

## An Actuarial Perspective on the 2021 Social Security Trustees Report

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The Social Security Trustees Report is a detailed annual assessment by the federal government of the solvency of the Social Security program. It also can inform discussions of Social Security’s financial challenges and possible solutions. The Social Security Administration’s actuarial staff prepares and certifies the financial projections for the Old-Age, Survivors, and Disability Insurance (OASDI) program, under the direction of the Social Security Board of Trustees. **The 2021 report reflects the recent impact of the COVID-19 pandemic and the ensuing recession,** which reduced the tax income to Social Security and contributed to making the projected combined OASDI trust fund reserve depletion date one year earlier (2034) than projected last year.

### The 2021 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance (OASI) and Federal Disability Insurance (DI) Trust Funds had the following highlights:

- **OASDI finances have been significantly affected by the pandemic and recession of 2020.** While the trustees project economic activity will recover to pre-pandemic levels by 2023, Gross Domestic Product (GDP) is projected to incur a permanent 1% reduction as a result.
- The combined **Social Security trust fund reserves are projected to become depleted during 2034\***, one year earlier than projected in last year’s report.
- If changes to the program are not implemented before 2034, **only 78% of scheduled benefits would be payable after depletion in 2034, declining to 74% by 2095.**
- The **actuarial deficit increased from 3.21% of taxable payroll to 3.54% of taxable payroll**, due to a mix of changes in near-term economic and demographic assumptions reflecting the pandemic and the 2020 recession, new program data, and methodological improvements that worsen the projected deficit by increasing expected benefit costs and lowering anticipated revenue from the taxation of benefits. These changes account for 0.27% of the total 0.33% increase to the 75-year actuarial deficit. Moving the valuation date from 2020 to 2021 adds the remaining 0.06%.
- If timely changes are not made, cutting benefits for future beneficiaries only will not be enough to achieve solvency. Instead, benefits for those retirees already receiving benefits would have to be cut or Social Security’s income would need to be increased.

**The sooner a solution is implemented to address the sustainable solvency of Social Security, the sooner we can plan for it and the less disruptive a required solution will need to be.**

OASDI Trust Fund (TFs)		
ANNUAL REPORT	2020	2021
Projected TF Reserve Depletion Date	2035	2034
Percentage of Benefits Payable at TF Reserve Depletion	79%	78%
Percentage of Benefits Payable in 75th Projection Year	73%	74%
75-year Actuarial Deficit (as a percentage of taxable payroll)	3.21%	3.54%

\*Assumes that the OASI and DI tax rates can be reallocated between trust funds (which was allowed by law in the past).

## Social Security Out of Balance— Sooner than Originally Projected

The last substantial changes made to the Social Security system occurred in 1983. At that time, the trustees projected that all scheduled benefits would be payable through 2057, the end of the 75-year projection period. That projection was based upon demographic assumptions regarding longevity, birth rates (fertility), immigration, and disability incidence as well as economic assumptions regarding interest rates, wage growth, inflation, and productivity gains. The trustees anticipated the increased longevity of Americans and the drop in fertility after the baby boom generation. Their 1983 population forecasts have stood the test of time. However, the economy has not progressed as projected in 1983<sup>1</sup>, so the reserve depletion date is now more than 20 years earlier than projected in 1983.

To support the future benefits promised in the 1983 amendments, including the ability to pay the baby boom generation in retirement, more money was accumulated in the OASDI trust funds than was required to pay immediate benefits. At the end of 2020, the amount in the trust funds was \$2.9 trillion. As has been known for many years, this amount in concert with taxes and trust fund earnings will likely not support benefits through 2057. The trustees project that full benefits will only be sustainable until 2034—the date the combined trust fund reserves are expected to be depleted. Benefits will continue to be payable after that date but not fully unless legislative action is taken.

The projected date at which the system will no longer be able to pay full benefits is based on an analysis of projected income and benefits under three deterministic assumption sets as well as on stochastic projections of the future. The deterministic assumption sets are referenced as intermediate, low-cost, and high-cost. The intermediate assumptions reflect the trustees' best estimates of future experience. The trustees present low-cost and high-cost results to provide a range of possible future experiences. They note that actual future costs are unlikely to be as extreme as those portrayed by the low-cost or high-cost projections. Table 1 shows when the trustees project the system will no longer be able to pay full OASDI benefits under the intermediate assumption set as well as stochastic projections.

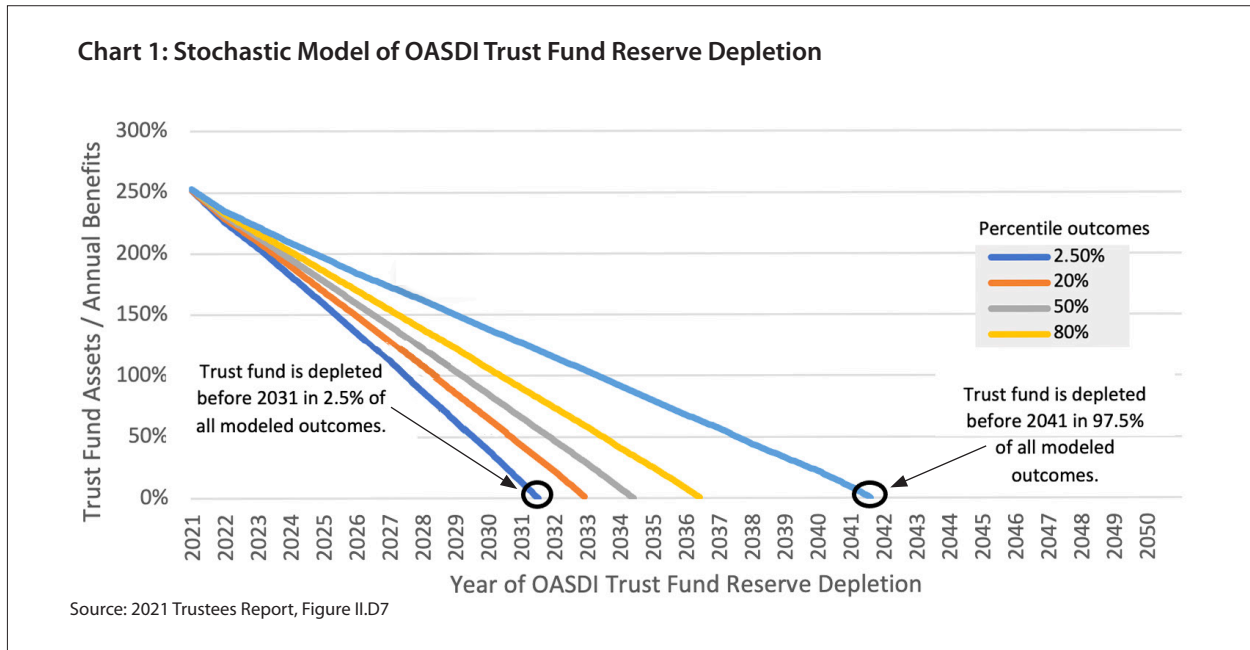
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<sup>1</sup>For example, real wage growth and real interest rates have not been as favorable, as shown in Charts 5 and 6 below.

Members of the Social Security Committee, which authored this issue brief, include Amy Kemp, MAAA, ASA, EA—Chairperson; Janet Barr, MAAA, ASA; Gordon Enderle, MAAA, FSA; Margot Kaplan, MAAA, ASA, FCA; Eric Klieber, MAAA, FSA; Alexander Landsman, MAAA, FSA, EA; Leslie Lohmann, MAAA, FSA, FCA, FCIA, EA; Mahrukh Mavalvala, MAAA, FSA, EA; Gerard Mingione, MAAA, FSA, EA; and Brian Murphy, MAAA, FSA, FCA, EA.

**Table 1: Projected Year in Which Current System Cannot Pay Full OASDI Benefits**

Intermediate Assumption Set	50 <sup>th</sup> Percentile of Stochastic Model	95% Confidence Interval of Stochastic Model
2034	2034	2031–2041



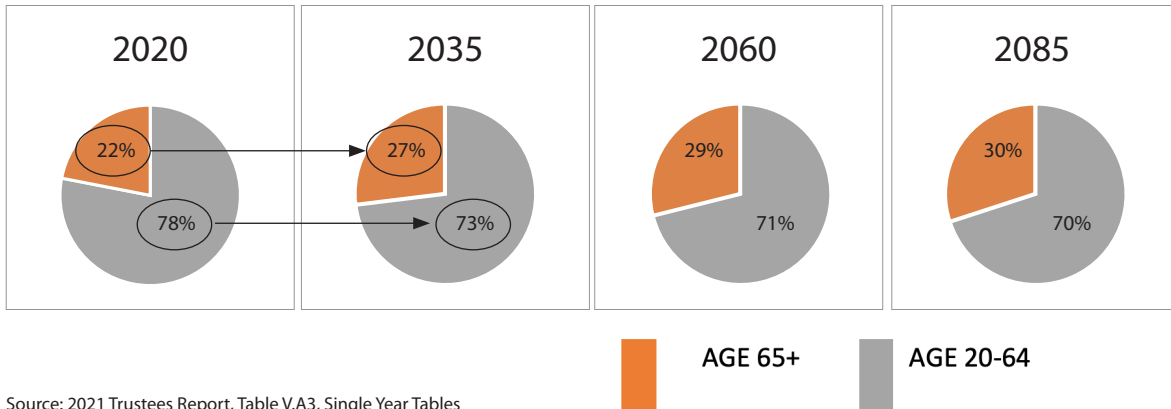
The 95% confidence interval referenced in table 1 is shown in Chart 1 by the leftmost and rightmost lines. In 95% of the scenarios generated by the trustees’ stochastic model, the OASDI trust fund reserves are depleted sometime between 2031 and 2041. This type of analysis shows the inherent uncertainty in projecting a complex system like OASDI and also shows the imbalances in the system are unlikely to be corrected without legislative action. More information on stochastic projections can be found in the Academy issue brief [A Guide to the Use of Stochastic Models in Analyzing Social Security](#).

## Demographic Issues

The projected imbalance in the system is essentially a story of demographics and wages. We first look at demographic issues. Wage and other economic issues are discussed later in this brief.

The series of pie charts on page 4 show the current and forecasted ratio between working-age adults and non-working-age adults in the United States. In rough terms, the population in the 20-64 age group comprise the workers paying taxes into the Social Security system to provide benefits generally to those in the age 65+ group. The projected system imbalance is a result of the taxpayer group becoming a smaller percentage of the overall population and thus not providing enough income to the system to pay all projected benefits to a relatively larger beneficiary group.

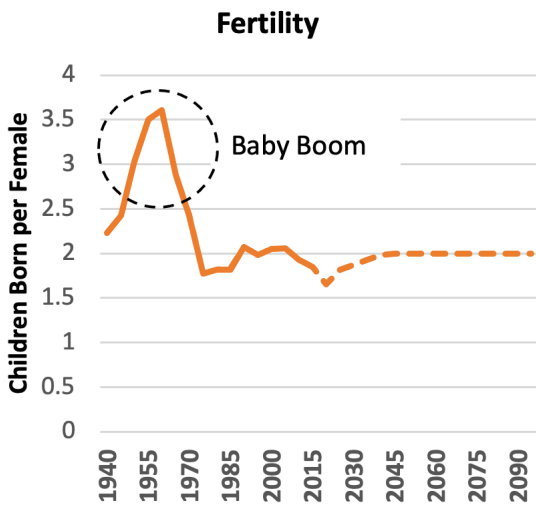
**Chart 2: U.S. Population: Comparison of Working Age Adults to Adults Age 65+**



Source: 2021 Trustees Report, Table V.A3, Single Year Tables

The projected aging of the U.S. population has been long anticipated. The “baby boom” from 1946–1964 was followed by a drop in the fertility rate and a materially smaller generation of succeeding workers (see Chart 3). In addition, average life expectancy at age 65 has increased significantly and is anticipated to continue increasing (see Chart 4). These two demographic trends combine to put stress on the Social Security system.

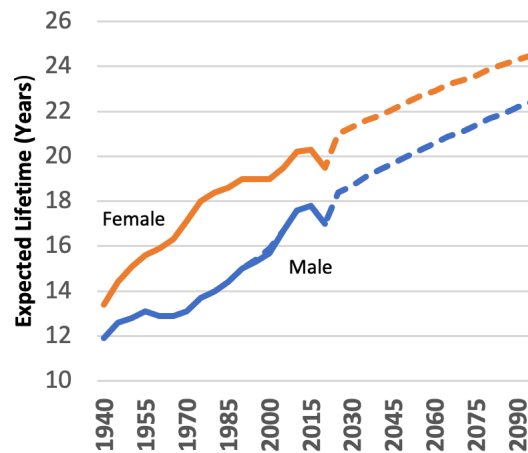
**Chart 3**



Source: 2021 Trustees Report, Table V.A1

**Chart 4**

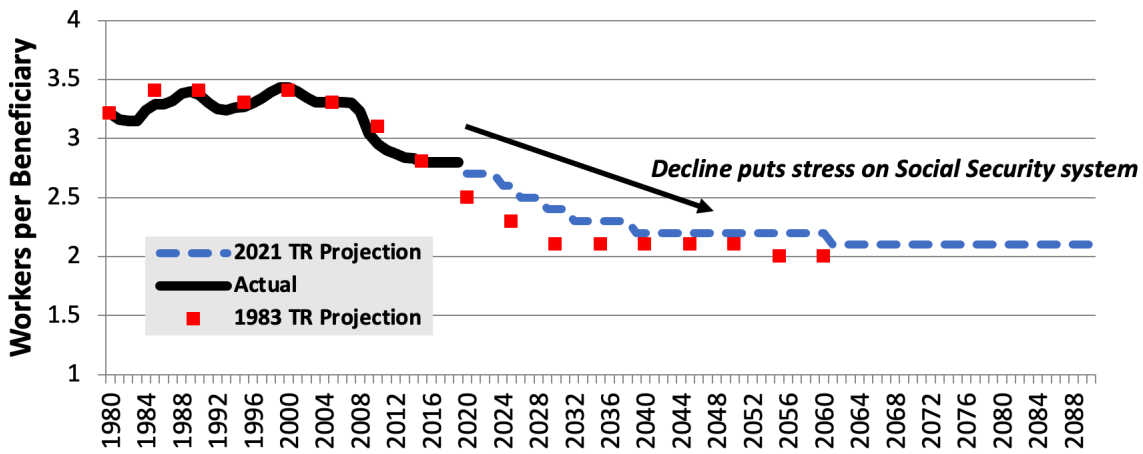
**Period Life Expectancy at Age 65**



Source: 2021 Trustees Report, Table V.A4, Single Year Tables

One way to express the impact of lower fertility rates, increased longevity of Social Security beneficiaries, and the overall aging of the U.S. population is to measure the ratio of projected workers to beneficiaries. Chart 5 shows the number of workers per beneficiary starting in 1980 and projected forward.

Chart 5: Projected Workers per Beneficiary



Source: 2021 Trustees Report, Table IV.B3, Single Year Tables  
 1983 Trustees Report, Table 28, Alternative II-B assumptions

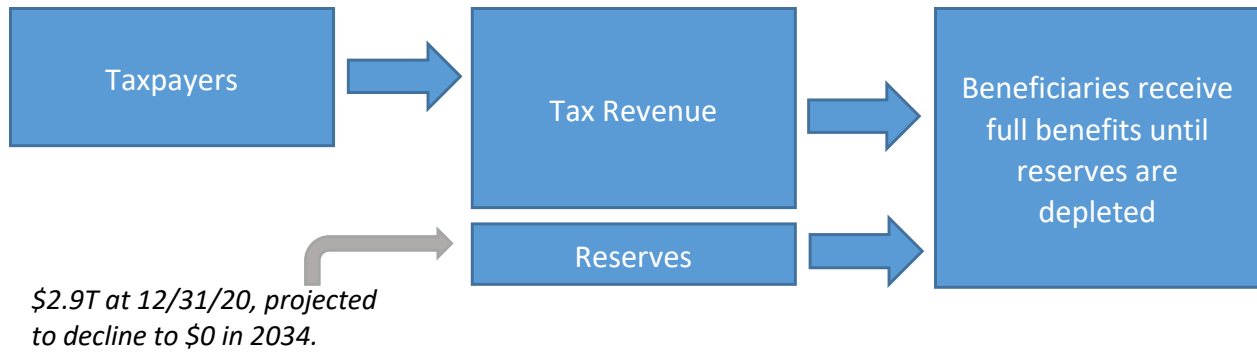
The decline in workers per beneficiary has been anticipated for several decades. The red points in Chart 5 show the projection from the 1983 Trustees Report.

Immigration is another demographic trend that affects the finances of Social Security. According to the Trustees Report, the OASDI cost rate decreases slightly with higher net immigration because immigrants largely comprise young age groups, thereby increasing the numbers of covered workers earlier than the numbers of beneficiaries. Appendix D, Table VI.D3 of the Trustees Report, and Table 2 below, show that increasing immigration by 440,000 people per year (35% of the intermediate assumption of 1,248,000) decreases the actuarial deficit by 0.39% of payroll yet leaves the projected trust fund reserve depletion date unchanged at 2034.

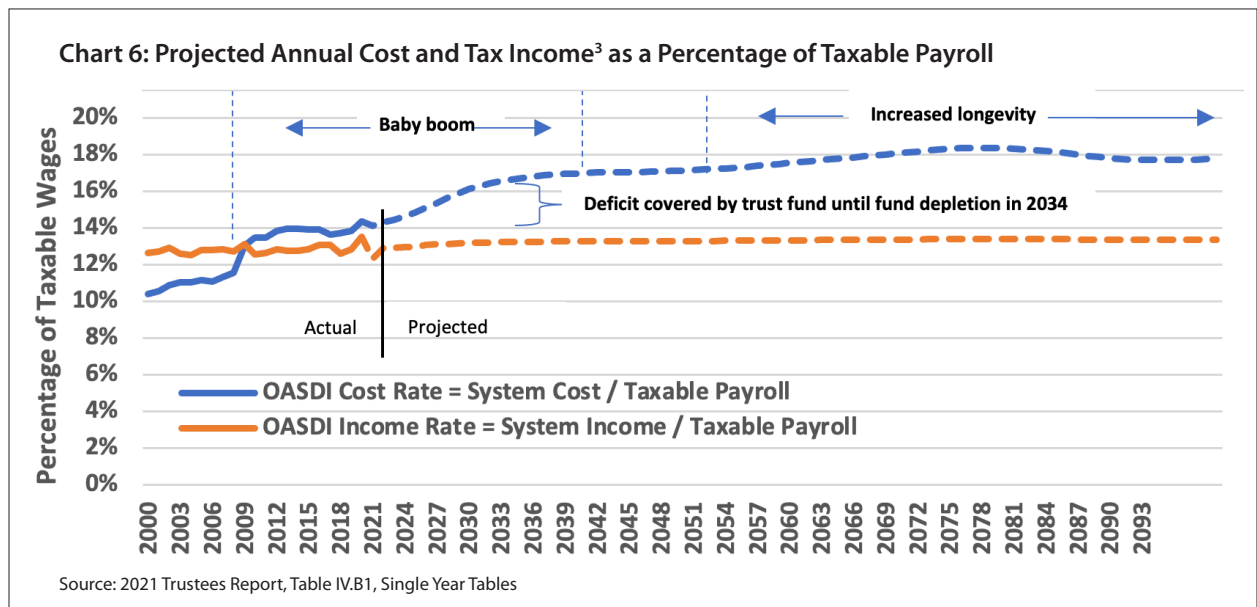
## Cost Rates

Today’s Social Security tax rate<sup>2</sup> (6.2% of earnings up to the wage base for both employees and employers) has been in place since 1990. During the period when the ratio of workers per beneficiary was higher than it is now, this rate allowed the system to build a \$2.9 trillion reserve. However, the tax rate is not sufficient to support projected benefits beyond the middle of next decade. As the number of workers per beneficiary decreases, the taxes paid by those workers along with other system income cannot keep pace with the projected increase in benefit payments. In fact, the cost of paying full benefits is projected to exceed total income in 2021 for the first time in decades. At the time the reserves are depleted, incoming tax revenue will only be able to support 78% of the projected benefits.

<sup>2</sup>Collected as payroll taxes under the Federal Insurance Contributions Act (FICA).



The trustees define the annual cost rate of the system to be the projected cost of benefits divided by the projected taxable payroll. Looking at the likely path of the future annual cost rate in Chart 6 is yet another way to see how the aging of the U.S. population affects Social Security finances.



## The Effect of Alternate Fertility, Mortality, and Immigration Assumptions

In addition to evaluating the Social Security program under different assumption sets and a model, the trustees evaluate how each of the fertility, mortality, and immigration assumptions separately affect the program’s finances. The report shows the impact of fertility, mortality and immigration rates on long-term system finances. However, due to their delayed outcomes, variations in these rates over the next 25 years will not change the conclusion that the system will be unable to pay full benefits by the middle of next decade. Table 2 summarizes the results of the analysis.

<sup>3</sup>Excludes income from interest earned on invested trust fund asset reserves.

**Table 2: Adjusting Fertility, Mortality, and Immigration Assumptions; All Other Assumptions Are Intermediate**

	Low-Cost Assumption	Intermediate Assumption	High-Cost Assumption
<b>Average Annual Total Fertility Rate 2031–2095</b>			
Children per woman	2.19	1.99	1.69
75-year actuarial deficit	3.07%	3.54%	4.26%
Projected year in which full benefits cannot be paid	2034	2034	2034
<b>Average Annual Death Rate Reduction 2031–2095</b>			
Mortality reduction (assumed average annual decrease in adjusted death rates)	0.28%	0.74%	1.25%
75-year actuarial deficit	2.89%	3.54%	4.28%
Projected year in which full benefits cannot be paid	2034	2034	2034
<b>Average Annual Total Net Immigration 2031–2095</b>			
Net annual immigration	1,688,000	1,248,000	830,000
Actuarial deficit	3.14%	3.54%	3.95%
Projected year in which full benefits cannot be paid	2034	2034	2033

The short-term impact of fertility and mortality variations are clear—workers that will be available in the middle of next decade are already born, and future fertility rates will not change their number. Similarly, any increase or decrease in expected lifetimes will take many years to ripple through the system and will not change the outlook for the system as projected for the middle of the next decade.

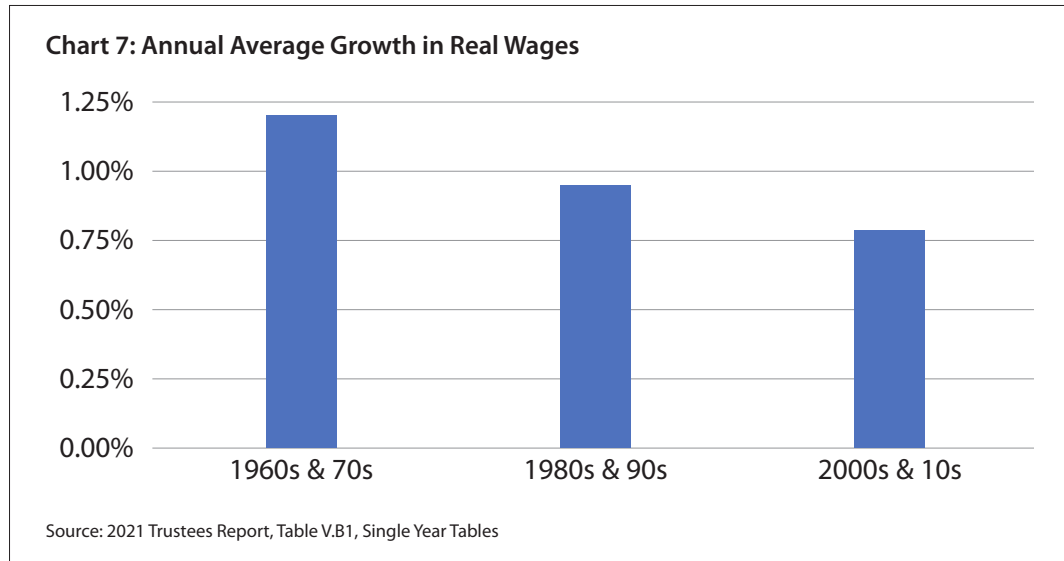
## Economic Issues

While the projected imbalance is driven primarily by demographics, the economy and the wages that individuals earn also have an effect on the sustainability of the system.

### Taxable Payroll

The decline in the ratio of workers to beneficiaries would put less stress on the system if taxable payroll increased enough to offset the declining ratio. Unfortunately, increases in taxable payroll have not been enough, thus exacerbating the demographic problem.

The trustees project real wages and use that projection to derive taxable payroll. Chart 7 below shows that the growth in real wages has steadily decreased over the past six decades. In the 1983 Trustees Report, intermediate assumption set II-B projected that real wages would ultimately increase at 1.5% per year. As Chart 7 shows, actual experience has been less than projected.



If future gains in taxable payroll are less than expected, additional stress will be put on the system via lower-than-expected tax revenue. Lower wages will also result in lower benefits, but the payment of those lower benefits is far in the future, and the net result is a degradation of the system’s current actuarial deficit. More information on the trustees’ assumptions can be found in the Academy issue brief [Assumptions Used to Evaluate Social Security’s Financial Condition](#).

#### Effect of Health Care Premiums on Taxable Payroll

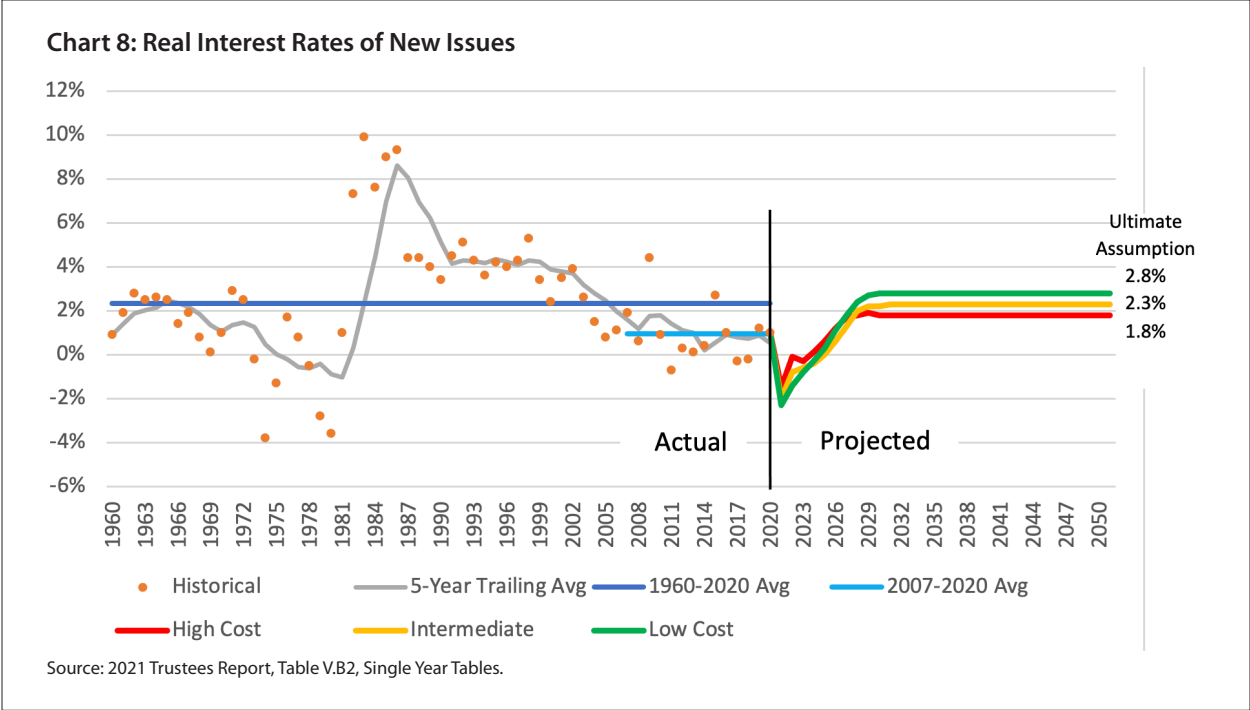
Employer-paid premiums for health insurance are not subject to Social Security payroll taxes under current law. These amounts have grown faster than wages in recent years, becoming a larger proportion of total compensation, effectively suppressing the growth of taxable payroll. This reduction in tax income has a negative financial effect on the OASDI program over both the short-range and long-range projection periods.

#### Effect of Low Interest Rates

OASDI trust fund asset reserves consist entirely of special U.S. Treasury securities that are issued each year as needed to invest any surplus of income over outgo. The interest rate on these securities at issue is set by law and is equal to the average market yield on marketable interest-bearing securities of the U.S. federal government with four or more years to maturity. Over the past four decades, these interest rates have fallen significantly. Chart 8 shows the interest rates on new bond issues net of the rate of inflation for the year.

Note that the rates in Chart 8 are those on new bond issues. This rate generally varies from the actual return realized on the full portfolio of bonds held by the trust funds, which includes bonds issued over a range of recent years.





Both trust fund asset reserves are small compared to the value of all the benefits that Social Security pays and their expected future yields are low. As a result, the effect of future interest earned by the trust funds is modest. As shown in Table 3 below, the current projected OASDI trust fund reserve depletion date of 2034 is unchanged under the low-cost and high-cost assumptions for real interest rates. On an ongoing basis, if rates over the next several decades continue to stay lower than in the past, system costs will increase marginally. For example, under the high-cost assumption rate of 1.8%, the 75-year actuarial deficit deteriorates by 0.19% of payroll (3.72% high-cost assumption versus 3.54% intermediate assumption).

**Table 3: Adjusting Real-Interest Rate Assumptions, All Other Assumptions are Intermediate**

	<b>Low-Cost Assumption</b>	<b>Intermediate Assumption</b>	<b>High-Cost Assumption</b>
Ultimate Real Interest Rate	2.8%	2.3%	1.8%
Actuarial Deficit	3.35%	3.54%	3.72%
Projected Year in Which Full Benefits Cannot Be Paid	2034	2034	2034

## Rebalancing Social Security

Restoring balance to the Social Security system could involve raising taxes, changing benefits, or finding a combination of these two approaches. Focusing on taxes alone, Table 4 shows that under the intermediate assumption set, an immediate combined employee/ employer tax rate increase of 3.36% of taxable payroll (about 27% of the current 12.4% rate) would be necessary to support all projected benefits under the current system over the next 75 years. The table also shows an immediate 21% cut in benefits for all current and future beneficiaries would be necessary to balance the system over the next 75 years if taxes remain unchanged.

**Table 4: Immediate Action to Achieve Solvency<sup>4</sup>**

Immediate increase in payroll tax rate without change to benefits	3.36% tax increase*
Immediate decrease in benefits for all current and future beneficiaries without change to tax rate	21% benefit decrease**

\*A 3.36% increase implies a 1.68% increase for employees and a 1.68% increase for employers. Resulting rates would be 7.88% for employees and 7.88% for employers.

\*\* If decreases were delayed to 2034, required benefit decreases would be 26%.

Table 4 shows the bookend options. The trustees note that lawmakers have a broad range of policy options regarding changes to the system, many of which combine changes to tax rates and benefits. It is important to note that changes in tax rates can be applied to all workers or a subset of workers. Likewise, changes to benefits can be applied to all beneficiaries or to a subset of beneficiaries. Readers may be interested in Academy [issue briefs](#) on Social Security reform on changing benefits, increasing taxes, and raising the retirement age. In addition, see the American Academy of Actuaries' [Social Security Game](#) to see how the various public policy options can be combined to restore balance to the system.

## A Moving Target and Sustainability of the Social Security System

As discussed above in this issue brief, recent Trustees Reports indicate that the trust fund reserves will be depleted sooner than the 1983 projections had suggested. With any projection of a system as complex as Social Security, there is the potential for the future to unfold differently than the assumptions. In fact, future results may differ *significantly* from those in the current report due to future experience that differs from that anticipated by the economic or demographic assumptions. The variability in the date that the OASDI trust fund reserves are depleted as shown in Chart 1 above illustrates this concept well.

<sup>4</sup>The tax rate increase of 3.36% differs from the 3.54% actuarial deficit primarily because the tax rate increase is the increase required to maintain solvency throughout the period with a zero trust fund reserve at the end of the period, whereas the actuarial deficit also incorporates an ending trust fund reserve equal to one year's expense at the end of the projection period. While such an increase in the payroll tax rate would cause some behavioral changes in earnings and ensuing changes in benefit levels, such changes are not included in these calculations because they are assumed to have roughly offsetting effects on OASDI actuarial status over the 75-year long-range period as a whole.

Under the trustees' definition, solvency is achieved when reserves combined with projected system income covers projected system expenses for a 75-year period. However, that definition has proved inadequate in certain circumstances. For example, if the expected income coming into the Social Security trust funds in the 76th and later years is less than the expected outgo in those years, the actuarial balance will deteriorate in the very next Trustees Report (and every year after that). Because of this, the trustees have for some time set a higher benchmark, *sustainable* solvency,<sup>5</sup> which is achieved when the projected trust fund ratio is positive throughout the 75-year projection period and is either stable or rising at the end of the period.

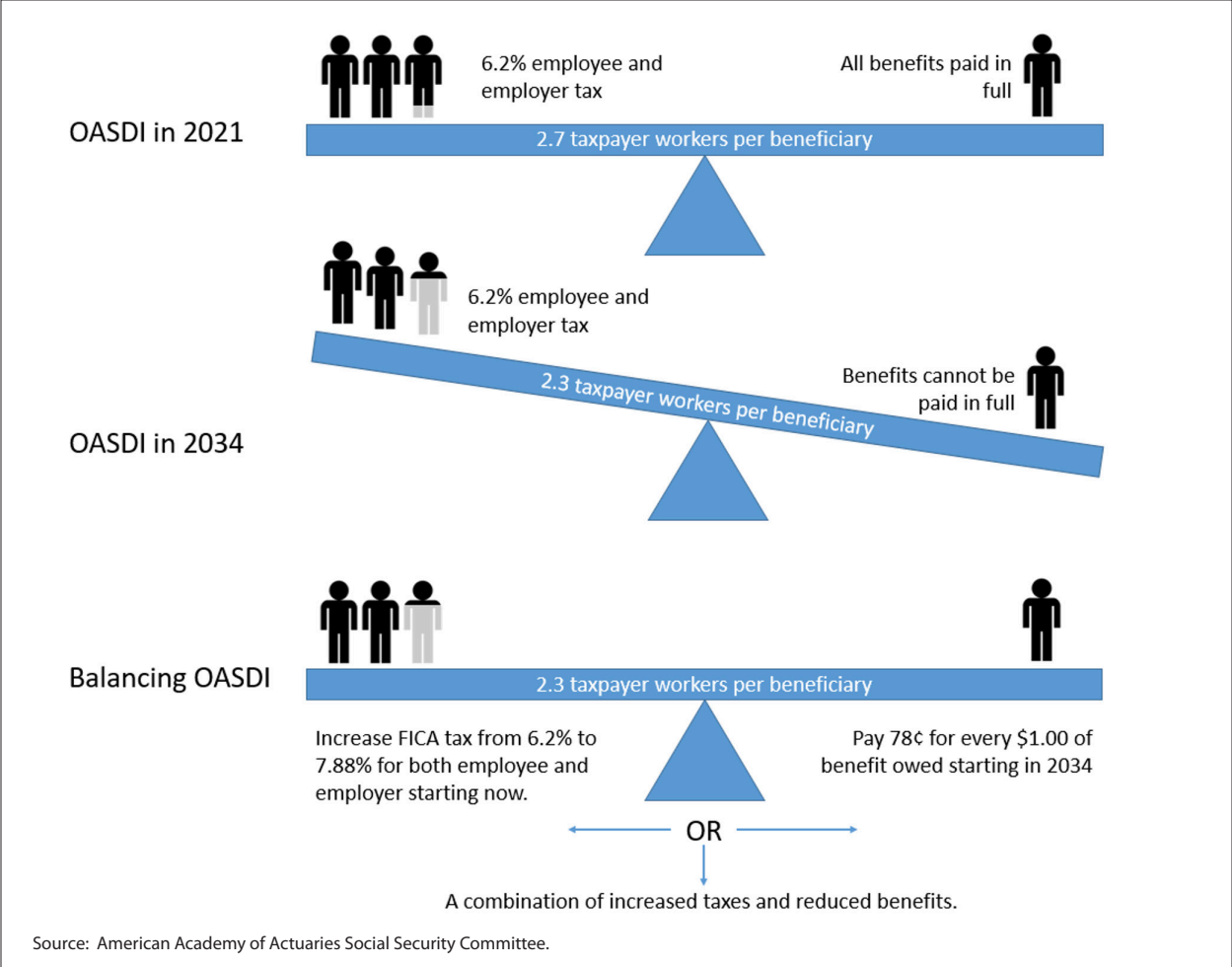
Because it cannot be predicted with certainty what will happen in the future, one way to keep Social Security sustainably solvent would be to have automatic adjustment mechanisms, such as automatically increasing Social Security's Normal Retirement Age depending on how much longevity increases in the future or increasing taxes (or reducing benefits) if fertility rates, immigration, real wages, or investment returns decrease. Such automatic changes could have limits placed on them and/or be subject to congressional approval or disapproval. This subject is discussed in more detail in the Academy's issue brief [Social Security—Automatic Adjustments](#).

## A Summary in Graphic Form

The graphic below summarizes the Social Security system's current imbalance. Today, taxes from the nearly three workers per retiree (along with revenue from benefit taxation and interest on the OASDI trust funds) plus asset reserves in the trust funds are sufficient for the OASDI system to pay 100% of all benefits. By the middle of the next decade, the number of retirees is projected to have grown much faster than the number of workers and the OASDI trust fund reserves are projected to be depleted. At that point, the program revenue is projected to be sufficient to pay only 78% of all benefits due. Legislative changes, which range from raising taxes to cutting overall benefits (or some of both), are needed to correct the system's imbalance.

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<sup>5</sup>Described on pages 18 and 25 of the current Trustees Report.



**A Word on Disability**

The Social Security system also provides benefits to disabled workers. The number of workers applying for disability benefits has decreased materially since the 2008–2009 recession. The 2021 Trustees Report shows that longer-term disability incidence is assumed to rise gradually from the current low levels to an ultimate age-sex-adjusted disability incidence rate of 5.0 per 1,000 by the end of the short-range projection period, the same rate as assumed in the 2020 report. By 2030, the trustees project that the percentage of total system benefits paid due to disability will drop from the current level of 13.1% to 10.6%.

## Technical Notes

The following notes are applicable to this issue brief.

- There are two trust funds in the Social Security system; one for the old-age and survivor benefits (OASI Trust Fund) and one for the disability benefits (DI Trust Fund). Currently, each trust fund tracks revenue and expenses separately. The DI Trust Fund had been projected to run out of money in 2016 but Congress authorized the OASI Trust Fund to transfer money to the DI Trust Fund to prevent that from happening. This issue brief discusses the Social Security system as a whole (OASI and DI combined) under an assumption that Congress will continue to amend the law as needed to permit the transfer of funds between OASI and DI to stave off any shortfall in one trust fund or the other.
- Unless otherwise indicated, all numbers, charts and tables are taken from 2021 Trustees Report.
- Unless otherwise indicated, the term “benefits” includes retirement, disability, and survivor benefits and expenses.
- Unless otherwise indicated, the term “income” includes revenue from payroll taxes and taxes on OASDI benefits as well as trust fund earnings.
- The intermediate assumption set reflects the trustees’ best estimates of future experience. Therefore, most of the figures in the Trustees Report and in this issue brief present outcomes under the intermediate assumptions only. The trustees also present results under low-cost and high-cost alternatives to provide a range of possible future experience. The Trustees Report states that actual future costs are unlikely to be as extreme as those portrayed by the low-cost or high-cost projections.
- The trustees also look at OASDI finances under 5,000 independently generated stochastic simulations that reflect randomly assigned annual values for most of the key parameters. These simulations produce a distribution of projected outcomes and corresponding probabilities that future outcomes will fall within or outside a given range.

# Appendix I

## References

Annual Trustees Report and related Social Security Administration publications

[\(<http://www.ssa.gov/OACT/pubs.html>\)](http://www.ssa.gov/OACT/pubs.html)

## Academy Resources

[\*Individual Equity and Social Adequacy in The U.S. Social Security System—A Public Policy Monograph\*](#) (March 2021)

[\*Issue Brief on Individual Equity and Social Adequacy\*](#) (March 2021)

[\*Immigration and Social Security\*](#) (December 2020)

[\*Assumptions Used to Evaluate Social Security Program\*](#) (November 2020)

[\*Social Security — Automatic Adjustments\*](#) (May 2018)

[\*Women and Social Security\*](#) (May 2017)

[\*Helping the ‘Old-Old’—Possible Changes to Social Security to Address the Concerns of Older Americans\*](#) (June 2016)

[\*Academy Essential Elements Paper on Social Security\*](#) (July 2014)

[\*Social Security Individual Accounts: Design Questions\*](#) (May 2014)

[\*Quantitative Measures for Evaluating Social Security Reform Proposals\*](#) (May 2014)

[\*Social Security Reform Options: A Public Policy Monograph\*](#) (March 2014)

[\*Means Testing for Social Security\*](#) (December 2012)

[\*Significance of the Social Security Trust Funds\*](#) (May 2012)

[\*Understanding the Assumptions Used to Evaluate Social Security’s Financial Condition\*](#) (May 2012)

[\*Social Security Reform: Possible Changes in the Benefit Formulas and Taxation\*](#) (June 2010)

[\*Raising the Retirement Age for Social Security\*](#) (October 2010)

[\*Investing Social Security Assets in the Securities Markets\*](#) (March 2007)

[\*Social Security: Evaluating the Structure for Basic Benefits\*](#) (September 2007)

[\*A Guide to the Use of Stochastic Models in Analyzing Social Security\*](#) (October 2005)

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