Methodology

Pew Charitable Trusts, Retirement Savings Project (RSP)

The Impact of Insufficient Retirement Savings in Pennsylvania, 2020-2035

Overview

Econsult Solutions, Inc. (ESI) has produced estimates of the impacts of insufficient retirement savings on Pennsylvania's economy, its financial position, and its elderly residents. This study updates a 2018 report produced by ESI for the Pennsylvania Retirement Security Task Force, which undertook analysis of the statewide revenue and expenditure implications of insufficient retirement savings in Pennsylvania over the 2015-2030 period, as well as subsequent estimates of county-level impacts across the Commonwealth produced for the Pew Charitable Trusts in 2020. This study updates each category of statewide and county-level impacts using a similar methodology and updated data and projections. Results cover the years 2020-2035.

This document summarizes ESI's methodological approach in two parts:

1. **Population, Income, and Savings Levels**

    a. Statewide estimates are developed of size and income distribution of the elderly population, the average shortfall in retirement income levels among that population, and the level of annual savings that would be needed to address the savings gap.

    b. County-level estimates are developed for each of these metrics over the 2020-2035 period.

2. **Program Expenditure and Tax Base Analysis**

    a. Statewide estimates are developed of additional state program costs for elderly residents associated with insufficient retirement savings, as well as differentials in elderly household spending.

    b. County-level estimates are developed of the additional taxpayer contributions per household in order to support these additional costs.

This methodology document summarizes the detailed methods described in ESI comprehensive 2018 statewide report, detailing updates in data sources and methods, and the methodology used to apportion statewide estimates to each County in Pennsylvania.

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1   Population, Income and Savings Levels

Statewide Analysis

Statewide analysis of population, income and savings trends is undertaken as follows:

- Projections are developed of Pennsylvania's elderly population and number of households in 2020 and 2035 based on the extrapolation of forecasts from the Pennsylvania Independent Fiscal Office (IFO) (Section 1.1).

- The income distribution of Pennsylvania's elderly population in 2020 and 2035 is estimated under different savings scenarios using data from the Current Population Survey (Section 1.2).

1.1   Population and Household Projections

Population projections for the Commonwealth of {Pennsylvania have been generated by the Pennsylvania Independent Fiscal Office (IFO). The IFO projections are available until 2030, and are extrapolated by ESI from 2030-2035. A projected "progression rate" is calculated for 2025-2030 for each five-year each age cohort as it advances into the next five-year age band. This progression rate is then applied forward to extrapolate the population distribution projected by IFO in 2030 to estimate the population distribution for 2035 for all age cohorts 10 and up.[1] Projections for the "0-4" age cohort for are calculating by applying the ratio of the projected "0-4" and "20-44" populations in 2030 to the projected "20-44" population in 2035, while the "5-9" age group population is extrapolated forward to 2035 by applying the average population growth rate for this group from 2025-2030 to the projected "5-9" population in 2030.

Next, population forecasts are converted to projections of households, which form the base unit of analysis for benefit program eligibility and expenditures and income modeling undertaken throughout this report. This translation is undertaken by age band. American Community Survey (ACS) data is used to calculate the average household size for each age cohort by dividing the population by the number of "householders" in each age bracket. This ratio (also known as the "headship rate") is held constant for each age cohort[2] across the analysis period in order to translate population estimates to household estimates for 2020 and 2035. From household estimates, a "dependency rate" is calculated by dividing the number of elderly households by the number of working age (20-64) households.

Figure 1.1 below shows statewide estimates of the elderly population and households.

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[1] For example, in order to calculate the 2035 population of the "40-44" age group, the ratio between the "35-39" age cohort in 2025 and the "40-44" age cohort in 2030 is multiplied by the 2030 population forecast for the "35-39" age group.

[2] Age cohorts utilized are: aged 20-44, aged 45-64, aged 65+.

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Figure 1.1: Statewide Elderly Population and Household Estimates, 2020-2035

Measure	2020	2035
Total Population	13.00 M	13.05 M
Elderly Population (65+)	2.49 M	3.04 M
Elderly Population Share (%)	19%	23%
Total Households	5.21 M	5.36 M
Elderly Households (65+)	1.56 M	1.91 M
Elderly HH Share (%)	30%	36%
Working Age Households (20-64)	3.65 M	3.45 M
Elderly HH Dependency Ratio	0.43	0.55

1.2   Household Income Distributions by Scenario

Incomes for Pennsylvania's elderly households are estimated using data from the U.S. Census Bureau's Current Population Survey (CPS). Survey responses from several years are aggregated, and adjustments for inflation and growth are undertaken to estimate the income distribution of Pennsylvania's elderly households as of 2020.

Next, additional income scenarios are developed for Pennsylvania's elderly households as a means of understanding the impact of retirement savings on the state's economy and its fiscal position. First, elderly household incomes are projected to 2035 under a "baseline" scenario in which retirement savings behavior remains consistent. This baseline scenario is developed by observing income replacement levels (using CPS data) for Pennsylvania's near-retirees (ages 50-64) in 2005 and its elderly residents (65+) in 2020. The changes in income observed for this cohort over the fifteen-year period are then applied to the incomes of the current cohort of near retirees (50-64) as of 2020 to project the income distribution of the state's elderly population as of 2035. All results are expressed in consistent dollar terms ($2020), meaning that differentials reflect changes in real purchasing power.

Notably, this approach to developing the baseline scenario does not assume that elderly incomes remain constant over the 2020-2035 period, but rather that the relationship between working-age and retirement income remains constant from the prior generation of retirees. Since Pennsylvania's near-retiree households in 2020 are projected to have somewhat higher incomes (in inflation-adjusted terms) than the near-retiree households in 2005, this cohort is projected to have a slightly higher level of income in retirement when holding savings behavior constant.

- A "baseline" scenario in which savings behavior remains consistent with current levels; and

- A "sufficient savings" scenario in which Pennsylvania's current and future retiree households achieve recommended savings levels to maintain their standard of living.

Using longitudinal analysis of income patterns, income distributions are developed for Pennsylvania's elderly households under baseline and sufficient savings scenarios in 2020 and 2035. The baseline scenario is estimated by applying the observed replacement rates of the current generation of elderly residents of Pennsylvania to extrapolate incomes for the state's elderly residents as of 2035. The sufficient savings scenario is defined with an income replacement target of 75 percent (consistent with established industry benchmarks), with adjustments at the low and high end of the income distribution.

The differential between these scenarios represents the gap between the income levels that Pennsylvania's retirees are anticipated to achieve under the current trends, and the typically recommended income replacement levels. In other words, it illustrates the expected shortfall in elderly incomes due to insufficient retirement savings.

Figure 1.2 below shows statewide estimates of household incomes in the baseline scenario and income gaps between baseline and sufficient savings scenarios.[3]

Figure 1.2: Statewide Elderly Household Income Estimates, 2020 & 2035

Measure	2020	2035
Elderly Households (65+)	1.53 million	1.91 million
Elderly Households w/Income <$75,000	1.02 million	1.20 million
Share of Elderly HH w/Income <$75,000	66%	63%
Average Income for Elderly HH w/Income <$75,000	$35,970	$36,990
Average Income Gap for Elderly HH w/Income <$75,000	$7,350	$7,810

County Analysis

County-level analysis of population, income and savings trends proceeds as follows:

- Population estimates by age cohort for each county are developed based on adjustments made by Pennsylvania's Independent Fiscal Office (IFO) to the Pennsylvania State Data Center County-level population projections (Section 1.3).

- Next, county-level income distribution data from the American Community Survey is used to estimate the income profile of elderly households in each county in the baseline and sufficient savings scenarios in 2020 and 2035 (Section 1.4).

- This differential between scenarios is then expressed in terms of annual savings levels needed for an average household to close this "savings gap" under standard investment return assumptions (Section 1.5).

1.3   County-Level Population Projections

Information used to derive county level population projections are sourced from forecasts by county and age cohort issued by the Pennsylvania State Data Center (PASDA). These projections are based in 2010 Census population forecast, and therefore do not reconcile at the statewide level with the most recent population estimates or with updated IFO forecasts. These county level forecasts are therefore reconciled to the statewide forecasts by age cohort for 2035 described above.

A 2-step process is used to calculate the county level population projections.First, an adjustment ratio between the extrapolated IFO and PASDA forecasts is developed by comparing the statewide "progression rates" for each five-year age cohort as it advances to the next age bracket for each five-year forecast period. This adjustment factor is then applied to the progression rates for each county and age cohort reflected in the PASDA forecast for each five-year period. This approach has the effect of reconciling the county level forecasts to the statewide projections for each cohort, while maintaining differentials in the distribution of population change by age and county reflected in

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[3] Information on the approach used to estimated annual savings levels needed to address this income gap is included in Section 1.5 below.

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the PASDA forecasts. The number of households is then estimated by applying the same age-specific headship rates used in the statewide forecasts to the projected population in each age cohort and county in 2035.

estimated from the elderly population using age-specific headship rates from 2020, which reflect the average household size for each age cohort. Headship rates by cohort are applied consistently in each county and held constant across the 2020-2035 analysis period.

County-Level Income Distributions

ESI's statewide analysis estimated the household income distribution for the elderly (65+) and near retirement (45-64) age groups using the Census Bureau's Current Population Survey (CPS). CPS represents the most comprehensive data source on incomes and is used to calculate official federal poverty statistics.

Sample sizes in CPS are insufficient to estimate county level incomes by age cohort. County level incomes data is available from the American Community Survey (ACS) on an annual basis, while historical data is available through the decennial census. Since reported incomes for elderly households in ACS do not reconcile precisely to the statewide elderly incomes derived from analysis of the CPS data, the modeling approach uses the statewide distributions as a benchmark, and the ACS data as a means to model the local variation by county. This "cross-walk" between CPS and ACS data is undertaken by comparing the statewide distribution of elderly households by income band between the two data sets in the benchmark year of the analysis period (20202020) and assigning ACS income data proportionally to the nearest income band in order to reconcile with the established CPS distribution. This proportional assignment by income band is then repeated using ACS data by county to establish county level estimates that reconcile to the statewide CPS distribution, while accounting for local variation present in the ACS data.

County level data from Census 2000 on the income of near-retiree (45-64) households is then compared to the estimated distribution for elderly households (65+) as of 2020 to understand changes in income patterns as the population cohort enters retirement age. This step includes analysis of both of the share of households in each county with incomes below $75,000, and of the distribution of incomes among those households, as reflected in a weighted average calculated using the midpoint of each income band.[4] This information is used to calculate an index of the level of retirement insufficiency among elderly households in each county in 2020, relative to near-retiree incomes in that county in 2000. This index then used to estimate the sufficiency gap between baseline and sufficient incomes in each county, relative to the statewide gap. Notably, this index is not driven by the absolute level of income in each county as of 2020, but rather by 2020 income levels for elderly households relative to 2000 income levels for near-retiree households in each county. This approach extends the "income replacement" framework used to define savings insufficiency at the statewide level to each county.

This income translation is then extended forward by comparing income data for near-retiree (45-64) households using 5 Year (2016-2020) ACS data to project the income distribution and sufficiency gap for elderly households in 2035. Current statewide income data from ACS is "cross-walked" with the projected elderly income distribution in 2035 derived from CPS data in the statewide study, and this statewide adjustment is again applied proportionally by county. This analysis is then applied in each county to modify the index of relative sufficiency estimated for 2020 to produce a relative sufficiency index for each county for 2035. This index is then applied to the statewide

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[4] Income bands utilized in the analysis are in fifteen $5,000 increments through $74,999 (i.e. $0-$4,999, $5,000-$9,999, etc.) and in five larger bands thereafter.

sufficiency gap of $7,810 to estimate the average savings gap for households with less than $75,000 in income as of 2035.[5]

1.4   Savings Gap (Statewide and County)

The average sufficiency gap statewide and in each county for elderly households with less than $75,000 in income in both 2020 and 2035 is translated into the annual savings required to close this differential under standard investment assumptions. This analysis assumes:

- A flat annual savings level over thirty years (i.e. identical annual contributions)

- An investment return of 6.5 percent annually

- An annual drawdown of 4.5 percent of lump sum assets upon retirement

The function of this calculation is not to explain the observed behavior of savers, but rather to express the level of savings that would be necessary for a typical household in each county to address the retirement sufficiency gap estimated within the analysis. Using the standardized parameters, a model is constructed to "solve for" the lump sum savings amount needed upon retirement to address the income gap at the modeled drawdown rate, and then in turn to solve for the annual savings level needed to yield the given lump sum amount given the savings period and investment assumptions. On a statewide basis, the average annual savings required is calculated at $1,780 for 2020 and $1,890 in 2035, with variation above and below this benchmark by county. This translates to about $150 - $160 in monthly savings (see Figure 1.3).

Figure 1.3: Statewide Elderly Population and Income Estimates, 2020 & 2035

Measure	2020	2035
Average Savings Gap for Elderly Households w/Income <$75,000	$7,350	$7,810
Average Lump Sum Savings Needed to Full Gap (HH <$75,000)	$163,400	$173,600
Average Annual Savings Needed to Fill Gap (30 Years)	$1,780	$1,890
Average Monthly Savings	$148	$157

This analysis focuses only on households with incomes below $75,000 in retirement. This approach is consistent with the income scenario analysis developed in the statewide study, which defined incomes above $75,000 as "sufficient" for the purpose of evaluating public policy implications regardless of the replacement rate implied relative to working age income.

County level metrics generated by the analysis detailed throughout this section include:

- **Elderly Households**, which represents the estimated count of households in which the head of household is 65+ in both 2020 and 2035

- **Elderly Households <$75,000,** which represents the number of elderly households estimated to have less than $75,000 in income (inclusive of all sources) in both 2020 and 2035

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[5] Note that this figure is expressed in current dollars, meaning that the anticipated growth in the sufficiency gap is in real terms, rather than driven by inflation.

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- **Share of Elderly Households <$75,000**, which estimates the proportion of elderly households with less than $75,000 out of all elderly households in each county for both 2020 and 2035

- **Average Income for Elderly Households <$75,000**, which estimates the average annual income among those elderly households with less than $75,000 in income in both 2020 and 2035

- **Savings Gap for Elderly Households <$75,000**, which estimates the average shortfall in savings for elderly households with less than $75,000 in income relative to the sufficient savings scenario utilized in this analysis for both 2020 and 2035.

- **Annual Savings Required**, which estimates the level of annual savings required to address the average retiree savings gap as it stands in 2020 and 2035 given a thirty-year savings horizon and standard investment assumptions.

Income metrics for elderly households as of 2035 are defined based on the "baseline" scenario, which represents anticipated outcomes under the continuation of current savings behavior. The savings gap and annual savings calculations represent differentials between this baseline scenario and the "sufficient savings" scenario, in which households achieved recommended income replacement levels, as defined in the statewide study. Results for 2035 are expressed in $2020, to allow for comparison to 2020 results in common dollar terms.

2   Program Expenditure and Tax Base Analysis

Statewide Analysis

Statewide analysis of economic and program expenditure impacts are undertaken as follows:

- Household spending for elderly residents is modeled by income level, and estimated by scenario (Section 2.1)

- Economic and fiscal modeling are undertaken to estimate the economic and tax revenue impacts within Pennsylvania of differentials in elderly households spending due to insufficient savings (Section 2.2)

- State program expenditures for elderly residents are estimated (Section 2.3)

- State program expenditures are estimated under the population and savings scenarios to estimate the net difference attributable to insufficient savings (Section 2.4)

2.1   Household Spending by Elderly Residents

Statewide estimates of household spending by Pennsylvania's elderly residents are updated for 2020 and 2035 following a parallel methodology the approach employed in the 2018 statewide study.[6] Spending profiles for 2020 are developed by income level and by sector based on national survey data from the Consumption and Activities Mail Survey (CAMS) within the Health and Retirement Study (HRS). Updated data for this study is drawn from the 2019 wave of the CAMS.

Spending by income band is modeled for three different categories of goods: fixed goods (such as healthcare, food and utilities) for which consumption growth diminishes as income increases; variable goods (such as housing and automotive costs) for which spending rises are a similar rate to total spending, and discretionary goods (such as donations, vacations and hobbies) for which spending rises rapidly as income grows. Modeling of total spending by income level and the breakouts by category and sector are specified using linear growth equations of best fit based on CAMS survey results.

Per household expenditures by income band and category are assumed to remain constant in real terms ($2020) through 2035, with the exception of spending on medical services, which have historically growth faster than inflation. The rate of "excess inflation" in healthcare expenditures is estimated by computing the historic differential in the growth rate of the Consumer Price Index for medical services (CPI-M) and the overall Consumer Price Index (CPI-U) over the 2005-2020 period. This excess growth is applied to per household health care expenditure estimates for 2035.

Estimates of per household spending by sector for each income level are matched to the demographic and income scenarios developed in Section 1.2 to compute spending by Pennsylvania's elderly households under each of the scenarios. The net difference between the scenarios represents the differential in household spending associated with insufficient savings (see Figure 2.1).

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[6] See Section 3: Economic Impacts of Reduced Household Spending and Appendix C: Modeling Household Spending for a detailed description of the methodology employed.

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Figure 2.1: Elderly Household Spending by Scenario, 2020 & 2035

Sector	Baseline 2020 ($M)	Sufficient 2020 ($M)	Net 2020 ($M)	Baseline 2035 ($M)	Sufficient 2035 ($M)	Net 2035 ($M)
Healthcare	$7,326	$7,650	$325	$11,404	$11,923	$519
Utilities	$6,461	$6,643	$182	$8,025	$8,263	$238
Phone/internet/cable	$4,601	$4,796	$195	$5,755	$6,007	$252
Food	$2,022	$2,078	$57	$2,511	$2,585	$74
Personal care	$1,056	$1,098	$42	$1,319	$1,373	$54
Mortgage or rent	$13,014	$13,456	$442	$15,709	$16,242	$533
Automotive	$7,446	$8,014	$568	$9,157	$9,841	$685
Clothing	$1,197	$1,220	$23	$1,435	$1,463	$28
Home goods / insurance / prop taxes	$14,597	$15,823	$1,226	$17,927	$19,485	$1,558
Donations & gifts	$5,313	$5,828	$515	$6,569	$7,218	$649
Vacation	$3,687	$4,044	$357	$4,559	$5,009	$450
Hobbies	$2,052	$2,251	$199	$2,538	$2,788	$251
Total	**$68,771**	**$72,902**	**$4,130**	**$86,909**	**$92,199**	**$5,290**

2.2   Economic and Fiscal Impact from Household Spending

Differentials in household spending on various goods in services calculated above produce reductions in the level of economic activity, employment and tax revenue generation for the Commonwealth of Pennsylvania. Economic and fiscal modeling is undertaken to determine the economic and tax revenues impacts of the net differential in expenditure between scenarios. This modeling updates similar analysis from the 2018 statewide study.[7]

For each sector of expenditure, estimates are developed of the portion of expenditures taking place within Pennsylvania, with out of state spending excluded from the economic impact analysis. The economic impacts of these in-state expenditures are then modeled using the industry standard IMPLAN input-output modeling framework, based on 2019 data. This framework relies on the relationship between sectors to estimate the extent to which indirect (supply chain) and induced (labor income) impacts of each dollar of direct spending are retained within the Pennsylvania economy.

IMPLAN also estimates the number of job-years and the employee compensation associated with the increase in direct, indirect and induced economic activity. Jobs are converted to full-time equivalent (FTE) job-years based on the ratio between employment and FTEs for each impacted sector. Employee compensation includes both wages and benefits.

Tax revenue impacts from the additional direct, indirect and induced economic activity are modeled based on known relationships between various types of economic activity and tax collections (i.e. effective tax rates). Since the economic activity originates with direct consumer expenditures, analysis is undertaken for each category to determine the applicable of Pennsylvania's sales tax, which has broad categories of exemptions from the standard 6 percent rate.

Economic and fiscal modeling is undertaken for the study endpoints of 2020 and 2035. Annualized results are extrapolated in order to estimate the cumulative impacts of the 2020-2035 period. Growth in economic impacts

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[7] See Section 3: Economic Impacts of Reduced Household Spending and Appendix C: Modeling Household Spending for a detailed description of the methodology employed.

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are a function of increases in the function of growth in the senior population (which is projected on an annual basis), as well as changes in the income profile of seniors, which is projected at the study endpoints. A variable annual growth rate is calculated for each year based on a combination of the "phase-in" of senior population growth (which occurs disproportionately in the early years of the analysis period) and a consistent growth rate for other factors. This annual rate is weighted by the proportion of overall growth accounted for by population growth (around 4/5) and reconciled to the calculated starting and end points.

Annual estimates of economic and fiscal impacts from the net difference in household spending due to insufficient savings and the cumulative impacts over the 2020-2035 period are shown in Figure 2.2 below.

Figure 2.2: Economic and Fiscal Impacts from Differentials in Elderly Household Spending, 2020-2035

Measure	2020	2035	Cumulative 2020-2035
Direct Spending (Net Differential)	$4.13 B	$5.29 B	$77.6 B
Economic Output	$6.22 B	$7.96 B	$117.5 B
Employment (FTE)	45,760	58,690	864,140 job-yrs
Earnings	$2.11 B	$2.62 B	$39.0 B
PA Tax Revenue	$170 M	$223 M	$3.16 B

2.3   State Program Expenditures

Analysis is undertaken of state assistance programs that support elderly residents to illustrate the impact of insufficient savings on state program costs. This section modeling updates similar analysis in the 2018 statewide study.[8]

Identified programs are retained from the prior study, with the exception of the Community Health Choices (CHC) program, which replaces the previously analyzed Home and Community-Based Services program. CHC is a mandatory managed care program for dually eligible (Medicare and Medicaid) individuals and individuals with physical disabilities over the age of twenty-one. The program aims to improve access and coordination of medical care, by providing more hands-on care planning. The program was implemented in three phases (covering different regions of the state) over three years, starting in 2018. The program is intended to expand current long term supportive services programs and phase out HCBS waiver programs.

Figure 2.3 below describes each of the programs analyzed, and the administering department.

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[8] See Section 2: State Assistance Costs and Appendix B: Modeling State Assistance Costs for a detailed description of the methodology employed.

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Figure 2.3: State Funded Assistance Programs for Elderly Residents

Program	Description	Administering Department
Medicaid Programs		
Long-Term Care	Institutional care for medically and financially needy individuals in nursing facilities	Human Services
Community Health Choices	Comprehensive health and support services for dually eligible individuals or disabled individuals (age 21+)	Human Services
Long-Term Managed Care	Comprehensive health and support services delivered in the community through the LIFE program (age 55+)	Human Services
Medicare Drug Program	Mandated state payment to reduce federal Medicare Part D (prescription drug) costs	Human Services
Medicaid - Other	Remaining inpatient and outpatient services for which Medicaid provides payment (often supplementing Medicare)	Human Services
PennCARE	Statewide network of home and community-based service providers	Aging
Property Tax / Rent Rebates	Rebates to low-income elderly residents for housing costs	Revenue
PACE / PACENET	Prescription drug coverage for low-income elderly residents	Aging
Free and Reduced Fare Transit	Subsidized local transportation services for elderly residents	Transportation

Program and budget data from FY 2021 (running July 2020 – June 2021) is utilized to estimate total expenditures for each program as of 2020. Funds within the Medicaid program in this fiscal year derived specifically from federal COVID-relief legislation are excluded from the analysis, as they do not represent recurring programmatic expenditures over the analysis period.

Next, program and budget data is utilized to estimate the share of funding from each program that applies to elderly residents, and the share of elderly program spending that is derived from state sources. Through these successive steps, spending on non-elderly residents is excluded from the analysis, as is spending from federal funds. Shares of state expenditures are derived from FY 2021 budget data for the applicable line items.

Shares of elderly expenditures are estimated from program data. Data sources and methods for this allocation are described in Figure 2.4 below.

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Figure 2.4: Data Sources for Estimates of Share of Program Spending on Elderly Residents

Program	Approach	Data Source / Year
Medicaid Programs		
Long-Term Care	PA Nursing Home Enrollment by Age	PA Department of Health Annual Nursing Home Reports 2020-21
Community Health Choices	Program utilization data by age	Community HealthChoices Encounter Databook SFY 2020-2021. MedPAC MACPAC Dually Eligible Data Book (CY 2019)
Long-Term Managed Care	PA Nursing Home Enrollment by Age	PA Department of Health Annual Nursing Home Reports 2020-21
Medicare Drug Program	National profile of Medicare / Medicaid dual enrollees by age	*MedPAC MACPAC Dually Eligible Data Book (2019)*
Medicaid - Other	Residual based on estimate of total Medicaid spending on seniors	Governor's Executive Budget 2020-21 Medicaid Appropriations and Enrollees by Category of Assistance (E27-15)
PennCARE	Senior-only program	
Property Tax / Rent Rebates	Program participant data by age	PA Department of Revenue 2020
PACE / PACENET	Senior-only program	
Free and Reduced Fare Transit	Senior-only program	

Figure 2.5 combines total program expenditures and estimated shares on elderly residents and with state funds to derive estimated state expenditures on elderly residents by program for 2020.

Figure 2.5: State Program Expenditures for Elderly Residents, 2020

Program	Total Expenditures 2020 ($M)	% Spent on Elderly Residents	Elderly Expenditures 2020 ($M)	% State Funds	State Elderly Expenditures 2020 ($M)
Medicaid Programs					
Long-Term Care	$340	86%	$292	61%	$180
Community Health Choices	$9,629	59%	$5,703	45%	$2,580
Long-Term Managed Care	$323	91%	$294	44%	$130
Medicare Drug Program	$695	62%	$433	100%	$433
Medicaid - Other	$22,460	8%	$1,853	41%	$753
PennCARE	$286	100%	$286	100%	$286
Property Tax / Rent Rebates	$239	89%	$213	100%	$213
PACE / PACENET	$155	100%	$155	100%	$155
Free and Reduced Fare Transit	$75	100%	$75	100%	$75
Total	**$34,202**	**27%**	**$9,305**	**52%**	**$4,805**

2.4   Net State Assistance Costs

State assistance costs for elderly residents each program are allocated by income band based on a mix of program data and eligibility rules. Allocation shares by income band are matched to senior household estimates and estimated program spending on seniors to ensure that the sum of spending by households matches the established estimates of spending by program. The data sources and methods utilized for these estimates are outlined in Figure 2.6 below.

Figure 2.6: Data Sources for Allocating Program Spending by Income Band

Program	Approach	Data Source / Year
Medicaid	National income profile (as share of FPL) for 65+ Medicaid participants	Medicaid and CHIP Payment and Access Commission (MACPAC) Analysis of National Health Interview Survey (NHIS) Data, 2019 (MACStats 2019, Exhibit 2)
PennCARE	Linear decrease with income	
Property Tax / Rent Rebates	Program participant data by income level	PA Department of Revenue, 2020 PA Department of Aging Annual Report, 2020
PACE / PACENET	Program participant data by income level	
Free and Reduced Fare Transit	Linear estimate of decline with income	

Per household program expenditures by income level for non-medical programs are assumed to remain constant in real terms ($2020) through 2035, which in effect assumes a continuation of existing state policy throughout the analysis period. For medical programs, the rate of anticipated "excess inflation" is drawn from projections of increases in per capita health care costs published in the Congressional Budget Office 2022 *Long-Term Budget Outlook.* This excess growth is applied to per household Medicaid and PACE expenditure estimates for 2035.

Estimates of per household program expenditures for each income level are matched to the demographic and income scenarios developed in Section 1.2 to compute state assistance costs under each of the scenarios. The net difference between the scenarios represents the differential in state assistance costs associated with insufficient savings (see Figure 2.7).

Figure 2.7: Program Expenditures under Baseline and Sufficient Savings Scenarios, 2020 and 2035 ($M)

Program	Baseline 2020	Sufficient 2020	Net 2020	Baseline 2035	Sufficient 2035	Net 2035
Medicaid Programs						
Long-Term Care	$180	$151	$29	$242	$202	$40
Community Health Choices	$2,580	$2,161	$418	$3,468	$2,894	$574
Long-Term Managed Care	$130	$109	$21	$175	$146	$29
Medicare Drug Program	$433	$363	$70	$582	$486	$96
Medicaid - Other	$753	$631	$122	$1,012	$845	$167
PennCARE	$286	$271	$15	$342	$323	$18
Property Tax / Rent Rebates	$213	$163	$50	$245	$187	$57
PACE / PACENET	$155	$129	$26	$187	$164	$24
Free and Reduced Fare Transit	$75	$71	$4	$89	$85	$5
Total	**$4,805**	**$4,049**	**$756**	**$6,342**	**$5,331**	**$1,011**

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Annual results in between the analysis endpoints of 2020 and 2035 are extrapolated in order to estimate the cumulative difference in state expenditures due to insufficient savings over the 2020-2035 period. Growth in net expenditures over time is function of growth in the senior population (which is projected on an annual basis) as well as changes in the income profiles by scenario (which are projected at the study endpoints). A variable annual growth rate is calculated for each year based on a combination of the "phase-in" of senior population growth (which occurs disproportionately in the early years of the analysis period) and a consistent growth rate for other factors. This annual rate is weighted by the proportion of overall growth accounted for by population growth (around 2/3) and reconciled to the calculated starting and end points.

Annual estimates of state expenditures under both scenarios, the net differential attributable to insufficient savings, and the cumulative cost over the 2020-2035 period are shown in Figure 2.8 below.

Figure 2.8: Annual and Cumulative Program Expenditure Differential due to Insufficient Savings, 2020-2035 ($M)

Year	Baseline Scenario ($M 2020)	Sufficient Savings Scenario ($M 2020)	Net Differential ($M 2020)
2020	$4,805	$4,049	$756
2021	$4,963	$4,180	$782
2022	$5,128	$4,318	$810
2023	$5,282	$4,447	$835
2024	$5,432	$4,572	$860
2025	$5,575	$4,692	$884
2026	$5,713	$4,806	$907
2027	$5,829	$4,903	$926
2028	$5,939	$4,995	$944
2029	$6,041	$5,080	$961
2030	$6,133	$5,157	$976
2031	$6,171	$5,188	$982
2032	$6,210	$5,221	$989
2033	$6,252	$5,256	$996
2034	$6,296	$5,293	$1,003
2035	$6,342	$5,331	$1,011
Cumulative (2020-2035)	**$92,110**	**$77,489**	**$14,621**

County Analysis

County-level analysis is undertaken to estimate the impact of increased assistance program costs associated with insufficient retirement savings in terms of the required contributions from the taxpayers in each county.

- The mixture of funding sources used to finance the selected assistance programs is identified (Section 2.5)

- Fiscal and economic data is used to estimate the relative contribution of taxpayers in each county to these funding sources (Section 2.6).

- County tax base shares by funding source are applied to the statewide net program expenditure totals to generate county levels estimates of additional taxpayer contributions attributable to insufficient retirement savings in 2020, 2035 and in aggregate across the 2020-2035 period (Section 2.7).

2.5   Funding Source Mix by Program

To estimate the relative contribution of taxpayers in each county to program assistance costs for these programs, the mix of funding sources for each program is identified based on FY 2021 budget data utilized in the statewide analysis. Figure 2.9 below shows the proportion of funding for each program that originated from the General Fund, the Lottery Fund, the Tobacco Settlement Fund, and Other sources. Other sources consist primarily of assessments on medical providers that help to fund the Medicaid program.

Figure 2.9: State Funding Source Mix by Program, FY 2021

Program	General	Other	Lottery	Tobacco
Medicaid Programs				
Long-Term Care	100.0%	-	-	-
Community Health Choices	72.7%	13.7%	10.1%	3.6%
Long-Term Managed Care	100.0%	-	-	-
Medicare Drug Program Payments	100.0%	-	-	-
Medicaid - Other	39.9%	13.7%	31.1%	15.4%
PennCARE	-	0.2%	99.8%	-
Property Tax / Rent Rebates	-	-	100.0%	-
PACE / PACENET	-	-	100.0%	-
Free and Reduced Fare Transit	-	-	100.0%	-
Total	**51.4%**	**12.1%**	**26.4%**	**10.2%**

2.6   Funding Source Allocation by County

Program costs or revenue shortfalls by funding source are then allocated based on measures of the relative contribution of the taxpayers in each county to each funding source. Figure 2.10 below outlines the major drivers of revenue to each of the identified funding sources and the data utilized to estimate the contribution by county to these components of the tax base. A more detailed description of allocation method for each funding source is included following the table.

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Figure 2.10: Allocation Method by Major Revenue Source

Source of Funds	Major Revenue Sources	Allocation Method (Data Source)
General Fund	Sales Tax	Direct Remittances by County (PA Dept of Revenue Tax Compendium FY 2020-21)
	Income Tax	Direct Remittances by County (PA Dept of Revenue Tax Compendium FY 2020-21)
	Corporation Tax	Gross Regional Product by County (Bureau of Economic Analysis 2020 Estimates)
	Estate & Realty Transfer Tax	Direct Remittances by County (PA Dept of Revenue Tax Compendium FY 2020-21)
Lottery Fund	Margin on Game Revenue	Lottery Prizes by County (PA Lottery Economic and Benefit Impact Report 2019-2020)
Tobacco Settlement Fund	Statewide Settlement	General Fund Proportions Utilized

Other	Medical Assessments:
	
	    Nursing Home Assessment
	    MCO Assessment
	    Hospital Assessment
	    Statewide Hospital Assessment
	    Other Assessments
		CHC Program:
		Nursing Home Incidence Rate by Age Group (PA Dept of Health 2020-2021); Per Capita Population Shares (American Community Survey)
		
		All other relevant programs:
		Per Capita Population Shares (American Community Survey)

General Fund – Sales Tax

Total sales tax remittance is comprised of three separate categories in Pennsylvania. Data from the PA Revenue Department available in the statistical supplement to the Pennsylvania FY 2020-2021 Tax Compendium tracks the remittance of non-Motor Vehicle and Motor Vehicle Sales Tax by county. Miscellaneous and Liquor Control Board (LCB) Sales Tax remittance is provided only at the state level. The proportion of each county's taxable income (as reported by the Compendium) is used to estimate its share of state Miscellaneous and LCB Sales Tax. Total sales tax remittance by county is estimated by summing the county's contributions to the three categories of Sales Tax.

General Fund – Income Tax

The Revenue Department's statistical supplement to the Pennsylvania FY 2020-2021 Tax Compendium provides data tracking the remittance of personal income tax by county. This data is used directly to quantify relative income tax contributions by county.

General Fund – Corporation Tax

The Revenue Department reports corporation tax remittance at the state rather than county level. Further, a county level analysis would face challenges due to the inconsistent relationship between the location of business activity and the physical address where corporations are headquartered (which itself may be chosen for advantageous tax purposes). Therefore, data from the Bureau of Economic Analysis on the Real Gross Regional Product by county is used as a proxy for each county's contribution to the state's corporation tax collections. Each county's GRP as a share of the Pennsylvania GRP in 2020 is calculated using this data. These shares are used to allocate corporation tax remittance by county.

General Fund – Estate and Realty Transfer Tax

The Revenue Department's statistical supplement to the Pennsylvania FY 2020-2021 Tax Compendium reports the remittance of estate tax and realty transfer tax by county. This data is used directly to quantify the combined county-level contribution to estate and realty transfer tax.

General Fund – County Totals and Shares

The weighted average of each county's contribution to the four above-outlined General Fund revenue sources (sales tax, income tax, corporation tax, estate and realty transfer tax) is calculated. Since these sources represent around 90 percent of General Fund revenue, the resulting proportions are used to represent each county's relative contribution to programs funded through this source as of 2020.

These proportions are then re-estimated for 2035 based on anticipated changes in the population distribution between 2020 and 2035. Using county-level population estimates from the US Census Bureau, the Pennsylvania Data Center and the Pennsylvania Independent Fiscal Office (described in detail in section 2 below), each county's share of the state population is calculated for 2020 and projected for 2035. The ratio between each county's share of statewide population in 2020 and its share in 2035 is applied to each county's General Fund contribution share in 2020 to project a contribution share for 2035.

Lottery Fund

Data from the Pennsylvania Lottery's Annual Sales and Benefits Reports for Fiscal Year 2019-20 tracks lottery prizes by county. Since player winnings track with the volume of state revenue generated through ticket purchases, this data is used as a proxy for each county's contribution to the Lottery Fund. The relative contribution of each county to the Lottery Fund is calculated using this data and applied to 2020. Consistent with the General Fund analysis described above, shares are re-estimated for 2035 based on anticipated changes in the population distribution between 2020 and 2035.

Tobacco Settlement Fund

The Tobacco Settlement Fund is financed through lump-sum settlement payments each year from several tobacco companies and the use of funds from this source vary from year to year depending on state legislation. Given these nuances, this funding source cannot be directly quantified at the county level. However, these funds can be considered as supplemental to the General Fund, which in their absence would be required to provide additional funding to maintain a consistent level of public service. Therefore, the General Fund shares for each county in 2020 and in 2035 are used as a proxy for relative contributions to programs funded through this source.

Other Funds

The "Other" category of revenue is comprised primarily of assessments of medical facilities which are used to support the funding of Medicaid programs. For this funding source, a distinct approach is undertaken for the Community Health Choices (CHC) program, because about two-thirds of Other funding supporting the CHC program is derived from medical assessments of nursing homes. To allocate this source, the incidence rate of nursing home patients in Pennsylvania under the age of 65 and the incidence rate over the age of 65 (as a share of the total population) are calculated using data from the Pennsylvania Department of Health. These incidence rates are applied to data on the two demographic population groups – under 65 and 65 and older – in each county to estimate each county's revenue contribution to nursing home assessment in 2020 and in 2035, which is blended with a per capita allocation used to estimate the contribution for the remaining portion of CHC Other funds. For the remaining programs supported by this funding source, the approach undertaken is a per capita allocation based on the population of each county relative to the population of the state in 2020 and 2035.

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2.7   Taxpayer Contributions due to Insufficient Savings by County

Finally, county level estimates of taxpayer contributions due to insufficient savings are calculated by combining the calculations detailed above. Program level estimates of net expenditures due to insufficient savings (Section 1.1) are matched with funding proportions by program (Section 1.2) to estimate the level of additional program expenditures associated with each funding source in 2020 and 2035. These expenditures by funding sources are then allocated based on the county level distribution estimated for each funding sources in 2020 and 2035.

County level contributions by funding source are summed to a total contribution for the taxpayers of each county attributable to insufficient savings in 2020 and 2035. An annualized trend is developed for the interim years by reconciling the differential growth rates estimated by county to the statewide estimate of additional program costs (calculated in Section 2.4) through annual scalars applied across each county. This annual trend allows for the calculation of cumulative results over the 2020-2035 period for each county.

In order to add context to county-level taxpayer contribution estimates, several additional metrics are generated that speak to demographic composition and demographic change over the time period. Using population data and projections by age group at the county level (using the method detailed in Section 2 of this document), the number of working age (15 to 64 years) households and the number of elderly households (65 + years) are calculated. These projections allow for estimates of the dependency ratio (working age households per elderly household).

Additionally, the taxpayer contribution of each county attributable to insufficient savings is divided by the number of working age households in each county in 2020 and 2035. While the tax burden for elderly assistance programs is not borne exclusively by work age households, this metric is nonetheless helpful in illustrating the tax liability of insufficient savings relative to the size of the working age population. An annualized trend is developed by reconciling the implied trend in household growth in each county to the statewide estimate of households in each age band through the use of an annual statewide scalar. For each year and county, estimates of the taxpayer contributions due to insufficient savings are then divided by estimates of the number of households to produce per household estimates. This annual trend allows for the calculation of cumulative results over the 2020-2035 period for each county.

County level metrics generated by this analysis include:

- **Additional Taxpayer Contributions due to Insufficient Savings**, which include all modeled programs and are reported for 2020, 2035 and cumulatively over the 2020-2035 period
- **Share of Additional Taxpayer Contributions due to Insufficient Savings**, which are calculated as a proportion of the statewide total (summing to 100%) for 2020, 2035 and cumulatively over the 2020-2035 period
- **Elderly Dependency Ratios**, which are calculated as the number of working age households per elderly household in 2020 and 2035
- **Taxpayer Contribution per Household**, which are calculated as the additional taxpayer contribution from insufficient savings per working age household in 2020, 2035 and cumulatively over the 2020-2035 period