show in Figure 2.10).[45] However, this research suggests that low-income workers are unlikely to see a full offsetting wage cut and employers will be likely to bear more of the direct cost for a required employer contribution.

[42] See: Mitchell (1990), "*The Effects of Mandating Benefits Packages*," Cornell University ILR School. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=980906>

[43] *National Compensation Survey: Employee Benefits in the United States, March 2019* (September 2019). U.S. Bureau of Labor Statistics, page 179.

[44] Smith and Toder (2011), *Do Low-Income Workers Benefit from 401(k) Plans?* Urban Institute. <https://www.urban.org/sites/default/files/publication/26771/412463-Do-Low-Income-Workers-Benefit-from--k-Plans-Full-Report-.PDF>

[45] Results are expressed as elasticities, which are based to 1.00. For example, the estimated elasticity of -0.3289 for low-income men implies that for every dollar in additional employer contributions to their retirement accounts, wages for this group fall by around 33 cents.

Figure 2.10 – Est. Cash Wage Elasticity from Employer Retirement Savings Contributions

Gender	Total	Low Income	High Income
Male	-0.4129	-0.3289	-0.4491
Female	-0.4186	-0.1708	-0.8185

Source: Smith, Karen and Toder, Eric, The Urban Institute (2011).

A blended tax incidence among the population without access can be estimated by using the elasticities found by Smith and Toder, weighted by the demographic composition of these employees without access (accounting for earnings levels and gender). This calculation indicates that of the direct costs paid by firms associated with a required 401(k) contribution, 42% (or $0.42 of every dollar) would be passed on to employees in the form of reduced wages, with the remaining 58% borne by employers. An employer contribution of 3% envisioned in the mandatory employer contribution 401(k) scenario (following escalation) would thus correlate with a reduction in average earnings among participants of 1.25%.

Modeling of earnings and contribution levels under the mandatory employer contribution 401(k) scenario are discounted by applying this elasticity to the blended effective employer contribution level reflected in the modeling for each year and age/employer size cohort of participants.

Contribution Rates

Employee Contribution Rate

Contribution levels for participants are defined as a percentage of annual income. This proportion is applied to post-tax ("take home") salary (calculated above) under the Roth IRA and Roth 401(k) savings vehicles assumed in the scenarios. Under a Roth structure, contribution percentages are applied to "post-tax" or "take-home" earnings, as opposed to the "pre-tax" contributions in a traditional IRA or 401(k) structure, which create tax implications at the point of withdrawal. The Roth structure is simpler from the perspective of the saver and has been the preferred approach in most state Auto-IRA programs.[46]

State Auto-IRA programs in Oregon, California, and Illinois have each defined a default initial contribution level at 5% for savers as they begin saving. Research into savings behavior over a number of years has consistently indicated that a default setting has a powerful effect on the observed behavior of savers within a program.[47] This general finding has been borne out in initial data the states, with program data collected by CRI indicating that average contribution levels in Illinois (5.02%) and California (5.01%) match nearly exactly the default rate of 5% (as shown in Figure 2.7).

[46] Each of the active state Auto-IRA programs (Oregon, Illinois, and California) uses a Roth IRA as the default investment options, although traditional IRAs are available.

[47] Automatic enrollment of employees (with the option to opt-out) produces significantly higher participation rates than models that require active opt-ins.
See: Choi, Laibson, Madrian, and Metrick (2002). Defined Contribution Pensions: Plan Rules, Participant Choices, and the Path of Least Resistance, *Tax Policy and the Economy*, vol. 16, 67–114.
<https://scholar.harvard.edu/files/laibson/files/defined_contribution_pensions_plan_rules_participant_decisions_and_the_path_of_least_resistance.pdf>
See also: Clark and Young (2018). *Automatic enrollment: The power of the default*. Vanguard Research.
<https://institutional.vanguard.com/iam/pdf/CIRAE.pdf>

These observed rates suggest an equilibrium in which most savers use the default rate, with savers above and below that rate roughly balancing each other out. This analysis used the default initial contribution rate of 5% as the modeled effective rate for savers in their first year of the baseline Auto-IRA, threshold Auto-IRA, and voluntary employer contribution 401(k) scenarios, and the initial employee contribution rate of 4% as the effective rate within the mandatory employer contribution 401(k) scenario.

Both OregonSaves and CalSavers include an automatic escalation component for contributions, with savers in Oregon automatically adding 1% to their contributions each year up to a cap of 10%, and savers in California adding 1% each year up to a cap of 8%. Savers have the ability to opt-out from auto-escalation (just as they have the ability to change their initial contribution rates) and can also elect to continue to increase their contribution rates above the auto-escalation "cap." The elevated contribution rate within OregonSaves (5.3% as of fall 2020) relative to the two other states is reflective of the longer tenure of this program, which began to phase in its first participants in 2017. A portion of participants has therefore seen their contribution levels automatically escalate (although due to the phased implementation, the exact proportion of savers in their initial year relative to those at auto-escalated rates is unclear).

The baseline Auto-IRA, threshold Auto-IRA, and voluntary employer contribution 401(k) scenarios modeled in this analysis include an auto-escalation of 1% per year up to 10%, while the mandatory employer contribution 401(k) includes an auto-escalation of the employee contribution of 0.5% per year up to 7%. While initial default rates appear empirically to match closely to effective contribution rates, some degree of opt-outs is anticipated from auto-escalations. These opt-outs are not anticipated to be accompanied by offsetting escalations at greater than the automatic level, meaning that effective contribution rates are anticipated to be somewhat lower than the rates implied by the default auto-escalation schedule. Modeling assumes that 10% of participants will opt-out from the initial year of auto-escalation (and subsequently maintain their contributions at the initial default level for the remainder of their participation), as well as a smaller level of additional opt-outs from subsequent years of auto-escalation, which are assumed to be evenly distributed up to a total escalation opt-out of 20%.[48]

Using these initial default levels, auto-escalation and auto-escalation opt-out assumptions, a blended effective employee contribution rate can be calculated for participants based on their number of years of saving (see Figure 2.11). New participants (within their first year) are assigned the default initial contribution rate. Effective contribution rates then increase in subsequent years (represented in Figure 2.11 as the number of years of participation completed), accounting for opt-outs that lower the blended effective rate from the unadjusted pattern of auto-escalation. Effective employee contribution rates for each year of participation are identical in the baseline Auto-IRA, threshold Auto-IRA, and voluntary employer contribution 401(k) scenarios.

[48] Notably, this parameter should be understood to represent a net differential between employees opting to contribute less than the default level and more than the default level to estimate a blended effective contribution rate. A RAND analysis of administrative data for new hires in auto-enrollment/auto-escalation plans found that a substantial number contribute more than the default amount, in addition to those contributing less. Burke, Huang, and Luoto (2017), *Opting out of Retirement Plan Default Settings.* RAND Labor and Population Unit, Working Paper. <https://www.rand.org/content/dam/rand/pubs/working_papers/WR1100/WR1162/RAND_WR1162.pdf>. However, deviations in contributing more than the default level were more common among higher-income workers and among those in plans that started at a low contribution level (such as 3%). Based on the population of workers and default contribution levels envisioned in the modeled scenarios, it is anticipated that downward adjustments from auto-escalated contribution levels will exceed upward adjustments.

Figure 2.11 – Est. Weighted Average Employee Contribution Rates by Years of Participation

Years Saving	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
New	5.00%	5.00%	5.00%	4.00%
1	5.90%	5.90%	5.90%	4.45%
2	6.78%	6.78%	6.78%	4.89%
3	7.63%	7.63%	7.63%	5.32%
4	8.45%	8.45%	8.45%	5.74%
5	9.25%	9.25%	9.25%	6.15%
6	9.25%	9.25%	9.25%	6.55%
7	9.25%	9.25%	9.25%	6.55%
8+	9.25%	9.25%	9.25%	6.55%

Employer Contribution Rate

Employer contributions are possible within the Roth 401(k) models. These employer contributions are required in the mandatory employer contribution 401(k) model and are discretionary in the voluntary employer contribution 401(k) approach.

Under the mandatory employer contribution 401(k) model, employer contributions start at an initial rate of 1% and grow 0.25% per year up to 3% after eight years of participation. Since this schedule of increase is required, the effective rate for participants each year is modeled to match it.

Voluntary employer contributions are expected to be minimal, since firms that do not currently offer access by definition have chosen to limit their discretionary spending on potential employee benefits in the past. However, firms that are required to enable their employees to access a 401(k) vehicle may find it in their interest to offer a voluntary match for competitive reasons. Modeling of employer contributions in the voluntary scenario is set at 5% of the level of employee contributions estimated in this scenario.[49]

Contributions

Earlier modeling of participation and turnover yields estimates of the distribution of participants by their years of saving for each age and employer size cohort for each year and scenario. These are then matched with the effective contribution rates by years of saving, drawn from the modeling described above.

[49] This effective rate should be understood as a combination of the proportion of employers choosing to make contributions and the rate of those matching or not matching contributions relative to employee contributions. Data from Vanguard indicate that average contributions within 401(k) plans are around 7% for employees and 3.7% for employers — an effective match of more than 50%. However, it is anticipated that the majority of employers newly required to participate would decline to provide a contribution. These employers would in effect provide an employer contribution rate of 0% relative to employee contributions, bringing down the weighted average employer contribution level significantly from the rate experienced by workers at firms currently providing access voluntarily. Data from Vanguard reported in: Munnell and Chen (2020), *401(k)/IRA Holdings in 2019: An Update from the SCF.* Center for Retirement Research at Boston College. <https://crr.bc.edu/wp-content/uploads/2020/10/IB_20-14.pdf>

Adjustments are needed in the IRA scenarios to ensure that average contributions reflect the constraint on contributions for some participants from statutory annual contribution caps. Annual contributions in an IRA are limited to $6,000 for workers under 50 and $7,000 for workers 50 and older as of 2020. These limits are assumed to remain consistent in real-dollar terms (i.e., grow with inflation) over the course of the analysis period. Annual limits in the 401(k) models are assumed to be high enough to have a negligible effect on contributions for the population served.[50] While the average contribution for each age and employer size cohort (when accounting for post-tax earnings and the effective contribution rate) is below the IRA contribution limit in all cohorts and scenarios, these averages reflect a distribution of earnings within each cohort. When the highest earners within this distribution face a constraint from the cap, the blended average contribution for the cohort will necessarily be lower than the initial unconstrained estimate.

To account for this effect, CPS ASEC data are analyzed to understand the distribution of earnings within the portion of the population that is not currently contributing to a savings account.[51] This analysis is undertaken by age cohort, and incomes within each age group are scaled to match the mean of this distribution to the estimated mean earnings of participants. Modeled contribution rates are applied to these modeled incomes to determine the frequency and magnitude of contributions constrained by the annual IRA contribution cap within each cohort. In cases where contributions are constrained, it is assumed that contributions would be made up to the allowable limit, and the net remainder between unconstrained and constrained contribution levels is calculated. These net differentials beyond the allowable limit are used to define a statistical relationship between the effective contribution rate and the degree of constraint from annual limits for each age cohort. As contribution rates rise through auto-escalation, constraints from the annual contribution cap become relevant to a larger proportion of savers.

This equation is then applied to adjust the initially estimated contribution rate estimated for each cohort, year, and scenario, resulting in a slight reduction in the effective contribution rates. The effective contribution rate by years of savings is combined with estimated-post tax earnings for each cohort to estimate contributions for each cohort, year, and scenario. These results are calculated by age cohort, and aggregated by scenario (see Figure 2.12).

A blended average contribution rate is calculated for each year and scenario by comparing aggregate contributions to the number of active participants (those contributing in a given year). This blended rate, shown in Figure 2.13, is reflective of factors such as the mix of participants by cohort and duration of savings, as well as design features such as the escalation schedule envisioned in each scenario.

[50] Contribution limits in a 401(k) are $19,500 for 2020, with additional permissible “catch up” contributions for employees 50 and older of $6,500. See: Internal Revenue Service. <https://www.irs.gov/newsroom/401k-contribution-limit-increases-to-19500-for-2020-catch-up-limit-rises-to-6500>

[51] Custom analysis of Current Population Annual Social and Economic Supplement data, 2018–2019.

Figure 2.12 – Est. Average Annual Contribution per Participant

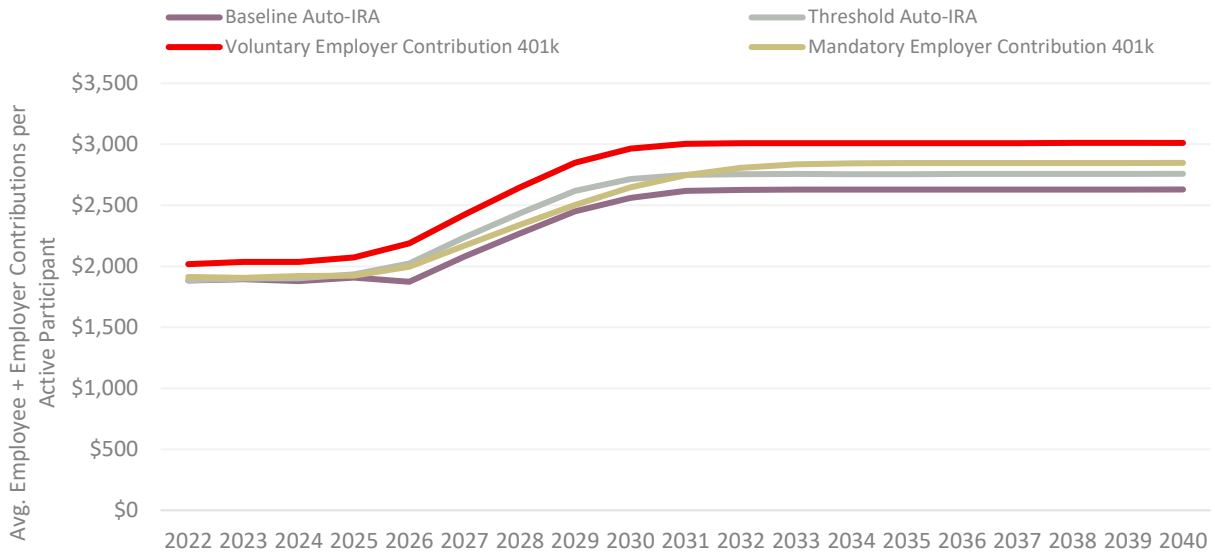
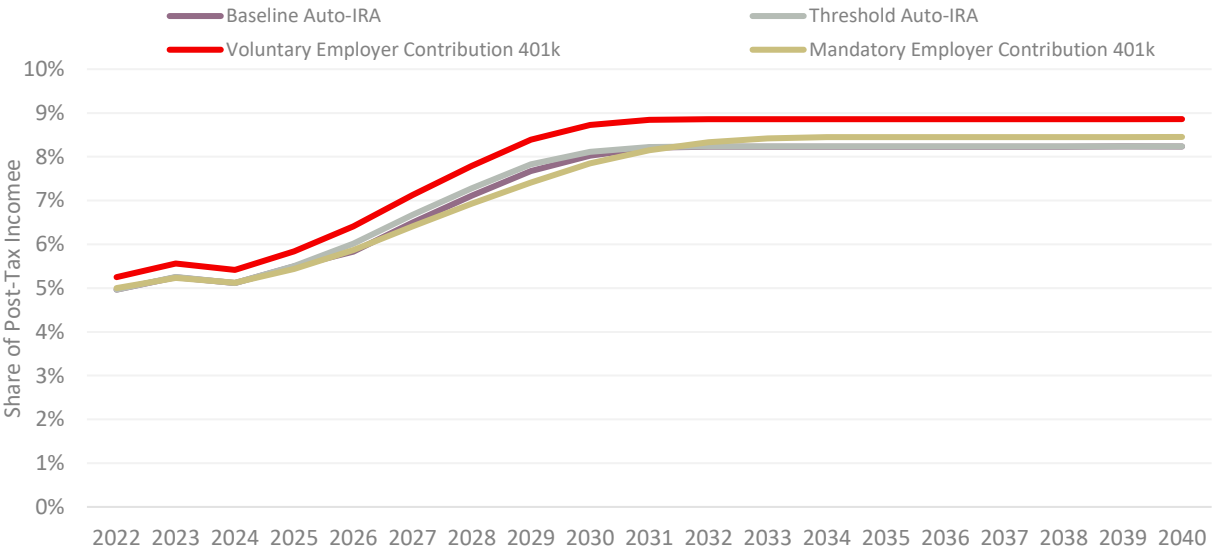


Figure 2.13 – Est. Average Combined Employee + Employer Contribution Rate



Saver's Tax Credit

As described in Section 1, each policy scenario modeled includes an enhanced version of the existing federal Saver's Tax Credit. Under the existing structure, filers under certain income thresholds can receive a credit on their federal tax liability based on a portion of their annual retirement savings contributions. The enhanced Saver's Credit modeled in this analysis includes higher income limits, credit amounts, and maximum credits, matched to the October 2020 SECURE Act 2.0 proposal introduced by Chairman Neal and Ranking Member Brady in the House

Ways and Means Committee.[52] In addition, the enhanced version modeled in this analysis includes a refundable structure providing for matching funds to be deposited directly into savers' accounts, replacing the current structure in which credits reduce federal tax liability.

Like the analysis of adjustments for IRA contribution limits described above, analysis of Saver's Credits requires estimating not only the average earnings of savers, but the distribution of those earnings to analyze eligibility and match levels. Analysis of CPS data on the income distribution of households not currently contributing to a savings account is once again relied on to understand income variations among the estimated mean income by age cohort.[53] This distribution is used to calculate the proportion of earners within various income ranges relevant to the eligibility of a saver, or the credit level for which they are eligible. Limits for single filers are used because contribution modeling is undertaken at the individual, rather than household, level. Notably, income thresholds for a married couple filing jointly are twice those of a single filer, meaning that this method can approximate the calculation for a household with two savers who are married and filing jointly.

An effective rate calculation for the Saver's Credit relative to initial contributions is developed for each income band. For the lowest income band, all contributions are eligible for a credit up to the qualified contribution limit of $3,000, and all annual contributions fall below this amount, making the effective rate equivalent to the 50% match on qualified contributions. As incomes increase, annual contributions exceed $3,000, reducing the effective rate due to contributions in excess of this level that are not eligible for matching credits. Next, as incomes exceed the initial threshold of $40,000, qualified contribution limits decline proportionately for the next $20,000 in earnings (meaning, for example, that a $50,000 earner is eligible for a credit on $1,500 in qualified contributions), leading to further declines in the effective rate. Finally, households above this earnings limit of $60,000 are treated as ineligible, with an effective rate on their contributions of zero.

These effective Saver's Credit rates by income level (calculated relative to initial contribution levels) are weighted by their frequency to produce a blended rate for each age cohort. This blended rate is applied to the modeled contributions for each age and firm size cohort, year, and scenario to estimate the applicable level of Saver's Credit. Figure 2.14 shows the average annual Saver's Credit by year and scenario, while Figure 2.15 shows the total annual Saver's Credits among all participants for each year and scenario.

[52] Information about provisions of SECURE Act 2.0 from the House Committee on Ways & Means (2020), The Securing a Strong Retirement Act of 2020 - Expanding Coverage and Increasing Retirement Savings – Section-by-Section Summary. <https://waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/documents/2.0Sectionbysection_final.pdf>
See Figure 1.9 for more information about the specific income and matching contribution limits envisioned in this proposal.
[53] Custom analysis of Current Population Annual Social and Economic Supplement data, 2018–2019.Note that this analysis is undertaken using gross income, while qualification uses adjusted gross income (AGI), as adjusted for deductions in the tax filing process. As a result, this analysis is conservative in the number of savers who could potentially benefit from this enhancement.

Figure 2.14 – Est. Average Annual Saver's Credit Contributions per Participant

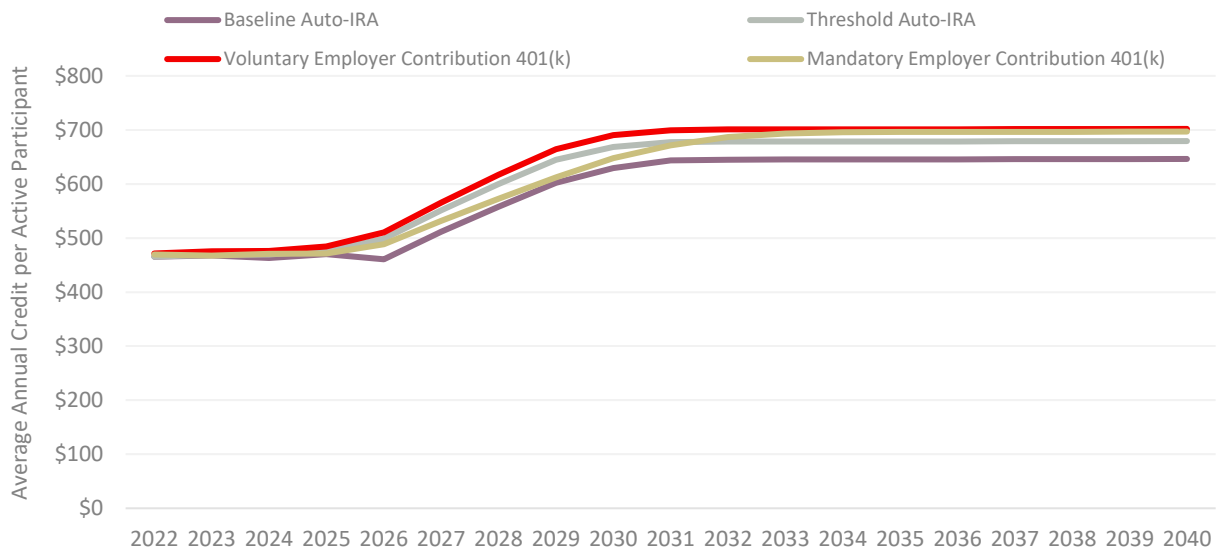
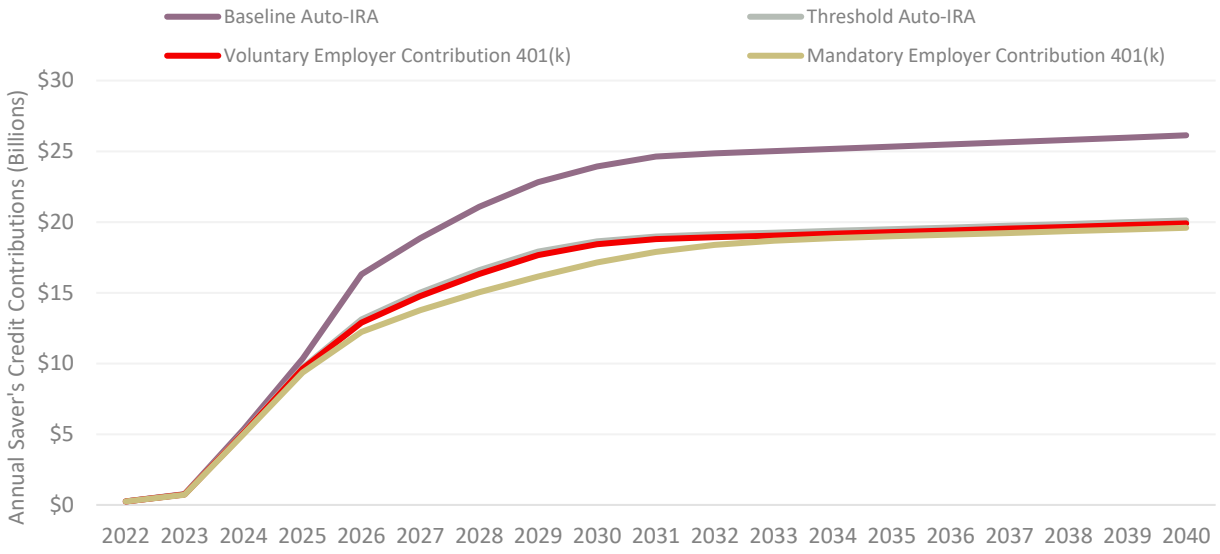


Figure 2.15 – Est. Total Annual Saver's Credit Contributions (in Billions)



Modeling Accumulation and Decumulation

Account Fees

Savers pay fees for the administration and investment management services associated with their accounts. These fees are typically expressed as a share of assets, and in effect reduce investment returns.

Fees levels are related to the size of the pool of assets managed with lower fee levels achieved through economies of scale.[54] These efficiencies are derived primarily from the investment management component, with increases in cost growing more slowly than increases in asset levels, bringing down the average cost as a share of assets. Approaches that offer straightforward and limited investment options are also able to limit costs more effectively.

The policy scenarios are all expected to benefit from these economies of scale to an increasing degree over time. regardless of how they are established. Some universal access structures rely largely on a single provider, in which case, that provider achieves these economies of scale, while other structures divide the market between private providers through various mechanisms, in which case, both economies of scale and competitive dynamics will produce similar effects in achieving low fee levels for savers.

Benchmarks of fees are relied upon to estimate initial fee levels, and the anticipated decline in fees over time. Initial fee levels are modeled to start at 0.90% of total assets, approximately based on observed fee levels in state Auto-IRA programs.[55]

This fee level is assumed to decline to 0.35% by the year 2040, based on long-term declines forecast in the feasibility study for CalSavers, which projects a fee of 0.36% by Year 15, and total fees for international models like UK NEST.[56] Fee decreases from the initial level are projected to begin once implementation is complete in 2026. Annual decreases from 2027 to 2040 are implementing using a compound annual growth approach, resulting in the annual schedule of fees as a share of assets shown in Figure 2.16.

Figure 2.16 – Est. Annual Fees as Share of Assets

Year	2021	2022	2023	2024 (Phase 1)	2025 (Phase 2)	2026 (Phase 3)	2027	2028	2029	2030
Combined Fee	--	0.90%	0.90%	0.90%	0.90%	0.90%	0.84%	0.79%	0.74%	0.69%
Year	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Combined Fee	0.64%	0.60%	0.56%	0.52%	0.49%	0.46%	0.43%	0.40%	0.37%	0.35%

[54] *The Economics of Providing 401(k) Plans: Services, Fees, and Expenses, 2019* (July 2020). ICI Research Perspective. <https://www.ici.org/pdf/per26-05.pdf>
Mitchell and Szapiro (2020), *Paperwork or Panacea: As PEPs Come of Age, What Can Their Forebearers Tell us About how They Will Work?* Morningstar Policy Research. <https://www.morningstar.com/lp/paperwork_or_panacea>
[55] Annual fees for OregonSaves range from 0.92%–1.02% of total assets; fees for CalSavers range from 0.825%–0.95% of total assets, and fees for Illinois Secure Choice are set at 0.75% of total assets.
[56] *California Secure Choice – Market Analysis, Feasibility Study, and Program Design Consultant Services – Final Report to the California Secure Choice Retirement Savings Investment Board.* <https://cri.georgetown.edu/wp-content/uploads/2020/05/CA-Mar-2016-MArket-Analysis-Feasibility-Study-nad-Program-Design-Report.pdf>

Early Withdrawals

Early withdrawals in the context of this analysis refer to savers removing assets from their accounts before the retirement age of 65, assumed within the modeling.[57] These withdrawals reduce the balances available to savers in their retirement years, and are therefore modeled to reduce asset balances over time. In practice, these assets are not truly "lost" from the perspective of the saver because these assets are available to them (net of potential early withdrawals) in the near term. Potential benefits from this short-term liquidity (such as providing a buffer for unexpected financial shocks) are not modeled directly in this analysis, which focuses on the ability of universal access to retirement savings options to enhance retirement security.

Observed rates of early withdrawals vary significantly among retirement savings vehicles. A 2019 Government Accountability Office (GAO) analysis represents the most-recent and -comprehensive review identified of early withdraw behavior among savers in the US.[58] This study matched administrative data sets from the Internal Revenue Service (IRS) and Department of Labor (DOL), and found that in 2013, early withdrawals from IRAs were equivalent to about 3% of total IRA assets, while hardship withdrawals among 401(k) participants were equivalent to about 0.5% of 401(k) assets (or about 8% of contributions).

These benchmarks represent imperfect proxies for the participants in the scenarios modeled. Importantly, the majority of IRA funds studied are derived from rollover accounts generated by separations from prior employers, rather than accounts receiving continued annual payroll deduction contributions.[59] Significant differences also exist between IRA and 401(k) participants within the existing framework, since the 401(k) is the dominant savings mode offered in the private sector workplace, and these savings are disproportionately held by higher-income households. These differences in rates of withdrawal are therefore understood to reflect in part the composition of the population of savers, and in part differences in the early withdrawal penalties associated with these savings options.[60]

The population of savers currently lacking access is understood to have lower incomes and to experience greater economic insecurity than the overall population of current savers, factors that would tend toward higher withdrawal rates. Since the same population is targeted in both IRA and 401(k) scenarios, disparities in withdrawal rates are anticipated to be more limited than those currently observed in the overall population of savers. Annual withdrawals are modeled at 2.25% of total assets in scenarios using a Roth IRA savings vehicle, and 1.50% of assets in scenarios using a Roth 401(k) savings vehicle once policy requirements are fully implemented. This modeling approach reflects the tendency of overall withdrawals to grow in proportion to the total assets available.

Modeling withdrawals during the implementation years requires a unique approach due to the outsized proportion of small accounts in the initial years, and the tendency for asset levels to shift materially over the course of a year. Data from the early implementation phase of state Auto-IRA programs are informative about the potential level of withdrawals relative to contributions in the initial implementation years.

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[57] Note that this definition differs from legal standards of early withdrawals, which typically impose penalties for withdrawals taken before the age of 59 and a half (along with other stipulations and exemptions).
[58] Jeszeck, et al. (2019). *Retirement Savings: Additional Data and Analysis Could Provide Insight into Early Withdrawals*. US Government Accountability Office. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3389474>
[59] As noted in the GAO report, "the bulk of assets in IRAs do not stem from annual contributions (capped at $6,000 annually for 2019), but rather from rollovers from 401(k) plans into IRAs." Jeszeck, et al. (2019), page 11.
[60] When non-qualified (i.e., early) withdrawals are made from a Roth IRA, non-taxable contributions are distributed before account earnings, which may allow the account holder to avoid penalties. By contrast in Roth 401(k), distributions are prorated between contributions and earnings, triggering tax penalties and reducing the incentive to make early withdrawals to a greater degree.

The CalSavers program provides quarterly reports of contributions and withdrawals by investment vehicle. [61] Results for target date funds provide a good proxy for the differentiated behavior of these initial savers by age. Figure 2.17 combines quarterly data from Q3 2019–Q2 2020 and shows withdrawal rates by target date fund as a share of contributions to those funds over this period. These rates illustrate that young savers (those participating in 2045–2065 target date funds) withdraw assets at about 1.5x the rate (relative to contributions) of older savers (participating in 2025–2040 target date funds).[62] Analysis of aggregate monthly data from Illinois Secure Choice shows higher overall rates of withdrawals relative to contributions than CalSavers, averaging 12.5% of contributions based on monthly data from September 2019 to August 2020.[63] These levels are likely to be elevated to some degree due to the COVID-19 crisis, and are anticipated to decline somewhat over time.

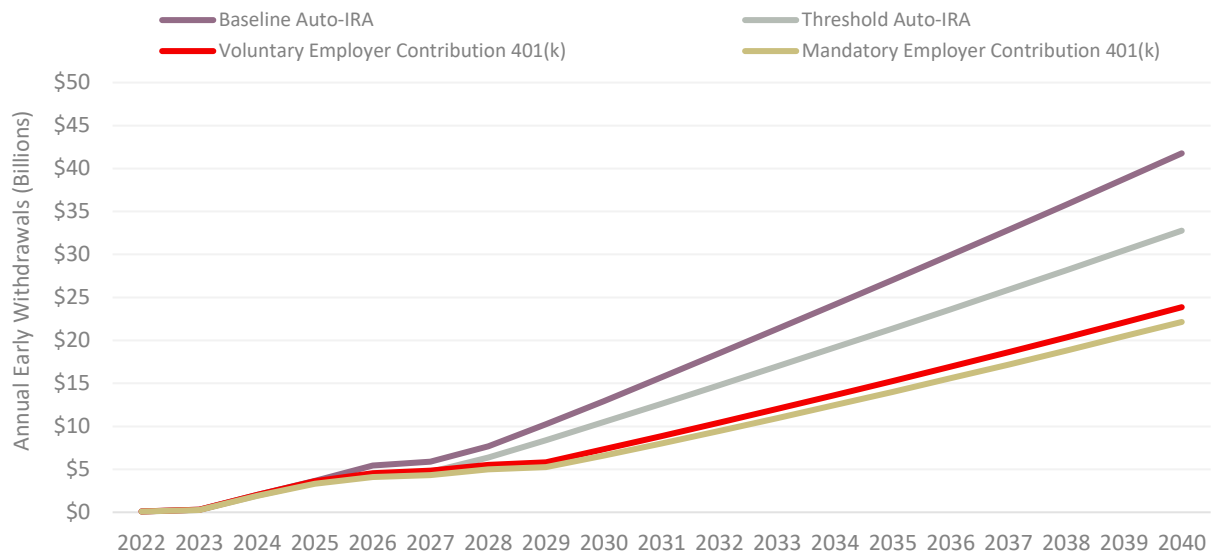
Figure 2.17 – CalSavers Contributions and Withdrawals by Target Date Fund, Q3 2019–Q2 2020

Target Date Fund	Annualized Contributions	Annualized Withdrawals	Withdrawal Share of Contributions (%)
2025	$106,688	$1,640	1.5%
2030	$145,171	$10,333	7.1%
2035	$105,848	$6,517	6.2%
2040	$120,944	$12,021	9.9%
2045	$161,417	$9,492	5.9%
2050	$150,466	$12,302	8.2%
2055	$166,985	$27,557	16.5%
2060	$71,074	$6,490	9.1%
2065	$20,956	$1,390	6.6%
Savers 45+ (TDF 2025-2040)	$478,651	$30,511	6.4%
Savers <45 (TDF 2045-2065)	$570,898	$57,231	10.0%

Withdrawals for the initial years, when small dollar accounts are most frequent, are modeled at 8% of contributions for savers ages 45–64 and 12% of contributions for younger savers. Withdrawals as a share of contributions are modeled to decline gradually in subsequent years (as average contribution levels increase through the auto-escalation feature). Once coverage requirements are fully implemented in 2027, the modeling approach shifts, and withdrawals are estimated as a share of assets per the approach outlined above. Figure 2.18 shows the annual withdrawals modeled in each of the scenarios.

[61] California State Treasurer. CalSavers Investment Performance Report. <https://www.treasurer.ca.gov/calsavers/reports.asp>
[62] Savers using the 2020 target date funds are excluded from this analysis, since their withdrawals may represent exits at retirement rather than the early withdrawals modeled in this component of the analysis.
[63] Illinois State Treasurer. Secure Choice Performance Dashboard. <https://illinoistreasurer.gov/Individuals/Secure_Choice/Secure_Choice_Performance_Dashboards>

Figure 2.18 – Est. Annual Early Withdrawals (in Billions)



Market Return

Market returns are a function of future market performance, as well as the investment mixes selected by participants. Future market performance is always an unknown variable, but historic data and market forecasts provide guidance about the range of expected returns.

Modeled annual returns levels are varied by age cohort to reflect differentials in the typical mix of investment assets typically held by savers at different ages. Younger savers are typically advised to pursue a higher-risk mix of investments than older savers, a transition that is captured through management of the investment mix in target date funds. This approach means that younger savers gain higher returns on average, although they are more exposed to risk over any short-term period.

Data from the Employer Benefits Research Institute (EBRI) on the mix of investment asset types by age show that savers broadly follow this guidance, with investments in lower-risk assets (bond funds, money funds, and other stable funds) increasing with age (see Figure 2.19).[64] This investment mix by age is combined with benchmarks of anticipated performance by asset type, including historic returns and proprietary forecasts, to develop a weighted average return for each saver age group, shown in Figure 2.19. Anticipated returns reflect the cautious outlook regarding future returns of many investment experts, although these effects are somewhat muted because returns are estimated in this analysis in real terms (net of inflation).

[64]Vander Hei, et al. (2018). *401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 2016.* Employee Benefits Research Institute. <https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri_ib_458_k-update-10sept18.pdf?sfvrsn=bca4302f_6>

Figure 2.19 – Est. Real Annual Market Return by Saver Age

Investment Mix by Age (EBRI Data)

Age Group	Equity Funds	Target-date Funds	Non–TDF Balanced Funds	Bond Funds	Money Funds	GICs/ other stable funds	Company Stock	Other	Est. Weighted Average Return
20s	32%	43%	7%	5%	1%	2%	6%	5%	**5.4%**
30s	45%	27%	5%	6%	2%	3%	7%	5%	**5.2%**
40s	51%	17%	5%	7%	3%	4%	8%	6%	**4.8%**
50s	45%	15%	6%	8%	4%	7%	8%	7%	**4.6%**
60s	39%	15%	6%	10%	5%	11%	7%	7%	**4.0%**

Where age cohorts used in modeling cut across decades, weighted average returns in the two relevant decades are averaged. For example, modeled returns for the 25- to 34-year-old cohort reflect the average of returns for the 20s and 30s age cohorts shown in Figure 2.19.

Account Balances

Account balances are estimated as a function of contributions, Saver's Credits, and market returns, net of fees and withdrawals. The sequence of steps described below is used to estimate account balances for each age cohort, year, and scenario.

Assets modeling begins each year with the base of assets carried over from the prior year. This value is zero in the first year of implementation and positive in subsequent years. These assets are segmented by age cohort and grown at the rate of market return assigned to each cohort.

Next, contributions by employees (as well as employers, in scenarios where employer contributions are included) for each age group are added. These contributions grow through a market return at half the annual rate normally applied to savers in each age cohort. This approach reflects that these contributions flow throughout the course of the year, and thus will, in effect, be able to grow through the market for approximately half the year on a blended basis (assuming an even distribution of contributions throughout the year).

These assets are then adjusted to reflect deductions for early withdrawals and fees. These steps reduce the aggregate balance from carryover and in-year contributions. Applicable Saver's Credits are then applied for each age cohort, adding to account balances. This sequence produces an initial calculation of total balances by age cohort at the end of each year.

Next, an adjustment is made to account for participants reaching the assumed age of 65. Account balances for participants reaching this age each year are removed from the end-of-year balance, since these participants are assumed to withdraw these assets at retirement age.[65] Segmenting contributions and balances by age cohort throughout the model allows balances for those participants reaching retirement age within the study period to be disentangled from overall calculation of plan assets.

[65] See methodology discussion below of the annual income supported by savings for more information about this approach.

Finally, among those savers below the retirement age, an "age progression" calculation is performed to roll end-of-year assets over into the following year. One-tenth of participants in each age band is assumed to age into the next age band for the purpose of modeling their returns in the subsequent year. These "progressed" balances by age cohort represent the starting point for the calculation for the following year. This full sequence is repeated until the end of the analysis period in 2040.

Figure 2.20 shows the average year-end balances among account holders under 65 (including both active and inactive accounts) by year and scenario. Figure 2.21 shows the total assets among participants under 65 (both active and inactive accounts) by year and scenario.

Figure 2.20 – Est. Average Account Balance (among Active and Inactive Account Holders <65)

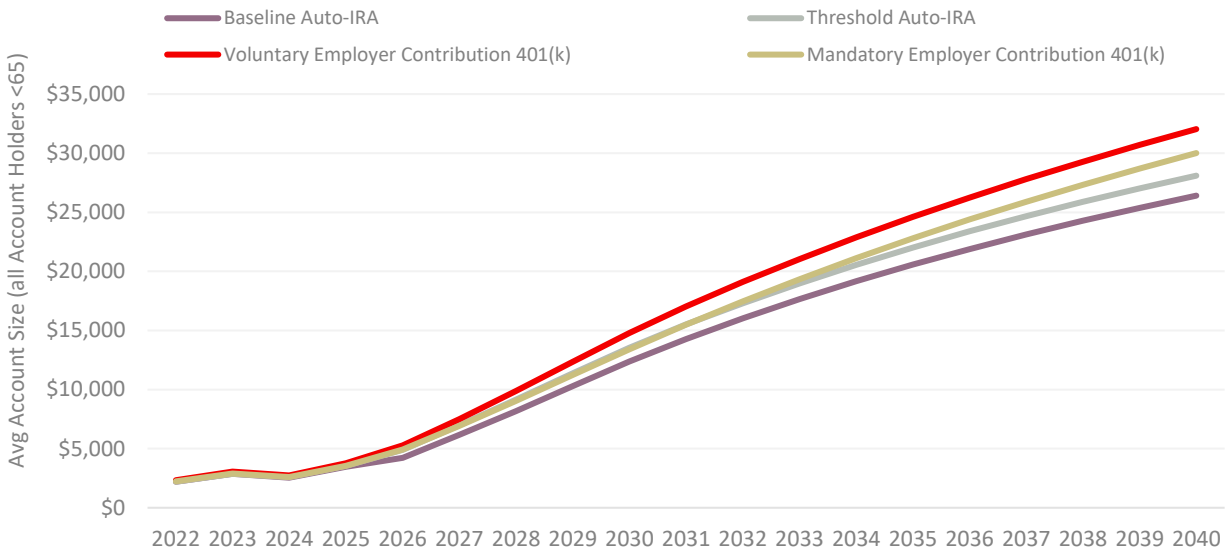
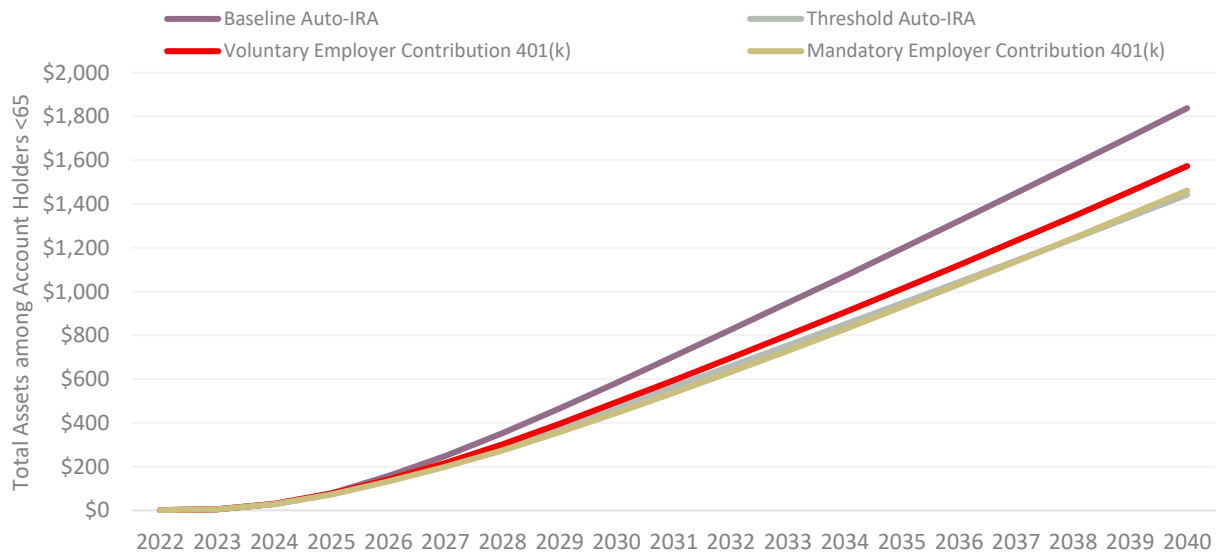


Figure 2.21 – Est. Total Account Assets (among Active & Inactive Account Holders <65) (in Billions)



Annual Income Supported by Savings

For participants reaching the assumed retirement age of 65, modeled account balances are converted to the level of annual income they can support in retirement. Since workers targeted by the universal access models previously lacked access to workplace solutions for retirement savings, this income, supported by new savings, can be thought of as supplemental to existing sources of retirement income (most notably Social Security) through their retirement years.

Retirees have a range of financial approaches for using "lump sum" assets at retirement to generate income over the remainder of their lifetime. CRI's 2019 report in conjunction with financial experts Willis Towers Watson reviews a range of "lifetime income" models that can protect assets and mitigate risk for retirees.[66]

The "baseline" financial option identified in that analysis to convert savings into lifetime income is the immediate annual annuity. In this approach, the saver converts their entire asset balance into a guaranteed lifetime income by transferring assets to an insurer or other provider, which begins paying benefits immediately upon purchase. Modeling in this analysis adopts this approach, which represents a straightforward and consistent benchmark for converting the value of lump sum savings into an annual income stream, for all participants reaching 65 in all scenarios. It is recognized that in practice, participants reaching 65 would take a variety of financial approaches (and may in some cases continue to work and save beyond age 65).

The immediate annuity value is estimated based on market benchmarks calculated in the 2019 CRI report in conjunction with Willis Towers Watson. Under normal market conditions, the annual value of an immediate annuity is estimated at around 6.7% of the total account value. This proportion translates the lump sum into a flat annual payment for the remainder of the saver's lifetime. However, this annual value is nominal, and a downward adjustment is needed to express the value in real terms. Using an inflation projection from the Congressional Budget Office (CBO)[67] and a life expectancy of 20 years from age 65,[68] this annual value is calculated to be equivalent to 5.46% of the lump sum asset value in the inflation-adjusted terms used throughout this report.

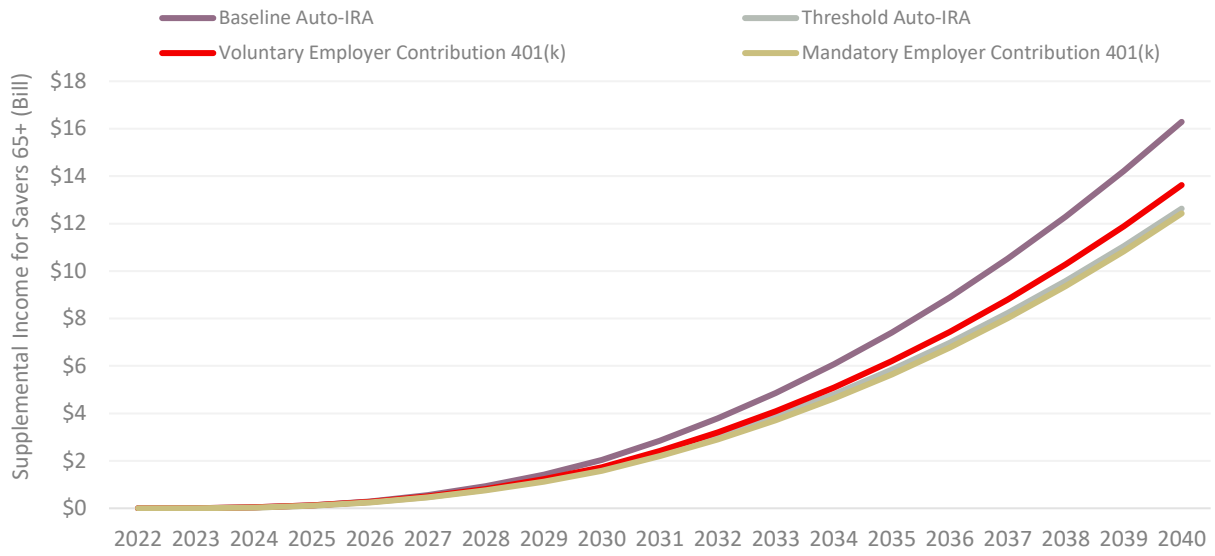
This rate is applied to the modeled account balances of plan participants reaching age 65 each year to estimate the supplemental annual income available in each scenario. This calculation is undertaken cumulatively each year, inclusive of participants reaching retirement age in prior years and continuing to receive annual income from their assets. Annual growth in the level of supplemental income each year during the analysis period results from the combination of the addition of a new cohort of savers, and the higher savings levels of each successive cohort of retirees, who benefit from additional years of savings relative to earlier retirees (see Figure 2.22).

[66] Antonelli, et al. (2019), Generating and Protecting Retirement Income in Defined Contribution Plans: An Analysis of How Different Solutions Address Participant Needs. Georgetown University Center for Retirement Initiatives, in conjunction with Willis Towers Watson. <https://cri.georgetown.edu/wp-content/uploads/2019/06/policy-report-19-02.pdf>

[67] An inflation rate of 2.2% is used, based on the long-term equilibrium reflected in the Congressional Budget Office's 2020 Long-Term Budget Outlook. <https://www.cbo.gov/publication/56516>

[68] Analysis of Social Security Administration data by the Urban Institute finds that remaining life expectancy at age 62 was approximately 20 years for men and 23 years for women as of 2015. These figures are expected to grow over the study period, since they are forecast to reach about 23 years and 25 years respectively by 2050. Since this study covers retirees over a broad time period and uses a later retirement age of 65, an expectancy of 20 years is used as a benchmark. Johnson (2018), *Is It Time to Raise the Social Security Retirement Age?* Urban Institute. <https://www.urban.org/research/publication/it-time-raise-social-security-retirement-age>

Figure 2.22 – Est. Annual Supplemental Income for Account Holders 65+ (in Billions)



Section 3 discusses the impacts of this supplemental income on the income distribution of the elderly population and on economic activity and government expenditures over the long term. As illustrated in Figure 2.22, retiree income effects from new savings grow in a non-linear fashion as both the number of retirees and their average savings accumulations grow over time. These trends would continue beyond 2040, meaning that annual impacts will grow significantly beyond the analysis period.

Saver Impacts

Individual savings examples in this report are derived from the same modeling framework as outlined above to define contribution and asset accumulation levels. Representative savers are assumed to be participating in the baseline Auto-IRA scenario. Results for individual savers are shown beyond the analysis period used for modeling national impacts (through 2040) to better illustrate the potential impacts over the full career of a saver, as well as differentials in outcomes based on varied start dates for savers.

Within the savings examples shown in Section 2.1 of the report, household starting ages are chosen to align with the starting points of age bands used in this study and contribution years are calculated based on a retirement age of 65, assuming continuous participation. Earnings estimates are based on average income for the relevant age and employer size cohorts defined in the modeling above. Participants are assumed to see modest changes in their real incomes over time as they move between age cohorts, consistent with the average differentials modeled throughout this report.

Contribution rates are based on the default initial and auto-escalation rates in the baseline scenario, with the participants remaining at the default levels throughout their saving years. Matching funds from the Saver's Tax Credit are applied as appropriate based on the enhanced refundable design assumed in this report.

Market returns are drawn from the modeling assumptions outlined above, applied with variation by age. Fee levels match those used for each scenario and are assumed to remain consistent at the 2040 level in years outside the

analysis period in individual examples with longer time horizons. No early withdrawals are assumed in these individual examples.[69]

Modeling of contributions and account balances for individuals follows the same sequence of steps utilized for the full population of savers outlined above. This approach is used to calculate an account balance as of the age of 65. This balance is then converted into a potential lifetime income stream using the calculation for an immediate annual annuity outlined above. Results are expressed in terms of the lump sum assets at retirement age (65), annual income value, and return on investment, which compares the aggregate employee contributions of the saver to the lump sum balance at age 65. All values are expressed in comparable terms ($2020).

Report Figure 2.4 compares potential account balances for a young saver over a 40-year time horizon with and without the enhanced Saver's Credit assumed in the scenarios modeled in this report. Results with the Saver's Credit follow the baseline modeling approach outlined above. Results without the Saver's Credit are modeled by removing the annual contributions from this component. Notably, the sample saver may be eligible for a Saver's Credit under its current design, but within the current structure, this credit would yield a reduction in their federal tax liability, rather than a deposit into their savings account.

Report Figure 2.5 compares outcomes for two savers making an identical level of contributions at different time periods in a 40-year time horizon. These two savers are assumed to each have a consistent annual income of about $35,000 (drawn from the average income for a 35-44 year old participant at a small employer) across the full span of this analysis, and to contribute at the default initial and auto-escalated levels used in the baseline Auto-IRA scenario. The "early saver" in this example makes these contributions over a 20-year period from ages 25–45 and then ceases contributions (while maintaining their account), while the "late saver" makes contributions over a 20-year period from age 45–65. The real value of these contributions is identical for both savers (totaling around $54,000). Saver's Credits are applied equally for each saver, using the enhanced credit design assumed in this analysis, and no early withdrawals are assumed.

Market returns and fees are applied based on the assumptions outlined above and used to model account balances for each saver over time. Since contribution levels are identical, differences in outcomes isolate the impact of the additional market return gained by the early saver through the timing of their contributions.

[69] Note that individual examples represent "model savers" who choose to participate when provided access through their employers, follow defaults, and do not diminish their savings through early withdrawals. National impact analysis recognizes that across the population, these and other factors (such as job turnover) will diminish savings levels, and accounts for each of these parameters in developing estimates of aggregate estimates of policy impacts.

3. Long-Term National Impacts from Increased Savings

Section 3 of the *Potential Benefits of Universal Access* report covers the implications of increased retirement savings through the universal access models on economic growth and on government expenditures associated with benefit programs for lower-income seniors.

This appendix provides supporting documentation on the following topics covered within Section 3 of the report:

- **Economic Growth and Tax Revenues**, which documents both economic benefits from increased access and savings, and additional tax revenues associated with faster economic growth.
    - This methodology is organized into sub-sections covering National Savings and Economic Growth, and Tax Revenue Impacts.
- **Benefit Program Spending**, which estimates the reduction in federal and state expenditures on benefit programs supporting lower-income seniors that could be realized due to increased income levels of the elderly population associated with the scenarios.
    - This methodology is organized into sub-sections covering Means-Tested Benefit Programs Supporting the Elderly, Program Expenditures by Income Level, Excess Medical Cost Growth, Income Patterns for Future Retirees, Federal Expenditure Savings, and State Expenditure Savings.

Economic Growth and Tax Revenue

National Savings and Economic Growth

More-accessible savings options will help the competitiveness of small businesses and the financial security of workers, including the self-employed, encouraging a more-dynamic economy, while increased savings levels will grow the income that senior households have available to spend in retirement. These benefits are reviewed within Section 3.1 of the report. In addition, universal access to retirement savings will have an effect on the macro economy by increasing the level of national savings. These benefits are described and modeled below.

From the perspective of an individual worker, contributions to retirement savings plan generally represent a shift on the margin from personal consumption to personal savings. From the national macroeconomic perspective, these personal savings are transformed into available capital for business investment through the stock market and financial system. Business investments made with this capital improve the productivity of workers, and in turn, create additional economic growth and income. Over time, this income growth allows consumption to rise again, outweighing the initial reduction from increased savings.

The relationship between national savings behavior and economic growth is defined in the "Solow Growth Model" developed by Nobel laureate Economist Robert Solow. [70] This framework describes and quantifies the relationship

[70] Solow (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, vol. 70(1), pages 65–94.
This framework is consistent with approaches to modeling potential economic growth from national savings used by the Government Accountability Office (GAO) and Congressional Research Service (CRS).
Government Accountability Office (2001), National Saving: Answers to Key Questions. <https://www.govinfo.gov/content/pkg/GAOREPORTS-GAO-01-591SP/pdf/GAOREPORTS-GAO-01-591SP.pdf>
Congressional Research Service (2003), Saving in the United States: How Has It Changed and Why Is It Important? <https://www.everycrsreport.com/files/20030117_RL30873_dcb36d191b110ddc22915ebca58c7126b629e30e.pdf>

between the marginal productivity of capital, capital depreciation, and consumption as a driver of economic growth. Within this framework, a single parameter (in this case, the savings rate) can be "shocked" to observe the difference in the growth rate over time between the baseline and revised savings assumptions.

The Solow Growth Model is incorporated into standard macroeconomics curricula, and spreadsheet versions have been produced through which users can update economic inputs and parameters with current information. This analysis used a version produced and published by the economics department at DePauw University as of 2016.[71] Baseline economic inputs are then updated with data drawn from the Bureau of Economic Analysis (BEA) and other standard sources. BEA inputs drawn from annualized data as of 2019 are the Gross Domestic Product (GDP), average national income, national savings rate, household savings and consumption, and relationship between personal savings and private business investment.[72] Standardized long-term economic parameters such as the rate of technology changes, the productivity of capital, and capital depreciation are drawn from N. Gregory Mankiw's *Macroeconomics* tenth edition (2019), a widely used intermediate macroeconomics text.[73] Collectively, these inputs describe a future growth path for the US economy through 2040 based on the historic relationship between these key parameters of economic growth.[74]

Next, the supplemental savings resulting from additional contributions within each of the universal access policy options modeled above are used to alter the national savings rate and consumption level, holding all other economic parameters consistent. The differential in the modeled path of GDP growth in these scenarios relative to current trends is therefore attributable to the additional savings associated with each model.

Increases in personal savings are derived through the annual contributions (by employees and employers, and through the Saver's Credit) under each policy option. Personal savings rates for 2021–2023 (when new savings are negligible before large-scale implementation of policy requirements) are left unadjusted from current trends. Adjusted rates are then calculated for the phase-in period (2024–2027) and the remainder of the analysis period (2028–2040) based on average annual contributions during those periods (adjusted to remove the effects of growth in the size of the workforce).[75] This approach produces an estimated increase in the national personal savings rates, which as of 2040, grows from the current level of 7.53% to 8.06%–8.24% based on the supplemental worker savings associated with the policy scenarios (see Figure 3.1).

Next, these changes in personal savings are translated into their impacts on overall savings, consumption, and investment based on existing activity patterns.[76] The additional contribution from personal savings is scaled to the overall savings rate, inclusive of all private sector activity, including savings by businesses. The national savings

[71] *Teaching Macroeconomic with Excel* (updated July 2016. DePauw University. <www.depauw.edu/site/learn/macroexcel/excelworkbooks/>
[72] Bureau of Economic Analysis, National Income and Produce Accounts (NIPA). Table 1.1.5: Gross Domestic Product, 2019 annualized data. <https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=3&isuri=1&nipa_table_list=5>
[73] Mankiw (2019), *Macroeconomics*, tenth edition.
[74] Note that results derived from this framework are later calibrated to specific estimates of growth rates over the next two decades forecast by the CBO. The Solow Growth framework is therefore used in this analysis as a means to isolate the relationship between savings and growth, rather than to directly generate a forecast of future growth trends.
[75] Since personal savings are expressed in the model as a rate, incremental changes are calculated on a per capita basis. Growth in the workforce is accounted for separately in the calibration of growth rates relative to current forecasts.
[76] Notably, not all personal savings translate directly into investment, with a portion contributing to the consumption of fixed capital (i.e., depreciation of existing assets). BEA data from 2019 is used to model the relationship between household savings and business investment, and this relationship (which suggests that about 71% of personal savings flows to business investment) is applied to additional personal savings generated by the modeled policy scenarios.

rates as of 2040 is estimated to grow from a current level of 17.50% to 17.79%–17.89%, with an associated reduction in consumption over the short term.

These revised parameters are input into the Solow Growth Model framework, and rates of GDP growth associated with each savings scenario are estimated. GDP results yielded by this model reflect long-term trends in average economic and workforce growth. These results are recalibrated to the lower growth environment forecast by the Congressional Budget Office, which projects an increase in real GDP of 1.7% per year for the 2020-2040 period,[77] while labor force growth is reconciled with estimates produced in Section 1 of this analysis.

Annual real per capita GDP growth under each of the policy scenarios accelerates from the baseline level of 1.700% to rates ranging from 1.712% to 1.716%. While these increments are small in a given year, these gains compound over time and apply to the full national GDP, which totals around $20 trillion as of 2019 and is forecast to rise to around $30 trillion by 2040. These small changes therefore produce meaningful differentials in economic output over time that are attributable to the additional savings and investment.

National GDP is anticipated to be $72–$96 billion larger in the year 2040 under the scenarios modeled relative to current trends. This difference translates to an increase in real GDP per capita as of $235–$312 as of 2040 (see Figure 3.1).

Figure 3.1 – Est. Increase in National Savings Behavior and GDP Growth, 2040

Parameter	Current Trends	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
Personal Savings Rate (%)	7.53%	8.24%	8.08%	8.10%	8.06%
National Savings Rate (%)	17.50%	17.89%	17.80%	17.81%	17.79%
Annual per Capita Real GDP Growth (%)	1.700%	1.716%	1.713%	1.713%	1.712%
Year 2040 GDP ($2020 Billion)	$30,015	$30,111	$30,091	$30,093	$30,087
GDP Differential in 2040 ($2020 Billions)	--	$96	$76	$78	$72
Additional GDP per Capita in 2040 ($2020)	--	$312	$245	$253	$235

Notably, these calculations hold constant the current trend in private sector employment growth in each of the policy options modeled. As a result, economic growth in the model is expressed as an increase in GDP and average income for the same base of workers and total population in each scenario. This translates to an increase in living standard for the US population over time.

In practice, changing living standards may have dynamic impacts on immigration flows. These changes would affect the number of workers and therefore the estimated participation, savings amounts, and account accumulations within the scenarios modeled. These effects could also change the rate of economic growth and GDP per capita calculations expressed above. This dynamic feedback loop is not accounted for in the modeled results expressed in this report.

[77] *2020 Long-Term Budget Outlook* (2020) Congressional Budget Office. <https://www.cbo.gov/publication/56516>

Tax Revenue Impacts

These increases in economic activity and GDP would also translate to increases in tax revenue collected by government at the federal, state, and local levels. Federal tax revenues are largely a product of income-generated taxes on households, payroll, and corporate earnings. Increasing the rate of GDP and national income growth therefore translates directly to increased tax revenues for the federal government.

Federal tax revenue impacts from additional economic growth are developed through an effective tax rate framework. This analysis compares current GDP (based on 2019 BEA data)[78] with 2019 tax collections for each of these three key sources for FY 2019 (as reported by the CBO)[79] to estimate the relationship between overall economic activity and resulting tax revenues. These three sources generated $3.19 trillion in federal taxes in FY 2019, with an aggregate effective rate of 14.9% relative to US GDP.

This effective rate is applied to the incremental economic growth modeled above under each of the scenarios to develop an estimate of the increase in tax revenue collections associated with scenarios. Incremental results are modeled for each year, based on the GDP estimates associated with each scenario relative to the baseline growth path projected by CBO.

Based on the current effective rate of tax collections relative to the tax base for each of these key sources, the additional economic growth stimulated by the cycle of increased savings, investment, and productivity is estimated to generate an increase of $11–$14 billion as of 2040 across the scenarios (see Figure 3.2).

Figure 3.2 – Est. Increase in Tax Revenue from Enhanced Economic Growth, 2040 (in Billions)

Tax Type	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
Personal Income Taxes	$7.7	$6.1	$6.3	$5.8
Payroll Taxes	$5.6	$4.4	$4.5	$4.2
Corporate Income Taxes	$1.0	$1.0	$1.0	$1.0
2040 Total	**$14.3**	**$11.5**	**$11.8**	**$11.0**

State and local governments have separate and distinct tax bases from the federal government, and frequently apply taxes that would be affected by economic growth and additional retiree resources described in this report. Due to the complexity and variation in state and local tax policy, this analysis is unable to define the changes in state and local tax revenue associated with the additional economic growth at an aggregate level without a more-detailed assessment, which is not addressed in this report.

Notably, local jurisdictions and school districts are often funded through real estate taxes. These tax bases are affected by trends in economic growth and earnings through the impact on property values, but this relationship is indirect and dependent on the operations of local real estate markets, as well as the particulars of tax assessment regimes in each location.

[78] Bureau of Economic Analysis, National Income and Produce Accounts (NIPA), Table 1.1.5: Gross Domestic Product.
[79] *Monthly Budget Review: Summary for Fiscal Year 2019* (November 7, 2019). Congressional Budget Office. <https://www.cbo.gov/system/files/2019-11/55824-CBO-MBR-FY19.pdf>

Benefit Program Spending

Means-Tested Benefit Programs Supporting the Elderly

The first step in analyzing the impact of increased retiree resources from universal access scenarios on benefit program expenditures is an analysis of the level and nature of expenditures to support the low-income elderly population. A range of programs that are means-tested or otherwise materially affected by the income levels of the elderly population are selected and quantified in terms of current spending. Studies from the Congressional Research Service and Congressional Budget Office, as well as a detailed review of program eligibility and outlay guidelines, informed the program selection.[80]

The framework excludes two programs that provide significant outlays to the elderly population due to the nature of program eligibility/outlays. Medicare is excluded from the selection, with the exception of the Part D Low-Income Subsidy Program, due to the program's universal eligibility for the senior population. Social Security is also excluded from the selection because program benefit levels are dependent on working age income rather than savings levels and thus not directly affected by increased retirement savings levels. Generalized federal spending on items like defense and infrastructure that benefit both the elderly and non-elderly population and is not affected by the income levels of elderly residents is also excluded.

Annual total federal expenditure levels are defined for the identified programs using Federal Fiscal Year (FFY) 2018 budget data presented by the Congressional Research Service.[81] Next, budget and program data from FFY 18 are used to isolate expenditures from federal funds on the elderly population (65 years and older). Data from FFY 18 are used to define the relationship between total federal expenditures and expenditures on elderly residents due to the lagged availability of demographic data for the selected assistance program.

Figure 3.3 identifies the program data sources used to isolate the level of expenditures on elderly residents.

[80] The Budget and Economic Outlook: 2019 to 2029 (2019). Congressional Budget Office.
Federal Spending on Benefits and Services for People with Low Income: FY2008-FY2018 Update (2020). Congressional Research Service.
Need-Tested Benefits: Estimated Eligibility and Benefit Receipt by Families and Individuals (2015). Congressional Research Service.
[81] Congressional Research Service, 'Federal Spending on Benefits and Services for People with Low Income: FY2008-FY2018 Update', 2020

Figure 3.3 – Data Sources Used to Determine Funding Allocation to the Elderly Population (65+)

Program	Data Source(s) Utilized
Medicaid	Office of the Actuary, Centers for Medicare & Medicaid Services, US Department of Health & Human Services, *2018 Actuarial Report on the Financial Outlook for Medicaid*.
Medicare Part D Low-Income Subsidy	Centers for Medicare & Medicaid Services, Office of Enterprise Data and Analytics, *CMS Chronic Conditions Data Warehouse* (2018).
Supplemental Security Income	US Social Security Administration, Office of Retirement and Disability Policy; Office of Research, Evaluation, and Statistics, *Supplemental Security Income Annual Statistical Report* (2018).
SNAP	US Department of Agriculture, *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2018*.
	US Census Bureau, 2018 American Community Survey 1-Year Estimates, Population by Age and Sex, *Table S0101*.
Low-Income Home Energy Assistance	U.S. Department of Health & Human Services, Administration for Children and Families, *LIHEAP Performance Measurement Data Warehouse* (2018).
	US Census Bureau, 2018 American Community Survey 1-Year Estimates, Population by Age and Sex, *Table S0101*.
Supportive Housing for the Elderly (Sect. 202)	US Department of Housing & Urban Development, *Picture of Subsidized Households – Section 202 Households* (2018).
Older Americans Act:	
Nutrition Program for the Elderly	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Congregate Meals & Home-Delivered Meals* (2018).
Supportive Services & Senior Centers	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Homemaker, Case Management, & Transportation* (2018).
Caregiver Support	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Caregiver* (2018).

The relationship between federal spending in aggregate and allocated spending on the elderly (65 and older) population in FFY2018 is then extrapolated forward to define federal program expenditures on elderly residents in Federal Fiscal Year 2020.[82] Figure 3.4 below summarizes anticipated federal expenditures in FFY2020 for each of the identified programs and the portion of these expenditures attributable to the elderly population. Federal spending on these programs is estimated to total more than $575 billion in 2020, more than $95 billion of which is allocated to the elderly population. The largest of these expenditures is for Medicaid, which accounts for more than $62 billion of federal spending on the elderly annually.

[82] FFY 2018 expenditures are extrapolated forward using inflation rates as defined by the US Bureau of Labor Statistics' Consumer Price Index for 2019 and 2020, with excess medical inflation applied for Medicaid and Medicare program spending as defined by the U.S. Congressional Budget Office in *The 2019 Long-Term Budget Outlook*. See subsequent "Excess Medical Cost Growth" section for additional detail.

Figure 3.4 – Est. Federal Benefit Program Expenditures on Low-Income Seniors, 2020 (in Millions)

	Total Federal Expenditures ($M)	Est. Federal Expenditures on Elderly ($M)
Medicaid	$413,851	$62,233
Medicare Part D Low-Income Subsidy	$30,329	$18,499
Supplemental Security Income	$60,130	$6,494
SNAP	$65,503	$5,550
Low-Income Home Energy Assistance	$3,779	$1,013
Supportive Housing for the Elderly (Sect 202)	$650	$534
Older Americans Act Programs:		
Nutrition Program for the Elderly	$929	$859
Supportive Services & Senior Centers	$399	$371
Caregiver Support	$187	$180
Total	**$575,756**	**$95,734**

Many of these programs have additional state supplements to the federal funds outlined above. For certain programs, aggregate state expenditures follow a regular relationship to federal spending. Analysis of state expenditure savings under each of the scenarios is undertaken at the end of this section.

Program Expenditures by Income Level

Next, the federal program expenditures on elderly residents identified in Figure 3.4 are allocated to the 2020 income distribution of senior households. Unlike earlier analyses in this study, which have focused primarily on impacts for individual savers, this analysis focuses on households, which are typical unit for the eligibility standards for most benefit programs.[83]

Incomes for elderly households are estimated using data from the US Census Bureau's Current Population Survey (CPS), which also serves as the basis for the federal government's official poverty statistics. Survey responses from multiple years are aggregated to increase the sample size and adjusted for inflation and normal growth to estimate the income distribution of elderly (65+) households as of 2020.[84]

Demographic participant data from administering departments and eligibility requirements are used to estimate the proportion of program expenditures on elderly households in each income band. Figure 3.5 details the data sources used for each program to estimate the distribution of federal benefit spending across income bands. This allocation incorporates the number of households in each income band to ensure that the current allocation aligns with the total estimated federal expenditures for elderly residents for each program.[85]

[83] Notably, poverty measures like the Federal Poverty Level (FPL) are calculated on a household level based on household income, with variation by household size.
[84] Income data in this analysis are drawn from the 2010–2019 waves of the CPS Annual Social and Economic Supplement. Data from each year are adjusted to common $2020 terms.
[85] This "top down" approach, rather than a "bottom up" approach of estimating expenditures by income band based purely on survey data, program data, or eligibility rules, maximizes the relative accuracy of the analysis by ensuring alignment with overall budget data.

Figure 3.5 – Data Sources Used to Allocate Federal Spending on the Elderly by Income Band

Program	Data Source(s) Utilized
Medicaid	Centers for Medicare & Medicaid Services, Office of Enterprise Data and Analytics, *Medicare Current Beneficiary Survey Data Public Use File – Selected Characteristics of Dual Eligible (Medicare-Medicaid) Beneficiaries*, Fall 2017 Sample[86]
Medicare Part D Low Income Subsidy	Centers for Medicare & Medicaid Services, Office of Enterprise Data and Analytics, *Medicare Current Beneficiary Survey Data Public Use File – Selected Characteristics of Medicare Part D LIS Beneficiaries*, Fall 2017 Sample
Supplemental Security Income	US Social Security Administration, Office of Retirement and Disability Policy, Office of Research, Evaluation, and Statistics, *Supplemental Security Income Annual Statistical Report* (2018)
	Office of Retirement and Disability Policy; Office of Research, Evaluation, and Statistics; *Characteristics of Noninstitutionalized DI and SSI Program Participants, 2013 Update*[87]
SNAP	US Department of Agriculture, *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2018*.
Low-Income Home Energy Assistance	US Department of Health & Human Services, Administration for Children and Families, *LIHEAP Performance Measurement Data Warehouse* (2018).
Supportive Housing for the Elderly (Sect. 202)	US Department of Housing & Urban Development, *Picture of Subsidized Households – Section 202 Households* (2018).
Older Americans Act:	
Nutrition Program for the Elderly	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Congregate Meals & Home-Delivered Meals (2018).*
Supportive Services & Senior Centers	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Homemaker, Case Management & Transportation (2018).*
Caregiver Support	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *National Survey of OAA Participants Public Use Files – Caregiver (2018).*
	Mathematica Policy Research, *Supporting Family Caregivers Through Title III of the OAA* (2011).
	Administration for Community Living; Aging, Independence, and Disability Program Data Portal, *OAA Title III Characteristics - U.S. Totals* (2018).

[86] While these data represent the most-comprehensive source of information about incomes of Medicaid and Medicare Part D recipients, income groupings do not provide any distinctions among recipients at or below 100% of the Federal Poverty Level (FPL). Since these distinctions are relevant to the allocation model between the lowest income bands, data from the SSI and LIHEAP program are used as a proxy to allocate the known share of Medicaid and Medicare Part D recipients below the FPL with further granularity.

[87] Income groupings for SSI beneficiaries in 2013 are presented as a ratio of Federal Poverty Level guidelines in 2013. These shares and bands are matched to updated Federal Poverty Level guidelines to estimate the income distribution in current terms, holding constant the portion of beneficiaries in each outlined proportional FPL band.

Analysis of the above-outlined demographic program data provides an estimate of the proportion of spending for each program allocated to households within each income band. These proportions are then applied to the federal expenditure amounts on the elderly to yield the estimated federal expenditures per program in each income band. These total expenditure amounts per program per income band are then divided by the number of elderly households within each income band to yield the per-household expenditures from federal funds for each program (see Figure 3.6).

Average federal program costs for elderly households vary significantly by income level. Total spending exceeds $20,000 per household for the lowest income bands and falls rapidly as incomes increase. The relationship between income and assistance program expenditures arises from the eligibility guidelines and means-testing rules of each program. Some programs include explicit income qualification guidelines, while others provide differentiated benefit levels depending on the income level of enrollees. In either case, assistance costs vary by income level, decreasing as income grows.

Figure 3.6 – Est. Benefit Program Expenditures per Household by Income Band, 2020

Program	<$10	$10-$20	$20-$30	$30-$40	$40-$50	$50-$60	$60-$75	$75-$100	$100-$150	$150-$200	>$200
Medicaid	$13,385	$5,758	$1,612	$566	$354	$206	$139	$17	$0	$0	$0
Medicare Part D Low Inc Subsidy	$3,691	$1,704	$565	$186	$106	$61	$41	$5	$0	$0	$0
Supplemental Security Income	$1,283	$315	$204	$163	$155	$157	$99	$50	$2	$0	$0
SNAP	$1,448	$566	$77	$6	$2	$1	$0	$0	$0	$0	$0
LIHEAP	$247	$94	$27	$5	$0	$0	$0	$0	$0	$0	$0
Supportive Housing for the Elderly	$101	$61	$13	$0	$0	$0	$0	$0	$0	$0	$0
Nutrition Program for the Elderly	$92	$63	$38	$20	$19	$5	$5	$5	$5	$5	$5
Supportive Serv & Senior Centers	$54	$35	$12	$7	$2	$1	$1	$1	$1	$1	$1
Caregiver Support	$27	$5	$4	$6	$6	$6	$5	$4	$2	$0	$0
TOTAL	**$20,329**	**$8,602**	**$2,553**	**$960**	**$645**	**$436**	**$290**	**$81**	**$10**	**$6**	**$6**

Excess Medical Cost Growth

The analysis holds constant the level of demand and the level of services received on a per-household basis within each income band. For non-medical programs, program spending per household for each income band is held steady over time, since results are expressed in $2020 terms. However, an adjustment is needed to account for excess medical inflation, which is anticipated to increase the real cost of medical care relative to other goods and services over time.

In the 2019 long-term federal budget outlook, the Congressional Budget Office projected a growth in "excess medical costs" for the Medicaid program of 1.6% per year from 2019 to 2049 and 1.1% per year for Medicare program costs over the same timeframe.[88] Applying this annual growth rate to the study years of 2020 to 2040 implies a growth rate for Medicaid costs of 37% faster than inflation and for Medicare costs of 24% faster than

[88] *2019 Long-Term Budget Outlook (*June 2019). Congressional Budget Office. <https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf>

inflation. These increases are applied to the estimated per household spending for Medicare Part D and Medicaid services to model program expenditures out to 2040.

Applying these growth rates results in an increase in per household expenditures across income bands (see Figure 3.7 below). Expenditures in the lowest income band are estimated at $26,300 per household as of 2040 (up from about $20,300 in 2020).

Figure 3.7 – Est. Benefit Program Expenditures per Household by Income Band, 2040 (in $2020)

Program	<$10	$10-$20	$20-$30	$30-$40	$40-$50	$50-$60	$60-$75	$75-$100	$100-$150	$150-$200	>$200
Medicaid	$18,387	$7,909	$2,215	$778	$486	$283	$191	$23	$0	$0	$0
Medicare Part D Low Inc Subsidy	$4,594	$2,121	$703	$232	$131	$76	$51	$6	$0	$0	$0
Supplemental Security Income	$1,283	$315	$204	$163	$155	$157	$99	$50	$2	$0	$0
SNAP	$1,448	$566	$77	$6	$2	$1	$0	$0	$0	$0	$0
LIHEAP	$247	$94	$27	$5	$0	$0	$0	$0	$0	$0	$0
Supportive Housing for the Elderly	$101	$61	$13	$0	$0	$0	$0	$0	$0	$0	$0
Nutrition Program for the Elderly	$92	$63	$38	$20	$19	$5	$5	$5	$5	$5	$5
Supportive Serv. & Senior Centers	$54	$35	$12	$7	$2	$1	$1	$1	$1	$1	$1
Caregiver Support	$27	$5	$4	$6	$6	$6	$5	$4	$2	$0	$0
TOTAL	**$26,233**	**$11,170**	**$3,294**	**$1,217**	**$803**	**$528**	**$352**	**$89**	**$10**	**$6**	**$6**

Income Patterns for Future Retirees

Savings accrued through the policy scenarios targeting private sector workers that previously lacked access can be thought of as additive to the existing architecture of wealth-building and support programs (such as Social Security). To understand the contribution of these scenarios to the well-being of the senior population, an income scenario is first constructed for 2040 in which retirement savings trends match those of the prior generation in terms of income replacement levels achieved. Analysis is then undertaken of the effects of the additional income generated by the scenarios on the income level and distribution of the elderly population in 2040.

An income scenario reflecting the continuation of current trends is developed through a longitudinal comparison of income replacement rates for the current cohort of retirees. Replacement rates are observed by comparing the income profile of near-retirees (age 45–64) as of 2000 to the current profile of elderly households (using CPS data).[89] These income changes are then applied forward to the current cohort of near-retirees (ages 45–64 as of 2020)[90] to estimate the income distribution of elderly (65+) households as of 2040. These distributions are applied to the previously estimated projections of the number of elderly households as of that year.

[89] This scenario matches the income profile of elderly households as of 2020 developed from CPS ASEC data and used to allocate current levels of benefit program spending by income band. CPS data from 2000 is also translated to $2020, to calculate observed "replacement rates" on a common dollar basis.

[90] This income profile is developed by repeating the analysis of 2010–2019 CPS ASEC data with the cohort of 45- to 64-year olds, adjusting again to express all incomes in $2020.

Importantly, this approach to developing the baseline scenario does not assume that elderly incomes remain constant over the 2020–2040 period, but rather that the relationship between working-age and retirement income remains constant from the prior generation of retirees. Since near-retiree (45–64) households have higher incomes in 2020 than they did in 2000 (in inflation-adjusted terms), this cohort is projected to have a slightly higher level of income as of 2040 than the current elderly population when holding savings behavior constant. In addition, this "cohort matching" approach does not assume that every near-retiree household remains in the United States during their retirement years or that no new households enter the country. Instead, prior effects of these inflows and outflows are incorporated by observing the overall characteristics of the cohort at two points in time.

Supplemental income from retiree savings is derived using the immediate annual annuity method outlined in Section 2 above. Since universal access models analyzed in this report are targeted to workers who currently lack access to savings, additional savings generated through these policy approaches can be understood as supplemental to the income levels anticipated under the continuation of current trends

This supplemental income is distributed across the future retiree population using a blended approach. First, analysis of CPS data is undertaken to estimate the income profile of near-retiree (45–64) households that are not currently contributing to a retirement plan to model the income distribution of participants reaching retirement by 2040. These modeled participants are assigned to parallel income bands for their current income levels in retirement age to model the share of assets associated with each band. This approach (which implicitly assumes an alignment between working age and retirement income percentiles) is averaged with an even per capita allocation of additional income in the 2040 elderly population. This blended approach reflects the ability of households to move between income levels over time.

Applying the supplemental income results in the revised income distributions of elderly households as of 2040 shown in Figure 3.8 below. Changes in the distribution are largely concentrated among the lowest income bands, with decreases in the share of the population with incomes below $10,000 and $20,000. In addition to movement between income bands, the average income grows for households remaining in the lowest income band.[91]

These distributional changes are applied to the projected elderly population (43.4 million households) across each of the policy options analyzed.

Figure 3.8 – Est. Distribution of Elderly Household Incomes, 2040 (in $2020)

Scenario	<$10	$10-$20	$20-$30	$30-$40	$40-$50	$50-$60	$60-$75	$75-$100	$100-$150	$150-$200	>$200
Current Trends	5.60%	15.80%	13.00%	10.80%	8.30%	6.90%	7.60%	9.10%	11.20%	4.40%	7.30%
Baseline Auto-IRA	5.37%	15.47%	13.03%	10.84%	8.38%	6.97%	7.76%	9.17%	11.28%	4.42%	7.32%
Threshold Auto-IRA	5.42%	15.54%	13.03%	10.83%	8.36%	6.95%	7.72%	9.16%	11.26%	4.41%	7.32%
Voluntary Employer Contribution 401(k)	5.41%	15.53%	13.02%	10.83%	8.36%	6.96%	7.72%	9.16%	11.26%	4.41%	7.32%
Mandatory Employers Contribution 401(k)	5.43%	15.55%	13.02%	10.83%	8.36%	6.95%	7.71%	9.16%	11.26%	4.41%	7.32%

[91] This effect is unique to the lowest income band, since other income bands see some proportion of households flowing both in and out of the band, leaving the average income effectively unchanged. The lowest income band, by definition, does not have any inflow from lower income bands, raising the average income among the remaining households.

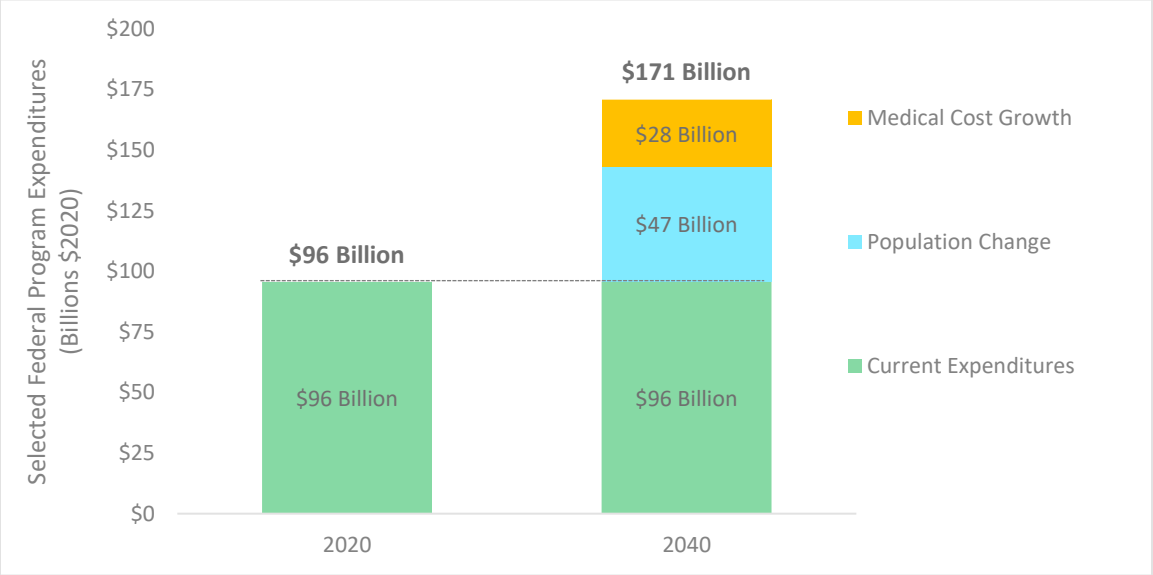
Federal Expenditure Savings

Federal expenditures savings are estimated across policy scenarios by combining projections of household growth, per-household expenditure estimates by income level, and household income scenarios by model. Population growth and spending per household in each income band are held constant across each scenario, meaning that changes in estimated expenditures are isolated to changes in the modeled income distribution of elderly households. These differentials, in turn, are isolated to the levels of participation and accumulations under the different savings scenarios analyzed.

First, the estimated senior income distribution under the continuation of current savings trends is modeled. This income distribution (shown in Figure 3.8 above) is applied to the projected 43.4 million elderly households in 2040 to yield the number of households in each band, and federal expenditures per household in each band estimated for 2040 (shown in Figure 3.7 above) are then applied to yield aggregate expenditures.

Federal expenditures in this scenario are estimated to total $171 billion, an increase of $75 billion from $96 billion in 2020.[92] Calculating this increase with and without the anticipated medical cost growth reveals that excess cost growth accounts for about $28 million of this increase, with the remaining $47 million driven by growth in the elderly population.

Figure 3.9 – Drivers of Growth in Benefit Program Spending for Low-Income Seniors, 2020–2040



Next, the calculation is repeated with each of the income distributions associated with each of the scenarios (shown in Figure 3.8). Relative to current trends, each of the scenarios reduces the number of households in the lower income bands, resulting in lower overall program expenditures. For the lowest income band, an additional

[92] Note that results are expressed in both cases in $2020, reflecting growth in real dollar terms.

step is taken to recalculate per household expenditures based on the increase in average incomes for households remaining in this band.[93]

Figure 3.10 shows the estimated total federal expenditures on assistance programs under each scenario as of 2040, relative to the spending projection under current trends of $170.8 billion. Expenditure savings by scenario of $4.8 billion to $6.2 billion are estimated relative to current trends.

Figure 3.10 – Federal Program Expenditures, 2040 (in Millions)

Program	Current Trends	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
Medicaid	$118,463	$114,076	$115,046	$114,781	$115,101
Medicare Part D Low-Inc Subsidy	$31,673	$30,580	$30,822	$30,756	$30,835
Supplemental Security Income	$8,766	$8,477	$8,541	$8,524	$8,545
SNAP	$7,884	$7,533	$7,610	$7,589	$7,615
LIHEAP	$1,421	$1,362	$1,375	$1,371	$1,375
Supportive Housing for the Elderly	$739	$715	$720	$718	$720
Nutrition Program for the Elderly	$1,137	$1,116	$1,121	$1,120	$1,121
Supportive Serv. & Senior Centers	$501	$488	$491	$490	$491
Caregiver Support	$239	$233	$234	$234	$235
TOTAL	**$170,822**	**$164,580**	**$165,961**	**$165,583**	**$166,038**
Net vs. Current Trends	**—**	**$6,242**	**$4,861**	**$5,238**	**$4,784**

State Expenditure Savings

Many of the benefit programs analyzed have a shared cost structure between the federal and state governments. Budget data are used to determine the relationship (matching rate) between state and federal funds for these programs.[94]

For some programs, such as Low-Income Home Energy Assistance, state funding supplements are not consistent across states or year-over-year, so a state match is not modeled for this program, although many states do supplement funding for this program and would yield savings associated with increased retiree income levels that are not modeled here. For Older Americans Act Programs, the minimum state match rate for each of the programs is modeled; however, many state and local governments choose to supplement federal funds at a much higher rate than is modeled. Additionally, state-specific programs that do not receive federal funding are not included in

[93] This calculation is undertaken through a linear extrapolation of marginal federal expenditures relative to household income by estimating the ratio of change between government expenditures and income between the first and second income bands.

[94] Medicaid shares are estimated based on projections from the Centers for Medicare & Medicaid Services (CMS) healthcare spending for categories in the National Health Expenditure Accounts. See: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected>.
For other modeled programs, state contribution data are derived from the program data sources reviewed in Figure 3.5. Fiscal Year 2018 data are used to match with the federal expenditure analysis above, since incremental state savings for these programs are calculated relative to federal savings.

this analysis. To the extent that they are means-tested, state programs would also realize expenditure savings as the result of enhanced retiree incomes from universal access scenarios.

State expenditure savings on these identified assistance programs that have a shared cost structure are estimated through an extrapolation of the modeled federal expenditure savings under each of the policy options. This calculation is undertaken by applying the estimated relationship between federal and state funding (expressed as aggregate spending among the states for each dollar of federal expenditure) by program to the estimated federal expenditure savings by program relative to current trends across each policy option.[95]

Figure 3.11 shows the estimated state expenditure savings under each scenario as of 2040. State expenditure savings on these benefit programs range from $1.9–$2.5 billion in the year 2040.

Figure 3.11 – State Expenditure Savings by Scenario in 2040 (Millions)

Program	State Spend per Federal $1	Baseline Auto-IRA	Threshold Auto-IRA	Voluntary Employer Contribution 401(k)	Mandatory Employer Contribution 401(k)
Medicaid	$0.55	$2,434	$1,896	$2,043	$1,866
Medicare Part D Low-Inc Subsidy	--	--	--	--	--
Supplemental Security Income	$0.14	$40	$31	$34	$31
SNAP	$0.06	$21	$16	$18	$16
LIHEAP	--	--	--	--	--
Supportive Housing for the Elderly	--	--	--	--	--
Nutrition Program for the Elderly	$0.15	$3	$2	$3	$2
Supportive Serv. & Senior Centers	$0.15	$2	$1	$2	$1
Caregiver Support	$0.25	$1	$1	$1	$1
TOTAL		**$2,502**	**$1,949**	**$2,100**	**$1,917**

[95] This methodology implicitly assumes that federal and state funds are used within the programs in a consistent manner, state expenditure declines in proportion to federal expenditures if program needs are reduced. In practice, rules for the nature or level of funding allocations could result in proportional state savings diverging (either higher or level) from proportional federal savings.

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