Pension System Solvency – From Linguistics to Economics[a]

Laurence J. Kotlikoff[b]

I'm honored to address the 2015 annual meeting of the Swiss Economic Society. The topic I was asked to examine – the Solvency of Pension Systems – is a challenging one. I'm going to begin my remarks by questioning whether I or anyone else can say anything economically coherent about the solvency of pension systems by themselves, i.e., as distinct parts of overall fiscal systems. My answer will be a firm NO. I will then turn to the real issue, which is overall fiscal solvency, how to measure it, and the potential impact on overall fiscal solvency of recently observed pension reforms, which often have been reforms in name only. Let me illustrate my concerns about measuring pension solvency taking the United States' Social Security system as an example. If you look at table II.B1 in the latest Social Security Trustees Report (Social Security Administration, 2014; the tables discussed here are printed in the Appendix to this essay), released in July of 2014, you'll learn that the system is in surplus. In fact, it has a trust fund of $2.8 trillion. That's a big number. If any of us had $2.8 trillion in the bank, we'd feel pretty rich and scoff at anyone who told us we were insolvent.

Moreover, if you consider the system's trust fund over the next 8 years, as does table IV.A3 in the Report, things still seem very reassuring with the trust fund equaling $2.7 trillion in 2023.

But, as table IV.B1 tells us, after 2023 the system's cash flows head south with each year's gap between taxes and spending rising. By 2090, i.e., 75 years from now, the system's expenditures exceed its taxes each year by 5 percent of the projected annual tax base.

Over this 75-year period the system has a fiscal gap – the present value of projected outflow net of its tax inflow and its current $2.8 trillion surplus of $10.6 trillion. It's rather hard to find this $10.6 trillion figure for a simple reason. It's hidden deep in the Appendix of the Trustees Report in table VI.F1.

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b Boston University, Department of Economics, 270 Bay State Road, Boston, MA 02215, USA.

Stated differently, this hidden table says the system is $10.6 trillion in debt over the next 75 years. And, very importantly, this is a present value. So while the trust fund is now $2.8 trillion, the system's 75-year unfunded liability, which is net of the $2.8 trillion trust fund, is $10.6 trillion.

Clearly, this is getting confusing. First I tell you the system is swimming in money. Next I tell you it's still swimming in money almost a decade from now. And then I tell you it's in the red, right at this very moment, to the tune of $11 trillion. Since U.S. GDP is now $18 trillion, $11 trillion represents over half a year's total output. Imagine everyone in America working for a half year and consuming nothing, but instead handing all of the output produced over this period to the government to meet its future Social Security obligations.

But the confusion gets worse. If you look at table VI.F1, you'll see two fiscal gaps – one calculated over the next 75 years and one calculated over the infinite horizon. The infinite horizon fiscal gap is $25 trillion! This is also a present value that is net of the current trust fund. It far exceeds current GDP. Furthermore, if you read the tables footnotes, you'll learn that $25 trillion represents 33 percent of the present value of all projected future taxes from now through the end of time. Stated differently, the system, according to the infinite horizon projection, is 33 percent underfinanced!

Is $25 trillion the worst representation of the system's current finances? Sorry, it's not. A tax dollar is a tax dollar and there is no reason that Social Security's payroll taxes need to viewed as paying for Social Security benefits. They could just as well be viewed as paying for the President's lunch or national defense or healthcare or servicing official debt or for any other form of federal expenditure. If we measure Social Security's infinite horizon fiscal gap, but omit FICA taxes on the grounds they are being used to pay for other things (and how can we prove otherwise?), the system's fiscal gap is not $25 trillion, but $100 trillion! That's more than five years of U.S. GDP!

Being $100 trillion in the red is a very long way from where we started with my saying the system is currently $2.8 trillion in the black. So what should we conclude? Is the system totally broke or is it swimming in cash?

John Mitchell, President Nixon's Attorney General, had a pet phrase when it came to referencing number crunchers. "Figures lie and liars figure." Mitchell, it turned out, was an expert with respect to lying. In fact, he went to jail for conspiracy, obstruction of justice, and perjury based on providing false testimony to Congress about the Watergate scandal. That's quite a rap sheet for the country's top judicial officer!

As I've shown, the first part of Mitchell's phrase rings true when it comes to assessing Social Security's solvency. Depending on which figure you use, you can

claim the system is in terrific or horrible fiscal shape. The second part of Mitchell's dictum on lying is also on target. American politicians on the left and the right are familiar with these different measures of Social Security's (in)solvency. Consequently, they must realize that they are lying to or, at least, misleading the public when they claim to know *for sure* Social Security's financial condition.

The reason there is no single correct measure of Social Security's or any pension system's solvency goes back to *economics' labeling problem*, which Jerry Green and I described in formal terms in Green and Kotlikoff (2008).

What we showed in a fully general neoclassical framework, and which I have been demonstrating since 1986[1] in less general settings, is that conventional fiscal measures, be they government debt, the deficit, taxes, transfers payments, disposable income, personal saving, private saving, private wealth, government wealth, and capitalism in general (i.e., private ownership), are not well defined economic measures. Instead, they are, like time and distance in physics, measurements of our frames of reference. In physics, that would be our direction and rate of speed through space. In economics, that would simply be our labeling conventions – the decisions governments make as to whether to call specific government receipts "borrowing" or "taxes" and the decisions they make as to whether to call particular government payments "return of principal plus interest" or "transfer payments." These arbitrary decisions, which would make the perpetrators of Enron's accounting fraud blush, determine what gets put on and what is kept off the books.

As Green and Kotlikoff (2008) makes clear, there are an infinite number of internally consistent methods of labeling the same fiscal policy, each of which will produce its own past, current, and future paths of government debts, deficits, and all the other aforementioned fiscal "variables." In short, conventional fiscal accounting, which occupies roughly 40 percent of the national income accounting chapters in most introductory economics textbooks, has nothing whatsoever to do with economics and everything to do with linguistics.

The Economists' New Clothes

The fact that economists, as a group, are discussing fiscal policy based on economically meaningless measures is beyond distressing. Here we are dedicated to conveying and developing economic science, yet we engage in analyses that are wholly inconsistent with basic economic theory.

1 See, for example, Kotlikoff (1986), Kotlikoff (1988), Kotlikoff (2002).

Were we, as a profession, simply routinely engaged in innocent, if mindless consideration of meaningless measures, the only damage would be our loss of time and credibility. But having certified these measures as legitimate fiscal indicators and having persuaded governments around the world, as well as the IMF, OECD, the World Bank, and other major international institutions, to use these numbers to assess nations' fiscal conditions, we economists find ourselves playing the tailors in Hans Christian Anderson's *The Emperor's New Clothes*.

This, of course, is the story of a king's tailors who are absolutely terrified by the truth that they have failed to produce any garments whatsoever for the king, let alone the most splendid garments in all the land. Rather than confess their failure, they persuade the king that he is dressed in the most magnificent attire when, in fact, he is naked.

And the king, who doesn't want to sound stupid and say he doesn't see or feel these new clothes, when he thinks others can, especially his brilliant tailors, becomes "persuaded" that he's actually dressed. This leads everyone in his court to become likewise "persuaded." The king then proceeds to parade his new clothes to the public. A small boy in the crowd screams out, "But the King is Naked!" at which point there is a murmur in the crowd, the king stops, ponders this for a moment, and then continues his parade to even louder cheers.

How Economic Theory Says to Measure Fiscal Sustainability

Were measuring fiscal sustainability simple, we economists would, presumably, be less likely to be substituting accounting and linguistics for economics. But the presence of aggregate shocks and the incompleteness of markets that prevent our pricing these aggregate shocks make assessing fiscal sustainability quite challenging.

Setting aside aggregate uncertainty, economics prescription for understanding a country's fiscal solvency is quite simple: Determine whether the economy's current policy path satisfies the government's intertemporal budget constraint. This leads naturally to fiscal gap and generational accounting. The fiscal gap is simply the present value difference between *all* projected government expenditures and *all* projected receipts.

The *all* is important. It requires that everything be put on the books regardless of the government's labeling convention. This obviously includes all pension system receipts and payments. But, I just told you that what is and is not a part of the pension system is entirely arbitrary! Yes, that's true. But the beauty of fiscal gap accounting is that reclassifying any fiscal policy, including pensions, won't

change the fiscal gap. The reason is simple – everything is put on the books no matter how it is labeled. The *all* in *all* expenditures and *all* receipts also and quite critically includes expenditures and receipts out to infinity. I.e., the fiscal gap is the infinite-horizon fiscal gap.

Now why would one need to consider receipts and expenditures through the end of time, notwithstanding the fact that they are being discounted to the present? The reason is that any finite horizon fiscal gap, be it 50, 75, or 100 years is not well defined in the sense that with the proper labeling convention any finite horizon fiscal gap of any size, positive or negative, can be reported. *It is only the fiscal gap measured over the infinite horizon that is label free!*

The U.S. Fiscal Gap

How big is the fiscal gap? Well, in the case of the U.S. Social Security system it's $25 trillion. But, as already argued, that number is also meaningless because what is and is not called a part of Social Security is simply a matter of word choice. But the overall U.S. fiscal gap, in which everything is put on the books, is meaningful. And its size is a sad testimony of the degree to which economists, in permitting politicians to substitute deficit for fiscal gap accounting, have facilitated what amounts to nothing less than generational theft.

The U.S. fiscal gap now stands at $210 trillion. This is 16 times the $13 trillion in official debt held by the public. It's also almost 12 years of GDP! On an ongoing basis the fiscal gap represents 10.5 percent of GDP. I.e., if you discount 10.5 percent of annual projected GDP, you arrive at $210 trillion.

But where do the projections come from underlying the number. They come straight from the U.S. government, specifically the Congressional Budget Office's July 2014 Alternative Fiscal Scenario. The CBO projects expenditures and receipts out 75 years. But it's easy to extend these projections through the infinite horizon because the CBO projects constant ratios of expenditures and receipts to GDP far before the 75 years have elapsed. It also assumes a fixed GDP growth rate in the run up to year 2090. I used a 3 percent real discount rate, which is very close to what the Social Security Trustees use in their fiscal gap calculations.

America's Unfunded Liability

When Detroit declared bankruptcy last year, its two pension funds were underfunded by 20 percent. In comparison, the entire U.S. fiscal operation is underfunded by 58 percent. Stated differently, it would take a 58 percent higher time path of federal receipts to produce the extra $210 trillion needed, in present value, to close the U.S. fiscal gap. This means that every single federal tax rate would need to be raised by 58 percent or more (to account for tax evasion and avoidance) in order to produce the required time path of extra receipts. And this needs to occur immediately and be maintained forever.

Another option is to cut all expenditures, including those labeled servicing of interest and principal on official debt, immediately and permanently by 33 percent. This too sounds and is draconian, but it's precisely what the CBO's projections are telling us.

Delay Will Make the Requisite Adjustment Even Larger

Fiscal policy, generationally and intertemporally speaking, is a zero-sum game. The less current older generations pay in the form of higher taxes or lower transfer payments, the more today's young generations as well as all future generations will be forced to pay either in the form of what's labeled higher future taxes or what's labeled lower future transfer payments. For example, if we make no adjustments to receipts or spending for the next two decades and decide at that point to raise taxes, the requisite immediate and permanent tax hike is not 58 percent, but 70 percent.

Implications for Generational Accounting

Generational accounting considers the burden on young and future generations of having to pay off the fiscal gap if the entire gap is left for them to pay. Clearly, letting all current adults off the hook would mean confronting today's and tomorrow's children with lifetime net tax rates that are at least twice as large as those adult Americans have experienced in their days gone by. Doing so would not only be immoral by most people's standards. It would also likely prove infeasible given the incredibly high net tax rates that would be needed on out kids to give today's adults a total pass. When net tax rates get too high, people head for the hills, i.e., to different countries. This is particularly true of high-skilled workers who can easily sell their services to employers in foreign lands.

Implications of the Fiscal Gap on the Economy's Intertemporal Budget

When a country has a positive fiscal gap, let alone an enormous one like that of the U.S., it is pretending that its government can consume, in present value, more that it can pay for, in present value, in the form of taxes net of transfer payments. (Taxes, by the way, should be construed here to include seignorage arising from money creation). Now if one adds the government's unbalanced intertemporal budget to appropriately discounted (discounted to the present using the time path of the economy's marginal product path) intertemporal budget constraints of successive generations one arrives at an economy-wide intertemporal budget constraint with the following implication – *the country is trying to spend more than its resources.*

This, in essence, is America's fiscal dilemma. The public and government are prospectively and collectively trying to consume more that the economy's resources, i.e., the country's net wealth plus the present value (as of today) of all its current and future human wealth. This attempt to consume far in excess of what our nation, and certainly our children, can afford is not a recent phenomenon. It's been going on for over six decades under Republican and Democratic administrations alike.

The proof is provided by America's postwar history of net national saving. The U.S. net national saving – net national saving divided by net national income (all measured at producer prices) was 15 percent in 1950. Today it is 3 percent. The six-decade-long downhill slide in the U.S. net national saving rate has not been perfectly steady, but it's been persistent.

What has spurred this dramatic decline in U.S. national saving? The answer is a massive and sustained redistribution from the young to the old that occurred under many headings (labels) – tax cuts, increases in Social Security, Medicare, and Medicaid benefits, reductions in dividend and capital gains tax rates, as well as explicit federal borrowing.

But why should taking from the young and giving to the old, whether under one guise or another, cause the nation to consume more and save less? The answer is that these "take-as-you-go" policies are not redistributing from one large happy intergenerationally-connected/altruistically-linked family that shares resources no matter their ownership.

On the country, the evidence against intergenerational altruism, discussed in my book, *Generational Policy*, appears overwhelming. When it comes to consumption, the young and the old, even within an extended family, act as if they

are strangers. Moreover, since the elderly have fewer years left to live, their propensities to spend are much higher than those of the young. Hence, using fiscal policy to take from young and future savers and give to old spenders produces more overall consumption and lower national saving – precisely as predicted by the selfish life-cycle model in which each generation is out for its own.

To drive this point home, consider the 12 percentage-point rise in consumption as a share of net national income since 1950. Some 11 of the 12 percentage points can be traced to a higher rate of consumption of households. I.e., household consumption as a share of national income is now 11 percentage points larger than it was in 1950.

And this dramatic increase in the nation's rate of household consumption has occurred primarily among the elderly. In 1960, the earliest postwar year for which data are available, the U.S. age-consumption profile was hump shaped. Today, as the work of Berkeley economist and demographer, Ronald Lee, confirms, it's a straight upward sloping curve.[2] One striking summary of what's happened is provided by the ratio of the average consumption of a 80 year-old to that of a 40 year old. This ratio was roughly 75 percent in 1960. By 2007, it was roughly 140 percent!

As emphasized by Feldstein and Horioka (1980), U.S. net national saving and net domestic investment move together. Hence, the decline in U.S. net national saving has produced a decline in U.S. net domestic investment. In 1950 U.S. net domestic investment was also 15 percent of net national income. Today it's just 4 percent.

Fiscal Gaps in Other Countries

In 2012, the European Council prepared what it calls S2 indicators of the infinite horizon fiscal gap of 17 EU countries (European Commission, 2012).The findings are remarkable. Italy has a fiscal gap equal to negative 2.3 percent of the present value of GDP. Luxembourg has a fiscal gap of close to 10 percent of the present value of GDP. The U.S., recall, faces a fiscal gap of 10.5 percent of the present value of GDP. Germany and France have relatively modest fiscal gaps – around 2 percent, whereas the UK has a pretty sizeable one, over 5 percent.

The bottom line is that the correlation between official debt to GDP ratios and fiscal gap to the present value of GDP ratios appears to be small or negative.

2 http://www.ntaccounts.org/doc/repository/Ron%20Lee%20BOJ%20presentation%20May30-2012.pdf.

This is not surprising. The countries in the worst long-term fiscal shape have the greatest incentive to keep most of their fiscal obligations off the books.

Italy, or course, is viewed by the bond market as in far worse fiscal shape than the U.S. or Luxembourg. This is a sad statement about the inability of those trading Italian, U.S., and Luxembourg government bonds to act independent of the actions of other traders. As Keynes pointed out, traders can survive if they lose money in a pack. But if they lose money on their own, their gooses are cooked, potentially for good. So their main concern, when it comes to placing trades, is not economic or fiscal reality, but the perceptions of other traders about those realities. If they think that other traders are pricing Italian bonds too low, but aren't likely to start buying, they won't buy either until they get a signal that collective "wisdom" has changed. This, partly, is why financial markets experience such large and abrupt swings. These markets, like other sectors of the economy, are subject to quite nasty faith-based multiple equilibria.

Assessing Fiscal Sustainability in Light of Aggregate Uncertainty

The fiscal gap must, in the end, be zero. I.e., along any realized path of the economy, the economy can't consume more than its resources.[3] Hence, the fiscal gap, in the manner that I, Auerbach and Gale (2014), Gokhale (2014), Raffelhueschen (2014), and many others have been calculating, represents a counterfactual exercise, which assumes the indefinite maintenance of current policy. In the context of uncertainty, one can run this counterfactual for all potential paths of the economy and weight each path by its probability. The result will be an expected present value fiscal gap. Although no one has, to my knowledge, produced such a measure, it seem eminently feasible.

Other Means of Assessing Fiscal Sustainability

A different approach to determining if a fiscal policy is feasible is to simulate fiscal policy in a detailed life-cycle computational general equilibrium model. An example here is Benzel et al. (2015). This study examines the interconnected demographic, fiscal, and macroeconomic transitions of the U.S., China, the EU, India, Russia, and Japan plus Korea.

3 This assumes the economy is dynamically efficient for which there appears to be compelling evidence.

As the paper points out, several of these countries/regions are skating very close to the edge when it comes to the maintenance of their current fiscal affairs. Indeed, if one pushes this model much farther with respect to running generational policies that are adverse to young and future generations the model provides a strong statement about sustainability. Specifically, the model refuses to converge. This is due not to any problem in the model's convergence algorithm, but due to the model's inability to permit the global economy or any region/country therein to consume more than it now owns and can produce going forward.

The Holy Grail -- Assessing Overall Fiscal Sustainability via Monte Carlo Simulations

The first-best method for understanding whether a country's fiscal policy is sustainable is to posit the precise means and timing of fiscal adjustment that the country will ultimately utilize. Given this, one can construct a dynamic, general equilibrium life-cycle model with aggregate shocks and simulate the distribution of the economy's position through time. Policies that leave future generations, in most simulated future states of nature, in dire economic circumstances may potentially be viewed as sustainable, but as also highly undesirable. If illuminating what current policy will likely mean for our progeny suffices to alter the nature or duration of current policy, economists will have earned their keep.

All this is far more easily said than done. The well known and dreaded *Curse of Dimensionality* has, to date, restricted our ability to simulate highly detailed versions of the life-cycle model with heterogeneous life-cycle agents in the presence of macro shocks. But new techniques are being developed over time, some more robust than others. The list here includes Marcet (1988), Rios-Rull (1996), Krussel and Smith (1998), Kreuger and Kluber (2006), Judd, Maliar, and Maliar (2011), and Hasanhodzic and Kotlikoff (2013). My sense is that within a decade we will be in a position to simulate the kinds of models needed to better assess fiscal sustainability. In the meantime, however, the evidence presented in Hasanhodzic and Kotlikoff (2013) suggests that the inclusion of macro shocks may prove of relatively minor importance in simulating fiscal policy paths. While macro shocks can provide variability along the transition path, this variability appears to be quite small compared to the impact of the policy itself. Stated differently, it's highly unlikely that one can hope for, let alone rely on positive macroeconomic shocks to bail out a country that is running what, apart from such shocks, is a highly unaffordable fiscal policy.

Conclusion

Neither economic theory nor common sense support piecemeal analysis of a country's fiscal circumstances, including that of its pension systems. Any and all fiscal analyses that hope to tell us anything whatsoever about a country's fiscal condition need to be comprehensive and account for the present, near term, and far term. Any approach short of this represents an exercise in linguistics not economic science. Unfortunately, the analysis of senseless fiscal indictors is rampant in our real, actually, unreal world.

This leaves we economists with three difficult tasks. First, we need to admit that we have spent decades conspiring with politicians to substitute fiscal nonsense for fiscal truth to help them win reelection and to keep ourselves in their good graces. Second, we need to identify and expose those nations, like the United States, that are waging economic war on their children by leaving them fiscal liabilities that are far beyond their capacities to pay. Third, we need to make plain that countries that try to spend more than they can afford not only impoverish their children directly, but also indirectly by leaving them with far less capital to work than would otherwise be the case. In short, when it comes to assessing fiscal policy, economists need to stick with their science, not with what politicians want to hear.

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Appendix: Tables from the 2014 Social Security Trustees Report

Table II.B1: Summary of 2013 Trust Fund Financial Operations (in Billion $)

	OASI	DI	OASDI
Asset reserves at the end of 2012	2,609.7	122.7	2,732.3
Total income in 2013	743.8	111.2	855.0
Net payroll tax contributions	620.8	105.4	726.2
Reimbursement from General Fund of the Treasury	4.2	.7	4.9
Taxation of benefits	20.7	.4	21.1
Interest	98.1	4.7	102.8
Total expenditures in 2013	679.5	143.4	822.9
Benefit payments	672.1	140.1	812.3
Railroad Retirement financial interchange	3.9	.6	4.5
Administrative expenses	3.4	2.8	6.2
Net increase in asset reserves in 2013	64.3	–32.2	32.1
Asset reserves at the end of 2013	2,674.0	90.4	2,764.4

Note: Totals do not necessarily equal the sums of rounded components.
Source: U.S. Social Security Administration (2014).

Table IV.A3: Operations of the Combined OASI and DI Trust Funds,Calendar Years 2009–23[a](in billion $)

Calendar year	Income					Cost				Asset Reserves		
	Total	Net payroll tax contributions	GF reim-bursements[b]	Taxation of benefits	Net interest	Total	Benefit payments[c]	Administra-tive costs	RRB interchange	Net increase during year	Amount at end of year	Trustfund ratio[d]
Historical data:												
2009	807.5	667.3	e	21.9	118.3	685.8	675.5	6.2	4.1	121.7	2,540.3	353
2010	781.1	637.3	2.4	23.9	117.5	712.5	701.6	6.5	4.4	68.6	2,609.0	357
2011	805.1	564.2	102.7	23.8	114.4	736.1	725.1	6.4	4.6	69.0	2,677.9	354
2012	840.2	589.5	114.3	27.3	109.1	785.8	774.8	6.3	4.7	54.4	2,732.3	341
2013	855.0	726.2	4.9	21.1	102.8	822.9	812.3	6.2	4.5	32.1	2,764.4	332
Intermediate:												
2014	882.4	753.2	.5	29.7	99.0	863.1	852.8	5.7	4.6	19.3	2,783.7	320
2015	938.0	808.4	.4	32.6	96.7	909.7	898.5	6.6	4.7	28.3	2,812.1	306
2016	985.3	853.0	.1	35.8	96.3	963.3	952.0	6.5	4.7	22.0	2,834.1	292
2017	1,042.7	904.9	.1	39.6	98.1	1,022.3	1,010.8	7.0	4.5	20.4	2,854.4	277
2018	1,105.0	960.0	e	43.4	101.6	1,087.6	1,075.2	7.5	4.9	17.4	2,871.8	262
2019	1,165.1	1,012.9	e	47.4	104.9	1,158.7	1,145.8	7.9	5.0	6.4	2,878.3	248
2020	1,224.5	1,065.5	e	51.5	107.4	1,235.2	1,221.8	8.2	5.1	–10.7	2,867.6	233
2021	1,283.2	1,118.9	e	55.8	108.5	1,312.3	1,298.6	8.6	5.1	–29.1	2,838.4	219
2022	1,341.4	1,172.0	e	60.3	109.2	1,395.8	1,381.5	9.0	5.4	–54.4	2,784.1	203
2023	1,399.3	1,224.5	e	65.2	109.5	1,484.9	1,470.2	9.4	5.4	–85.7	2,698.4	187
Low-cost:												

Calendar year	Income					Cost				Asset Reserves		
	Total	Net payroll tax contributions	GF reim-bursements[b]	Taxation of benefits	Net interest	Total	Benefit payments[c]	Administra-tive costs	RRB interchange	Net increase during year	Amount at end of year	Trustfund ratio[d]
2014	889.6	759.7	.5	29.7	99.8	861.1	850.8	5.7	4.6	28.5	2,793.0	321
2015	974.0	839.6	.4	32.6	101.5	907.4	896.2	6.6	4.6	66.7	2,859.6	308
2016	1,047.2	902.8	.1	36.1	108.1	967.8	956.6	6.6	4.7	79.4	2,939.0	295
2017	1,136.2	978.0	.1	40.4	117.8	1,037.0	1,025.3	7.2	4.4	99.2	3,038.3	283
2018	1,227.0	1,053.4	e	44.6	129.0	1,111.9	1,099.2	7.8	4.9	115.1	3,153.4	273
2019	1,317.6	1,127.8	e	49.0	140.7	1,191.9	1,178.6	8.3	5.0	125.7	3,279.0	265
2020	1,410.6	1,203.6	e	53.7	153.3	1,277.6	1,263.6	8.9	5.2	133.0	3,412.0	257
2021	1,505.6	1,280.5	e	58.4	166.6	1,365.1	1,350.6	9.4	5.2	140.5	3,552.5	250
2022	1,607.5	1,362.2	e	63.6	181.7	1,460.6	1,445.2	9.9	5.5	146.9	3,699.4	243
2023	1,713.1	1,445.7	e	69.3	198.1	1,563.7	1,547.7	10.5	5.6	149.4	3,848.9	237
High-cost:												
2014	872.9	744.8	.5	29.7	97.8	865.2	854.9	5.7	4.6	7.7	2,772.1	320
2015	897.6	772.5	.4	32.6	92.1	913.2	901.9	6.6	4.7	–15.5	2,756.6	304
2016	925.7	802.5	.1	35.7	87.4	963.6	952.3	6.5	4.8	–37.8	2,718.8	286
2017	958.8	835.6	.1	39.2	84.0	1,017.5	1,006.1	6.8	4.6	–58.7	2,660.1	267
2018	995.2	871.3	e	42.7	81.2	1,076.6	1,064.4	7.2	5.0	–81.4	2,578.7	247
2019	1,029.0	905.0	e	46.3	77.6	1,140.4	1,127.9	7.4	5.1	–111.4	2,467.3	226
2020	1,062.1	939.4	e	50.1	72.6	1,208.3	1,195.5	7.7	5.2	–146.2	2,321.0	204
2021	1,094.2	974.8	e	53.8	65.6	1,275.6	1,262.5	8.0	5.1	–181.3	2,139.7	182
2022	1,125.6	1,010.5	e	57.8	57.2	1,347.7	1,334.2	8.2	5.3	–222.2	1,917.5	159
2023	1,153.3	1,042.9	e	62.1	48.3	1,423.9	1,410.1	8.5	5.4	–270.6	1,646.9	135

a Appendix A (available at https://www.ssa.gov/oact/tr/2014/VI_A_cyoper_hist.html#207125) presents a detailed description of the components of income and cost, along with complete historical values.
b Includes reimbursements from the General Fund of the Treasury to the OASI and DI Trust Funds for: (1) the cost of noncontributory wage credits for military service before 1957; (2) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (3) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984–89 by Public Law 98-21; (4) the cost in 2009–17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (5) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.
c Projected benefits are estimated as scheduled under current law.
d The "Trust fund ratio" column represents reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.
e Between –$50 million and $50 million.

Note: Totals do not necessarily equal the sums of rounded components.

Source: U. S. Social Security Administration (2014).

Table IV.B1: Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990–2090 (as a Percentage of Taxable Payroll)

Calendar year	OASI Income rate[a]	OASI Cost rate	OASI Balance	DI Income rate[a]	DI Cost rate	DI Balance	OASDI Income rate[a]	OASDI Cost rate	OASDI Balance
Historical data:									
1990	11.47	9.66	1.82	1.18	1.09	0.10	12.66	10.74	1.91
1995	10.64	10.22	.42	1.87	1.44	.43	12.51	11.67	.85
2000	10.84	8.98	1.87	1.78	1.42	.36	12.62	10.40	2.23
2001	10.90	9.08	1.82	1.82	1.48	.35	12.72	10.55	2.17
2002	11.06	9.29	1.76	1.85	1.60	.24	12.90	10.89	2.01
2003	10.79	9.35	1.44	1.80	1.68	.12	12.59	11.03	1.56
2004	10.73	9.27	1.46	1.79	1.78	.02	12.53	11.05	1.48
2005	10.96	9.31	1.65	1.84	1.85	–.02	12.80	11.16	1.63
2006	10.96	9.18	1.78	1.83	1.88	–.05	12.79	11.06	1.73
2007	11.01	9.44	1.57	1.84	1.88	–.04	12.85	11.32	1.53
2008	10.90	9.54	1.37	1.83	2.01	–.19	12.73	11.55	1.18
2009	11.23	10.74	.50	1.88	2.31	–.43	13.11	13.05	.06
2010	10.75	11.06	–.30	1.79	2.41	–.62	12.54	13.47	–.92
2011	10.84	11.04	–.21	1.80	2.42	–.62	12.64	13.47	–.83
2012	11.04	11.34	–.30	1.81	2.46	–.66	12.84	13.80	–.96
2013	10.96	11.53	–.57	1.81	2.43	–.63	12.77	13.97	–1.20
Intermediate:									
2014	10.87	11.58	–.71	1.80	2.37	–.58	12.67	13.95	–1.29
2015	11.09	11.65	–.56	1.83	2.32	–.49	12.92	13.97	–1.05
2016	11.07	11.71	–.64	1.83	2.26	–.43	12.89	13.97	–1.08
2017	11.08	11.77	–.69	1.83	2.20	–.38	12.91	13.97	–1.06
2018	11.10	11.86	–.76	1.83	2.15	–.33	12.93	14.02	–1.08
2019	11.12	12.03	–.91	1.83	2.12	–.29	12.95	14.15	–1.20
2020	11.13	12.23	–1.10	1.83	2.10	–.27	12.96	14.33	–1.37
2021	11.15	12.41	–1.26	1.83	2.09	–.26	12.98	14.50	–1.52
2022	11.18	12.64	–1.46	1.83	2.10	–.26	13.01	14.74	–1.73
2023	11.20	12.90	–1.71	1.83	2.10	–.27	13.03	15.00	–1.97
2025	11.23	13.42	–2.19	1.84	2.12	–.28	13.07	15.54	–2.47
2030	11.31	14.52	–3.21	1.84	2.09	–.25	13.15	16.60	–3.46
2035	11.34	15.01	–3.66	1.84	2.08	–.24	13.19	17.09	–3.90
2040	11.35	15.00	–3.64	1.84	2.09	–.24	13.20	17.09	–3.89
2045	11.35	14.78	–3.43	1.85	2.16	–.31	13.20	16.94	–3.74
2050	11.35	14.69	–3.34	1.85	2.20	–.35	13.20	16.89	–3.69
2055	11.36	14.78	–3.42	1.85	2.24	–.38	13.21	17.01	–3.80
2060	11.38	15.03	–3.65	1.85	2.23	–.37	13.23	17.26	–4.03

Calendar year	OASI Income rate[a]	OASI Cost rate	OASI Balance	DI Income rate[a]	DI Cost rate	DI Balance	OASDI Income rate[a]	OASDI Cost rate	OASDI Balance
2065	11.39	15.26	–3.86	1.85	2.24	–.39	13.25	17.50	–4.25
2070	11.41	15.49	–4.09	1.85	2.25	–.39	13.26	17.74	–4.48
2075	11.42	15.65	–4.23	1.85	2.24	–.38	13.27	17.88	–4.61
2080	11.42	15.63	–4.21	1.86	2.27	–.42	13.27	17.90	–4.63
2085	11.42	15.73	–4.31	1.86	2.31	–.45	13.28	18.04	–4.76
2090	11.44	15.99	–4.55	1.86	2.30	–.45	13.30	18.29	–5.00
First year balance becomes negative and remains negative throughout the projection period			2010			2005			2010
Low-cost:									
2014	10.81	11.43	–.61	1.79	2.31	–.52	12.60	13.74	–1.14
2015	11.11	11.28	–.16	1.84	2.19	–.35	12.95	13.46	–.52
2016	11.03	11.17	–.14	1.82	2.08	–.25	12.86	13.25	–.39
2017	11.05	11.12	–.08	1.82	1.98	–.16	12.87	13.10	–.23
2018	11.06	11.15	–.08	1.82	1.90	–.08	12.89	13.05	–.16
2019	11.07	11.22	–.15	1.82	1.84	–.02	12.89	13.06	–.16
2020	11.08	11.32	–.24	1.82	1.79	.03	12.90	13.11	–.21
2021	11.10	11.41	–.31	1.82	1.76	.06	12.92	13.17	–.25
2022	11.12	11.52	–.41	1.82	1.73	.09	12.94	13.26	–.32
2023	11.13	11.66	–.53	1.82	1.71	.12	12.96	13.37	–.42
2025	11.16	11.99	–0.83	1.83	1.68	0.14	12.99	13.67	–0.69
2030	11.21	12.62	–1.41	1.83	1.58	.25	13.04	14.20	–1.16
2035	11.23	12.76	–1.53	1.83	1.52	.31	13.06	14.28	–1.22
2040	11.22	12.50	–1.28	1.83	1.49	.34	13.06	13.99	–.94
2045	11.21	12.13	–.92	1.83	1.51	.32	13.04	13.65	–.60
2050	11.20	11.91	–.70	1.83	1.52	.31	13.04	13.43	–.39
2055	11.20	11.84	–.64	1.83	1.52	.31	13.04	13.37	–.33
2060	11.21	11.89	–.68	1.83	1.50	.34	13.04	13.38	–.34
2065	11.21	11.86	–.66	1.83	1.49	.35	13.04	13.35	–.31
2070	11.20	11.81	–.60	1.83	1.48	.36	13.04	13.29	–.25
2075	11.20	11.65	–.46	1.83	1.47	.37	13.03	13.12	–.09
2080	11.18	11.37	–.19	1.83	1.49	.34	13.02	12.86	.15
2085	11.18	11.26	–.08	1.84	1.52	.31	13.01	12.78	.23
2090	11.18	11.34	–.16	1.84	1.52	.31	13.02	12.86	.15
First year balance becomes negative and remains negative throughout the projection period			2010			b			b

Calendar year	OASI Income rate[a]	OASI Cost rate	OASI Balance	DI Income rate[a]	DI Cost rate	DI Balance	OASDI Income rate[a]	OASDI Cost rate	OASDI Balance
High-cost:									
2014	10.94	11.79	–.84	1.81	2.45	–.64	12.75	14.24	–1.48
2015	11.05	12.12	–1.07	1.82	2.48	–.65	12.88	14.60	–1.72
2016	11.10	12.38	–1.28	1.83	2.48	–.65	12.93	14.87	–1.93
2017	11.13	12.59	–1.47	1.83	2.48	–.65	12.96	15.07	–2.11
2018	11.16	12.83	–1.67	1.83	2.47	–.64	12.99	15.30	–2.31
2019	11.17	13.12	–1.95	1.83	2.47	–.64	13.01	15.59	–2.58
2020	11.19	13.43	–2.24	1.84	2.48	–.64	13.03	15.91	–2.88
2021	11.22	13.69	–2.47	1.84	2.50	–.67	13.06	16.19	–3.13
2022	11.25	13.98	–2.74	1.84	2.53	–.69	13.09	16.51	–3.42
2023	11.27	14.35	–3.07	1.84	2.56	–.71	13.12	16.90	–3.79
2025	11.32	15.07	–3.75	1.85	2.63	–.78	13.17	17.70	–4.54
2030	11.42	16.72	–5.30	1.85	2.69	–.84	13.27	19.41	–6.15
2035	11.48	17.70	–6.22	1.86	2.76	–.91	13.33	20.46	–7.13
2040	11.51	18.09	–6.58	1.86	2.82	–.96	13.37	20.91	–7.54
2045	11.52	18.19	–6.67	1.86	2.96	–1.10	13.39	21.15	–7.76
2050	11.54	18.39	–6.85	1.87	3.06	–1.19	13.41	21.45	–8.04
2055	11.57	18.79	–7.22	1.87	3.16	–1.29	13.44	21.95	–8.50
2060	11.61	19.42	–7.81	1.88	3.19	–1.32	13.48	22.61	–9.13
2065	11.65	20.09	–8.45	1.88	3.25	–1.38	13.53	23.35	–9.82
2070	11.69	20.87	–9.18	1.88	3.29	–1.41	13.57	24.16	–10.59
2075	11.74	21.63	–9.89	1.88	3.29	–1.41	13.62	24.92	–11.30
2080	11.77	22.20	–10.43	1.88	3.34	–1.45	13.65	25.54	–11.88
2085	11.81	22.83	–11.02	1.88	3.36	–1.48	13.69	26.19	–12.50
2090	11.85	23.50	–11.65	1.88	3.33	–1.45	13.73	26.83	–13.10
First year balance becomes negative and remains negative throughout the projection period			2010			2005			2010

a Income rates include certain reimbursements from the General Fund of the Treasury.

b The Trustees project the annual balance to be negative for a temporary period and return to positive levels before the end of the projection period.

Notes: 1. The income rate excludes interest income.

2. Revisions of taxable payroll may change some historical values.

3. Totals do not necessarily equal the sums of rounded components.

Source: U. S. Social Security Administration (2014).

Table VI.F1: Unfunded OASDI Obligations Through the Infinite Horizon, Based on Intermediate Assumptions (Present Values as of January 1, 2014; Dollar Amounts in Trillions)

	Present value	Expressed as a percentage of future payroll and GDP	
		Taxable payroll	GDP
Unfunded obligation through the infinite horizon[a]	$24.9	4.1	1.4
Unfunded obligation through 2088[b]	10.6	2.7	1.0

a Present value of future cost less future non-interest income, reduced by the amount of trust fund asset reserves at the beginning of 2014. Expressed as a percentage of payroll and GDP for the period 2014 through the infinite horizon.

b Present value of future cost less future non-interest income through 2088, reduced by the amount of trust fund reserves at the beginning of 2014. Expressed as a percentage of payroll and GDP for the period 2014 through 2088.

Notes: 1. The present values of future taxable payroll for 2014–88 and for 2014 through the infinite horizon are $386.9 trillion and $603.3 trillion, respectively.

2. The present values of GDP for 2014–88 and for 2014 through the infinite horizon are $1,093.7 trillion and $1,816.7 trillion, respectively. Present values of GDP shown in the Medicare Trustees Report differ slightly due to the use of interest discount rates that are specific to each program's trust fund holdings.

Source: U.S. SOCIAL SECURITY ADMINISTRATION (2014).