

Memorandum

To: Colorado Retirement Savings Board
From: Econsult Solutions, Inc.
Date: November 18, 2019
RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Overview

ESI's fiscal impact study quantifies two broad categories of public impacts from insufficient savings for elderly Coloradans:

- 1) Current and future expenses to the state for public assistance programs for elderly residents.
- 2) The loss of revenue resulting from decreased economic activity due to reduced household spending by elderly households

These impacts are estimated by identifying the relevant revenue and expenditure categories (Task 1), estimating the relationship between per household revenues/expenditures and incomes (Task 2), accounting for anticipated demographic changes, and modeling the impact of different retirement savings and household income scenarios.

This memo focuses on state revenue impacts from insufficient savings, while subsequent analysis will detail impacts on state expenditures.¹ All findings will then be compiled into a comprehensive report. Our analysis of economic and tax revenue impacts from insufficient savings follows the following steps:

- **Demographic Change** details anticipated growth in Colorado's elderly population from 2020-2035
- **Household Income Scenarios** details current income levels for Colorado's elderly households, and projects future income levels under various savings scenarios
- **Household Spending** models the expenditures of Colorado's elderly households over time under the varied income scenarios developed above
- **Economic Impact** models the aggregate effect on the Colorado economy from differentials in household spending between retirement savings scenarios
- **State Revenue Impact** translates these differences in economic activity and income into revenue impacts for the state budget

Results are expressed at the start (2020) and end (2035) points of the analysis period, and cumulatively over the fifteen-year period from 2021-2035.

¹ Note that this sequence differs slightly from the initial project plan, which envisioned calculating impacts from demographic change over time (absent any change in savings levels) on both revenues and expenditures as Task 3, followed by calculations under different income scenarios in Task 4. Our program expenditure analysis has identified additional data sought from various state departments to refine our initial analysis of program costs. Conversely, modeling of savings and income scenarios has proceeded faster than anticipated, allowing us to develop a complete analysis of economic and revenue impacts. This change in sequence does not change the anticipated final report deliverables or timeline.

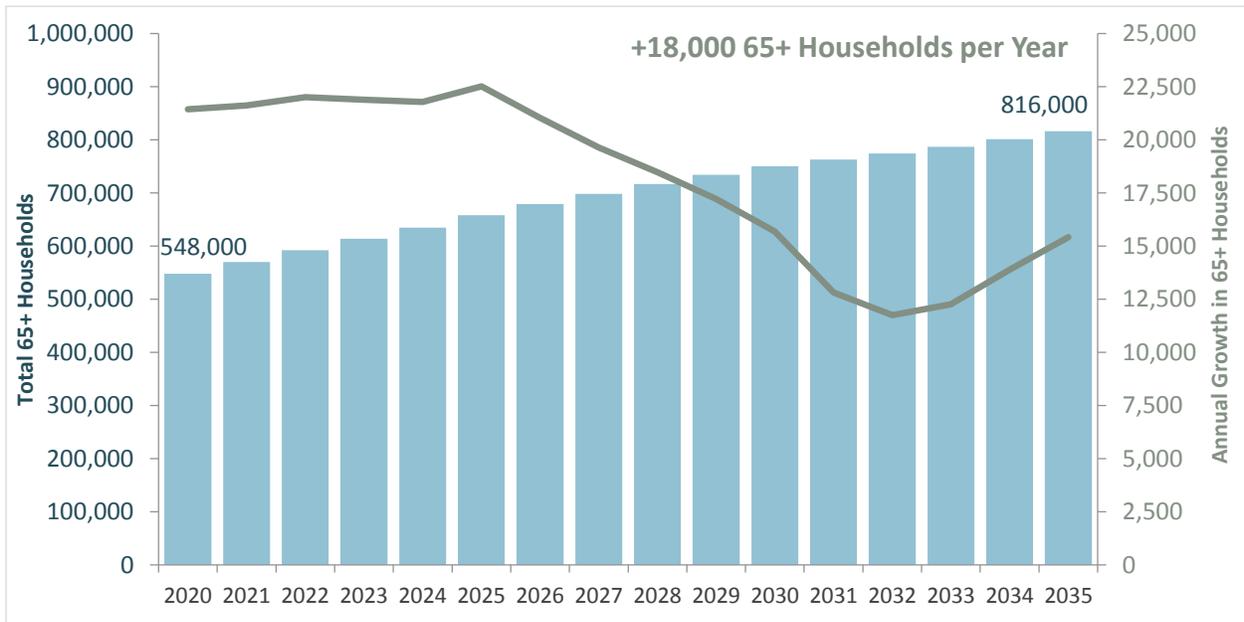
RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Demographic Change

Colorado’s elderly population is anticipated to increase rapidly over the next 15 years with the continued aging of the baby boomer generation. Projections from the State Demography Office issued in 2018 indicate that Colorado is anticipated to add about 18,000 senior households a year between 2020 and 2035 (see Figure 1).

Figure 1: Projected Colorado Elderly Household Growth, 2020-2035



Source: Colorado State Demography Office (2018)

Colorado’s senior population is anticipated to grow from 872,000 to 1.31 million over the 2020-2035, while households headed by seniors are projected to increase by 49% from 548,000 to 816,000 (see Figure 2).

The share of households represented by seniors is projected to grow from 23.6% in 2020 to 27.7% in 2035 (see Figure 3), while the share of the primary working age population is projected to shrink from 71.0% in 2020 to 67.7% in 2035. As a result of these changes, the “dependency ratio” represented by the number of working age households for each elderly household is projected to fall from 3.0 in 2020 to 2.4 in 2035. Notably, this ratio has already fallen significantly from 4.2 in 2010, as the first wave of baby boomers has crossed into retirement age.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Figure 2: Projected Colorado Household Growth by Age Band, 2020-2035

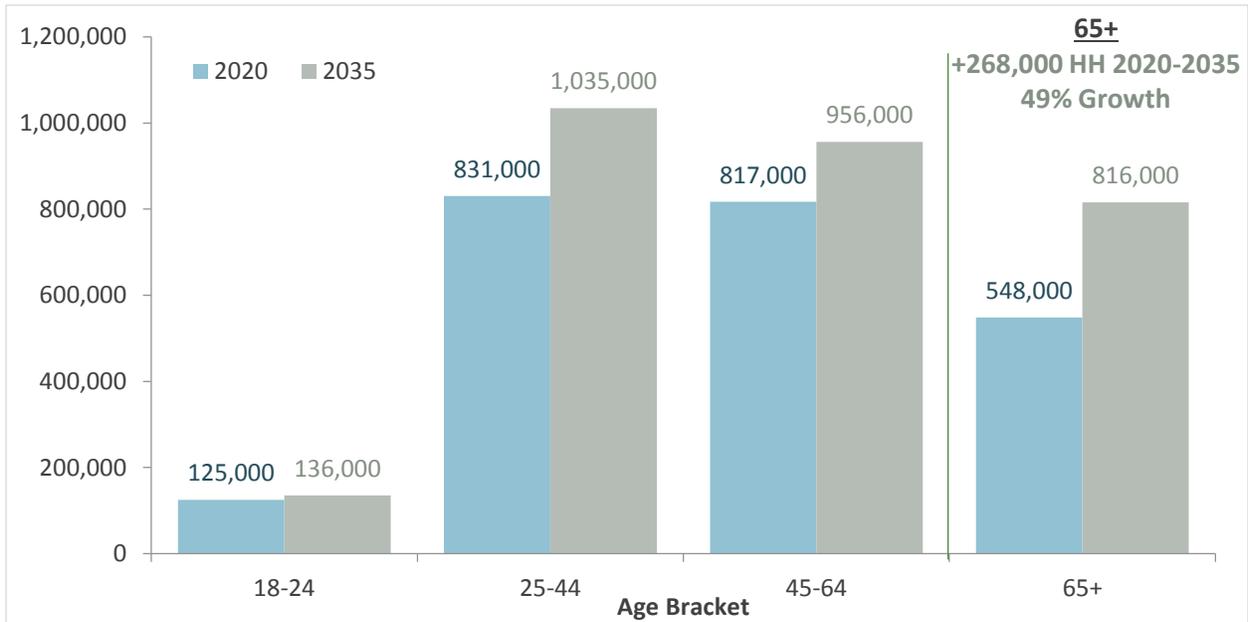
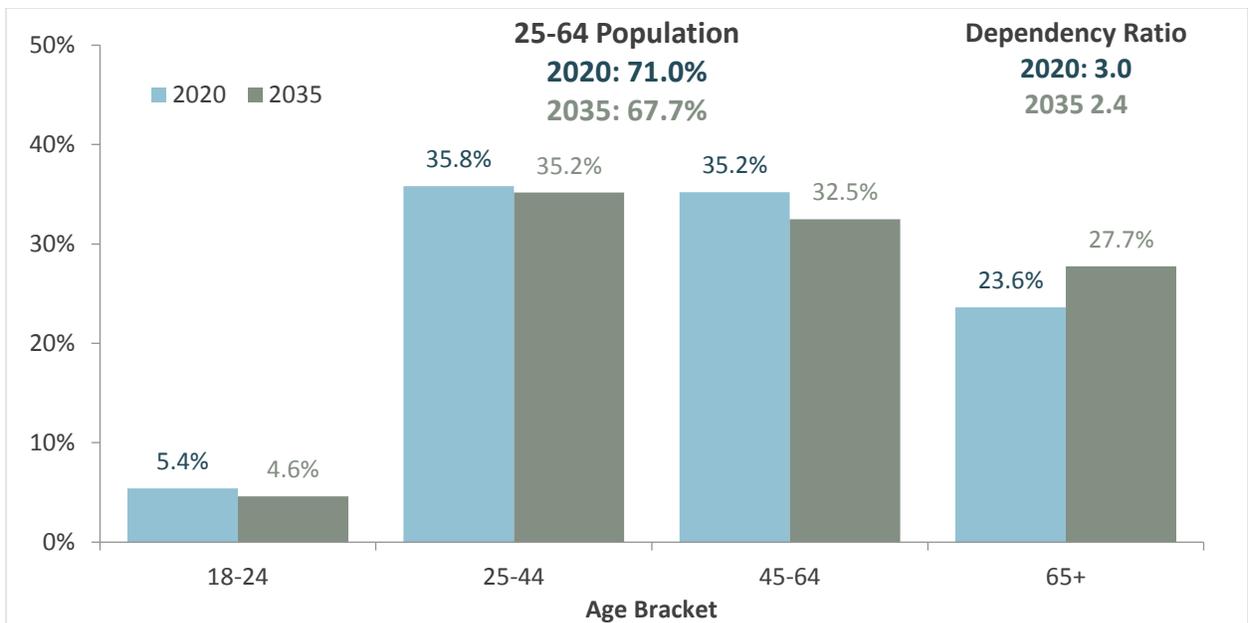


Figure 3: Share of Colorado Households by Age Bracket, 2020-2035



Source: Colorado State Demography Office (2018)

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Household Income Scenarios

Incomes for Colorado’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 Colorado’s elderly households as of 2020 (see Figure 4).² The median elderly household falls between \$60,000 and \$65,000 in income, and more than 70% of elderly households fall under \$100,000 in annual income.

Figure 4: Projected Income Distribution of Colorado 65+ Households - 2020



Source: ESI analysis of CPS Data

Next, additional income scenarios are developed for Colorado’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 Colorado’s near-retirees (ages 50-64) in 2000 and its elderly residents (65+) in 2015 (see Figure 5). 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 (see Figure 6). 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 Colorado’s near-retiree households in 2020 are projected to have somewhat higher incomes (in inflation-adjusted terms) than the near-retiree households in 2000, this cohort is projected to have a higher level of income in retirement when holding savings behavior constant.

² See ESI’s Task 2 memo for more detail on this data source and modeling approach undertaken to estimate incomes as of 2020.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Figure 5: Income Distribution of Colorado Near-Retiree (50-64) Households in 2000 and Elderly Households (65+) in 2015 (in \$2020)

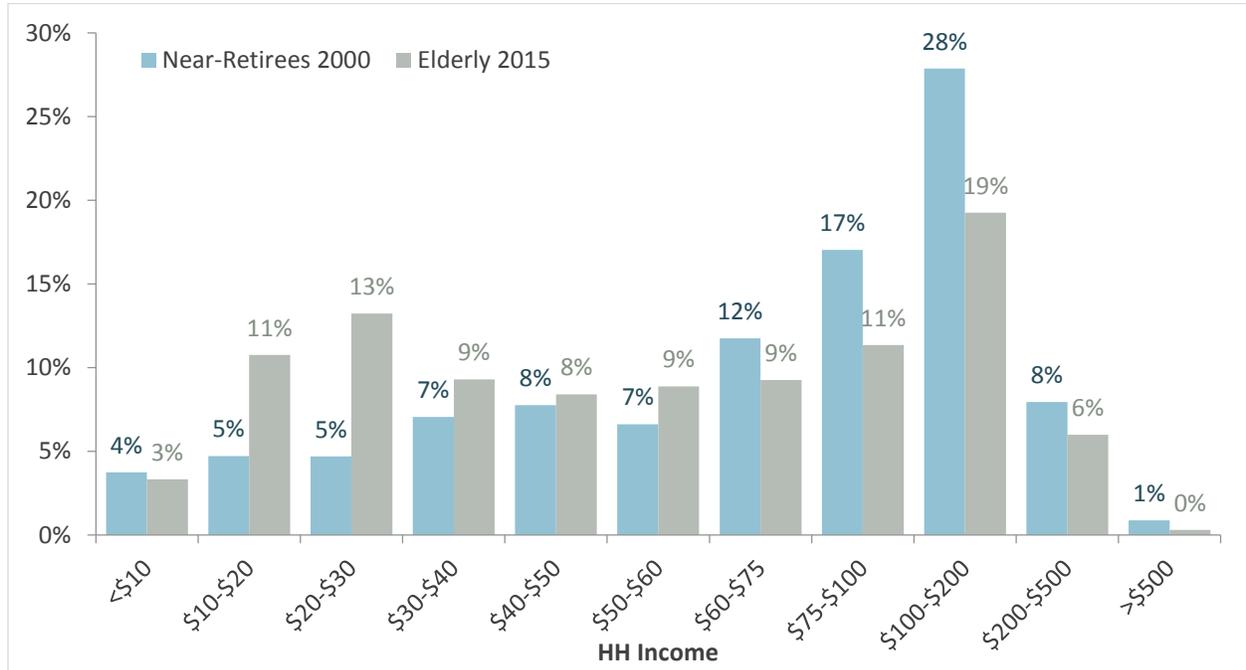


Figure 6: Projected Income Distribution of Colorado Near-Retiree (50-64) Households in 2020 and Elderly Households (65+) in 2035 (in \$2020)



Source: ESI Modeling of CPS Data

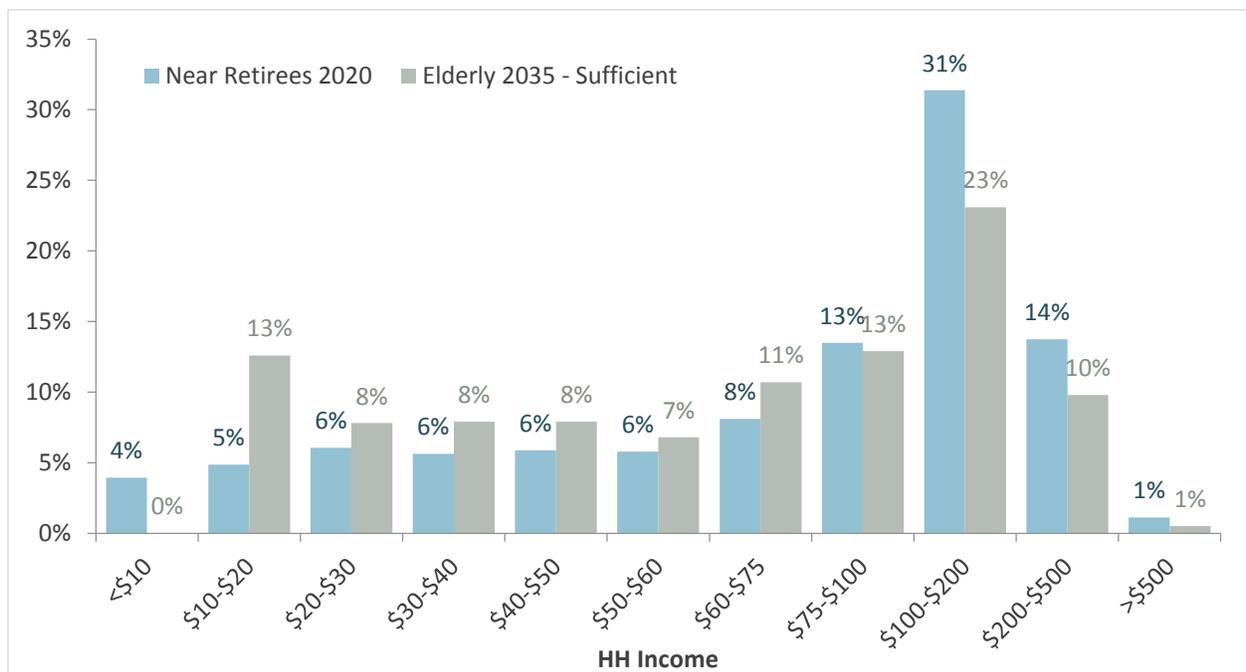
RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Next, alternative scenarios are developed in which Colorado’s elderly households meet the generally recommended levels of retirement savings as reflected by “income replacement” standards. The “sufficient savings” income scenario is defined by elderly households achieving a targeted 75% level of income replacement of their working age (50-64) income level. Adjustments are made to this replacement rate framework for lower-income households, with the minimum targeted elderly income set to the Federal Poverty Level (FPL), and for upper-income households, with baseline replacement levels projected for households above \$100,000 considered to be “sufficient.”³

This approach is used to model an alternative income distribution for Colorado’s elderly households in 2020 (based on near-retiree incomes in 2005) and to project forward incomes for Colorado’s elderly households in 2035, based on near-retiree incomes in 2020 (see Figure 7).

Figure 7: Projected Income Distribution of Colorado Elderly Households – Sufficient Savings Scenario



Source: ESI Modeling of CPS Data

The differential in the incomes elderly households between the baseline and sufficient savings scenarios represents the modeled change from increased savings utilized in this analysis. This differential between scenarios equates to an average gap of around \$4,300 in annual income for households with under \$75,000 in 2020, a gap which grows to more than \$5,000 by 2035. Households with incomes above \$100,000 are treated equivalently in each scenario.

³ Notably, this scenario should be understood as a mathematical benchmark of an increase in savings levels that allows for analysis of the differential effect on the state’s economy and fiscal position. This analysis does not represent that this scenario represents the ideal level of savings for any household or for the state’s households collectively, nor does it evaluate the effect of any specific policy intervention on achieving a particular level of retirement income.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Figure 8 and Figure 9 illustrate this differential for the 2020 and 2035 scenarios in terms of the cumulative distribution (showing the proportion of households that have at least the given level of household income in each band).

Figure 8: Cumulative Income Distribution of Elderly Households by Scenario – 2020

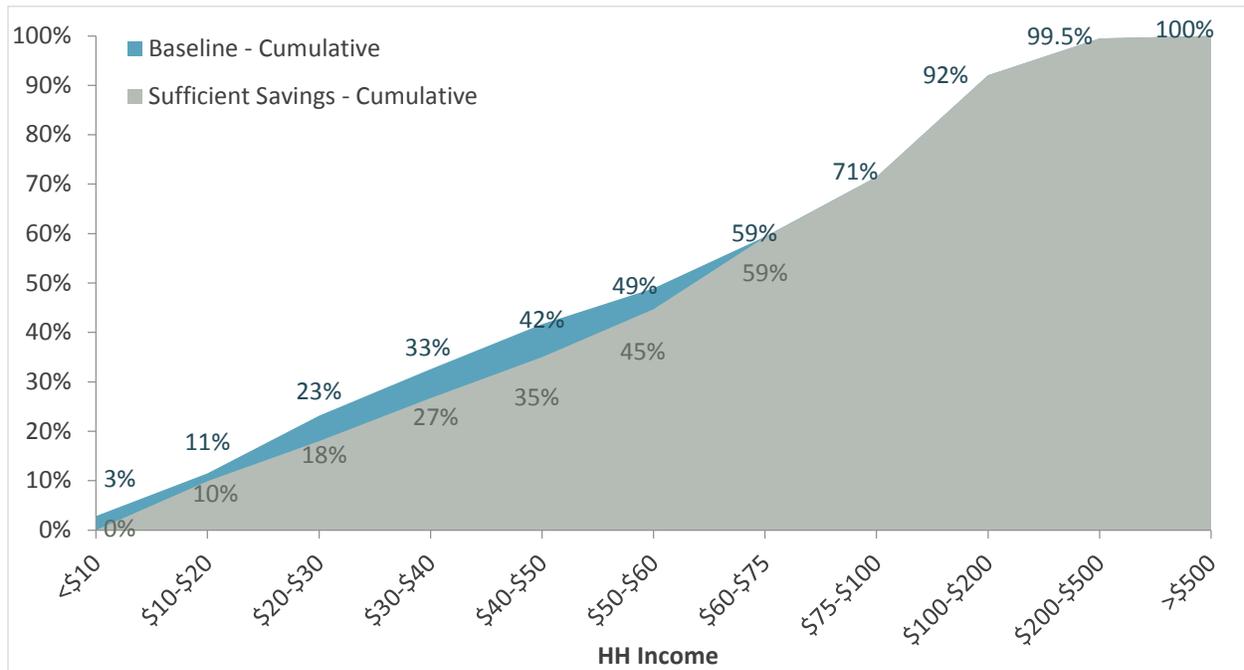
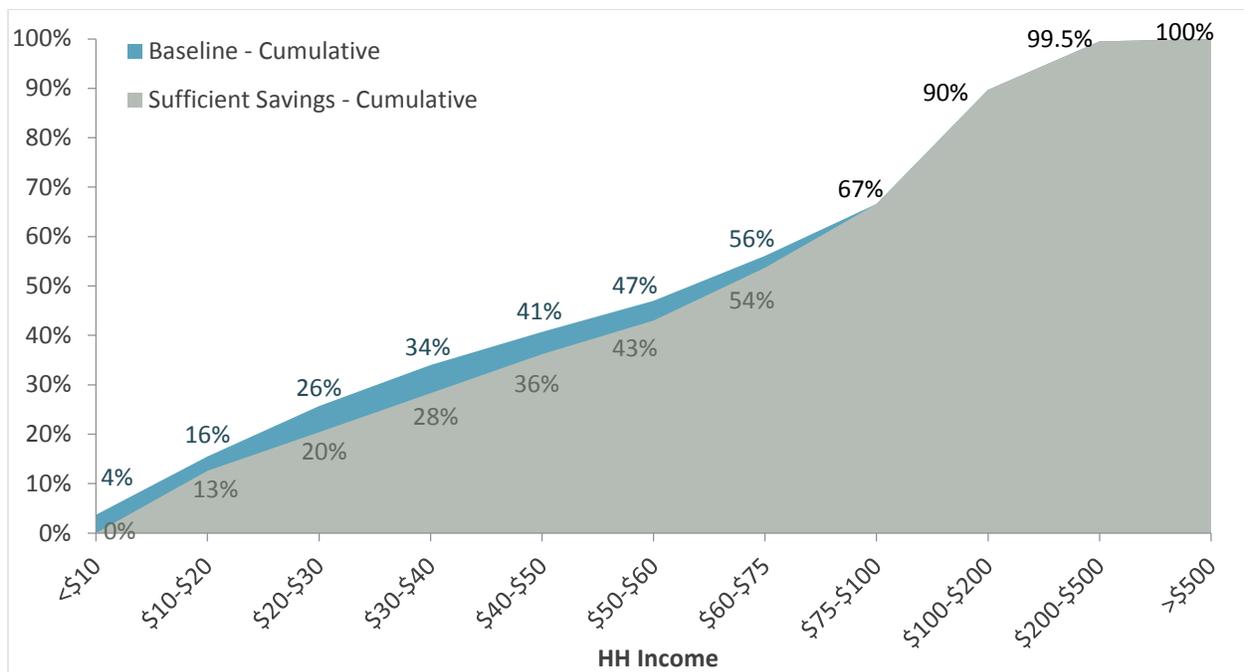


Figure 9: Cumulative Income Distribution of Elderly Households by Scenario – 2035



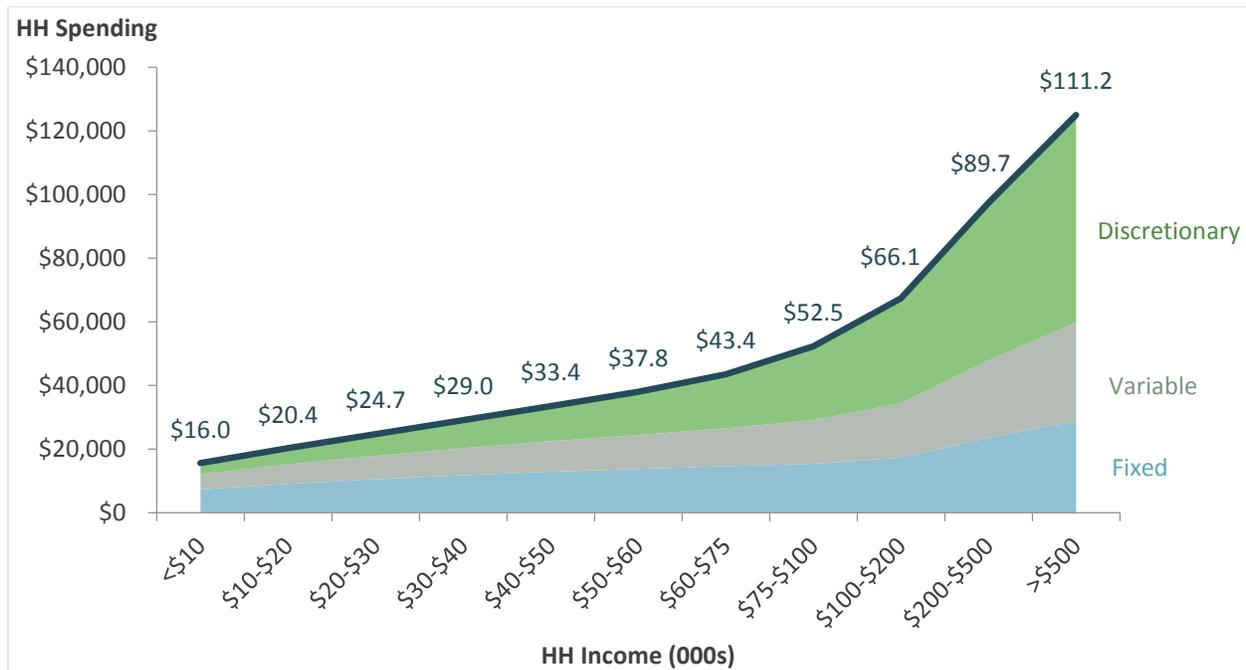
RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Household Spending

The level of income available to senior households affects the spending profile of those households, which in turn impacts the Colorado economy and its tax base. Data on the expenditure patterns of elderly households from the Consumption and Activities Mail Survey (CAMS) was used to model the level and distribution of household spending by income level.⁴ Expenditures by income band were modeled for twelve goods, which are grouped into three categories based on the relationship between income and spending. Figure 10 below shows this distribution, with spending on fixed goods⁵ rising slowly with income, spending on variable goods⁶ rising at a similar rate to income, and spending on discretionary goods⁷ rising rapidly with income.

Figure 10: Household Spending Patterns by Expenditure Type for 65+ Households



Source: ESI Modeling of CAMS data

Per household spending by income band is assumed to stay constant into the future (with both incomes and spending expressed in constant \$2020), but an adjustment is required to the distribution of spending to account for excess medical inflation. Costs for medical services have consistently risen faster than the cost of other goods for several decades, and are anticipated to continue to do so into the future. The differential between the growth in medical costs and other goods (excess medical inflation) crowds out other spending, and will also lead to an increase in per capita state costs for medical programs.

⁴ See ESI’s Task 2 memo for more detail on this data source and modeling approach undertaken to estimate household spending profiles as of 2020.

⁵ Fixed goods are defined as: healthcare, utilities, telecommunications, food and personal goods. See the Task 2 memo for a breakdown of expenditures in each of these categories.

⁶ Variable goods are defined as: mortgage/rent, automotive, and clothing

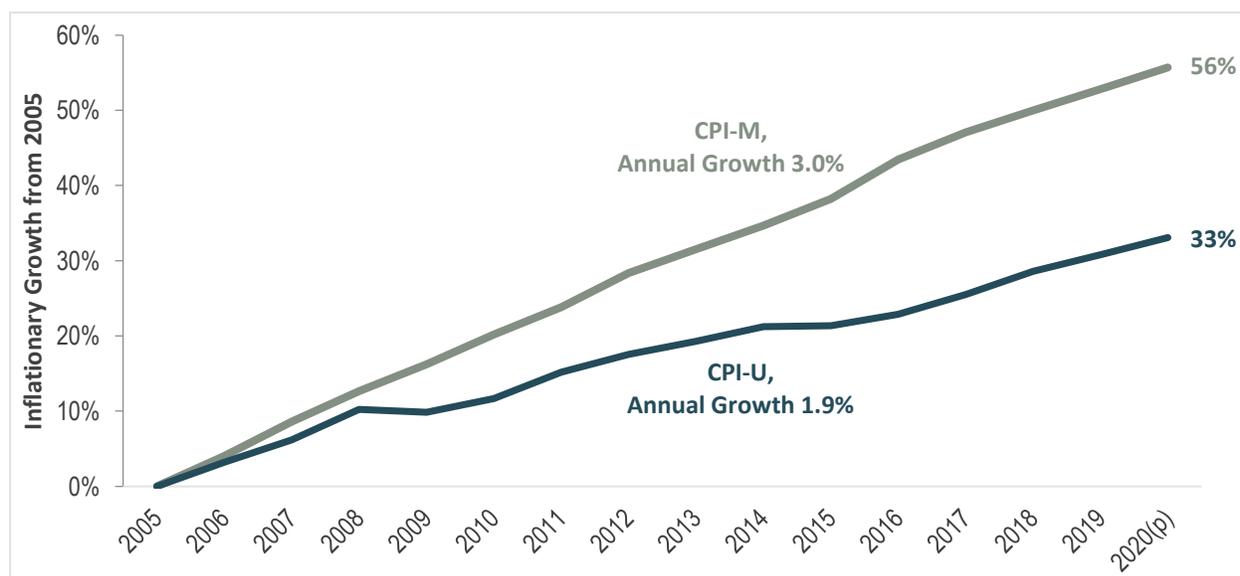
⁷ Discretionary goods are defined as: home costs, donations & gifts, vacations, and hobbies

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

The increase in health care spending relative to other goods for households is modeled based on the historic relationship between the growth in CPI-M, the Bureau of Labor Statistics’ (BLS) measure of consumer costs for medical care, and CPI-U, the benchmark BLS measure of inflation across the economy. Over the 2005-2020 period, overall inflation grew 1.92% annually, while medical inflation grew by 2.99%, or 1.56x as fast (see Figure 11). This ratio is applied forward to the baseline projections of CPI-U issued by the Congressional Budget Office (CBO) to yield a forecast for excess medical inflation over the 2020-2035 period.⁸ Expenditures are then re-allocated from goods in the discretionary and variable categories to account for additional health care spending, holding total expenditures per household constant.

Figure 11: Medical Cost Inflation Relative to Overall Inflation, 2005-2020



Source: ESI Analysis of BLS data

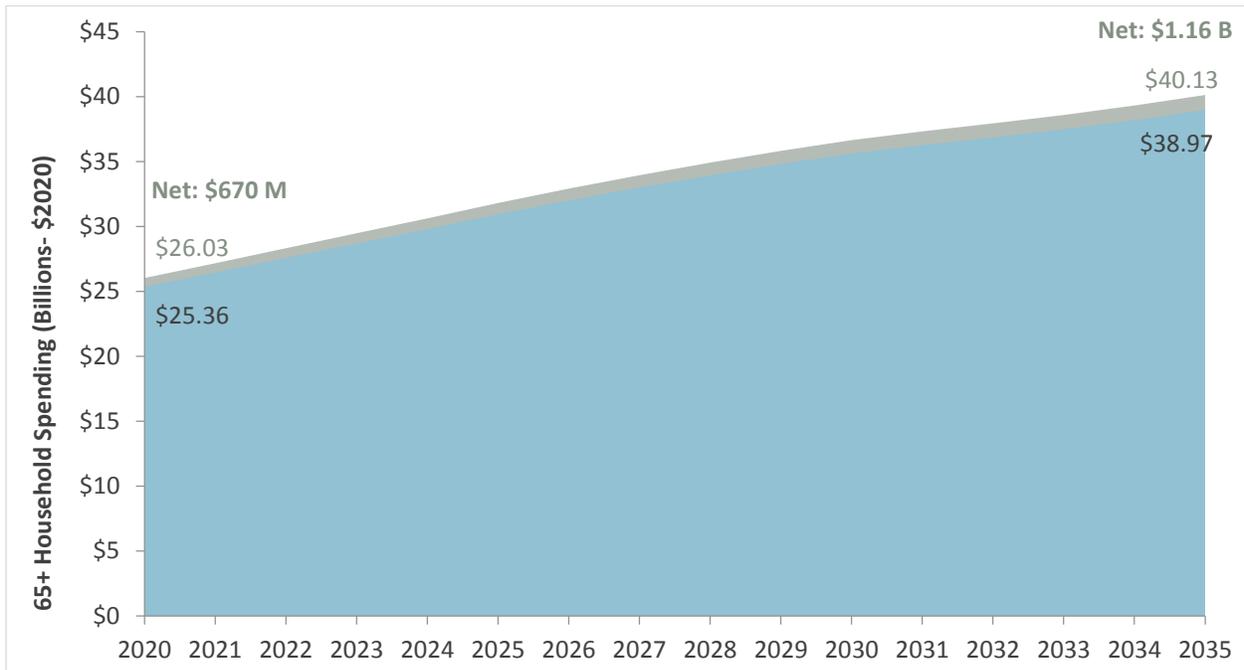
These household spending profiles for 2020 and 2035 are then matched to the demographic and income scenarios detailed above. Colorado’s elderly households are anticipated to spend \$25.36 billion in 2020, rising to \$38.97 billion by 2035 in the baseline scenario. This increase is due to demographic change alone, since the baseline scenario assumes a continuation of retirement savings behavior, and expenditures are expressed in constant dollars (\$2020). In the sufficient savings scenario, Colorado’s elderly households would spend an estimated \$26.03 billion in 2020, rising to \$40.13 billion by 2035 (see Figure 12).

⁸ Forecasts from the non-partisan CBO are drawn from the August 2019 *Update to the Budget and Economic Outlook: 2019-2029*. CPI projections for 2024-2029 are extended out to 2035 at the same rate.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

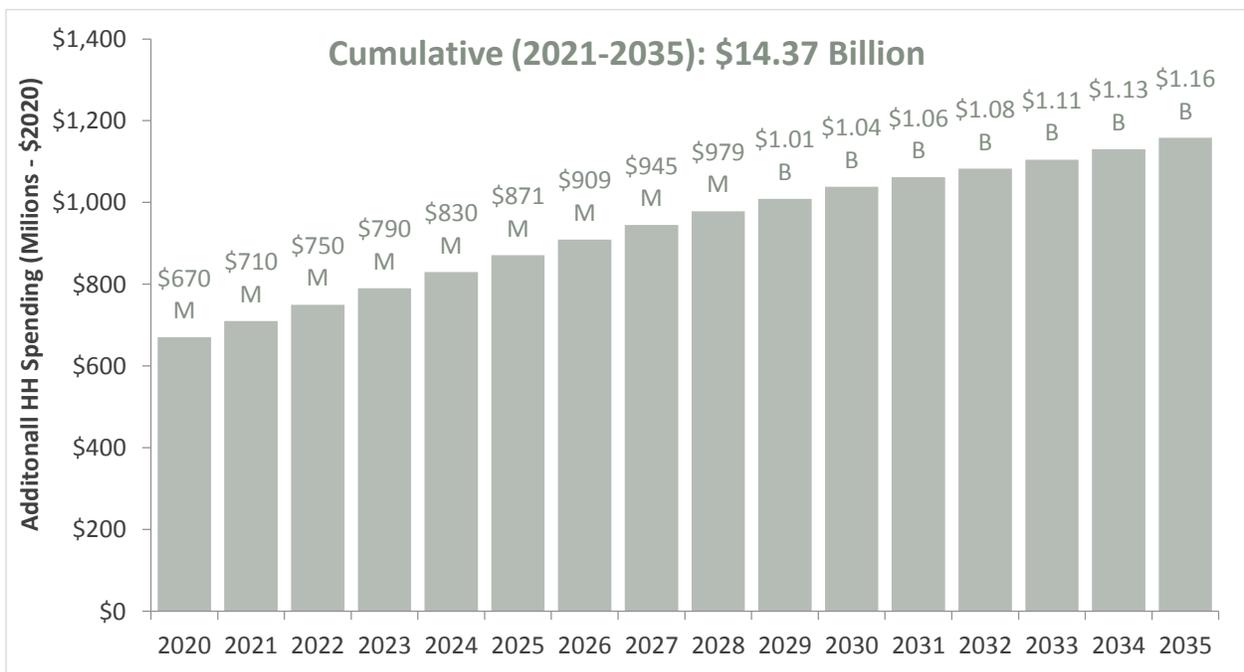
Date: November 18, 2019

Figure 12: Projected Direct Spending by Elderly Households, 2020-2035 (in Billions - \$2020)



The gap between these scenarios is the increase in household spending attributable to the modeled increase in retirement savings. This gap grows from \$670 million in 2020 to \$1.16 billion in 2035, and totals \$14.37 billion over the fifteen year period from 2021-2035 (see Figure 13).

Figure 13: Additional Spending by Elderly Households due to Increased Savings (in Millions - \$2020)



RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Figure 14 breaks down the modeled difference in household spending between scenarios by category. The largest single category is home costs (including home goods, insurance and property taxes), which accounts for \$150 million in additional spending under the sufficient savings scenario relative to the baseline in 2020. This gap grows to \$261 million by 2035 (due primarily to demographic change and the growth in the senior population), and totals \$3.23 billion over the fifteen year period from 2021-2035.

The expenditure categories that show the greatest variation with income (which do not correspond directly with the categories that make up the largest share of household spending) drive the largest differences in elderly household spending between income scenarios.

**Figure 14: Additional Spending by Elderly Households due to Increased Savings by Category
(in Millions - \$2020)**

Sector	Category	2020	2035	Cumulative
Home Costs	Discretionary	\$150	\$261	\$3,233
Donations & Gifts	Discretionary	\$126	\$218	\$2,710
Mortgage/Rent	Variable	\$90	\$149	\$1,870
Healthcare	Fixed	\$64	\$127	\$1,509
Automotive	Variable	\$64	\$106	\$1,326
Vacation	Discretionary	\$48	\$83	\$1,030
Telecommunications	Fixed	\$35	\$58	\$733
Utilities	Fixed	\$31	\$50	\$633
Food	Fixed	\$20	\$33	\$416
Hobbies	Discretionary	\$15	\$27	\$333
Clothing	Variable	\$15	\$24	\$307
Personal Care	Fixed	\$13	\$21	\$270
Total		\$670 million	\$1.16 billion	\$14.37 billion

Economic Impact from Household Spending

Next, economic modeling is undertaken to estimate the impact of this differential in household spending on the Colorado economy.

The first step in this process is to isolate the proportion of spending taking place locally by excluding out of state spending. Leakage of spending outside of the state economy can take the form of transactions physically made in another state (whether on vacation or in a neighboring state in the normal course of activity) or transactions that take place electronically to an out of state recipient (such as online retailers, or the recipients of some gifts and donations). The degree of leakage is estimated to be larger for certain goods like vacations which lend themselves to a greater degree of out of state spending, and for items like clothing that are more commonly purchased through an electronic retailer.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Figure 15 shows the resulting estimates of in state expenditure differences between income scenarios. Additional in state spending in the sufficient savings scenario is estimated at \$553 million in 2020, 83% of the total household spending estimate of \$670 million. The in-state expenditures gap grows to \$956 million in 2035, and totals \$11.86 billion over the fifteen year period from 2021-2035.

For the purpose of economic impact modeling, an additional adjustment is needed to account for the difference between wholesale and retail prices of certain goods.⁹ A “retail margin” adjustment is made to insure that economic modeling includes only the proportion of the purchase price that recirculates locally.

Accounting for both of these deductions, the direct effect of additional household spending in the sufficient savings scenario is \$504 million in 2020. This figure grows to \$873 million in 2035, and totals \$10.82 billion over the fifteen year period from 2021-2035.

Figure 15: Additional Spending by Elderly Households – In State Portion (in Millions - \$2020)

Sector	2020	2035	Est. In State Share	In State 2020	In State 2035	In State Cumulative
Home Costs	\$150	\$261	100%	\$150	\$261	\$3,233
Mortgage/Rent	\$90	\$149	100%	\$90	\$149	\$1,870
Healthcare	\$64	\$127	95%	\$61	\$121	\$1,433
Donations & Gifts	\$126	\$218	50%	\$63	\$109	\$1,355
Automotive	\$64	\$106	95%	\$60	\$100	\$1,259
Telecommunications	\$35	\$58	95%	\$34	\$55	\$696
Utilities	\$31	\$50	100%	\$31	\$50	\$633
Food	\$20	\$33	95%	\$19	\$31	\$395
Hobbies	\$15	\$27	95%	\$15	\$26	\$316
Vacation	\$48	\$83	25%	\$12	\$21	\$258
Personal Care	\$13	\$21	95%	\$12	\$20	\$256
Clothing	\$15	\$24	50%	\$7	\$12	\$153
Total	\$670 M	\$1.16 B		\$553 M	\$956 M	\$11.86 B
(Retail Margin)				(\$49 M)	(\$83 M)	(\$1.04 B)
Direct Total				\$504 M	\$873 M	\$10.82 B

These direct expenditures by elderly households within the state economy spur additional spillover effects. In an inter-connected economy, every dollar spent generates two spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from Colorado vendors. This represents what is called the “indirect effect,” and reflects the fact that in-state purchases of

⁹ Items sold at a store are typically purchased from a wholesaler, who derives some of the economic value through the production process, while the economic value added by retailers is only the “margin” by which the sales price exceeds their purchase price from their supplier. When the goods are not sourced locally, only this margin recirculates within the local economy.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

goods and services support in-state vendors, who in turn require additional purchasing with their own set of vendors.

- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the “*induced effect*,” and reflects the fact that some of those goods and services will be purchased from in-state vendors, further stimulating the Colorado economy.

The role of input-output models is to determine the linkages across industries in order to model the magnitude and composition of the spillover impacts across the economy. The total economic impact of household spending is expressed as the sum of direct and spillover (indirect + induced) impacts. ESI has developed a customized impact model of the Colorado economy using the industry-standard IMPLAN modeling framework.¹⁰

IMPLAN also generates estimates of the level of employment and earnings supported by direct and spillover economic activity. Employment is expressed in “job-years,” which are converted to full-time equivalent (FTE) positions using industry-specific ratios.¹¹ Employee compensation represents both salary and benefits.

Inclusive of spillover effects, additional household spending from increased savings would generate an additional \$947 million in economic impact in the Colorado economy in 2020. This activity would support 7,060 FTE jobs, with earnings of \$276 million. Based on the demographic, income and spending scenarios described above, the differential in economic impact is modeled to grow to \$1.65 billion by 2035, supporting 12,390 FTE jobs with \$483 million in earnings. Cumulatively over the fifteen year 2021-2035 period, this differential represents \$20.38 billion in total economic impact, 153,050 job-years (or 10,200 FTE jobs per year) and \$5.97 billion in earnings (see Figure 16).

Figure 16: Colorado Economic Impact from Household Spending with Increased Retirement Savings

Impact Type	2020	2035	Cumulative
Direct Output (\$M)	\$504	\$873	\$10,821
Indirect & Induced Output (\$M)	\$443	\$773	\$9,559
Total Impact	\$947 million	\$1.65 billion	\$20.38 billion
Employment (FTE)	7,060 jobs	12,390 jobs	153,050 job-years
Employee Compensation	\$276 million	\$483 million	\$5,972

Source: ESI Modeling using IMPLAN

¹⁰ IMPLAN is produced and licensed by the Minnesota IMPLAN Group. IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economies. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the level in which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system.

¹¹ When calculated over multi-year period, “job-years” should be understood as an aggregation of individual years of employment, rather than a number of unique positions. For example, the total of 153,050 job years over fifteen years expressed in Figure 15 could also be understood as an average of 10,200 annual jobs for fifteen years.

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

State Revenue Impact

The income scenarios and associated household spending and economic activity reviewed above also have significant implications for the state's tax base and revenue collections. The additional income available to elderly households under the sufficient savings scenario would generate state revenue directly through the personal income tax, and through the sales tax and liquid fuels tax on the direct purchases enabled by the additional disposable income. In addition, the downstream activity in the state economy from elderly household spending would lead to additional personal income, corporate income and sales and use tax.

Direct tax impacts are modeled as a function of the observed effective tax rates on activity from data published by the Colorado Department of Revenue. Effective tax rates for elderly households by income band are modeled based on tax return data for elderly households from 2015, while sales tax effective rates are calculated based on collection data by sector from 2018. Additionally the 22 cents per gallon liquid fuels tax that accrues to the Cash Fund is modeled based on the estimated incremental expenditures on this good.

Downstream tax impacts are modeled based on broader statewide relationships between activity types and tax collections (earnings to personal income tax, and value added to sales and corporate income taxes), since spillover activity flows across all sectors of the state economy. These effective rates are applied to the modeled differential in activity between income scenarios.

Inclusive of all of these components, it is estimated that additional state revenue from increased savings and spending by elderly households would total \$44 million in 2020, and grow to \$77 million in 2035. Over the fifteen year period from 2021-2035, additional tax revenue is estimated to total \$947 million (see Figure 17).

Figure 17: State Revenue Impacts with Increased Retirement Savings (\$Millions)

Tax Type	2020	2035	Cumulative
Personal Income Tax (\$M)	\$35.7	\$62.4	\$771
Sales and Use Tax (\$M)	\$7.2	\$12.3	\$153
Corporate Income Tax (\$M)	\$0.9	\$1.5	\$19
Motor Fuels Tax (\$M)	\$0.2	\$0.3	\$4
Total State Tax (\$M)	\$44 million	\$77 million	\$947 million

Source: ESI Modeling using IMPLAN and Colorado Revenue Department Data

RE: Fiscal Impact Study: Revenue Impacts from Insufficient Savings

Date: November 18, 2019

Next Steps

This memo has outlined estimates of differentials in household spending, economic impact and associated tax revenues for the State of Colorado over the 2020-2035 period between retirement savings scenarios.

Subsequent analysis will refine initial modeling (presented in Task 2) of the relationship between income and state expenditures for programs serving Colorado's elderly households. Estimates of program expenditures per household by income level will then be applied to the baseline and sufficient savings income scenarios developed in this analysis to yield a gap in state program expenditures between scenarios. As with the economic impact and state revenue analysis above, the gap between state expenditures under the baseline and sufficient savings scenarios will represent the net fiscal impact to the state of insufficient retirement savings for the 2020-2035 period.

Following this analysis, ESI will assemble a complete technical report, documenting the methodology and findings underlying the economic impact, revenue and expenditure analysis for submission to the Board and ultimately to the Colorado Legislature.