Analyzing the Actuarial Balance: The Social Security Board of Trustees 2023 Report

Introduction

Social Security is projected to become depleted one year sooner. The Social Security Board of Trustees reported that Social Security's trust fund will become depleted in 2034 as opposed to 2035 as reported last year (SSBT, 2023 & SSBT, 2022). Each year, the Social Security Board of Trustees, publish a report accessing the financial solvency of the Social Security program. It has been known for quite some time that Social Security is insolvent meaning the amount of future taxes combined with the current trust fund assets are not sufficient to pay out future benefits. The program's trust fund invests in special issue treasury assets. This trust fund serves as a buffer for when payroll taxes are lower than benefits payable. However eventually this buffer is projected to run out as more of the US population retires. For more details on the Social Security program, check out my previous article.

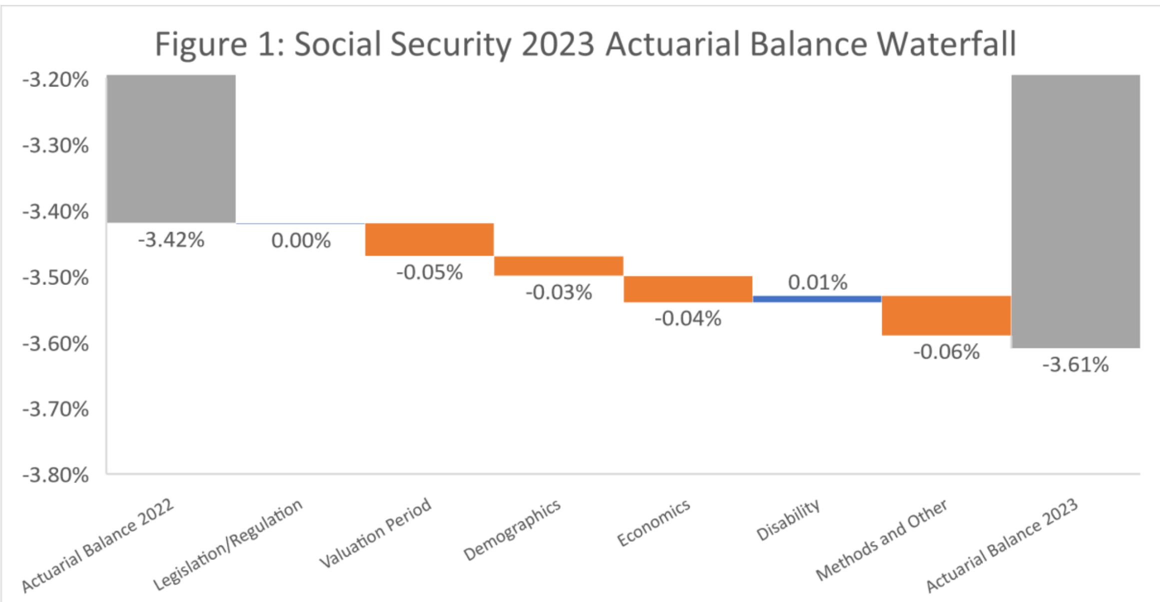
In addition to the depletion date, the trustees also report on a less interpretable figure called the actuarial balance. The actuarial balance basically represents present value of benefits that cannot be paid divided by the present value of taxable payroll[1]. The taxable payroll is the projected income that is subject to the Social Security tax. As such the actuarial balance can be thought of the increase in the payroll tax rate needed to make Social Security solvent.

Per the recent report, the actuarial balance is -3.61% (SSBT, 2023). This represents a 0.19% reduction from the 2022 actuarial balance of -3.41% (SSBT, 2022). Table 1, below summarizes the factors contributing to the decline in the actuarial balance. While the components may seem insignificant, it should be noted they are a percentage of the present value of future taxable payrolls over 75 years. Since this present value of future US taxable payrolls is roughly $655 trillion each 0.01% decrease in the actuarial balance is roughly $65 billion in present value. Thus, the actuarial balance implies the total value of the Social Security's deficit today is roughly $23.6 trillion, greater than the US GDP.

[1] Technically, the actuarial balance also makes provision for the trust fund ratio (Trust fund balance / Benefits) at the end of the projection period being 100% (SSBT, 2023).

Table 1: 2023 SSBT Actuarial Balance Waterfall	Balance %
Actuarial Balance 2022	**-3.42%**
Legislation/Regulation	0.00%
Valuation Period	-0.05%
Demographics	-0.03%
Economic Data	-0.04%
Disability Data	0.01%
Methods and Other Assumptions	-0.06%
Total Change*	**-0.19%**
Actuarial Balance 2023	**-3.61%**

** Difference due to rounding*



The valuation period difference is solely due to rolling their model forward one year and represents the projected additional cost that will be realized 75 years from now. There are several offsetting demographic sub-factors driving the 0.03% demographic decrease in actuarial balance. Fertility rates were assumed to be slightly lower which hurts Social Security. However, mortality has been high since the Covid-19 pandemic which has helped the program by reducing benefits payable, but only slightly. In addition, immigration assumptions were revised downwards. Economics is driven by worse off short-term economic outlook projected by the Trustees which will decrease wages. There is a slight offset due to higher interest rates. However, higher interest rates have been accompanied by higher inflation rates which increases benefits payable to retirees. In addition, because Social Security invests in long term bonds, it locked in its portfolio rate[2] when interest rates were very low during the post-2008 era. This means that the trust fund's

[2] The average rate earned on assets within the trust fund

portfolio yield will not rise as quickly as the prevailing treasury rates. Methods and Other Assumptions includes an adjustment for average benefits from last year which factors in the 8.7% 2022 cost of living adjustment (OCA). In addition, there are other adjustments that I will discuss later.

For the remainder of this paper, I will focus on the components driving the actuarial balance. I have divided the paper into three parts; 1) Demographic Assumptions, 2) Economic Assumptions and 3) Additional Impacts.

Demographics

Fertility and Immigration

The birth rate in the United States is quite frankly too low for Social Security's liking. When birth rates decline the older population will outnumber the younger generation. This trend is highlighted by the sizable cohort popularly known as the "Baby Boomers". The birth rate was above 3 children per child-bearing aged woman (SSBT, 2023). However, this rate fell and hovered around 2.0 from the 1970s to 2009. After the great financial crisis, having kids became more challenging and the birth rate fell below 2 and reached an all-time low of 1.64 in 2020 (SSBT, 2023).

The way I am describing the birth rate may seem a little too calculating but it is important to understand how low fertility rates impact the program. As such, I will entertain the reader further with my cold and calculating thinking. The US needs new lives to come into the country who will work and pay taxes in the future. Without these new lives the US will not be able to fund its operations which includes paying retirement benefits to Social Security recipients. Now obviously valuing lives as just a means to fund a pension plan is detestable. However, you need taxes to fund a government. Currently, there are not enough younger people in the US to support the older age population. This problem is not just limited to the US but is a worldwide phenomenon (UN DESA, 2020). As to how the US can address this problem, that is a public policy decision. A non-specific solution could be the US should make it cheaper and easier to have children.

Alternatively, it is possible add new lives into US through immigration. If more immigrants enter the US, the population will get younger. This is under the assumption that immigrants are generally young working-age people. This in turn will reduce our ratio of retiree to active workers. Again, this is another public policy decision. However, regardless the US likely needs to increase its tax base to support its aging population or there will be financial repercussions. As for quantifying these impacts, the worsened projected birth rates decreased the actuarial balance by 0.01% and decreased immigration by 0.04% (SSBT, 2023).

Mortality

We just talked about lives entering the population so it is fitting to now discuss lives who leave the population (a.k.a. mortality). We will first look at working age mortality followed by retiree mortality. When working age people die, the Social Security program loses out on future taxes it would have collected. The program may benefit overall as Social Security would no longer have to pay that person when they retire[3]. Retiree deaths are generally positive for the program as the program generally does not have to pay benefits after the beneficiary dies. I must caveat that death is not good in the philosophical sense but for pension plans, deaths reduce future liabilities. Mortality during the Covid-19 pandemic was elevated as the virus killed many Americans. In addition, other non-Covid deaths, especially deaths of despair, increased during and after the pandemic (National Center for Health Statistics, 2023). In 2022, the excess mortality for ages 15-64 was 11% and for 65+ the excess mortality appeared to range from 5-12% (SSBT, 2023). In general, this higher mortality increased the actuarial balance by 0.02%. However, this increase was more than offset by the combined negative impact from immigration and birth rates.

Economics

Interest Rates and Inflation

Both interest rates and inflation increased in 2022. The inflation rate was 8.7% in 2022, up from 5.0% in 2021 (BLS). Treasury rates rose too as the 30-year treasury rate rose from roughly 2% as of year-end 2022 to roughly 4.0% as of year-end 2023. When inflation rises, benefits payable will increase because Social Security benefits are increased annually by a cost-of-living adjustment (COLA).

Social Security earned interest on its trust fund asset portfolio at a rate of 2.4%. You might astutely point out that the treasury rates are well above this amount as of this writing. However, current rates are what Social Security can earn on new assets that it purchases (called the "new money rate"). Unfortunately, Social Security is hindered from investing in these new money securities because it purchased lower yielding assets (it purchased from 2008-2021) that have not yet matured. To make matters worse, let's bring inflation back into the picture. As discussed previously, inflation leads to higher benefits each year (in 2023, retirees received an 8.7% increase in benefits (OCA)). Therefore, Social Security is being weakened by higher inflation rates and cannot benefit fully from higher interest rates since its portfolio is unable to turnover. One might wonder why Social Security invested in long term bonds at near 0% interest. This is a good question and it appears that it was a typical practice according to the Trustees report (2023 SSBT). Social Security would have been better off it bought shorter term assets when rates were near zero so it could recycle its portfolio quicker if rates ticked up. As a caveat, it is easy to have great vision in hindsight.

For 2023, the Trustees estimated the inflation rate to be 4% for 2023 and 2.53% for 2024. If inflation is higher than projected, benefits will be higher than expected because of higher COLA's which means Social Security's financial health would be worse than what is reported. From March 2022 to March 2023, the inflation rate was 5% which is above the Trustees projection but below the 8.7% experienced in 2023. Per the recent BLS March 2023 inflation report, inflation showed signs of cooling in March.

Overall, higher interest rates will allow the trust fund to eventually yield higher returns. In addition, because interest rates are higher, Social Security is once again subject to downside

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[3] Note that Social Security provides assistance to the deceased's widow and their other dependents.

interest rate risk especially when considering that the theoretical liability duration is much higher than the theoretical asset duration[4].

Wages

The projection of wages matter to Social Security since payroll taxes are a calculated as a percentage of wages. Unfortunenately the Trustees are projecting a recession in 2023 which is projected to reduce wages and therefore reduce tax receipts. In addition, the long-term outlook of wages appears problematic as labor force growth is projected to be stagnant. This conceptually makes sense given the baby boomers are retiring and relatively few new lives are projected to enter the US to replace them (whether through childbirth or immigration). The revised (downwards) economic growth assumptions in the near term and the long term reduced the actuarial balance by 0.13%. This was partially offset by higher projected interest rates which increased the actuarial balance by 0.02%.

In addition, one must also consider the variability of wages between different people. This is a fancy way of saying we should also consider wage inequality when looking at the Social Security program's solvency. Payroll taxes are only payable for the first $160,000 in wages (OCA). The cap does adjust each year for annual wage increases. However, the wealthy have seen their wages rise faster than the rest of the population. In turn the percent of taxable wages is now 82.3% of all earnings in 2022 (i.e., all earnings above contribution base are not taxable). The ratio was 88.6% in 1984 (SSBT, 2023). The problem with the 160,000 cap is that it is linked to the average wage increases per year for the population as a whole rather than average wage increases for people above the cap. This causes high earners to pay relatively less in payroll taxes over time.

Additional Impacts

Disability

In addition to providing retirement benefits, Social Security provides disability benefits to people who qualify as disabled per the program's requirements. Disability benefits are small compared to retirement benefits. Disability rates can be broken down into two components actuarily. The probability that someone will go on claim is referred to as incidence and the probability that someone will go off claim after disability is referred to as the termination rate. Incidence has been volatile since 1970. Termination rates, on the other hand, have historically declined (people stay on claim longer) with mortality improvement. The disability portion of the program is currently solvent. This is due to low disability rates experienced since 2010 (SSBT, 2023). Further, after the pandemic, termination rates and incidence have both moved in a favorable direction for Social Security (meaning lower incidence rates and higher termination rates). Incidence rates may have decreased after the Covid-19 pandemic due to fears of receiving care in formal medical institutions (SSBT, 2023). Higher termination rates have likely been driven by

[4] Duration is a financial concept that measures the sensitivity of an asset's (or liability's) value relative to interest rates. It is common for asset managers to "match" the duration of their assets and liabilities so that the overall entity value is less sensitive to interest rate changes. For more detail, see my article on this topic. Social Security's asset duration < Social Security's liability duration so downwards shocks in interest rates will increase liability valuations relatively more than asset valuations.

elevated mortality related to Covid-19 and perhaps other non-covid causes. The figures below are from the 2023 Social Security report illustrating historical age-adjusted incidence and termination rates.

Figure V.C3.—DI Disability Incidence Rates, 1970-2100
[Awards per thousand disability-exposed]

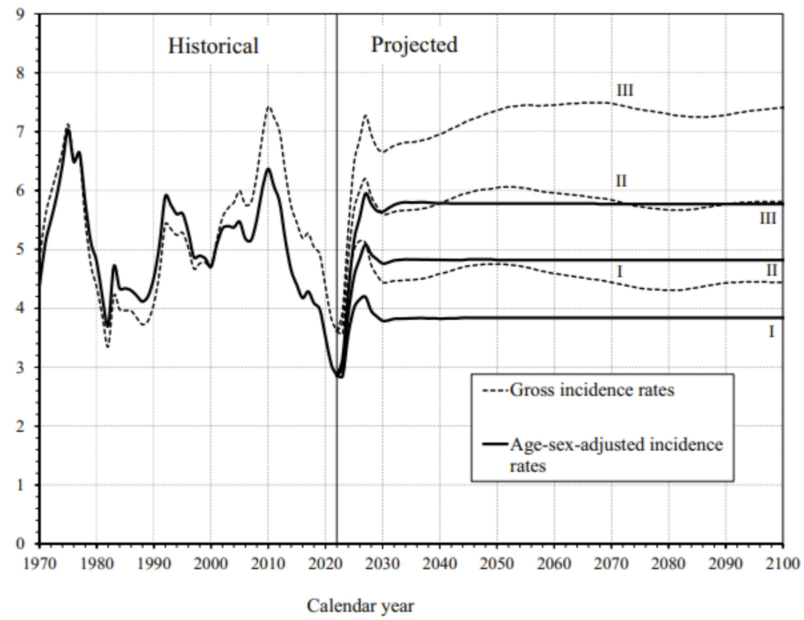
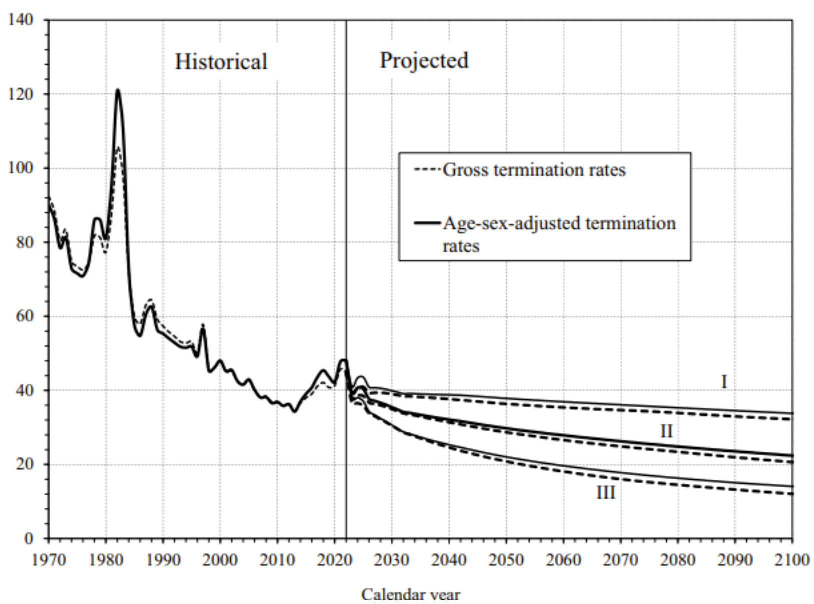


Figure V.C4.—DI Disability Termination Rates, 1970-2100
[Terminations per thousand disabled-worker beneficiaries]



Source: Social Security Board of Trustees (SSBT). (2023). The 2023 Annual Report of The Board of Trustees of The Federal Old Age and Survivors Insurance and Federal Disability Insurance Trust Funds. (Report No. 83). Washington, DC: Social Security Administration.

Other Methods and Data Assumption Changes

I will now discuss breakdown the "Methods and Other Assumptions" grouping that resulted in a -0.06% change in the actuarial balance. While -0.06% may not sound like much I must remind you that this equates to just under $400 B in present value. There are many offsetting factors contributing to this category. Per the Social Security Trustees, they are as follows;

- Slower increase in projected ultimate disability rates due to lower disability claims experienced in recent years; +0.02%
  - Reasoning: Lower disability rates means fewer future disability benefits
- Older than expected recent immigrant population; -0.02%
  - Reasoning: older immigrants will spend less years working and contributing to Social Security program and will receive benefits from the program sooner than younger immigrants.
- Benefit adjustment factors for mortality inequality; -0.03%
  - Reasoning: Trustees assume people who are wealthier will have higher benefits and have higher life expectancy. This observation has been noted by demographers as socioeconomics are a strong predictor of mortality (Waldron, 2013). Therefore, the trustees are assuming that average benefits per beneficiaries will rise with time as wealthier people live longer than the general population.
  - Note that the Trustees are adjusting an existing assumption for mortality inequality (they had been factoring this trend in before).
- Updated sampling of newly entitled beneficiaries; -0.03%
  - Reasoning: This updated sampling methods allowed Trustees to better assess the benefits levels of newly eligible beneficiaries. This modeling improvement led to higher projected benefits and thus a weakened actuarial balance.
- Other changes; +0.01%

Conclusions

The fundamental equation for the Social Security Trust Fund is as follows;

- Trust Fund Balance End of Year = Trust Fund Balance Beginning of Year *less* Benefits Paid *plus* interest earned *plus* taxes collected *less* expenses (very small).

Benefits in general are projected to increase due the aging population. In addition, benefits inflated by 8.7% in 2022 which increases the program's liability. The rate of interest earned by the Trust Fund should increase in the future due to higher interest rates. However, Social Security locked in its interest rates at low yields by purchasing many of its assets in the low yield environment that persisted from 2008 to 2020. Thus, it may not realize the full benefits of higher interest rates for several years or if at all (if interest rates come back down).

For taxes I will break down this into another equation as follows;

- Taxes = Taxes on benefits *plus* taxable payroll* Payroll Tax Rates *plus* other taxes.

Taxes on benefits will slightly offset rising benefits and other taxes can be ignored. Taxable payrolls are expected to stall for several reasons. 1) birth rates and immigration are too low to replace the baby boomer population which prevents the tax base from growing. 2) relatedly, the baby boomers are retiring which will lead to less tax payers funding Social Security. 3) a recession is projected for 2023 which will reduce earnings in the short term. And 4) taxable payrolls as a percentage of total payrolls is declining as more earnings exceed Social Security's taxable maximum. In summary, many factors affecting the program are moving in the wrong direction.

Social Security is projected to become depleted in 2034. However, by looking at its actuarial balance we can get a better sense of the programs' insolvency in the long term. Social Security's severely negative actuarial balance of -3.61% indicates that under the current design payroll tax rates must be raised by 3.61% for the program to become solvent. There are of course other ways to fix the insolvency which is another public policy discussion. However, based on the Trustee's report the program is now weaker than before.

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