The Impact of an Aging U.S. Population on State Tax Revenues

By Alison Felix and Kate Watkins

The U.S. population is getting older. In 2011, the first members of the baby boom generation turned 65, an age typically associated with retirement. By 2030, almost 19 percent of the U.S. population will be 65 or older, up from just over 13 percent today. This aging of the population has important implications for state tax revenue because as the baby boom generation retires, the nation's labor force participation rate is expected to decline and, with it, income and spending. Most people earn less and spend less during retirement, suggesting that an aging population could reduce government revenue, particularly from sales taxes and individual income taxes. These sources of revenue make up more than 80 percent of total state tax collections.

While several studies have noted that demographic change will affect tax revenues, few have quantified the projected effects across states. The effect will differ across states because they vary in the degree to which they rely on income taxes and sales taxes. For example, while most states rely heavily on both of these sources, seven states do not impose an individual income tax and five do not assess a general sales tax. Also, some states' tax structures are more progressive than others. And many states differ in the goods and services they tax. Moreover, their populations vary in age composition as well as projected migration rates.

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This article examines the effects of aging populations on tax revenue across all 50 states. Isolating the effect of demographic change on tax revenue—by holding constant all other factors (such as likely income growth and other variables)—the results suggest that the aging of the population alone from 2011 to 2030 will reduce both income tax and sales tax revenue per capita in nearly every state. In fact, the analysis shows that if the U.S. population in 2011 had already had the age composition that is projected for 2030—that is, with a greater proportion of retirees—state tax revenue would have been lower by $8.1 billion, or 1.1 percent.

Section I examines income and spending patterns across age cohorts in the United States to explore how the aging of the population can lead to lower revenue from income taxes and sales taxes. Section II projects how much the aging of the population will reduce states' income tax revenue. Section III projects how much it will reduce states' sales tax revenue. Section IV projects the combined effect of these reductions on total state tax revenue.

I.   AGING POPULATIONS AND TAX REVENUE

Income and spending patterns change over the lifetimes of workers and consumers, and the impact of these changes on state revenue can be substantial. Most workers' earnings increase during their careers and then fall at older ages, as they reduce hours or retire. Similarly, consumer spending tends to increase as people move from early life to middle age, and then spending declines after retirement. The effects of these changes in income and spending could have significant implications for government budgets because income taxes and sales taxes make up a large share of total government revenue. In recent years, individual state income and sales taxes combined have totaled more than 80 percent of state tax revenue.[1] State governments also rely on federal transfer payments, and thus are exposed to the federal government's dependence on these sources of tax revenue.[2]

Demographic projections

As the baby boom generation retires, the age distribution of the U.S. population will shift. According to the U.S. Census Bureau's latest projections, the population segment of age 65 and older is projected

to expand as a share of the total U.S. population from 13.3 percent in 2011 to 18.6 percent in 2030.[3] This trend will be reflected in each state in the nation, though the shift is expected to be more dramatic in some states than in others.

State-level population projections are available from two sources—the Census Bureau and individual state agencies. The Census Bureau last released state-level population projections in 2005.[4] Most individual state agencies have released projections within the past two years and, therefore, incorporate more recent population estimates, including for the years spanning the Great Recession. As such, they are likely more reliable than the Census Bureau projections. However, Census Bureau projections are available for every state while state agency projections are only publicly available for 35 states.[5] For this reason, this article presents both sets of projections, but the analysis will emphasize state agency population projections. State agencies differ in their methodologies for projecting population, but most rely heavily on the most recent estimates of population in addition to assumptions about survival rates, fertility rates, and net migration.

Based on state agency projections for nearly every state, the population segment of people older than 65 is expected to increase as a share of each state's total population by more than 5 percent by 2030. (Maine and North Carolina are projected to see their shares increase by more than 10 percent.) The projections suggest that states currently having the largest shares of their populations 65 and older will continue to have the largest shares through 2030. These states include Florida, Maine, West Virginia, Pennsylvania, and North Carolina. By 2030, about one in four residents of these states may be a retiree.

Over the same period, total populations are expected to continue increasing, albeit at a slower pace than in past years. Annual population growth in the United States is expected to slow from about 1 percent in the 1980s and 1990s to a little more than 0.6 percent from 2011 to 2030. This slowdown will stem primarily from the combination of a decreasing birth rate and an increasing death rate, the latter due to the aging of the population.

Growth rates are projected to vary across states. For example, populations in Arizona and Colorado are projected to grow 1.5 percent or more annually from 2011 to 2030, continuing a trend over the

last three decades of fast growth due to in-migration. Over the same period, population growth in Maine and Pennsylvania is expected to remain close to zero, continuing the historical trends in these states of growth rates below the national average.

Income tax revenue projections

Average income tax revenue from individuals varies across age cohorts, as taxpayers' incomes and rates of labor force participation change with age.[6] Average wage and salary income tends to rise over a worker's career. Initially, these sources of income may increase as people early in their working lives move from part-time to full-time jobs that make better use of their skills and education. Once workers move into the full-time labor force, many increase their earnings by gaining experience, earning promotions, or switching to higher-paying jobs at other firms or organizations. Average salaries usually continue to increase throughout workers' careers until they retire. Retirement typically takes one of two forms: retiring from full-time to part-time work or completely exiting the labor force. Chart 1 shows the rise and fall of average income across workers' progressive life stages, with average income in 2011 rising from $13,793 (for ages 15 to 24) to $51,169 (for ages 45 to 54), and then declining to $25,417 (for those older than 75).
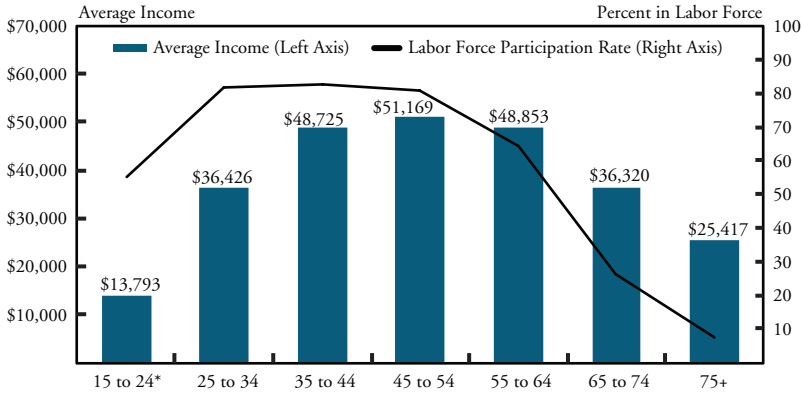
Labor force participation rates vary dramatically by age as well, as also shown in Chart 1. Only 55 percent of the 16-to-24 population participated in the labor force in 2011, by either being employed or actively looking for a job. Participation rates peaked for those 35 to 44, with almost 83 percent participating. At retirement, participation rates fell sharply, with only 26.4 percent of those 65 to 74 and 7.5 percent of those 75 and older remaining in the labor force.[7]

Labor force participation rates have changed over the years, primarily driven by an increase in participation among women and a decrease among men.[8] However, since the mid-1980s, labor force participation rates have trended upward for people older than 65, who began retiring later or taking part-time jobs as a bridge between full-time employment and full retirement (Sjoquist, Wallace, and Winters).

Income tax collections generally follow the distribution of wage income across age groups. Income tax collections are lowest for young

Chart 1

AVERAGE INCOME AND LABOR FORCE PARTICIPATION RATES BY AGE COHORT, 2011

Average Income   Percent in Labor Force

| | Average Income (Left Axis) | Labor Force Participation Rate (Right Axis) |

Values shown: $13,793; $36,426; $48,725; $51,169; $48,853; $36,320; $25,417

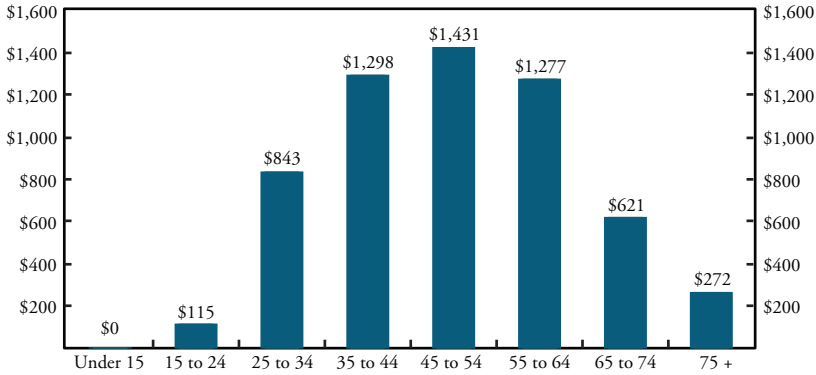Age cohorts: 15 to 24*; 25 to 34; 35 to 44; 45 to 54; 55 to 64; 65 to 74; 75+

*Labor force participation rates shown for ages 16 to 24.
Sources: Census Bureau, Current Population Survey; Bureau of Labor Statistics.

workers aged 15 to 24, many of whom work part time and earn entry-level salaries. Tax collections increase for older workers, peaking among 45- to 55-year-olds then falling as workers begin to retire (Chart 2).

Most states that assess individual income taxes have collections that follow this pattern of rising and then falling across age cohorts. However, different tax structures and distributions of taxpayer earnings produce variation across states. The degree to which different states' tax structures are more or less progressive causes some variation. Under more progressive tax structures, higher earners—who tend to be concentrated in middle-aged cohorts—pay a higher share of taxes than lower earners in the younger and older age cohorts. For example, in California, where tax rates range from 1.0 percent to 13.3 percent, the highest-earning age cohort—45 to 54—on average pays 2.2 times as much as the 25 to 34 cohort. In contrast, in Colorado, which has a flat tax rate, the 45 to 54 cohort pays 1.8 times more in taxes than the 25 to 34 cohort.[9] In addition, many states have tax policies that lower the effective income tax rate for older individuals. For example, 36 states did not tax Social Security income in 2011, and many states do not tax some pension and retirement income (Olin).

The distribution of wage and salary earnings also varies across states. For example, in Connecticut young workers 25 to 34 earned

Chart 2

AVERAGE STATE INCOME TAX LIABILITY BY AGE COHORT, 2011 AND 2012

Note: Data are pooled from the Annual Social and Economic Supplements of the Census Bureau's Current Population Surveys from both 2011 and 2012.
Sources: Census Bureau, Current Population Survey; authors' calculations.

on average 59.5 percent as much as the highest-earning group (45 to 55), while in Mississippi young workers earned 93.6 percent as much as earners 45 to 55.[10]
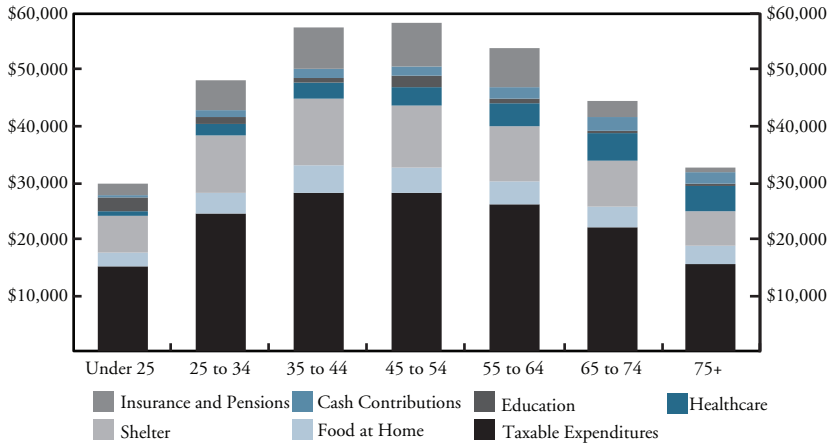
Sales tax revenue projections

Age demographics also affect sales tax collections. Although consumers typically smooth consumption somewhat throughout their lifetimes by borrowing early in life and spending from savings later in life, consumer spending still follows a pattern of rising then falling, similar to that of income.[11] As with income, spending historically has peaked for middle-aged cohorts, while younger and older individuals have spent considerably less (Chart 3). With the rise and fall of consumer spending across age cohorts, sales tax revenue also rises and falls.

Chart 3 also shows that the composition of spending varied somewhat across age cohorts in 2011. Average spending on shelter and food represents a comparable share of spending across age cohorts, while other goods and services fluctuate more with age. Healthcare costs, in particular, rise as a share of total spending as consumers age.

Middle-aged people typically have the highest levels of consumer expenditures. In 2011, spending was highest on average among those 45 to 54, propped up by the highest levels of spending on

Chart 3
AVERAGE EXPENDITURES BY AGE COHORT, 2011

Note: Taxable expenditures are defined by the authors to include expenditures commonly taxed across the states, including spending on apparel, transportation, entertainment, personal care products, food away from home, alcohol, tobacco products, reading material, housing costs except shelter and miscellaneous expenditures.
Source: Census Bureau, Consumer Expenditure Survey.

entertainment of all age cohorts (entertainment is a subcategory of taxable expenditures shown in Chart 3). Spending was also highest for education, presumably on college expenses for the cohort's children. Spending was also elevated for those 35 to 44, due to higher average spending on apparel, housing, and transportation (apparel, transportation, and housing other than shelter are also subcategories of taxable expenditures).

On average, spending by those younger than 25 and those older than 75 was slightly more than half of that of middle-aged consumers. While those older than 75 have historically spent the least on average, their expenditures in the past several decades have risen. In recent years, spending by the 75-and-older cohort has exceeded average spending for those younger than 25. From 1984 to 2011, average real spending rose 35.8 percent for those older than 75 compared to 4.5 percent for all consumers.[12] Healthcare spending makes up almost 14 percent of total spending among people older than 75, a higher share than all other age cohorts. This share of expenditures has remained fairly constant over the past three decades.

Although sales tax collections over the average U.S. taxpayer's lifetime follow a pattern similar to that of overall spending (rising until

middle age and then falling in older age), state revenue trends vary because tax structures differ in the goods and services that states tax. Currently, 45 states assess sales taxes on general retail transactions, with rates ranging from 2.9 percent in Colorado to 7.5 percent in California.[13] Most of these states assess sales taxes on apparel, transportation, entertainment, personal care products, food away from home, alcohol, tobacco products, reading material, housing costs except shelter, and miscellaneous expenditures.[14] But tax exemptions differ across states. Prescription medicines are exempt in nearly all states. Groceries are exempt in 31 states and the District of Columbia, but not in 19 other states.[15] Sales taxes have traditionally been assessed primarily on goods, but some services also are taxed. The number of services taxed varies widely by state with Hawaii, New Mexico, and South Dakota having much broader tax bases by taxing more services.[16]

The exemption of services, prescription drugs, food, and services from taxation in many states has important implications for sales tax collections as the population ages. As people age and spend less, a greater share of their spending tends to go to services and prescription drugs, which are often tax-exempt. Thus sales tax collections from the elderly may fall faster than their total spending.[17]

Other tax revenue sources

In addition to individual income and sales taxes, state and local governments rely on a variety of other tax sources including property taxes, corporate income taxes, severance taxes, and estate taxes. For most states, these sources make up a much smaller share of total revenue and, with the exception of estate taxes, are less likely to be directly or heavily influenced by an aging population.

Although local governments rely heavily on property taxes, most states do not collect a significant amount of revenue from this source, which represents just 1.9 percent of total state tax revenue.[18] Older individuals typically spend less on housing, and many states offer property tax exemptions or credits for lower-income, elderly individuals. These factors may reduce property tax collections for this cohort (Sjoquist, Wallace, and Winters).

Corporate income taxes and severance taxes are not likely to be directly affected by an aging population and instead are much more

closely related to the business cycle. State collections from estate and gift taxes are likely to increase as the population ages, but these collections are typically assessed only on high-wealth individuals and make up less than 1 percent of state tax collections.[19]

The analysis in this paper focuses on individual income and sales taxes due to the expected effect of aging on these sources of revenue and the importance of these tax sources for state government revenue. However, other revenue sources may play a stabilizing role in total tax revenue collections as the U.S. population ages. Also, taxes are not the only source of government revenue. Intergovernmental transfer payments, insurance and pension trust funds, and receipts from nontax charges all contribute to state government revenues.

II.   THE EFFECT OF AGING POPULATIONS ON STATES' INCOME TAX REVENUE

This section provides an empirical analysis of the projected effect of an aging population on states' individual income tax collections. State-level population projections are applied to current income tax patterns to project how aging alone might affect individual income tax revenue in each state by 2030, holding all other factors constant. Isolating the effect of demographic change, the findings suggest that, although total revenue from income taxes will grow in stride with population growth in most states, average per capita revenue from income taxes will fall in nearly every state.

Several studies have explored the potential effects of aging populations on tax revenues from different angles. For example, Sjoquist, Wallace, and Winters provide a detailed discussion of how an aging population might affect state revenues given the prevalence of tax policies that benefit the elderly such as the exemption of Social Security and pension income from taxation. Lee and Edwards discuss the hump-shaped pattern of federal, state, and local tax collections across the age distribution but focus their analysis on the cost per taxpayer of maintaining current levels of benefits.[20] Rathage, Garosi, and Olson compare the effect of aging on tax revenues in rural and metro areas. Using North Dakota as a case study, they find that rural areas may suffer greater declines in revenue given current demographics and projected migration patterns.

Building on this previous literature, the analysis here allows for comparisons across states, accounting for regional differences in

demographic change and tax structures, and identifies a number of considerations for policymakers for interpreting results.

Findings

State-level data can be used to project the effect of demographic change on individual income tax revenues. The analysis suggests that isolating the impact of an aging population and holding all other factors (such as income growth, tax structures, and other variables) constant, demographic change alone from 2011 to 2030 will likely reduce income tax revenue per capita by 2.4 percent across all the states and the District of Columbia (Chart 4).[21] Even though per capita income tax collections are projected to fall in most states, total state income tax revenues are projected to increase in more than half of the states due to an increase in the total population (Chart 5).
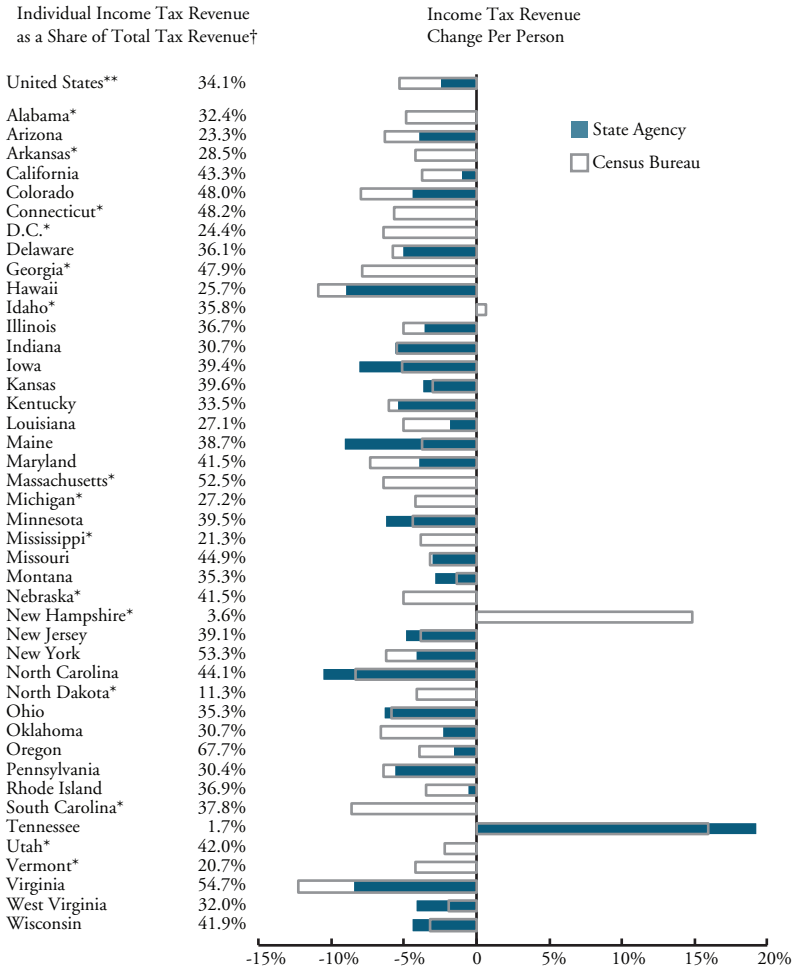
Chart 4 provides the projected percent change from 2011 to 2030 in state individual income tax revenue per capita for each state obtained by isolating the effect of an aging population on tax revenue and holding all other factors (such as income growth, tax structures and other variables) constant. Chart 5 shows the projected percent change in total state individual income taxes due to demographic change alone, and Appendix Table A1 provides a summary of projected percent change in population from 2011 to 2030.

In Charts 4 and 5, individual income tax revenue projections are provided using both census and state agency projections to examine how differences in population projections might alter results. Estimates based on census population projections are shown in the gray outline, and estimates based on population projections from state agencies are shown in the blue bars for those states that make projections publicly available. In many cases, there is a significant difference in the two income tax estimates driven by large differences in the population projections. For example, Maine showed the largest difference between Census Bureau and state agency estimates of average per capita tax revenue growth—ranging from -9.1 percent to -3.7 percent, holding all else equal.

These projections were derived by comparing estimates of state individual income tax revenues in 2011 to estimates for 2030. To obtain estimates of current state individual income tax revenues, the estimated average per capita state income tax liabilities for each age cohort were multiplied by 2011 population levels.[22] Similarly, the same average per

Chart 4

PROJECTED CHANGE IN PER CAPITA STATE INDIVIDUAL INCOME TAX REVENUE, 2011 TO 2030

Individual Income Tax Revenue
as a Share of Total Tax Revenue†

United States**	34.1%
Alabama*	32.4%
Arizona	23.3%
Arkansas*	28.5%
California	43.3%
Colorado	48.0%
Connecticut*	48.2%
D.C.*	24.4%
Delaware	36.1%
Georgia*	47.9%
Hawaii	25.7%
Idaho*	35.8%
Illinois	36.7%
Indiana	30.7%
Iowa	39.4%
Kansas	39.6%
Kentucky	33.5%
Louisiana	27.1%
Maine	38.7%
Maryland	41.5%
Massachusetts*	52.5%
Michigan*	27.2%
Minnesota	39.5%
Mississippi*	21.3%
Missouri	44.9%
Montana	35.3%
Nebraska*	41.5%
New Hampshire*	3.6%
New Jersey	39.1%
New York	53.3%
North Carolina	44.1%
North Dakota*	11.3%
Ohio	35.3%
Oklahoma	30.7%
Oregon	67.7%
Pennsylvania	30.4%
Rhode Island	36.9%
South Carolina*	37.8%
Tennessee	1.7%
Utah*	42.0%
Vermont*	20.7%
Virginia	54.7%
West Virginia	32.0%
Wisconsin	41.9%

Income Tax Revenue
Change Per Person

Legend: ■ State Agency □ Census Bureau

†Individual income tax revenue as a share of total state tax revenue for 2011 (Census Bureau 2012a)
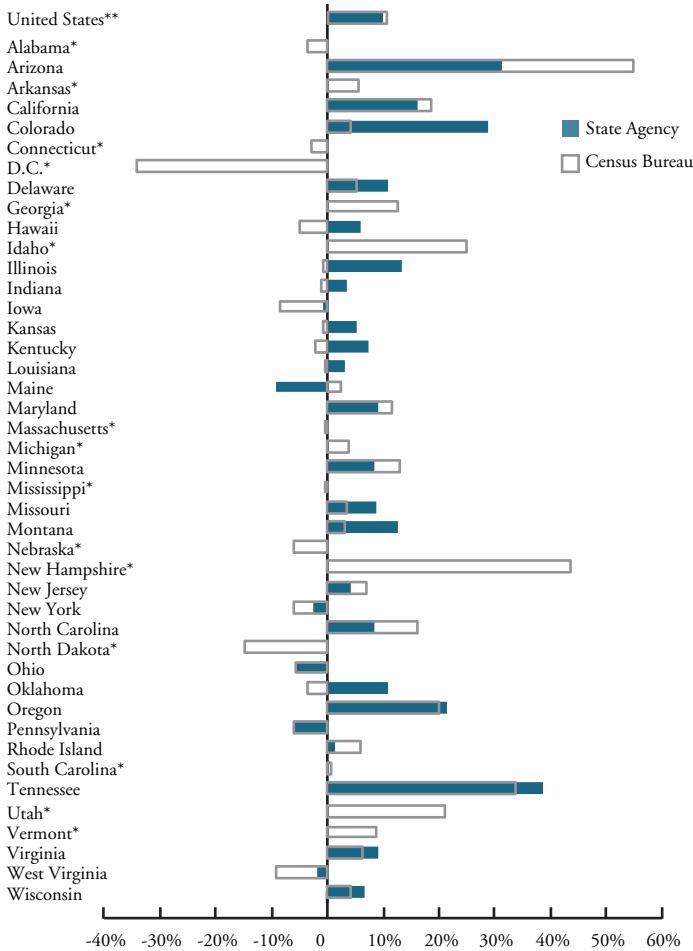*State agency projections were not available at the time of publication
**U.S. projections from 2005 interim census projections (gray outline) and 2012 U.S. projections (solid blue fill).
Notes: States without individual income tax are not shown. These include Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. New Mexico is not included due to a known error in the CPS data for that state.
Sources: Authors' calculations using pooled data from the March 2011 and 2012 ASEC of the Census Bureau's CPS, 2011 Census Bureau population estimates, 2005 interim census population projections, and population projections from state agencies.

Chart 5

PROJECTED CHANGE IN TOTAL STATE INDIVIDUAL INCOME TAXES, 2011 TO 2030

State Agency
Census Bureau

*State agency projections were not available at the time of publication
**U.S. projections from 2005 interim census projections (gray outline) and 2012 U.S. projections (solid blue fill)
Notes: States without individual income tax are not shown. These include Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. New Mexico is not included due to a known error in the CPS data for that state.
Sources: Authors' calculations using pooled data from the March 2011 and 2012 ASEC of the Census Bureau's CPS, 2011 Census Bureau population estimates, 2005 interim census population projections, and population projections from state agencies.

capita state income tax liabilities were multiplied by Census Bureau and state agency population projections for the year 2030 for each state to produce projections of state individual income tax revenues in 2030. This methodology is similar to that used by Rathage, Garosi and Olson.

Across the states, individual income taxes comprised 34.1 percent of total state tax revenue.[23] However, dependence on this revenue source varies across states. Seven states do not tax individual income. And in Tennessee and New Hampshire, income tax is only applied to capital gains from dividends and interest and to inheritance income. In these two states, income tax revenue makes up a considerably smaller share of total revenue than in the remaining 41 states and the District of Columbia with an income tax.

Demographic change alone is expected to lead to declines in per capita revenue in all but three states that assess a state income tax. Because Tennessee and New Hampshire's individual income tax is limited to capital gains and inheritance, it is not surprising that they are among the three with projected growth in revenue per capita, as income from interest earnings, dividends, and capital gains generally rises with age. The remaining state, Idaho, is projected to have particularly strong population growth for those aged 35 to 54. Growth in these cohorts, which have the largest tax liability on average in Idaho, results in a slight increase in average per capita income tax revenue for the state.

At the opposite spectrum, demographic change alone is projected to reduce Virginia's per capita income tax revenue by 8.4 percent based on state agency projections. The average income tax liability for those over 65 in Virginia was zero in 2011 and 2012, likely reflecting the state's exemption for Social Security income and deduction of up to $12,000 for seniors.

Strong overall growth in state income tax collections is projected in states like Arizona and Colorado that expect fast population growth. In contrast, state demographers in Maine and Pennsylvania are expecting populations to remain fairly flat, contributing to the overall projected decline in total income tax revenue for those states (Appendix Table A1).

Data and policy considerations

The results in this analysis rely heavily on several assumptions, including the assumption that population projections are accurate and that on average for each age cohort income tax liabilities will remain constant over time. Underlying the latter assumption are the assumptions that for each cohort average income and labor force participation will remain constant, and state tax policies will not change—an unlikely scenario given historical precedence. Each of these factors could affect actual state income tax collections and should be considered when interpreting these results.

The predictive capacity of the analysis relies on the accuracy of the population projections.[24] Because Census Bureau projections are somewhat dated, they may be less reliable than more current state-level projections. For example, Census Bureau projections will likely underproject population growth in states such as Wyoming and North Dakota that experienced fairly dramatic population growth in the years following the release of the latest projections. Comparing results from state agencies to Census Bureau projections demonstrates the sensitivity of the analysis to the projections used (see Chart 4).

Future changes in labor force participation rates could affect future income tax revenues. If participation rates continue to decline for men under 65 and women under 25 as they have since 1980, income tax collections will likely be lower than projected. At the same time, if labor force participation rates continue to increase among men 65 and older and among women over 25, income tax collections from these cohorts will likely be higher than projected.[25] One reason that labor force participation rates may continue to increase among older cohorts is an expected increase in life expectancy. The Census Bureau projects that the life expectancy at birth for non-Hispanic, white men will increase from 76.8 in 2010 to 79.9 in 2030 and to 83.2 by 2060.[26]

In addition to an increase in labor force participation rates among those aged 65 and older, incomes for this cohort have also increased faster than any other age cohort since 1980. Since 1980, real average income has grown 1.55 percent per year for workers age 65 and older, 1.23 percent for workers 55 to 64, and less than 0.9 percent for all other age cohorts. Future changes in income distributions across age cohorts will also likely affect income tax revenue to states.

Another important consideration is the impact of inflation on income taxes and government spending. Historically, average U.S. incomes have outpaced inflation. For instance, from 1980 to 2011 nominal income increased 4.25 percent annually on average, while inflation increased 3.3 percent annually.[27] The results in this analysis rely on current tax collections to project future tax collections, in effect holding changes in income and income tax liabilities constant. However, if incomes and income tax liabilities increase at a faster pace than the prices of the goods and services that state governments buy, then real income tax collections may be higher than the results of this analysis suggest.

Finally, a number of factors could influence per capita income tax revenue outside of demographic change and changes in income or labor force dynamics. These include changes to state income tax structures and changes in economic activity that affect income patterns across age cohorts. As states frequently alter their tax structures and incomes are subject to the business cycle, actual tax collections will likely differ from the projections in this analysis.

While many factors could alter the effect that an aging population has on individual income tax revenues, the analysis in this section provides useful insights for policymakers. In particular, an aging population is likely to put downward pressure on individual income tax collections on a per capita basis. Additionally, general population growth plays an important role in the future of tax revenue for states. States that grow the most are likely to experience the highest total revenue growth regardless of demographic change. As policymakers and tax revenue forecasters consider future tax changes and fiscal policy, the longer-term implications of population growth and an aging population should be considered.

III. THE EFFECT OF AGING POPULATIONS ON STATES' SALES TAX REVENUE

Using population projections through 2030 and current expenditure patterns, the analysis in this section projects that demographic change alone—if all other factors are held constant—will reduce sales tax revenue per capita in 49 states and the District of Columbia by 2030. Total revenue from all taxpayers will grow in most states due to population growth, while taxes paid per person will decline. These trends will result from the fact that most people dramatically reduce

their consumption at retirement age (Banks, Blundell, and Tanner; Hurd and Rohwedder). This dramatic decline in consumption with age has important implications for sales tax revenues, which comprise a significant share of state government revenue for most states.

Sales taxes, including general sales and selective sales taxes, comprised 48.4 percent of total tax revenues across all states in 2011. Of the 45 states with a general sales tax, total sales tax dependency ranged from 30.6 percent in North Dakota to 83.6 percent in South Dakota. In the five states that do not impose a general sales tax, selective sales tax collections still comprise from 4.6 percent to 38.6 percent of total tax revenue.[28]
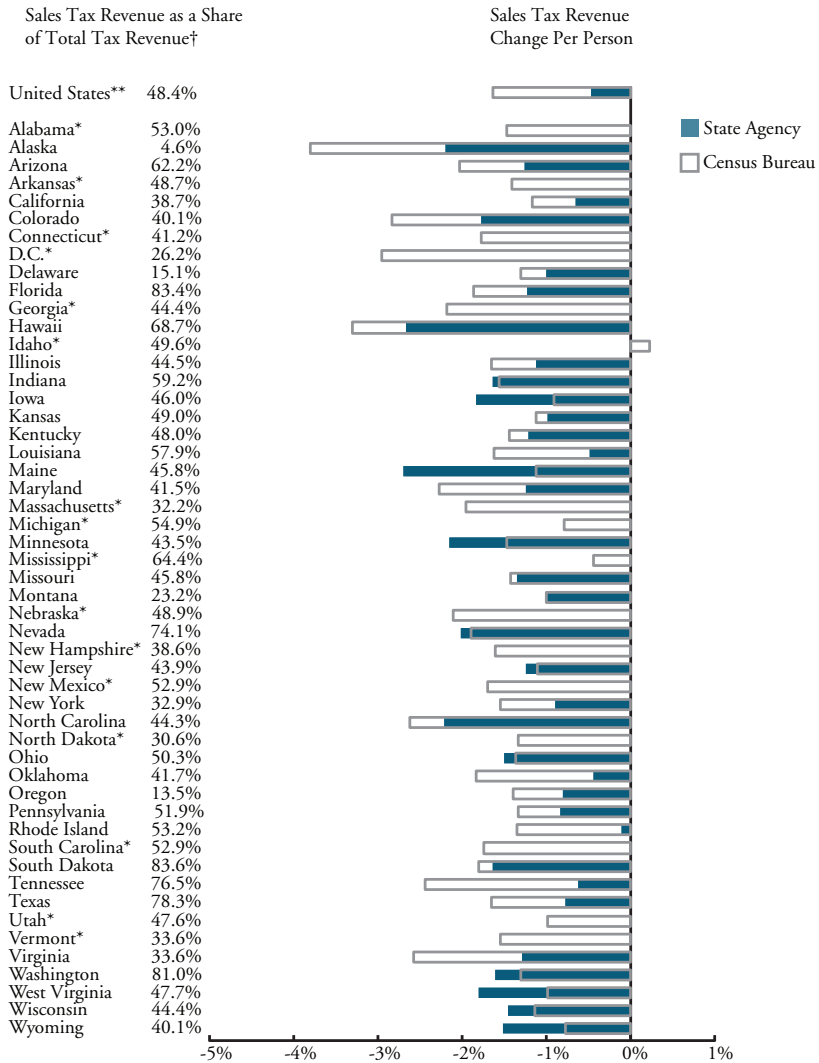
Findings

Isolating the effect of an aging population, average taxable expenditures are projected to decline on a per capita basis in all but one state from 2011 to 2030, holding all other factors constant. Across all states, average taxable expenditures per capita are expected to fall 0.5 percent compared with what they would have been absent demographic changes.[29] Despite a projected decline in per capita sales tax revenue, projected increases in population in most states over the next 20 years are estimated to drive total sales tax revenue, resulting in higher total sales tax collections across most states.

These findings were reached by multiplying Census Bureau and state agency population projections by average estimated taxable consumption expenditures by age cohort using data from the Census Bureau's 2011 Consumer Expenditure Survey (CES). Because data for actual sales tax liabilities are not available by age cohort, estimated taxable expenditures were used in the analysis. Estimated taxable expenditures are assumed to include expenditures commonly taxed across the states, including spending on apparel, transportation, entertainment, personal care products, food away from home, alcohol, tobacco products, reading material, housing costs other than shelter (such as utilities and furniture), and miscellaneous expenditures. Because of the small sample size of the CES, state-level estimates of expenditures by age cohort are unreliable. As a result, average nationwide taxable expenditures for each age cohort were multiplied by the 2011 population estimates and 2030 projections for each state. Chart 6 provides the 2011 share of total state

Chart 6

PROJECTED CHANGE IN PER CAPITA TAXABLE EXPENDITURES, 2011 TO 2030

Sales Tax Revenue as a Share of Total Tax Revenue†		Sales Tax Revenue Change Per Person

United States**	48.4%
Alabama*	53.0%
Alaska	4.6%
Arizona	62.2%
Arkansas*	48.7%
California	38.7%
Colorado	40.1%
Connecticut*	41.2%
D.C.*	26.2%
Delaware	15.1%
Florida	83.4%
Georgia*	44.4%
Hawaii	68.7%
Idaho*	49.6%
Illinois	44.5%
Indiana	59.2%
Iowa	46.0%
Kansas	49.0%
Kentucky	48.0%
Louisiana	57.9%
Maine	45.8%
Maryland	41.5%
Massachusetts*	32.2%
Michigan*	54.9%
Minnesota	43.5%
Mississippi*	64.4%
Missouri	45.8%
Montana	23.2%
Nebraska*	48.9%
Nevada	74.1%
New Hampshire*	38.6%
New Jersey	43.9%
New Mexico*	52.9%
New York	32.9%
North Carolina	44.3%
North Dakota*	30.6%
Ohio	50.3%
Oklahoma	41.7%
Oregon	13.5%
Pennsylvania	51.9%
Rhode Island	53.2%
South Carolina*	52.9%
South Dakota	83.6%
Tennessee	76.5%
Texas	78.3%
Utah*	47.6%
Vermont*	33.6%
Virginia	33.6%
Washington	81.0%
West Virginia	47.7%
Wisconsin	44.4%
Wyoming	40.1%

Legend: ■ State Agency   □ Census Bureau

X-axis: -5%   -4%   -3%   -2%   -1%   0%   1%

†Sales tax revenue as a share of total state tax revenue for 2011 (Census Bureau 2012a)

*State agency projections were not available at the time of publication

**U.S. projections from 2005 interim census projections (grey outline) and 2012 U.S. projections (solid blue fill)

Note: The sales tax revenue share of total taxes includes both general sales tax revenue and selective sales tax revenue.

Source: Authors' calculations using data from the Census Bureau's 2011 Consumer Expenditure Survey, 2011 Census Bureau population estimates, 2005 interim census population projections, and population projections from state agencies.

tax revenue from state sales taxes to show each state's relative dependence on this revenue source, and a summary of taxable expenditure projections per capita obtained by isolating the effect of an aging population on tax revenue and holding all other factors (such as expenditure patterns, tax structures, and other variables) constant. Additionally, Chart 7 shows the projected change in total taxable expenditures by state from 2011 to 2030 due to demographic change alone.

Of the states imposing a sales tax, the impact of an aging population alone on per capita taxable expenditures is projected to range from a decline of 3.3 percent for Hawaii to a 0.2-percent increase for Idaho, the only state with a projected increase. States with the largest per capita decreases, including Hawaii, Colorado, North Carolina, and Maine, tended to have large cohorts aged 45 to 54 and 55 to 64 in 2011. In these states, population growth for younger cohorts is not projected to compensate for lower levels of consumption as these large cohorts enter retirement.

Results using Census Bureau population projections are within 1 percent of those using available state agency projections for most states. The largest difference between projections occurs for Tennessee, where results range from a per capita revenue decline of 2.4 percent using Census Bureau projections to a decline of 0.6 percent using state agency projections, holding other factors constant. This equates to a $399 difference in estimates of average spending per person, the largest dollar difference of any state.
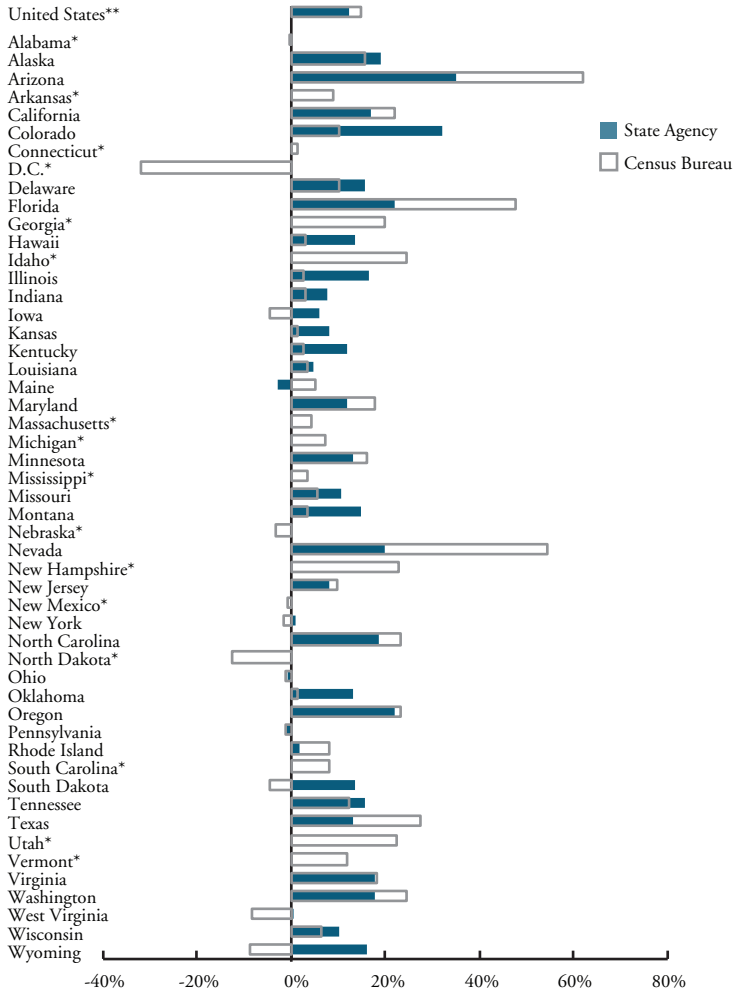
Similar to total income tax projections, total taxable expenditures are projected to grow at a magnitude similar to population growth (Chart 7). Among the projections from state agencies, Arizona and Colorado are projected to have the strongest total revenue growth from 2011 to 2030 due to population increases greater than 30 percent in these states. Only Pennsylvania and Maine are expected to see their populations fall through 2030, though projected population declines are by less than 1 percent over this period. These two states and Ohio are projected to see total taxable expenditures fall.

Data and policy considerations

These findings rely on a number of assumptions that policymakers should consider carefully when interpreting results. Similar to the

Chart 7

PROJECTED CHANGE IN TOTAL TAXABLE EXPENDITURES, 2011 TO 2030

*State Agency

□ Census Bureau

*State agency projections were not available at the time of publication
**U.S. projections from 2005 interim census projections (grey outline) and 2012 U.S. projections (solid blue fill)
Source: Authors' calculations using data from the Census Bureau's 2011 Consumer Expenditure Survey, 2011 Census Bureau population estimates, 2005 interim census population projections, and population projections from state agencies.

income tax projections, the reliability of results is contingent upon the accuracy of population projections. Additionally, results rest on the assumption that average taxable expenditures are consistent across states and will remain constant over time on average for each age cohort. However, state tax structures and consumption patterns differ and change over time (Yocum). Also, out-of-state spending (such as tourism) and business spending influence revenues.[30] Each of these factors could influence the sensitivity of state sales tax revenue to an aging population.

Average expenditures have increased for some age cohorts more than others over the past several decades. This is particularly true of those over the age of 75. While spending for those over 75 remains well below most other age cohorts, the increase over time is noteworthy and illustrates how shifts in spending patterns across age cohorts could affect the results of this analysis. Comparing results using data from 1991 relative to the 2011 expenditure data used in this analysis shows the importance of taking these shifts into account. For example, total taxable expenditures across all states were projected to increase only 10.7 percent based on 1991 data, instead of 12.1 percent based on 2011 data. Per capita taxable expenditures were projected to decrease 1.7 percent, compared to 0.5 percent.[31]

Differences in state tax structures will influence the sensitivity of sales tax revenue to demographic change to the degree a state's tax base relies on expenditures from the retired population. For example, 14 states include food expenditures in their tax base. These expenditures make up a larger share of total spending for the retired population than other goods. Per capita and total taxable expenditures increase by 0.1 across all states when food at home is included as a taxable expenditure. The increase is as high as 0.3 percent for Wyoming taxable expenditures per capita and 0.2 percent for total taxable expenditures using Census Bureau population projections.

Several results from this analysis may warrant policymakers' attention as they consider potential changes in future fiscal policies and tax policies. Policymakers can expect that an aging population will put downward pressure on consumption and sales taxes, on a per capita basis, as was the case with individual income taxes. At the same time, even as sales taxes per capita decline, total population growth will drive total sales tax collections higher. In addition, the variation in sales tax revenue found across states illustrates that tax collections are influenced

not only by sales tax rates but also by decisions about which goods and services are taxed and by the ways that spending on these items varies across age cohorts.

IV. THE EFFECT OF AGING POPULATIONS ON TOTAL STATE TAX REVENUES

The total effect of an aging population on state tax revenues will depend on its effects on both individual income taxes and sales taxes, and it will also depend on the degree to which a given state relies on each of these two sources of income. For the nation, individual income tax revenue contributed 34.1 percent to total state tax revenue, and general and selective sales tax revenue contributed 48.4 percent in 2011. The projections derived earlier regarding expected effects of demographics on income taxes and sales taxes can be used to quantify the effect of aging on total tax revenue. Specifically, an aging population alone—holding all other factors constant (such as income growth, expenditure patterns, tax structure and other variables)—is expected to reduce individual income tax revenue by 2.4 percent per person by 2030. An aging population is expected to have less effect on consumer expenditures, and therefore sales tax revenues, falling just 0.5 percent per person by 2030. Combining these effects, if the U.S. population had the projected age composition of 2030 in 2011, total state tax revenues would have been $8.1 billion, or approximately 1.1 percent, lower.[32] However, care should be taken when interpreting such estimates due to the many considerations included in this analysis.

The effect of aging populations varies widely across states because of the vast differences among the states in their reliance on income tax revenue and sales tax revenue. In Alaska, individual income taxes and sales taxes combined contribute only 4.6 percent to total state tax revenue (Charts 4 and 6). By contrast, these two sources make up 94.4 percent of total tax revenue in Hawaii. Therefore, the negative effects of an aging population on total state tax revenues are likely to be much higher in Hawaii compared with Alaska.

An aging population will likely have varying effects on individual income tax revenues and sales tax revenues depending on each state's current age composition, projected population growth, and tax structure. For example, among the states with state agency population projections, per capita individual income tax revenues are projected to increase by

19 percent due to demographic change alone in Tennessee because only capital gains and interest income are taxed in that state. In every other state, isolating the impact of an aging population on revenue is expected to reduce per capita income tax revenues—ranging from a 0.5-percent decline in Rhode Island to a 10.5-percent decline in North Carolina. Variations also exist across states for per capita sales tax revenues. Among states with state agency population projections, per capita sales tax revenue projections range from a 0.1-percent decline in Rhode Island to a 2.7-percent decline in Maine.

The analysis suggests that an aging population is likely to have a larger negative effect on individual income tax revenue than sales tax revenue. However, the effects of an aging population on tax revenues is only one factor that policymakers are likely to consider in fiscal policy deliberations. Individual income taxes are generally more progressive than sales taxes, meaning that higher income earners pay a larger share of their income in taxes. Sales taxes are frequently regressive, meaning that lower-income individuals pay a higher share of their income on taxes. In determining future tax policy, policymakers might weigh the effects of these two taxes on income distributions, which are higher for some age cohorts than others. In addition to distributional effects, policymakers also may weigh the benefits that different groups receive from tax-funded state government services, such as educational, healthcare or retirement benefits. Many of these services target the young and the elderly—the lowest income-earning cohorts.

V.   CONCLUSION

State policymakers continually re-evaluate their tax policies in response to changing business conditions and constituent demands. An aging population is one of the many factors that policymakers might consider in developing future tax policies. This article shows that demographic change alone will likely reduce individual income taxes and sales taxes in nearly every state in the nation on a per capita basis in the coming years, holding all other factors constant. At the same time, total revenues will likely increase with total population growth in most states.

Of course, policymakers should be aware of the many considerations that could affect tax revenue in coming years. Regional differences in state population compositions, income and consumption patterns, and
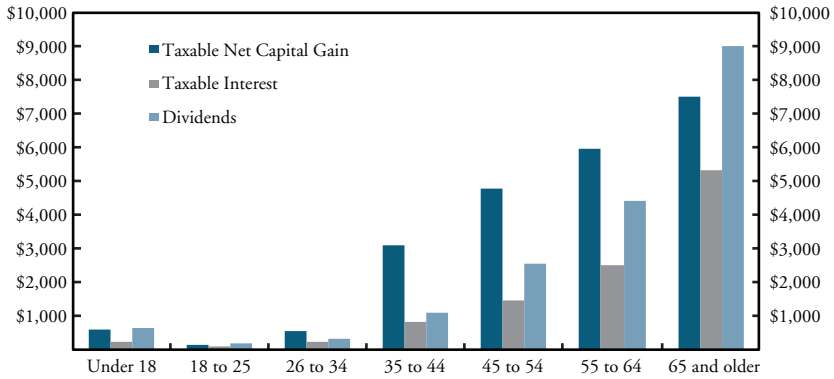
tax structures will affect the degree to which demographic change will affect tax revenue in each state in coming years.

While this analysis only addresses the implications of an aging population on state tax revenue, another important consideration is the impact of demographic change on the cost of government services. A wealth of academic literature and policy research shows how, why, and to what degree an aging population could affect government spending and the cost of services offered.[33] Generally, this literature projects that an aging population will increase the demand for government services and therefore increase total spending, assuming the same level of services. The findings in this analysis suggest that demographic change alone may lead to rising per capita expenditures and falling per capita revenue as the baby boom generation retires, unless policy changes are undertaken.

APPENDIX

Chart A1

CAPITAL GAINS, TAXABLE INTEREST, AND DIVIDENDS
PER TAX RETURN BY AGE COHORT, 2008

Source: Internal Revenue Service, Statistics of Income.

Table A1

TOTAL PROJECTED POPULATION CHANGE, 2011 TO 2030

	Population	
	Census Bureau[1]	State Agency[2]
United States*	16.7% (2005) 12.6% (2012)	N/A
Alabama	1.5%	N/A
Alaska	20.1%	21.7%
Arizona	65.3%	36.6%
Arkansas	10.3%	N/A
California	23.2%	17.5%
Colorado	13.2%	34.6%
Connecticut	3.0%	N/A
D.C.	-29.9%	N/A
Delaware	11.6%	16.9%
Florida	50.5%	23.7%
Georgia	22.4%	N/A
Hawaii	6.6%	16.5%
Idaho	24.3%	N/A
Illinois	4.4%	17.6%
Indiana	4.5%	9.6%
Iowa	-3.5%	8.1%
Kansas	2.4%	9.3%
Kentucky	4.2%	13.3%
Louisiana	5.0%	5.2%
Maine	6.2%	-0.2%
Maryland	20.5%	13.4%
Massachusetts	6.4%	N/A
Michigan	8.3%	N/A
Minnesota	18.0%	15.7%
Mississippi	3.8%	N/A
Missouri	7.0%	12.2%
Montana	4.7%	15.9%
Nebraska	-1.2%	N/A
Nevada	57.2%	22.4%
New Hampshire	24.9%	N/A
New Jersey	11.1%	9.4%
New Mexico	0.8%	N/A
New York	0.1%	1.7%

Table A1 continued

	Population	
	Census Bureau[1]	State Agency[2]
North Carolina	26.6%	21.3%
North Dakota	-11.3%	N/A
Ohio	0.0%	0.6%
Oklahoma	3.2%	13.5%
Oregon	24.8%	23.1%
Pennsylvania	0.2%	-0.3%
Rhode Island	9.7%	1.8%
South Carolina	10.0%	N/A
South Dakota	-2.9%	15.5%
Tennessee	15.3%	16.4%
Texas	29.8%	14.1%
Utah	23.7%	N/A
Vermont	13.6%	N/A
Virginia	21.3%	19.1%
Washington	26.3%	19.6%
West Virginia	-7.3%	2.4%
Wisconsin	7.7%	11.6%
Wyoming	-8.0%	17.7%

[1]Census Bureau state population projections for the year 2030, as published in 2005, were compared to 2011 Census Bureau population data. Notably, the 2030 projections are projected from a 2004 base year. As such, they fail to reflect more recent actual population data.
[2]State agency projections for 2030 were compared to 2011 Census Bureau population data.
N/A = Not applicable or not available.
*U.S. projections are from (1) 2005 interim Census Bureau and (2) 2012 Census Bureau projections.
Source: Authors' calculations based on 2011 population data from the Census Bureau and 2030 population projections from the Census Bureau and state agencies.

ENDNOTES

[1]These figures, reflecting both general sales tax revenue and selective sales tax revenue, are based on data for fiscal year 2011 from the U.S. Census Bureau.

[2]Although individual income and sales tax revenue makes up more than 80 percent of state tax revenue, states also receive revenue from sources other than taxes. As a percentage of all state government revenue (both tax and nontax revenue), individual income and sales taxes combined account for 28 percent.

[3]Authors' calculations based on data from the Census Bureau.

[4]The Census Bureau continues to release population projections by age for the nation as a whole, allowing comparisons at the national level of population projections released in 2005 and 2012.

[5]At the time of publication, state agency population projections by age for 2030 were only publicly available for 35 states.

[6]In a majority of states, most revenue from individual income taxes is based on earnings from salaries and wages. Additional revenue flows from taxes on capital gains and inheritances such as income from interest, dividends, and estates. Unlike wage and salary income, average income from capital gains, taxable interest, and dividends continues to increase after retirement (Appendix Chart A1). According to 2008 data from the Internal Revenue Service, average federal taxable net capital gains, taxable interest, and dividends increase dramatically from age cohorts younger than 35 to those in the 35-to-44 age cohort and continue to increase for older cohorts. Although these three income sources make up less than 3 percent of income for tax filers aged 18 and 34, they make up about 35 percent of income for those who are 65 and older (Internal Revenue Service 2010).

[7]Bureau of Labor Statistics, 2011.

[8]Labor force participation rates increased from 59.2 percent in 1950 to a high of 67.1 percent in 1997. The increase in participation was primarily due to increased participation among women—almost 34 percent of women in 1950 compared to 59.8 percent in 1997. Changes to men's participation were less drastic, but most age groups have experienced a decline in participation over the past 60 years. Notably, the participation of men ages 16 to 24 fell from 68.2 percent in 1950 to 56.8 percent in 2010, and participation dropped from 41.6 percent to 22.1 percent for men over 65 (based on data from the Census Bureau's Statistical Abstracts of the United States).

[9]Authors' calculations based on average wage and salary income from pooled March 2011 and 2012 data from the Census Bureau, Current Population Survey. Tax rates came from the Tax Foundation.

[10]Ibid.

[11]There is extensive research on saving and consumption patterns. Attanasio discusses the hump-shaped pattern in consumption data and reviews literature that examines the life cycle-permanent income model. Although many authors

have taken this consumption pattern as evidence against the life cycle model, Attanasio concludes that the model is not rejected by the data after including controls for labor supply variables and demographics. Attanasio also notes the difficulty in modeling the consumption behavior of the retirement population.

[12]Average expenditures by age group were adjusted to 2011 dollars using the U.S. consumer price index for all urban consumers (CPI-U).

[13]States without a general sales tax include Alaska, Delaware, Montana, New Hampshire, and Oregon (Tax Foundation). These states do, however, impose selective sales taxes on items such as alcohol, tobacco, and gasoline.

[14]Taxable expenditures are defined to include these items throughout the analysis.

[15]National Council of State Legislatures (2013).

[16]Federation of Tax Administrators (2007).

[17]Sjoquist, Wallace, and Winters note that services and medical goods and services make up a larger share of total purchases among older individuals.

[18]Census Bureau 2011 Annual Surveys of State and Local Government Finances.

[19]Based on Census Bureau data for fiscal year 2011.

[20]They find that population aging will increase the cost per taxpayer of current benefits.

[21]Based on Census Bureau population projections published in 2013. Using population projections published in 2005 results in a 5.3 percent reduction in revenue per capita.

[22]To reduce sampling error, individual level income tax data is pooled from the Annual Social and Economic Supplements of both the 2011 and 2012 Current Population Surveys (CPS) conducted by the Census Bureau. From this data, the average state income tax liabilities after credits are calculated for each state and for each age cohort. Population estimates for 2011 are the most recent available population data from the Census Bureau.

[23]Census Bureau, 2011 Annual Surveys of State and Local Government Finances.

[24]According to Mulder, the Census Bureau experienced larger forecasting errors during times of a dynamic shift in the trends of fertility, mortality, or net-migration rates. A recent stabilization of these factors has led to an increase in forecast accuracy. Furthermore, data availability, quality, and methodology improved in recent years. For example, the average of the mean absolute percent errors for five-year-ahead projections of annual U.S. population growth made in the 1990s was 3.13 percent, an improvement when compared with the average errors of 12.85 percent in the 1980s and 13.67 percent in the 1970s. Although data are not available to test the improvement in 30-year forecasts from the mid-1990s, the improvement in short-term population forecasts and improvements in data availability and methodology suggest that the accuracy of long-term forecasts has also likely improved.

The state population projections for 2000 with a base year of 1995 had a mean absolute percentage error (MAPE) of 2.6 percent when compared to the actual 2000 census population count. This is an improvement when compared to earlier projections as various studies found a MAPE error of around 3 percent to 5 percent

for five-year projections made between 1955 through 1980 (Wetrogan and Camp-bell; Smith and Sincich). State population projections are affected by errors similar to national population projections such as birth, mortality, and net migration rates as well as an unanticipated shift in socioeconomic trends. However, according to Wang, the largest factors causing state population projection errors are erroneous base year population estimates and their population growth rates.

[25]Participation rates increased from 19 percent in 1980 to 22.1 percent in 2010 for men age 65 and older, while rates fell for men in every other age cohort. For women, labor force participation rates have increased in all age cohorts over age 25 since 1980 but still remain below rates for men (based on data from the Census Bureau's Statistical Abstracts of the United States).

[26] Based on the Census Bureau's "Methodology and Assumptions for the 2012 National Projections."

[27]Based on Census Bureau CPS income and BLS CPI-U inflation data.

[28]Census Bureau, 2011 Annual Surveys of State and Local Government Fi-nances. Alaska, Delaware, Montana, New Hampshire, and Oregon do not impost a general sales tax.

[29]Based on Census Bureau population projections published in 2013. Using projections published in 2005 results in a 1.6-percent reduction in revenue per capita.

[30]Data are not currently available that distinguish business or out-of-state spending from in-state resident spending. As a result, it is difficult to quantify how much tourism or business spending contributes to a given state's tax base and how this might impact the results of this analysis. Some business and tourism spend-ing is likely included in the expenditure estimates used in this analysis. However, estimates do not take into account the location or reason (business or personal) for expenditures.

Also, estimates of consumption expenditures used in this analysis are for indi-viduals. As such, they may not adequately reflect dependency relationships, where individuals consume on behalf of another person, such as a spouse, dependent child, or elderly adult. Changes in dependency patterns over time could influence expenditure patterns and sales tax revenue over time and should be considered when interpreting results.

[31]These projections use the U.S. population projections from the Census Bu-reau as published in 2013.

[32]To obtain this estimate, fiscal year 2011 state individual income tax collec-tions were reduced by 2.4 percent and total state sales collections were reduced by 0.5 percent. This decline in revenue was compared to total tax revenue in fiscal year 2011.

[33]For example, Congressional Budget Office; Government Accountability Office; and Lee and Edwards.

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