



Paying for Medicare Now and in the Future

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March 2016

Summary

Medicare celebrated its golden anniversary this past year. The program now provides insurance coverage for over 50 million Americans, and accounts for 20 percent of the nation's health care spending. Its shares of the nation's output and total health care spending have grown significantly over its first 50 years.

Here we note how Medicare spending is projected to grow based on several alternative forecasts. We then estimate how lifetime Medicare benefits, taxes, and premiums are distributed across and within generations. Our estimates show that Medicare is progressive within generations. We also show that that across generations the program has, up to now, provided increasing replacement rates relative to pre-retirement earnings. Accounting for all lifetime taxes and premium payments in support of the program, we estimate that net benefits for medium earning workers will remain positive even for today's new labor force entrants. Though the program is progressive within generations, each generation's retirement benefits are paid in part by higher taxes on succeeding generations.

Moving toward equalizing the tax burden across generations can be accomplished by constraining the tax financed portion of Medicare so that per capita spending grows at the same rate as per capita GDP. We outline four alternative ways to recast the program's financing and insurance structure so as to constrain the tax-financed portion of retiree health care spending.

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Introduction

While the onset of the Affordable Care Act (ACA) has created great controversy and persistent calls for repeal, the one thing that all seem to agree on is the desirability of the low rate of growth of per-capita federal Medicare expenditures implied by the Act. Specifically, the bill calls for per-capita federal Medicare spending to grow at about the same rate as per-capita gross domestic product (GDP). What is at debate is how we get to that magic level of per-capita Medicare federal expenditure growth. The ACA does this by controlling the level of payments to suppliers of senior health care through the expectation that they increase efficiency. This increase in efficiency is embodied in the productivity adjustment in reimbursements envisioned in the Act. With more efficient providers, the increased level of senior health care required as the Medicare population expands can be supplied with per-capita costs rising at the rate of GDP growth.

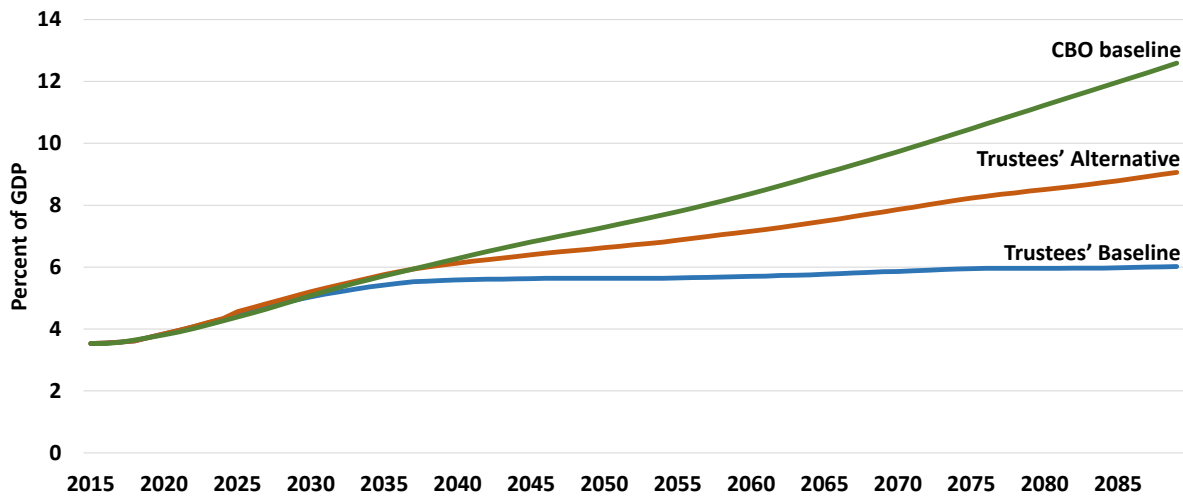
What the ACA does not do is tell us how this increase in efficiency will happen. Perhaps it harkens back to the past logic when it was argued that the supply of health care by providers was based in income targeting. In that framework, reducing the price of services would have increased supply. However, even the Medicare Trustees are skeptical of the ability of envisioned increases in productivity assumed in the Trustees baseline projections of federal Medicare costs. This skepticism is embodied in the fact that the Trustees produce an alternate forecast expressed as a share of GDP that by the close of the forecast period is a full 150% of the baseline. To add to this dose of reality the Congressional Budget Office (CBO) estimates of the future of federal Medicare expenditures will more than double the Trustees baseline by the end of the forecast period.

Figure 1 below shows three paths of future federal Medicare expenditures: the Trustees' baseline, the Trustees' alternative and the CBO's baseline. For the coming decade all three forecasts show an almost identical rising federal Medicare expenditure share of GDP. Even with different assumptions concerning the effectiveness of per-capita cost control the dominant factor over the next decade is the growth of the Medicare population as more and more of the baby boomers become Medicare recipients. Even though the rate of baby boomer retirements will remain constant over the years of the baby boomers' retirements, the rate of growth of the Medicare population will decline. Essentially the constant numerical level of baby boomer retirements will be a smaller and smaller share of a larger and larger Medicare population.

Over the long run, these three estimates of the future of federal Medicare expenditures differ greatly and the question is whether understanding the reason for the difference can help us to find reforms that will bring them together. A way to think about the differences among these three forecasts of future federal Medicare expenditures is to frame them in the context of what is referred to as excess cost growth. The goal of the ACA's provisions related to Medicare was to

constrain per-capita federal Medicare expenditure growth to the growth of per-capita GDP. Historically per-capita health care expenditures have risen faster than per-capita GDP. This difference has been ascribed to several factors.

Figure 1. Congressional Budget Office and Medicare Trustees' Estimates of Medicare Spending as a Percentage of GDP



Notes: The CBO baseline series is from the 2015 Long-Term Budget Outlook, June 2015 and the Trustees' Baseline and Alternative Series are from the 2015 Medicare Trustees Report, July 2015.

First, the share of health care expenditures that have been paid by users directly has fallen over the last 30 years from 25% to just over 10%. Second, as the nation becomes wealthier citizens have demanded and received more and better health care. Third, technological advances have decreased the cost and increased demand for body part replacements and other procedures that improve quality of life.

All of these factors have contributed to what is termed “excess cost growth” in health care. Essentially excess cost growth is the difference between per-capita health care expenditure growth and per-capita GDP growth. Put in terms of excess cost growth the goal of the ACA and of the majority of Medicare reform proposals on both sides of the aisle have been to reduce or to eliminate excess cost growth as it applies to federal expenditures. In this context the three projections of future federal Medicare spending contained in the above figure are due to different assumptions concerning excess cost growth.

Let's begin with the Trustees baseline forecast which is essentially based on the assumption that whatever is in the ACA concerning Medicare actually happens. Specifically, all productivity adjustments for paying providers really happen so for all practical purposes per-capita federal Medicare expenditures grow at the rate of per-capita GDP growth. The Act requires that reimbursements be set assuming that productivity in the provision of health care rise at the rate of increase in economy-wide productivity. The result is that the driving force behind per-capita

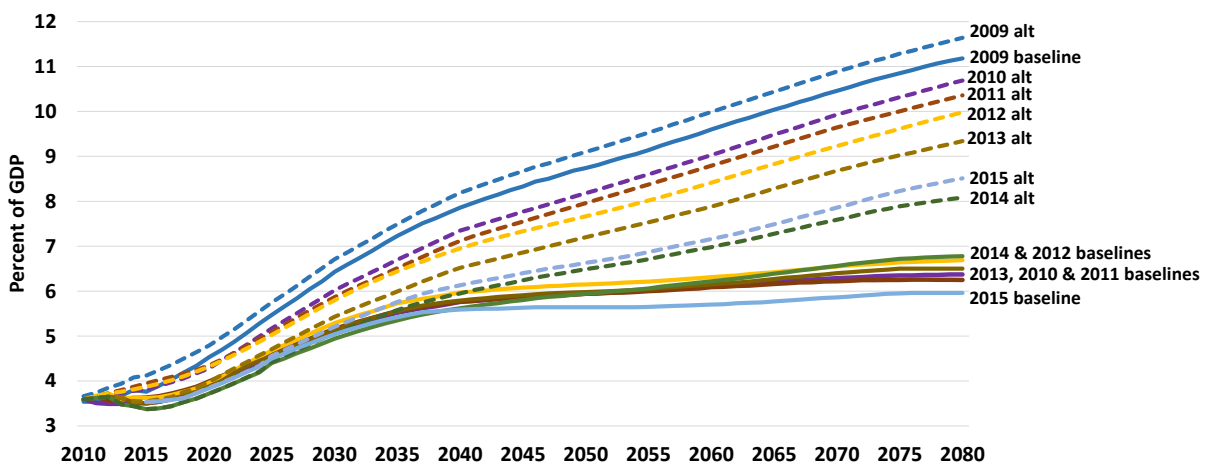
GDP growth – total factor productivity – will be matched by providers of Medicare and excess cost growth will disappear.

The Trustees alternative forecast recognizes that productivity growth in health care has always been below economy-wide productivity growth. The Trustees alternative forecast assumes that the ACA productivity adjustments occur but only for the first years of the forecast. Then beginning in 2020 the Trustees assume that the ACA imposed economy-wide productivity adjustment to Medicare reimbursements will be phased down until 2034 when the Medicare price updates reach the rate of increase assumed for private health plans. Without these changes the payment rates to providers that are currently about 67% of private insurance would fall to 40%. Clearly providers would vacate the Medicare business in response to such a draconian reduction in compensation.

The CBO baseline allows for the limits included in the ACA to be effective for the next decade, implying a modest growth in excess cost beginning with 0.4% and reaching 0.8% by the end of the decade, 2025. After 2025 the CBO assumes that long-run excess cost growth gradually rises and ultimately reaches 1.3% in 2040. The CBO forecast then combines these cost growth assumptions with the demographics of increased longevity and baby boom retirements to reach their ultimate forecast. This ultimate forecast is that federal Medicare expenditures will be more than double the Trustees baseline forecast and almost 40% greater than the Trustees alternative forecast by the close of the forecast period.

While Figure 1 above indicates that a realistic vision of the future of federal Medicare expenditures will require significant increases in taxation the estimates themselves are subject to significant uncertainty. As an illustration of this uncertainty Figure 2 below shows the history of such forecasts. As a baseline for comparison the top two lines in Figure 2 are the Trustees estimates for 2009, the year before the passage of the ACA.

Figure 2. Medicare Spending as a Percentage of GDP, Baseline and Alternative Forecasts, 2009-15 Medicare Trustees’ Reports



Notes: Medicare Trustees Reports and CMS Office of the Actuary Illustrative Alternative Projections, 2009-2015.

What is abundantly clear is that the Trustees baseline and alternative forecasts have become more optimistic with each passing year. This trend is most pronounced in the first year after the passage of the ACA. Here the 2010 Trustees baseline forecast fully incorporated the provisions of the ACA and solved the federal Medicare expenditure problem in the long-run. The fact that the 2010 alternative forecast was very little different from the 2009 baseline indicated that the Trustees were very skeptical about the future of the provisions of the ACA being realistic. Then with each passing year the level of skepticism entailed in the Trustees alternative was reduced. The objective embodied in the post-ACA Trustees baseline forecast of constraining per-capita spending growth to the rate of per-capita GDP growth is shared by the current administration, is implicit in the ACA, and is consistent with estimates of reform proposals from both sides of the aisle. Though lower federal Medicare spending is a shared objective, achieving it will require significant changes in Medicare as we know it.

As the chief actuary notes at the end of the 2015 Medicare Trustees Report,

“The ACA has been successful in reducing many Medicare expenditures to date. Although early indications from some of the alternative payment model demonstrations have been encouraging, there is a strong possibility that certain payment changes will not be viable in the long range. Specifically, the annual price updates for most categories of non-physician health services will be adjusted downward each year by the growth in economy-wide productivity. Sustaining these price reductions will be challenging for health care providers, as the best available evidence indicates that most providers cannot improve their productivity to this degree for a prolonged period given the labor-intensive nature of these services.

Absent an unprecedented change in health care delivery systems and payment mechanisms, the prices paid by Medicare for most health services will fall increasingly short of the cost of providing such services. If this issue is not addressed by subsequent legislation, it is likely that access to, and quality of, physicians’ services would deteriorate over time for beneficiaries. Overriding the price updates specified in current law, as lawmakers repeatedly did in the case of physician payment rates under the SGR formula, would lead to substantially higher costs for Medicare in the long range than those projected in this report.”¹

Is it realistic to think that federal Medicare spending per-capita can be constrained to grow at the same rate as per-capita GDP? Without significant changes in the current program recent history suggests the answer is no. In truth, attaining the shared fiscal goal will require that seniors pay for more of their health care than they would if Medicare remains on its old spending path. Seniors will either have to pay for an increasing portion of their health care through higher premiums, higher deductibles and copayments or face dramatic reductions in access to care and quality.

¹ See pages 258-259, 2015 Medicare Trustees Report.

The challenge is to find reforms that are both politically feasible and fair to both seniors and taxpayers. It is important to take account of the fact that a reform that increases the amount that future seniors pay of their retirement health care also reduces their tax burden while they are still in the work force. In our analysis below we calculate lifetime taxes and benefits for current and future retirees based on the alternative and baseline forecasts from the 2015 Medicare Trustees Report. In particular, the baseline achieves the goal of equating future per-capita federal Medicare expenditure growth, across the income distribution, to the growth of per-capita GDP.

As a basis for the scale of any reform we use the Trustees alternate forecast of federal Medicare expenditures as the base that must be reduced to the Trustees baseline forecast. Each reform must be scaled so that it achieves the reduction implied by the difference between these two forecasts. In one sense this level of reform is the minimum that will be required considering the fact that the CBO forecast by 2080 is more than double the Trustees baseline and fully 40% greater than the Trustees alternate forecast.

Before we consider how to pay for Medicare in the future it is important to understand how the program is currently financed and how that financing structure combined with the historical and forecast benefit payments impact workers over their lifetimes.

How We Pay for Medicare

Medicare's expenditures are currently paid through a combination of payroll taxes, taxes on Social Security benefits, federal general revenues, premium payments from retirees, state transfers, and a few other sources. Figure 3 illustrates how total expenditures and each of the program's three parts were financed in 2015.

Medicare's Hospital Insurance Revenue Sources

As its name implies, Medicare's Hospital Insurance (HI), or Part A, primarily covers health care spending associated with hospitalizations, but it also covers home health care, payments to skilled nursing facilities and hospice care. Part A has two dedicated funding sources: a 2.9% payroll tax and federal income taxes on Social Security benefits. In the figure, we see that in 2015 payroll taxes will pay for 87% of Part A's \$276 billion in spending. Federal income taxes on Social Security Benefits will pay for 8% and general revenues and premiums from voluntary enrollees make up the remainder.

Unlike the Social Security payroll tax of 12.4% which is levied on earnings up to the Social Security taxable maximum, currently \$118,500, the HI payroll tax is on all earnings including earnings above the Social Security taxable maximum. The Affordable Care Act increased the payroll tax by another 0.9 percent on earnings above \$200,000 for single workers and above \$250,000 for married couples. Thus, the payroll tax is 3.8% above these thresholds and because

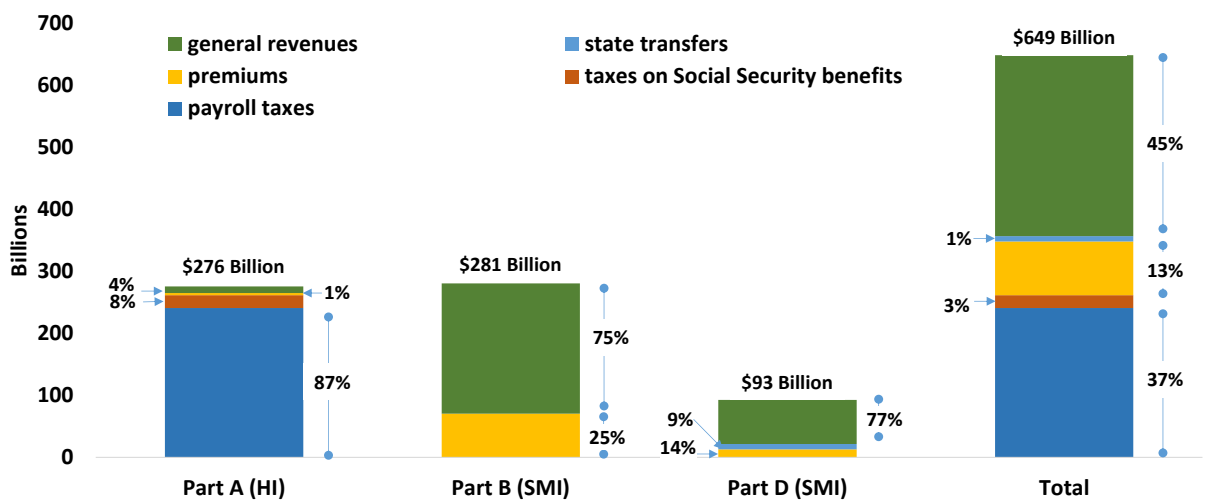
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these thresholds are not indexed with inflation, by the end of the long run projections the Trustees estimate that 80% of workers will be impacted by this tax increase.²

The federal income taxes on Social Security benefits are divided between Social Security and Medicare. Depending on their incomes, retirees pay federal income taxes on up to 85 percent of their Social Security benefits with the taxes on the first 50% directed to OASDI and the taxes on the remaining 35% directed to the HI program.

These two revenue sources have generally covered the HI program's expenses with some periods of deficits and surpluses. Since 2005, the HI portion of the program has run deficits that contribute to the overall deficits of the federal government. Based on the 2015 Medicare Trustees Report, the HI portion of the program is expected to run a slight surplus between 2016 and 2021, but in all years 2022 and beyond the program is expected to run deficits even with the optimistic current law forecast.

Figure 3. Composition of Medicare's Funding in 2015



Notes: From the 2015 Medicare Trustees Report Table III.B4., Table III. C4. and Table III.D3. General revenues include interest payments and "other" revenue.

Medicare's Supplementary Medical Insurance Revenue Sources

Medicare Supplementary Medical Insurance (SMI) includes Parts B and D. Part B covers doctors' visits, and payments for outpatient hospitalizations and for some of the home health expenses. Part D covers pharmaceuticals. These two programs are voluntary in the sense that individuals must pay a premium to enroll. Part B premiums are set at approximately 25% of the average beneficiary's expenses. Medicaid pays the Part B premiums of eligible lower income retirees and higher income retirees began paying higher premiums in 2007. In 2015, premiums

² See p. 28, 2015 Medicare Trustees Report.

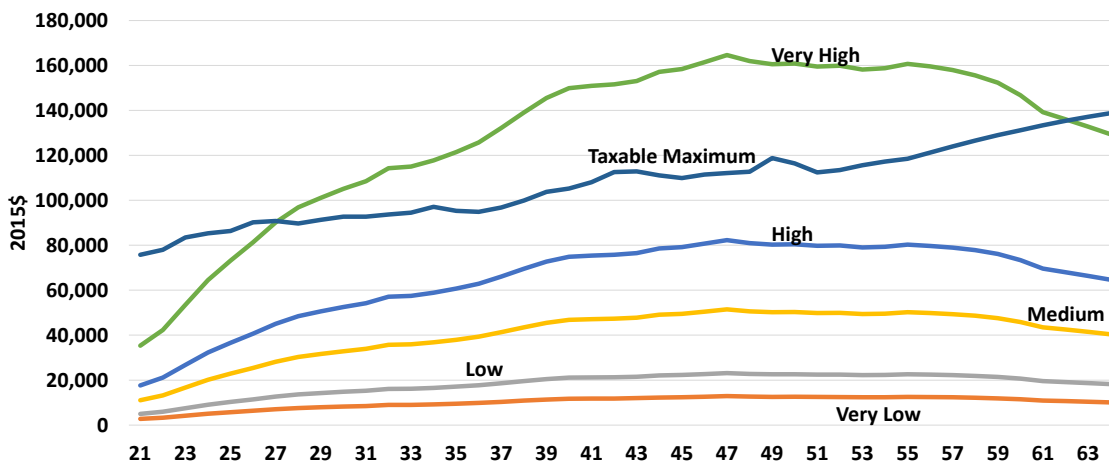
cover 25% of the \$281 billion Part B expenditures. Part D premiums cover 14% of this part of the program’s 2015 expenses of \$93 billion, state transfers pay another 9% and general revenues pay the remainder.

Altogether Medicare spending is expected to be \$649 billion in 2015. Taken as a whole the two largest revenue sources are general revenues, 45%, and payroll taxes, 37%. Premiums account for 13% of total spending and taxes on benefits and state transfers make up the remainder.³

Lifetime Medicare Taxes, Premiums, and Benefits

Several studies have analyzed the relationships between lifetime income and Medicare taxes and benefits.⁴ In this section we estimate lifetime Medicare benefits, taxes and premiums based on six hypothetical earnings profiles for birth years 1930 to 1990. Lifetime Medicare benefits are based on historical data and projected benefits derived from the 2015 Medicare Trustees Report’s baseline and alternative forecasts.

Figure 4. Scaled Earnings for Hypothetical Workers Born in 1960, 2015\$



Notes: The very low, low, medium, and high earnings profiles are derived from the scaled factors from Michael Clingman and Kyle Burkhalter, “Scaled Factors for Hypothetical Earnings Examples under the 2015 Trustees Report Assumptions,” Actuarial Note, No. 2015.3, July 2015.

The hypothetical earnings profiles are from the Social Security Administration.⁵ Figure 4

³ The Medicare Modernization Act of 2003 requires the issuance of funding warning if Medicare required 45% or more of its funding from non-dedicated funding sources within a designated forecast window. Between 2006 and 2013 the funding warning was issued. The funding warning has not been issued with the 2014 and 2015 Medicare Trustees Report. One of the dedicated funding sources is interest on the HI Trust Fund bonds. However, that interest is ultimately paid through general revenues and is included in the general revenues category in Figure 3.

⁴ See Bhattacharya and Lakdawalla(2006), McClellan and Skinner(2006), and Rettenmaier(2012). See also Steuerle and Quackenbush (2015) for estimates of lifetime Medicare benefits and HI payroll taxes.

⁵ See Clingman and Burkhalter (2015). See the appendix for additional details.

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depicts the profiles, in 2015 dollars, for workers born in 1960 (who are 55 in 2015). The Social Security Administration uses these profiles to estimate retirement benefits for workers with very low, low, medium, and high earnings. These series produce average earnings over the hypothetical workers' highest 35 earnings years that are 25%, 45%, 100%, and 160%, respectively, of the Social Security average earnings.

These hypothetical earnings profiles provide a convenient comparison of the incidence of the Social Security program's benefits and taxes across income classes. In our case, they provide the starting point for estimating lifetime taxes in support of the Medicare program. We assume the same earnings series for men and women – that is, for example, medium earnings men and women have the same earnings profiles. We also include an earnings series that assumes the worker earns the Social Security taxable maximum in each year and we estimate a sixth earnings profile for very high earners to complement the four profiles the Social Security Administration uses.

The very high series assumes that the average of the 35 highest years is 320% of the Social Security average earnings. The very high earner profile is relevant in Medicare's case because Medicare's funding is broader and more diverse than is Social Security's. We also use the earnings profiles to estimate expected income during retirement as a combination of income from Social Security and from retirement pensions or flows from savings.

Hospital Insurance Payroll Taxes

Our estimates of lifetime HI payroll taxes assume that in the years up to 2015 the statutory payroll tax rate applied to earnings levels at or below the "Medicare taxable maximum." The HI program's current 2.9% payroll tax rate is applied to all labor market earnings, but in 1990 and earlier, the HI payroll tax was applied to earnings up to the Social Security Taxable maximum. Between 1991 and 1993 the HI taxable maximum was increased to \$125,000, \$130,200, and \$135,000, respectively. Beginning in 1994 there was no limit to the earnings on which the HI tax was applied.

Given that the HI portion of the program is expected to run a surplus between 2016 and 2021 under both the baseline and the alternative forecasts, we assume that the statutory payroll taxes up to 2021 represents worker's payroll tax payments into the program. Because the HI program runs a deficit in 2022 and beyond under the current tax rates we could make one of two assumptions as to how the deficits are financed – either by increased federal income taxes or by increases in the HI payroll tax. We opt for the latter in the current exercise. Thus, in the years 2022 and later the payroll tax is assumed to increase to fill the funding gap not already covered by the existing payroll tax (including the additional taxes above the mentioned thresholds) and the revenues from the taxation of benefits. In the years beyond 2021 we estimate two payroll tax rate series based on the baseline and alternative forecasts.

For the higher-earning hypothetical workers the additional payroll tax of 0.9% will soon impact their tax payments. As seen in Figure 4, none of the earning series are in excess of \$200,000, the threshold for single workers of the ACA's new additional tax. However, recall that

the thresholds for the new tax are not indexed with inflation. By 2028, the nominal taxable maximum will exceed \$200,000 and the nominal peak earnings for the very high profile will reach that threshold by 2019.

Federal income taxes in support of SMI

To estimate workers' lifetime federal income taxes in support of the SMI portion of the program we identify federal income taxes in each year for the different hypothetical earnings profiles. The details of how federal income taxes are estimated in each year for all of the earnings levels are discussed in the appendix, but are briefly described here. The relationship between wage income and average federal income tax rates is derived from the Internal Revenue Service's Statistics of Income tables and summary data from the Tax Foundation. These two sources allow for tax rates estimates by income profile spanning 1980 to 2011. For the years prior to 1980 the tax rates by income profile as of 1980 are indexed to the prior years. The index is based on the relationship between the prevailing average income tax rates in those years and federal tax revenues less the dedicated payroll taxes. Similarly for the years 2012 and beyond, all income tax rates by income class as of 2011 are indexed to the net of payroll taxes necessary to fund the primary baseline or alternative spending from the CBO's 2015 Long-term Budget Outlook.⁶

Lastly, the share of federal general revenues necessary to fund Medicare's Part's B and D net of premium payments are determined in each past year 1967 to 2015 and forecast into the future based on projected spending.

Taxes on Social Security Benefits

The taxes on Social Security benefits directed to the HI program are accounted for during the workers' retirement years. As noted earlier, retirees pay federal income taxes on up to 85 percent of their Social Security benefits with the taxes on the first 50% directed to OASDI and the taxes on the remaining 35% directed to the HI program. Single Social Security beneficiaries whose combined income was below \$34,000 and married couples whose incomes were below \$44,000 in 2014 did not pay income taxes on benefits that would be directed to the HI program, but above those threshold benefit taxes are collected. Retirees' combined income is defined as adjusted gross income, nontaxable interest and half of their Social Security benefits. The thresholds are not adjusted for inflation and consequently, revenues from these taxes rise over time from 3% of total Medicare income in 2015 to 5% by the end of the Trustees' projection.

Our calculations of taxes on Social Security benefits require that we estimate adjusted gross income during retirement for each of the hypothetical earnings series. To make this estimate, we assume that retirees target to replace 80% of their average income over their final 15 years in the labor force. This 80% is comprised of their Social Security benefits with the remainder coming from other taxable sources.⁷ Thus, during retirement we assume that retirees' adjusted gross incomes are equal to the difference between their targeted income and their Social Security

⁶ See "The 2015 Long-Term Budget Outlook," Congressional Budget Office, June 2015.

⁷ Social Security benefits are available from the 2015 Social Security Trustees Report, Table V.C7.

benefits. We then determine if the amount is above the threshold for HI taxes and then apply the historical or projected income tax rates for each affected earnings level.⁸

Premium payments in support of SMI

For both parts of SMI, Parts B and D, we assume that premium payments cover 25% of each part's average benefit. This assumption results in an overestimate of premium income from the very low and low hypothetical earners who may be eligible for Medicaid. If eligible, Medicaid covers premiums. Our premium assumption is applicable in the case of lifetime Medicare net benefits, given that we limit the analysis to lifetime incidence of Medicare and not the incidence of all federal health care spending.

The higher premium shares payable under current law for higher income retirees are identified by again assuming that retirees' incomes are equal to 80% of the average pre-retirement earnings for the ages 55 to 64. As noted earlier, the income thresholds are not indexed to inflation and the means-testing applied to premium payments will affect an increasing portion of retirees over time.

Medicare Benefits

Our estimates of Medicare benefits during retirement assume that the annual value of the benefits is equal to the sum of average Part A, Part B, and Part D spending. This is consistent with the calculation of Part B and D premiums and the Part A premiums paid by voluntary enrollees. Separate series for each of Medicare's parts and for the baseline and alternative forecasts are utilized.

Lifetime estimates of the Medicare benefits, premium payments, taxes on Social Security benefits, and federal income taxes in support of Parts B and D are contingent on conditional life expectancies at age 65. For the purposes of this exercise we assume that individuals live with certainty to the age of 65 and then, at retirement, life expectancy is contingent on lifetime income and on sex. Adjusting life expectancy by sex and lifetime incomes follows the methodology described in Rettenmaier(2016).⁹ Higher income workers have longer life expectancies than lower income workers, women have higher life expectancies at retirement than do men, and income differentials in longevity (based on lifetime earnings) are more distinct among men than among women. Medicare benefits, premium payments, taxes on Social Security benefits, and federal income taxes in support of Parts B and D as described above are adjusted by the income-adjusted probabilities of survival to each age above 65.

Estimates

Our estimates of lifetime Medicare benefits, taxes and premiums for workers born in 1930 to 1990 are found in Appendix Tables A-1 to A-4. The tables present the results for single men and

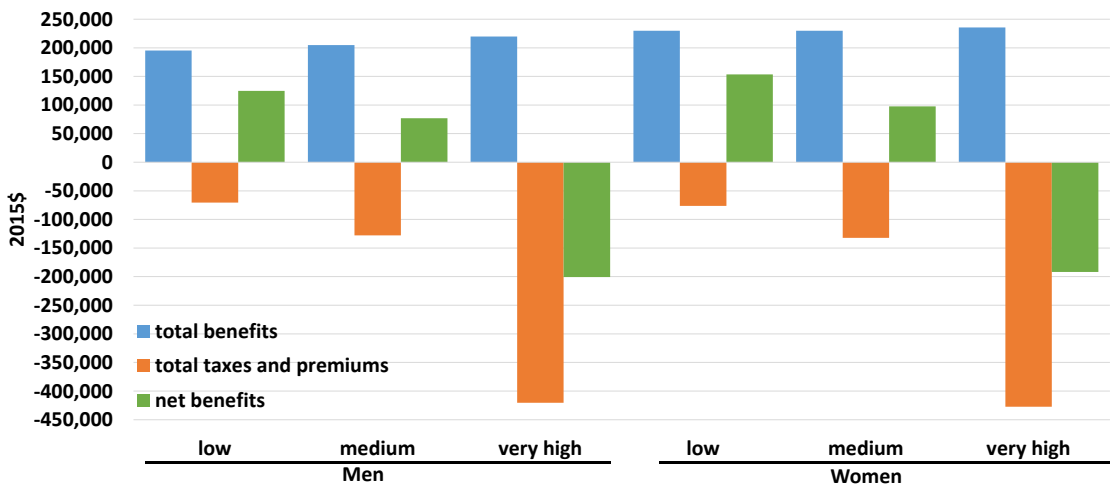
⁸ Prior to 1994 no taxes on benefits were directed to the HI program and therefore benefit taxes are included in the lifetime taxes for the affected birth years in the years 1994 and later.

⁹ The methodology is summarized in the appendix. It adjusts the Social Security Administration's life tables used in producing the 2007 Trustees Reports by differential mortality rates based on lifetime income.

women under the Trustees’ baseline and the alternative forecasts. As a way to summarize the results, Figures 5-8 present the estimates for men and women, who are new retirees and new labor force entrants as of 2015, under the baseline and alternative forecasts. The earnings series are also limited only to those for the low, medium and very high earners.

The estimates in Figure 5 are for men and women born in 1950 who reached 65 years of age in 2015. The estimates are at age 65, are presented in 2015 dollars and all assume a real 2.9% discount rate which is the Trustees’ assumed long run real discount rate. The Medicare benefits are consistent with the Trustees’ 2015 baseline estimates. Medicare benefits rise in income and are higher for women than for men. These relationships are all due to the income-adjusted mortality rates. The lifetime taxes and premiums are quite different by the income profiles, with the taxes and premiums paid by the very high earners more than three times the amount for medium earners.

Figure 5. Lifetime Medicare Benefits, Revenues, and Net Benefits, Men and Women Born in 1950 (2015 Retirees) – Baseline Estimates
2015\$, 2.9% real discount rate, estimates at age 65



Source: Authors’ estimates. Hypothetical earnings from Social Security Administration. Individuals work with certainty at ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

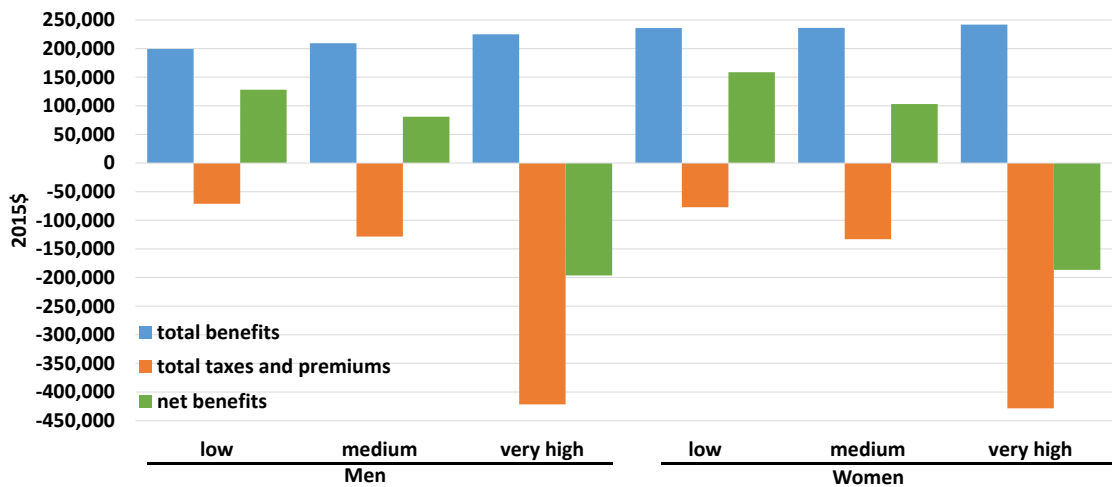
Consider the cases of medium earning men and women. Medicare benefits at retirement are equal to about \$205,000 for medium earning men and are equal to about \$230,000 for medium earning women. Taxes and premiums are approximately \$128,000 and \$132,000, respectively, for the medium earning men and women born in 1950. This results in positive net benefits of \$77,000 and \$98,000, respectively. Thus, for the medium earners retiring in 2015, Medicare will provide net benefits over and above the taxes and premiums they paid (payroll taxes and federal income taxes during their work years) and will pay (premiums and federal income taxes during retirement) in support of the program. Note also that the net benefits for the low earning workers are over \$100,000. In contrast, the very high earning workers pay over \$200,000 more

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in taxes and premiums in support of the Medicare program than they receive in benefits over their lifetimes.

Figure 6 again presents estimates for new retirees in 2015, but in this case Medicare benefits are based on the alternative forecasts. Comparing this to Figure 5 we see that the results are only slightly different. Most of the taxes in support of the program have already been paid for members of this birth year and as we saw in Figure 1, the Trustees baseline and alternative forecasts are the same over the first decade of the forecast and then only gradually diverge up until the mid-2030s. Thus, the higher benefits, and taxes and premiums necessary to fund them, are largely paid by future workers.

Figure 6. Lifetime Medicare Benefits, Revenues, and Net Benefits, Men and Women Born in 1950 (2015 Retirees) – Alternative Estimates
2015\$, 2.9% real discount rate, estimates at age 65



Source: Authors' estimates. Hypothetical earnings from Social Security Administration. Individuals work with certainty at ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 alternative estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

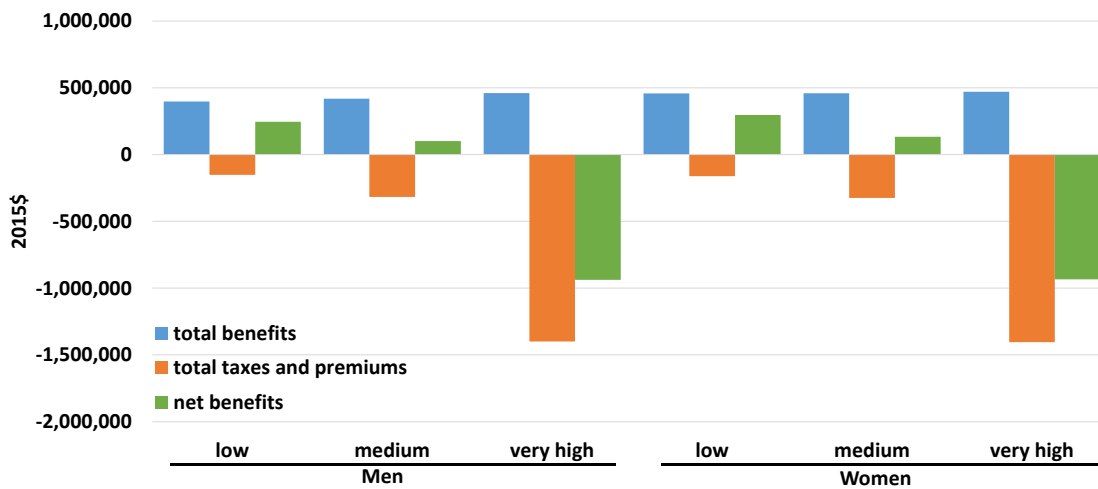
However, for this group of new retirees we see how the timing of benefit growth and the taxes are staggered. For example, medium earning men's lifetime benefits will increase to over \$209,000 if the alternative forecast prevails compared to the \$205,000 with the baseline forecast. Their taxes and premiums will rise only modestly resulting in higher net benefits of almost \$81,000 under the alternative.

Figures 7 and 8 present the results for workers born in 1990 who are basically new entrants to the labor force in 2015. Figure 7 presents the estimates that assume the baseline forecast holds in the future. These workers will retire in 2055, which is well into the years in which the baseline and the alternative forecasts diverge.

Several things are of note in these figures. First, medium earnings workers continue to receive net transfers from Medicare. Under both forecasts, compared to today's retirees, their lifetime taxes grow more rapidly than benefits, but their net benefits remain positive. The 1990 birth

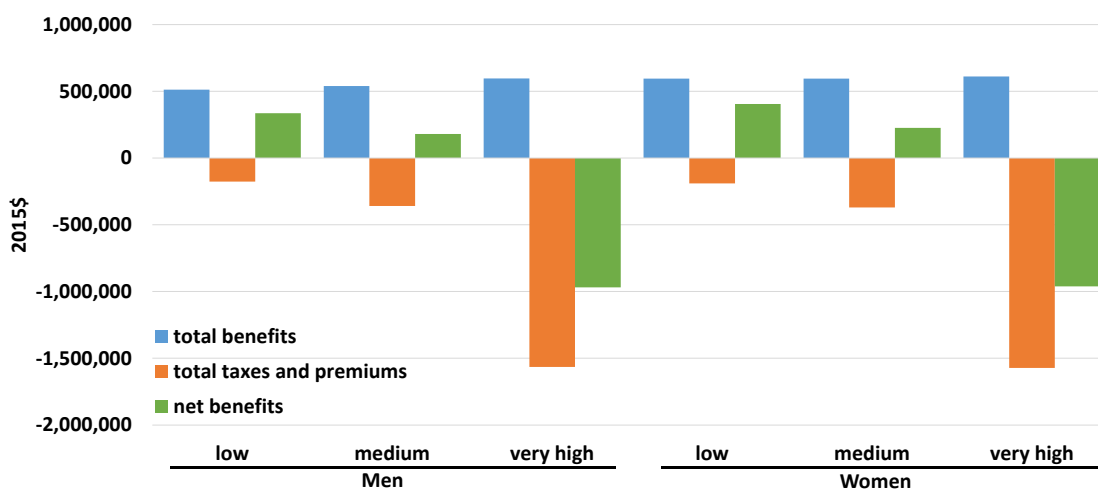
cohort's very high earners' total taxes and premiums under the baseline forecasts are almost 3 times their benefits. In contrast, those born in 1950 had lifetime taxes and premiums that are less than 2 times their benefit payments. Much of this is due to the means-testing of premiums. For this birth year, the very high earners' premiums are equal to almost 42% of the total Medicare benefits they receive, given that they pay premiums of 80% of the average Part B and D spending.

Figure 7. Lifetime Medicare Benefits, Revenues, and Net Benefits, Men and Women Born in 1990 (2055 Retirees) – Baseline Estimates
2015\$, 2.9% real discount rate, estimates at age 65



Source: Authors' estimates. Hypothetical earnings from Social Security Administration. Individuals work with certainty at ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

Figure 8. Lifetime Medicare Benefits, Revenues, and Net Benefits, Men and Women Born in 1990 (2055 Retirees) – Alternative Estimates
2015\$, 2.9% real discount rate, estimates at age 65



Source: Authors' estimates. Hypothetical earnings from Social Security Administration. Individuals work with certainty at ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 alternative estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

While Figures 5-8 illustrate Medicare's benefits, taxes, and premiums for several earnings profiles and for two birth years, the appendix tables provide a more comprehensive view across birth years and across the earnings distribution. Over time and across birth years the ratio of benefits to taxes and premiums, the "monies' worth ratio", generally declines. This is due in part to the fact that the younger birth years have paid Medicare related taxes over their entire working years. In contrast, the older cohorts, like the 1930 birth year, started paying Medicare related taxes in their late 30s. Also, in the case of the baseline forecast high earning men's net benefits are positive up to the 1960 birth year and then are negative for all future birth years. Beginning with the 1940 birth year, the net benefits of workers who earn the taxable maximum turn negative. These results illustrate the progressive nature of the program in the lifetime context.

Comparing Figures 7 and 8 we also see that the net *benefits* for the medium workers are again higher under the alternative forecast than under the baseline forecast. However, the net *taxes* for the very high earning workers are higher under the alternative. How is it possible that the higher spending under the alternative appears to produce higher net benefits for most earners except those with very high earnings and can such an intergenerational program persist?

Because of persistence of excess cost growth from the perspective of individual retirees the Medicare program has been and continues to be a good deal for all except high earning individuals. There are two issues involving excess cost growth. One, can it persist? Two, if it can then can the current generational transfer system of financing retirement health continue into the indefinite future?

It is often argued that health care growth that exceeds the growth in total output cannot persist in the long run.¹⁰ The basis of this argument is that eventually this excess cost growth would result in a 100% health care economy, i.e., an economy with no non-health care consumption. However, so long as non-health care consumption is growing, although more slowly than output growth, excess cost growth can persist even in the long run. Thus we can't rely on the mathematics of limits to get us out of the excess cost growth problem.

As a result we must deal with the reality of excess cost growth. This empirical fact coupled with the combination of demographics and increasing longevity has the potential to produce a crisis in taxpayer funding of Medicare. However, viewed from a new Medicare recipient perspective most will receive benefits that exceed the taxes paid during their work years. Moreover, absent progressive taxation and with continued excess cost growth those entering the Medicare phase of their life will have underpaid in work years taxation for their benefits. How is this possible, you might ask? Is this a classic "free lunch"?

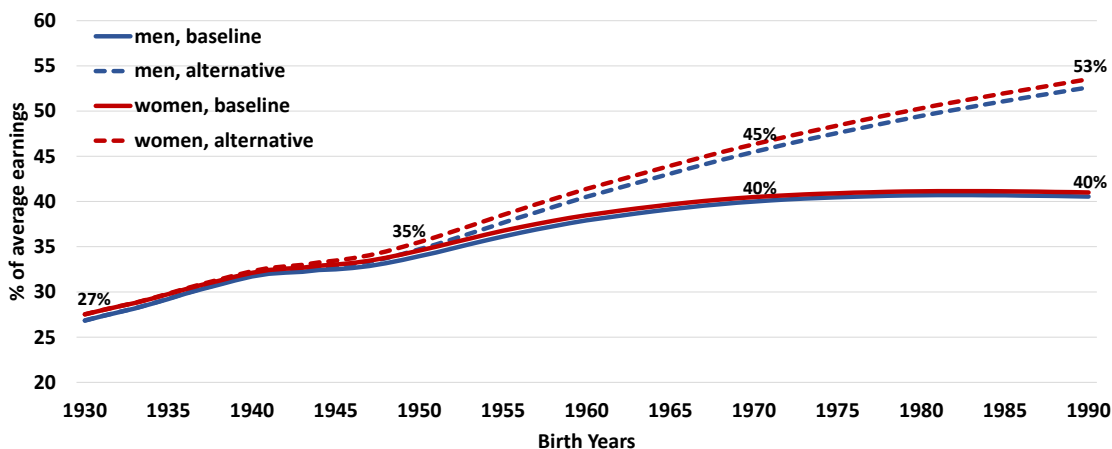
The so-called Medicare good deal is a direct result of excess cost growth. During future retirees' work years they are paying taxes to support a smaller Medicare program than they will

¹⁰ For example see CBO's June 2015 "The 2015 Long-Term Budget Outlook" page 37 which states "Health care spending cannot rise more quickly than GDP forever".

be part of upon retirement. Thus, on the average at least, there does appear to be a free lunch. With progressive taxation as the previous section showed except for the highest income earners where the progressivity of the income tax component of Medicare financing dominates future Medicare benefits, all others find Medicare a good lifetime deal. But we know that there are no “free” lunches. So what is the catch? Actually there are two catches.

The first catch is that per-capita retiree health care consumption growth in excess of per-capita GDP growth means that the share of retirement consumption that is health care is rising. With generational transfer financing in place this increasing share of retirement health care means that workers can expect a greater and greater share of their retirement expenses will be paid by the next generation. The caveat is however that since current taxpayers will be responsible for less of their retirement consumption they will save less for their future and the equilibrium capital stock will be lower.

Figure 9. Annuitized Value of Medicare Benefits as a Percent of Average Lifetime Earnings, Medium Earnings, Baseline and Alternative Forecasts



Source: Authors’ estimates. Hypothetical earnings from Social Security Administration. Individuals work with certainty at ages 21 to 64 and retire at age 65. See text and appendix for details.

Figure 9 illustrates how Medicare’s annuity value as a percent of average lifetime earnings (based on the medium earning profile) has grown by birth year. For the medium workers born in 1930 Medicare is worth about 27% of their average annual earnings. For today’s retirees it is worth about 35% of average earnings, and as seen the annuity based on the higher alternative forecast is slightly higher than the annuity from the baseline forecast. We also see that women’s annuity values are higher than men’s due to long life expectancy. For the 1970 birth cohort, Medicare’s annuity value is 40% of average earnings if based on the baseline forecast but is 45% if based on the alternative. For today’s new labor force entrants Medicare’s annuity value remains at 40% if derived from the baseline forecast but rises to 53% if based on the alternative.

The important points from this figure are: (1) Medicare’s annuity value stabilizes at 40% when Medicare per-capita grows at the same rate as per-capita GDP as seen in the series derived from the baseline forecast and (2) the alternative forecast produces an annuitized value that grows as

a percent of average lifetime income. A third point, not seen in the figure, but implied by it, is that under both forecasts Medicare's cumulative total spending on behalf of each successive birth cohort will rise relative to their cumulative lifetime earnings if that eligibility age remains fixed at 65, given that conditional life expectancy at age 65 is anticipated to rise. Thus, even with the baseline forecast growth assumption, indexing the eligibility age to gains in longevity would also be necessary to stabilize Medicare's share of individuals' lifetime consumption.

So, the second catch, as illustrated in the alternative forecast, is that the excess cost growth implies an ever rising tax rate on the working population. This rising tax and resultant falling return to work will have incentive effects on the supply of labor. Some of this labor supply incentive effect may already be in progress as evidenced by the continuing decline in the labor force participation rate.

We are faced with a continually rising share of retiree consumption financed by generational transfers that consume an ever-increasing share of the working population's output. It is this incentive effect that suggests an alternative statement about excess cost growth. That is, "generational transfer financed retiree excess cost growth cannot persist in the long run."

This summary of the within and across generation distributional effect of Medicare illustrates that Medicare is progressive within generations in that higher income workers receive lower net benefits or pay higher net taxes than do lower income workers. It also has illustrated that across generations it has, up to now, provided increasing replacement rates relative to pre-retirement earnings. Also, accounting for all lifetime taxes and premium payments in support of the program, net benefits for medium earning workers remain positive even for today's new labor force entrants. The program is progressive within generations, but it is also the case that each generation's retirement benefits are in part paid by the succeeding generation's taxes.

Moving toward equalizing the tax burden across generations can be accomplished by constraining the tax financed portion of Medicare so that per-capita spending grows at the same rate as per-capita GDP. In the next section we explore ways to distribute the expenses associated with retiree health care between retirees and workers.

Reforms that Constrain Per-Capita Federal Medicare Expenditure Growth to Per-Capita GDP Growth

We proceed on the basis that in the long run the extent of generational transfers' as a share of the economy is constrained. In Medicare's case it is then necessary to entertain reforms that limit per-capita federal Medicare expenditure growth to per-capita GDP growth and thus fix the Medicare generational transfer burden on the working population. For any reform to be viable two conditions must be met.

- First, reforms must be sustainable. For a reform to be sustainable it must not rely on the hope of new technology or new federal bail-out legislation.
- Second, any reform that limits the federal government's role in paying for retiree health cannot restrict seniors' access to the health care system. Essentially any reform must be done in a way that allows seniors to maintain their health status.

The reality is that health care spending is growing throughout the developed world. So it's not just seniors who are consuming more health care. In that sense Medicare reform is not about reducing expenditures on health care, although some reforms may contribute to that end. The reforms contained here will succeed in controlling the extent that future tax payers must pay for the health care of their elders. But then these same future taxpayers when they reach retirement must pay for the amount of their health care that exceeds the per-capita federal expenditure limit.

All reforms, including the ones analyzed here, put the burden on the younger population to provide funding for some part of their own retirement health care. As we become richer and longer-lived, health care consumption has and will continue to increase in importance. As a result we should expect that excess cost growth will be with us for the foreseeable future. That expectation underlies the fact that both Trustees alternative and the CBO forecasts of per-capita federal Medicare expenditures exceed the Trustees baseline forecast.

Essentially the Trustees baseline forecast assumes that the provisions of current law, the ACA, will control future Medicare costs by simply not paying providers for services rendered. It is clear that, as the CMS Chief Actuary says in the Statement of Actuarial Opinion at the end of the 2015 Trustees Report, not paying providers will result in a reduction in services to Medicare beneficiaries. But then if actual growth in level of health care consumed by seniors exceeds the growth in federal government funding the difference must be covered by senior users of the health care system.

Any reform that achieves a per-capita federal Medicare expenditure growth equal to the per-capita growth of GDP, so that the Medicare burden on taxpayers as a share of GDP remains constant, must be done in a way that does not impede the development of new health care solutions to problems arising from aging. Further, such reforms must be done in a way that minimizes the effect on recipients, both those currently in the system and future retirees.

Here we take the baseline spending projection from the 2015 Trustees Report as our target for federal Medicare expenditures. As a minimum measure of the magnitude of the reform problem we use the difference between the Trustees 2015 alternative forecast and their baseline forecast. We use the term minimum measure of the problem because a still conservative measure by the CBO indicates an almost 50% bigger problem. The word "problem" is used to indicate the amount of increase in the out-of-pocket health care expenditures that will be

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required to move from the Trustees alternate forecast to the baseline on the one hand and from the CBO forecast to the Trustees baseline forecast on the other.

If seniors' per-capita demand for health care continues growing at a rate faster than the ACA's implicit spending cap of per-capita GDP growth, then retirees must gradually bear a greater share of their health care consumption. Reforms that attempt to constrain the taxpayer burden must recognize that the retiree burden will grow over time. The question is how this growing retiree burden is distributed across retirees.

We consider Medicare reforms that change how the program is financed and how the insurance package is designed. In the context of any of the reform options there is the issue of eligibility criterion, specifically the age at which seniors enter the Medicare population. The analysis presented here is on the reconciliation of the per-capita growth in senior health care and per-capita GDP growth no matter the size of the Medicare population.¹¹

We consider four options.

- **Option 1** is basically traditional Medicare with all three parts combined. Taxpayers finance the baseline spending path, but premiums that increase over time cover the gap between the baseline and the alternative forecast.
- **Option 2** again restricts the taxpayers' burden to the baseline but relies on increasing premiums and copays to achieve this baseline level of spending.
- **Option 3** is a combination of traditional Medicare and private insurance. CMS retains its role to setting procedures' reimbursement rates but these reimbursement rates are limited such that aggregate spending follows the baseline forecast. Beneficiaries are then free to obtain health care anywhere, pay market prices and receive the CMS reimbursement.
- **Option 4** is essentially premium support. Retirees purchase health insurance privately with a combination of their own resources and a premium support payment supplied by CMS. Again, aggregate taxpayer financed spending is limited to the baseline forecast.

Note that all four options limit Medicare's taxpayer financed spending to follow the baseline forecast and that all four can incorporate retiree premium payments, deductibles, co-payments, or contributions that vary by lifetime income.

¹¹ This does not mean that changes in the Medicare population size are not important but their impact is of a second order of importance to the size of the difference between the future per-capita cost growth and per-capita GDP growth. Since the Balanced Budget Amendment of 1995 Medicare has been the secondary payer for employed citizens of Medicare eligibility age with firm supplied health insurance. As a result total expenditures are reduced as more and more 65-year-olds delay retirement.

Option 1: Beneficiary Premiums to Cover Excess Cost Growth

Reducing federal per-capita Medicare spending growth in the alternative forecasts to the baseline estimates from the 2015 Trustees Report could be accomplished by raising premiums. In effect, Medicare stays essentially as it is, but premiums paid by participants rise each year to account for the per-capita excess cost growth.

Recall from Figure 1 that at the end of the projection, the Trustees' alternative forecast was 50% higher than the baseline. Thus, if the taxpayers' burden is limited to the baseline, but retirees desire to spend commensurate with the alternative forecast, premiums would have to cover the additional 50%. Naturally, the distribution of those additional premiums across retirees would be the subject of debate.

Such a reform basically changes how Medicare is financed, but its implementation is easier to conceptualize if considered along with a reformed insurance structure in which all of Medicare's three parts are combined. With this option, as currently is the case, retirees can choose Medicare Advantage plans or can stay in fee-for-service Medicare. CMS would retain its role in setting reimbursement rates and managing the program.

Effective implementation of this reform would require a well-defined premium schedule, and if means-tested, the distribution of the premiums by income would also have to be announced well in advance and adapt, to effectively limit spending to the baseline. Past reforms have already established means-testing for Part B and D premiums. However, to constrain taxpayer financed Medicare to the levels in the baseline forecast requires that the income thresholds are lower and that the premiums apply to all parts of the program.

Option 2. Deductibles and Co-pays Limit Spending to the Baseline Forecast

This option changes Medicare's insurance package such that increasing deductibles and copayment rates accomplish the goal of constraining aggregate spending to the baseline forecast. As with Option 1 it is simplest to conceive of this reform with all of Medicare's parts combined and with the insurance covering catastrophic events.

The reform could include uniform deductibles, copayment rates and maximum dollar expenditures across all beneficiaries. Retirees would then be responsible for the rising required cost sharing. Means-tested contributions to Health Savings Accounts could complement the reformed insurance. Option 2 holds promise in expanding the role of prices in the health care market.

There are several questions that must be addressed with this reform. For example, how the contributions to lower income retirees' HSAs be financed and how much of the unspent portion would these retirees? Deposits into the HSAs for lower income retirees could come from redirected Medicaid payments that have historically been directed toward premium payments, implicit Medigap insurance, and state contributions.

The HSAs for the lower income retirees could be implemented in a way similar to the debit cards used in the Supplemental Nutrition Assistance Program (SNAP.) Let's call the new card a Supplemental Medical Assistance Program or "SMAP" card. Lower income retirees would receive this debit card that could be used to cover deductibles and copayments with some portion of the remaining balance retained by these retirees.

Several other issues arise with this option. For example, are the contributions to retirement HSAs tax preferred? Will deductibles and copayment rates increase with lifetime earnings? Behavioral responses will result from the imposition of higher cost sharing requirements, unless a new form of Medigap insurance emerges. This possibility raises the ongoing issue of whether to tax Medigap to the degree that it induces more use of the taxpayer provided insurance. These are all important issues, but are smaller obstacles than the alternative – the expected consequences of the full implementation of the ACA's productivity adjustment.

Option 3. Constrained Federal Payment Rate by Procedure and Services

This reform and the following reform bring a large amount of individual freedom to Medicare participants. While the previous two reforms structural adjustments to Medicare financing and insurance coverage, this reform is at least a partial departure from the role of CMS in senior health care. The role of CMS in this reform is to set the reimbursement rates for all covered health care. However, unlike current Medicare where Medicare pays providers all except the deductible and copay, here Medicare gives the participants the level of the CMS determined reimbursement. Then participants are responsible for the difference. Moreover, as a result of the expected excess cost growth, the share of total costs borne by participants can be expected to rise over time.

The way this reform would work can be illustrated in what is perhaps a non-typical case but nevertheless makes clear the distinction between this reform and traditional Medicare. Consider the case of a knee replacement. In this Medicare reform the patient knows how much Medicare will pay. If the patient can find a facility that performs the knee replacement for the Medicare amount or less, the procedure is totally paid by Medicare. However, because of the expected excess cost growth the difference between the market price of knee replacements and the Medicare reimbursement will be rising over time. This difference makes it worthwhile for the patient to shop for the replacement just as they would for a new car.

This form of coverage allows a real market for medical services to emerge as patients are in charge. As a result the suppliers will have to compete on price with the potential of reducing the level of excess cost growth, at least during the adjustment period. We say this because making users care what health care costs will affect demand and as a result the level of health care expenditures may fall. During the adjustment to a new lower level of care it will appear the excess cost growth has slowed as indeed it would have. But once the new lower level of spending is reached all the reasons for per-capita health care spending rising faster than per-capita GDP will return.

A final issue with this reform is dealing with that part of the retired population that has insufficient funds to pay for their health care. As with Option 2 these retirees would again have a debit card (SMAP card) to use in this case. In health care, however, there are two issues that must be resolved. First, for those who are chronically ill, paying the growing difference between market prices and Medicare reimbursements will be an increasing burden. Second, health status shocks may result in random large increases in health care requirements.

The first of these issues is handled by setting the level of funding in SMAP cards issued to the lower income retired population using something similar to the current way by which CMS determines the risk-adjusted payments to Medicare Advantage. The chronically ill would receive a greater SMAP allocation. The second of these issues is resolved through the establishment of a real insurance market against catastrophic health status changes. The premiums for such insurance can come wholly from CMS but would lower the level of reimbursements across the board.

This reform has great potential. Over time we could see a real market emerge for health care. We could see the ads for physicians and hospitals focusing on price and convenience. We could also see the return of the insurance market for catastrophic health status changes. The evolution of supplemental private market insurance products purchased by the non-poor population would be similar to those that emerge under Option 2 but in this case, like current Medigap, they would first provide some form of catastrophic coverage.

Option 4. Premium Support Payments that Rise at the Same Rate as Per-Capita GDP

Option 4 will offer a significant level of both individual choice and individual payment responsibility while limiting the role of CMS in the Medicare market. In its simplest form this option provides average premium support payments that in aggregate follow the baseline forecast. The relative size of federal support for participants, the level of premium support, will be determined using the methodology similar to that currently used for Medicare Advantage's risk adjusted payments.

With this option, the only role of the federal government, and hence, CMS, is to determine the level of individual federal support, based on the beneficiaries health conditions. Importantly, CMS controls over prices, reimbursements to providers, and allowable procedures will be completely absent. Each enrollee would receive a level of premium support that is based on current health status and cost risk. Further, no enrollee will be allowed to cash out their premium support payment.

Currently, only Medicare Advantage plans are similar to private markets for beneficiaries. In the relatively unregulated world envisioned for Option 4, Medicare Advantage plans could still exist but would see much more competition. Importantly, all plans must include catastrophic coverage, even for healthier enrollees.

Thus, while a plan offering minimum benefits for a minimum premium may well attract healthier, and perhaps wealthier, enrollees, they must still pay for any significant change in their health status. Furthermore, the enrollees' premium support payments would be based on expected health care cost, adjusted so that less healthy individuals are not at a disadvantage vis-à-vis providers. Each beneficiary would know his or her risk-adjusted stipend each year. These would be estimated based on the value of the evolving insurance coverage.

Conclusion

Excess health care cost growth and demographics are driving the rise in health care spending by the retired population. We should not expect retirees' demand for health care spending to slow relative to the rest of the population, though that is the implicit assumption of the framers of the ACA. All the evidence points to the conclusion that health care consumption is a superior good. That is, as we become wealthier, the share of our income that we spend on maintaining our health status increases. For decades per-capita health care spending has grown more rapidly than the nation's per-capita GDP. This relationship has been termed health care's "excess cost growth".

While it is unreasonable to think that Medicare beneficiaries' health care consumption will somehow be constrained to the Medicare Trustees' baseline forecast, it is not unreasonable to use the baseline forecast as the target for taxpayers' support of the program. As we have outlined, even if we are able to constrain the taxpayer burden the baseline forecast future retirees would continue to receive an annual transfer in retirement that maintains its share of pre-retirement earnings.¹² Retirees would then be responsible for any health care spending in excess of this amount.

Due to the rising number of retirees and excess cost growth it is important and indeed almost imperative that we change the extent that a growing Medicare cost burden is taxpayer financed. Indeed most reforms either passed or suggested have exactly that goal. These proposals all are geared toward bringing the per-capita federal cost growth of Medicare, the taxpayer burden, in line with the per-capita growth of GDP. In addition, all seem to agree that this goal will not be accomplished by reducing the payments to providers. Thus, any real solution must entail an increase in the share of senior health care that is paid for by the senior population.

From the perspective of the working population, changes in the benefit structure of Medicare is a two-sided coin. On one side is the fact in their future Medicare will cover less and less of their senior health care. Thus, Medicare spending will be shifting to greater reliance on beneficiaries and less reliance on taxpayers. Reform is about finding feasible options to shift Medicare spending from taxpayers to beneficiaries while ensuring access to improving technology. The

¹² Recall that unless the eligibility age is also increased over time this constant replacement rate would actually result in rising lifetime Medicare benefits relative to lifetime earnings.

other side of future lower taxpayer funded Medicare is that the tax burden for current workers will be lower.

Our analysis of these offsetting trends in the cases of the baseline and alternative forecasts revealed how the current financing and benefit structure distribute the programs' benefits and tax burdens across and within generations. We also considered four reform options that would limit the taxpayer burden to the spending path that follows the baseline projection.

Option 1 accomplishes federal expenditure cost control by covering all the excess cost growth through means-tested premiums. Essentially this leaves current Medicare just as it is except for the fact that premium increases would replace the general revenue transfers to Medicare that are projected to be necessary due to excess cost growth. Premiums could be means-tested to control the burden on low income retirees.

Option 2 replaces the premium increases under Option 1 with increases in deductibles and copayment rates. The higher cost sharing requirements could be moderated for lower income retirees by issuing SMAP cards, the value of which is related to the income of the recipient. The larger deductibles and copayment rates have the potential of increasing the role of markets as Medicare beneficiaries face a larger share of the health care they consume. Implementing additional tax preferred savings plans for retirement health care could address the cost sharing requirements.

Option 3 expands the role of markets in health care. Specifically this reform controls per-capita federal Medicare expenditures by decreasing the reimbursement rates for allowable procedures. While this might seem similar to the ACA's assumed lower reimbursement to providers, the concept is very different. Here beneficiaries pay the difference between the market price of a procedure and the Medicare reimbursement rate. Just as in Option 2 the means-testing component is accomplished by income adjusting the size of SMAP account contributions.

Option 4 represents the most extreme departure from traditional Medicare although it is a variant of many reform proposals suggested by Congress. In this reform beneficiaries get what is essentially a premium support payment that can only be spent on health. The total of the premium support payment can be used to buy health insurance. Here the CMS plays no role other than determining the size of the payment in a way similar to the current methodology for Medicare Advantage's patient specific risk adjusted payments from CMS. The means-testing component would augment the support of lower income retirees in the same magnitude as in the other options.

These four reforms options can accomplish the goal of bringing the more realistic Trustee alternative forecast of federal Medicare expenditure down to the level of the Trustees' baseline forecast. In all four reforms, beneficiaries are increasingly more responsible for funding their retirement health care expenditures. As illustrated by our analysis of lifetime benefits, taxes, and

premiums, the current financing arrangement distributes much of the program's financing burden on higher earning workers and on subsequent generations. The program's generational equity can be improved if future beneficiaries – current workers – prepay some of their retirement health care through new savings options.

Acknowledgement

This research was partially funded by the National Center for Policy Analysis.

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Appendix Tables

Table A-1 Lifetime Medicare Benefits, Taxes and Premiums for Men Medicare Spending Based on Trustees 2015 Baseline Estimates Estimates at Age 65, 2015\$, 2.9% Real Discount Rate						
Earnings Assumption	Birth Year	Total Medicare Benefits	Medicare Payroll Taxes	Medicare Income Taxes	Medicare Premiums	Net Medicare Benefits
Very Low	1930	118,838	8,399	290	14,651	95,499
	1940	162,517	14,567	621	24,045	123,285
	1950	192,662	20,093	938	30,888	140,743
	1960	241,453	23,869	1,251	39,490	176,843
	1970	292,180	27,755	1,655	47,748	215,022
	1980	341,855	33,423	2,235	55,962	250,236
	1990	392,829	40,918	3,036	64,848	284,026
Low	1930	120,359	15,114	1,052	14,855	89,338
	1940	164,503	26,211	1,998	24,352	111,942
	1950	195,157	36,155	3,139	31,293	124,570
	1960	244,600	42,949	4,500	40,005	157,145
	1970	295,987	49,942	6,405	48,370	191,271
	1980	346,327	60,141	9,079	56,697	220,410
	1990	398,046	73,627	12,329	65,711	246,378
Medium	1930	126,203	33,588	4,827	15,652	72,135
	1940	172,137	58,249	8,404	25,540	79,945
	1950	204,833	80,350	14,641	32,868	76,974
	1960	256,823	95,450	23,949	42,003	95,420
	1970	310,801	110,988	44,581	50,791	104,441
	1980	363,787	133,656	63,135	59,570	107,426
	1990	418,507	163,628	84,177	69,099	101,603
High	1930	130,524	50,570	18,822	16,245	44,887
	1940	177,785	92,337	26,644	26,420	32,384
	1950	212,014	128,550	43,391	34,037	6,036
	1960	265,900	152,709	65,307	43,487	4,397
	1970	321,807	177,569	99,117	52,589	-7,468
	1980	376,776	213,835	139,831	61,707	-38,597
	1990	433,752	286,117	186,507	71,623	-110,494
Taxable Maximum	1930	135,273	66,689	32,969	16,891	18,724
	1940	183,986	124,002	57,213	27,384	-24,613
	1950	219,864	195,386	98,011	35,314	-108,848
	1960	275,812	260,031	155,568	63,151	-202,938
	1970	334,118	319,383	235,316	109,202	-329,782
	1980	396,281	402,448	332,532	129,827	-468,525
	1990	460,986	506,583	447,071	152,259	-644,927
Very High	1930	135,273	66,566	48,622	17,455	2,631
	1940	183,986	136,171	86,398	33,137	-71,720
	1950	219,864	229,537	141,533	49,440	-200,647
	1960	275,812	303,165	207,369	90,215	-324,937
	1970	334,118	388,267	307,493	109,202	-470,843
	1980	396,281	493,725	431,349	129,827	-658,619
	1990	460,986	624,354	576,980	197,936	-938,284

Source: Authors' estimates. Hypothetical earnings from Social Security Administration (2015a). Individuals work with certainty from ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

Table A-2
Lifetime Medicare Benefits, Taxes and Premiums for Women
Medicare Spending Based on Trustees 2015 Baseline Estimates
Estimates at Age 65, 2015\$, 2.9% Real Discount Rate

Earnings Assumption	Birth Year	Total Medicare Benefits	Medicare Payroll Taxes	Medicare Income Taxes	Medicare Premiums	Net Medicare Benefits
Very Low	1930	148,098	8,399	290	18,782	120,627
	1940	194,553	14,567	621	29,099	150,267
	1950	230,701	20,093	939	37,089	172,581
	1960	286,956	23,869	1,252	46,925	214,910
	1970	344,806	27,755	1,658	56,364	259,029
	1980	401,622	33,423	2,238	65,813	300,148
	1990	460,578	40,918	3,040	76,079	340,540
Low	1930	147,530	15,114	1,088	18,701	112,627
	1940	193,841	26,211	2,017	28,987	136,626
	1950	229,799	36,155	3,171	36,942	153,532
	1960	285,830	42,949	4,540	46,741	191,599
	1970	343,453	49,942	6,457	56,143	230,912
	1980	400,030	60,141	9,139	65,551	265,199
	1990	458,713	73,627	12,399	75,770	296,917
Medium	1930	147,621	33,588	5,061	18,713	90,258
	1940	193,955	58,249	8,550	29,004	98,152
	1950	229,935	80,350	14,885	36,964	97,737
	1960	285,999	95,450	24,236	46,769	119,544
	1970	343,654	110,988	45,606	56,176	130,884
	1980	400,262	133,656	64,293	65,589	136,724
	1990	458,977	163,628	85,487	75,814	134,049
High	1930	148,279	50,570	20,283	18,805	58,621
	1940	194,780	92,337	27,730	29,134	45,580
	1950	230,973	128,550	44,761	37,133	20,529
	1960	287,295	152,709	66,773	46,981	20,832
	1970	345,209	177,569	100,796	56,430	10,414
	1980	402,086	213,835	141,677	65,889	-19,316
	1990	461,106	286,117	188,532	76,166	-89,709
Taxable Maximum	1930	151,184	66,689	35,361	19,213	29,921
	1940	198,422	124,002	59,573	29,706	-14,860
	1950	235,556	195,386	100,781	37,880	-98,491
	1960	293,015	260,031	158,467	67,082	-192,566
	1970	352,076	319,383	238,467	115,107	-320,881
	1980	410,141	402,448	334,847	134,433	-461,586
	1990	470,514	506,583	448,427	155,450	-639,947
Very High	1930	151,184	66,566	51,286	20,125	13,206
	1940	198,422	136,171	88,983	36,346	-63,079
	1950	235,556	229,537	144,679	53,031	-191,691
	1960	293,015	303,165	210,644	95,831	-316,626
	1970	352,076	388,267	311,080	115,107	-462,378
	1980	410,141	493,725	433,989	134,433	-652,005
	1990	470,514	624,354	578,528	202,085	-934,453

Source: Authors' estimates. Hypothetical earnings from Social Security Administration (2015a). Individuals work with certainty from ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

Paying for Medicare Now and in the Future

Table A-3
Lifetime Medicare Benefits, Taxes and Premiums for Men
Medicare Spending Based on Trustees 2015 Alternative Estimates
Estimates at Age 65, 2015\$, 2.9% Real Discount Rate

Earnings Assumption	Birth Year	Total Medicare Benefits	Medicare Payroll Taxes	Medicare Income Taxes	Medicare Premiums	Net Medicare Benefits
Very Low	1930	118,863	8,399	290	14,654	95,521
	1940	163,083	14,567	621	24,128	123,768
	1950	196,701	20,093	938	31,471	144,198
	1960	257,220	23,877	1,256	41,763	190,324
	1970	330,613	27,991	1,694	53,253	247,674
	1980	412,940	34,714	2,381	66,177	309,668
	1990	505,774	44,810	3,355	81,058	376,552
Low	1930	120,385	15,114	1,052	14,859	89,360
	1940	165,084	26,211	1,998	24,437	112,437
	1950	199,287	36,155	3,139	31,890	128,104
	1960	260,661	42,964	4,526	42,320	170,851
	1970	335,053	50,367	6,595	53,966	224,125
	1980	418,506	62,465	9,705	67,069	279,266
	1990	512,691	80,630	13,643	82,164	336,253
Medium	1930	126,232	33,588	4,827	15,656	72,160
	1940	172,785	58,249	8,404	25,634	80,498
	1950	209,358	80,350	14,641	33,522	80,846
	1960	274,104	95,482	24,136	44,493	109,994
	1970	352,436	111,934	46,860	56,755	136,886
	1980	440,369	138,820	68,416	70,575	162,558
	1990	539,980	179,190	93,763	86,528	180,499
High	1930	130,557	50,570	18,822	16,250	44,915
	1940	178,485	92,337	26,644	26,523	32,981
	1950	216,843	128,550	43,391	34,734	10,167
	1960	284,107	152,759	66,085	46,110	19,154
	1970	365,377	179,083	104,485	58,832	22,977
	1980	456,667	222,098	151,795	73,189	9,585
	1990	560,353	311,015	207,845	89,785	-48,292
Taxable Maximum	1930	135,308	66,689	32,969	16,896	18,754
	1940	184,739	124,002	57,213	27,494	-23,971
	1950	225,008	195,386	98,011	36,057	-104,447
	1960	295,000	260,136	157,649	67,019	-189,803
	1970	379,801	322,159	249,274	122,294	-313,925
	1980	480,912	416,294	361,147	154,152	-450,681
	1990	596,369	546,239	495,061	191,095	-636,026
Very High	1930	135,308	66,566	48,622	17,462	2,659
	1940	184,739	136,171	86,398	33,291	-71,122
	1950	225,008	229,537	141,533	50,480	-196,543
	1960	295,000	303,266	209,738	95,741	-313,746
	1970	379,801	391,296	323,823	122,294	-457,612
	1980	480,912	510,257	468,015	154,152	-651,513
	1990	596,369	674,173	642,296	248,424	-968,523

Source: Authors' estimates. Hypothetical earnings from Social Security Administration (2015a). Individuals work with certainty from ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

Table A-4
Lifetime Medicare Benefits, Taxes and Premiums for Women
Medicare Spending Based on Trustees 2015 Alternative Estimates
Estimates at Age 65, 2015\$, 2.9% Real Discount Rate

Earnings Assumption	Birth Year	Total Medicare Benefits	Medicare Payroll Taxes	Medicare Income Taxes	Medicare Premiums	Net Medicare Benefits
Very Low	1930	148,169	8,399	290	18,792	120,689
	1940	195,621	14,567	621	29,255	151,179
	1950	236,879	20,093	939	37,979	177,868
	1960	308,186	23,877	1,257	49,981	233,071
	1970	393,518	27,991	1,697	63,347	300,483
	1980	489,159	34,714	2,384	78,390	373,670
	1990	597,755	44,810	3,359	95,741	453,845
Low	1930	147,601	15,114	1,088	18,712	112,687
	1940	194,899	26,211	2,017	29,141	137,529
	1950	235,929	36,155	3,171	37,825	158,778
	1960	306,927	42,964	4,567	49,778	209,618
	1970	391,904	50,367	6,654	63,088	271,795
	1980	487,134	62,465	9,775	78,066	336,828
	1990	595,230	80,630	13,724	95,338	405,538
Medium	1930	147,691	33,588	5,061	18,723	90,318
	1940	195,012	58,249	8,550	29,158	99,055
	1950	236,068	80,350	14,885	37,848	102,985
	1960	307,108	95,482	24,429	49,808	137,389
	1970	392,134	111,934	48,019	63,125	169,056
	1980	487,416	138,820	69,754	78,111	200,730
	1990	595,572	179,190	95,285	95,393	225,704
High	1930	148,351	50,570	20,283	18,816	58,682
	1940	195,848	92,337	27,730	29,290	46,492
	1950	237,158	128,550	44,761	38,024	25,822
	1960	308,549	152,759	67,585	50,040	38,164
	1970	393,978	179,083	106,382	63,421	45,093
	1980	489,723	222,098	153,929	78,481	35,216
	1990	598,440	311,015	210,198	95,851	-18,625
Taxable Maximum	1930	151,259	66,689	35,361	19,224	29,985
	1940	199,538	124,002	59,573	29,869	-13,906
	1950	241,972	195,386	100,781	38,804	-93,000
	1960	314,912	260,136	160,618	71,494	-177,335
	1970	402,128	322,159	252,833	129,457	-302,322
	1980	499,921	416,294	363,822	160,231	-440,425
	1990	611,121	546,239	496,637	195,754	-627,508
Very High	1930	151,259	66,566	51,286	20,141	13,266
	1940	199,538	136,171	88,983	36,574	-62,191
	1950	241,972	229,537	144,679	54,326	-186,570
	1960	314,912	303,266	213,091	102,134	-303,580
	1970	402,128	391,296	327,874	129,457	-446,500
	1980	499,921	510,257	471,067	160,231	-641,633
	1990	611,121	674,173	644,094	254,480	-961,625

Source: Authors' estimates. Hypothetical earnings from Social Security Administration (2015a). Individuals work with certainty from ages 21 to 64 and retire at age 65. Income-adjusted mortality rates by sex begin at age 65. Medicare spending from 2015 baseline estimates. Future payroll and income taxes increase to fund annual spending. See text and appendix for details.

Appendix

Federal Income Taxes

Our estimates of federal income taxes in support of SMI benefits are based on the relationship between wage and salary income, total income, and income taxes paid as reported in Statistics of Income (SOI) tables from the Internal Revenue Service (IRS). For the years 1995 to 2011, summary tables reporting adjusted gross income (AGI), total income, salaries and wages, and income taxes paid are used to calculate tax rates by the income thresholds reported in the tables.¹³ The wage and salary income ranges are then used in combination with the wage earnings from the hypothetical earnings profiles to interpolate federal income tax rates for each profile for these years.

For years 1980 to 2013, tax rates by percentiles in the income distribution are available from the Tax Foundation.¹⁴ The relevant percentiles for our exercise from these tables are limited to 0-50, 50-75, 75-90, 90-95, 95-99, and 99-100. The percentiles, and associated dollar value AGI thresholds, in the Tax Foundation data are used to impute wage and salary income to the years 1980 to 1994. This imputation is based on the relationship between AGI and wage and salary income as of 1995 from the more detailed (SOI) tables. Below the 50th percentile, the relative rates from 1995 SOI tables are adjusted by time trend in the rate from the Tax Foundation data. Together the SOI tables and the Tax Foundation's tables allow for the interpolation of tax rate to the earnings profiles for the years 1980 2011. The average tax rate for each wage from each of the hypothetical earnings profiles are estimated based on interpolating between the available wage and salary amounts from the IRS tables.

To estimates the tax rates for the years 1967 to 1979, the estimated tax rates in 1980 by earnings profile are indexed to the previous years. The index values are determined based on simple regression over the years 1980 to 2011 in which the average federal income tax rate is the dependent variable and total tax income as a share of GDP less payroll taxes as a share of GDP is the independent variable. The predicted values between 1967 and 1980 are then indexed to 1980 and used to adjust the tax rates in 1980 by earnings profile to produce tax rate estimates for the earlier years.

A comparable index is calculated for the years 2011 and later separately for the baseline and alternative forecasts of primary spending less HI and Social Security from the CBO's 2015 Long-term Budget Outlook.¹⁵ The index is then applied to the income tax rate estimates by earnings

¹³ See Statistics of Income Tax Stats – Individual Income Tax Returns at: <https://www.irs.gov/uac/SOI-Tax-Stats-Individual-Income-Tax>Returns>. Tables 1 and 2.

¹⁴ See the Tax Foundation's "Summary of the Latest Federal Income Tax Data, 2015 Update" available at: <http://taxfoundation.org/article/summary-latest-federal-income-tax-data-2015-update>. An earlier version of the Tax Foundation's data, ending in 2011 was used in the present study.

¹⁵ See Summary Data for the Baseline and Extended Alternative Fiscal Scenario in "The 2015 Long-Term Budget Outlook," Congressional Budget Office, June 2015.

profile from 2011 to produce two series of income tax rates by earnings profile in the future years.

Income Adjusted Life Tables

The methodology for adjusting the Social Security Administration's life tables used in producing the 2007 Trustees reports by lifetime income is described in Rettenmaier (2016). The differential mortality was derived by comparing two public use Social Security Administration data files the 2006 Earnings Public Use File (EPUF) and the 2004 Benefit and Earnings Public Use File (BEPUF). Both files include annual earnings for individuals beginning as early as 1951. The EPUF is a 1% sample of all individuals who had been issued a Social Security number as of 2006. However, for this EPUF does not include date of death so as not to reveal the identity of the individuals in the file. The BEPUF is restricted to individuals who received Social Security benefits in 2004 and are thus survivors to 2004. Select birth years from the BEPUF sample of survivor is compared to the sample of all individuals in the EPUF to estimates survival rates by income class birth year and sex. These survival rates are then used to produce differentials life tables by income class.