Enhancing Sustainability of Public Pensions

Acknowledgment

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EXECUTIVE SUMMARY

How sustainable are public pensions, given that the vast majority of them currently have unfunded liabilities? Our answer, detailed in this report, is that public pensions are or can be made fiscally sustainable with moderate fiscal adjustments. Fiscal sustainability is a well-defined theoretical concept in the economic literature. The theory is that if the ratio between debt and economy is stable, the debt is sustainable. We apply this theory to examine whether the ratio between unfunded liabilities and economy is stable.[1] Sustainability analysis is usually forward looking. However, we look backward to determine the average sustainability ratio and make fiscal adjustments annually to keep the ratio stable at or below the average going forward. We call this novel and original approach "sustainability valuation." We can enhance the sustainability of public pensions by adding sustainability valuation on top of current pension-funding practices such as actuarial valuation, employers' funding disciplines, sound investment strategies, and stress testing.

The practical value of the current study is that we can estimate how much money is needed to stabilize unfunded liabilities in relationship to the economy to make them and keep them sustainable. Based on the latest data (2018), it is our assessment that unfunded liabilities of the state and local pension plans in the United States can be stabilized and made fiscally sustainable by paying them down by about $141 billion or 0.8 percent of the economy. The $141 billion was about 3 percent of unfunded liabilities in 2018. In other words, if unfunded

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1   As discussed later, we examine unfunded liabilities that are usually amortized over 30 years in the context of 30-year personal income (annual income multiplied by 30 – a projection assuming no growth). Just as we don't compare a homebuyer's 30-year mortgage against his or her annual income, we shouldn't compare 30-year pension liabilities with one-year state and local personal income. We use personal income as a measure of economy instead of GDP for reasons explained in section 2.

liabilities were about 3 percent lower than what they were in 2018, they would have been fiscally sustainable. This amount is likely to be lower now given the higher investment returns in fiscal year 2021.[2]

Funding state and local pensions is the responsibility of state and local governments. For that reason, we have estimated the amount needed to stabilize unfunded liabilities for each state. As shown in the appendix, the amount needed to stabilize unfunded liabilities varies by state. Most states can stabilize unfunded liabilities at a moderate cost. Of course, state and local governments may not have the needed amounts readily available to pay down unfunded liabilities right away. However, they can use stabilization funds to stabilize unfunded liabilities in, say, the next five years[3] and then use the sustainability valuation approach to keep them stable and fiscally sustainable going forward.

A key benefit of focusing on sustainability is that as unfunded liabilities are stabilized in relationship to the economy, funding levels of plans are likely to improve. The present study shows that plans with relatively stable unfunded liabilities are better funded. This is true even when we control for the employer's funding discipline, which also has a positive impact on funding levels. For each 1 percent decline in personal income needed to stabilize unfunded liabilities, the funding level improves by about 7.7 percent. Finally, the more stable the unfunded liabilities, the lower are the employer contribution rates. For example, for each 1 percent decline in personal income needed to stabilize unfunded liabilities, the employer contribution rate declines by about 0.8 percent.

Beyond these benefits, sustainability valuation reflects history and reality in each state. It is a good complement to other funding practices and makes pension funding discussions within states and localities more realistic and practical. For example, actuarial valuation can keep a pension fund on track to paying benefits when due. The novel sustainability valuation approach on top of actuarial valuation will restore the balance between unfunded liabilities and economy to keep the pension fund stable and fiscally sustainable.

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2   "State Pensions Reach Highest Funded Level in 13 Years," *Chief Investment Officer*, September 23, 2021. https://www.ai-cio.com/news/state-pensions-reach-highest-funded-level-in-13-years/.

3   Stabilization funds may be a more efficient approach than annual appropriations because of investment earnings.

Enhancing Sustainability of Public Pensions

INTRODUCTION

What can we do to enhance the sustainability of public pensions? Many states and localities have reacted to worries about pension funding ratios and unfunded liabilities by increasing employee contributions and cutting benefits. Some have even closed pension plans to new hires. Yet questions about sustainability loom. Should our focus be on stabilizing the ratio between unfunded liabilities and state and local economic capacity? The theory is that as long as the ratio of unfunded liabilities and state and local economic capacity is stable, pensions are fiscally sustainable. How can this theory be put into practice to enhance sustainability? What will it cost to keep the ratio stable going forward? The purpose of this study is to explore these questions.

Why does the push to tinker with and even dismantle public pensions continue despite the changes states have already made? Zombie economics – dead and discredited ideas that nevertheless still walk among us – are largely to blame.[4] Anyone with an axe to grind can manipulate assumptions and come up with scary

pension liabilities numbers. The fundamental error that critics of public pensions commit over and over is to compare 30-year pension liabilities, that is, liabilities that are amortized over 30 years, with one-year state and local revenues. They then argue that public pensions are unsustainable and therefore should be converted into do-it-yourself retirement saving plans such as 401(k) defined-contribution plans. For example, a recent article in the *Chicago Tribune* argues that pension liabilities in Illinois are 10 times the current state and local revenues.[5] That certainly looks terrifying, but it is the wrong comparison. When we compare pension liabilities that are amortized over 30 years with 30-year revenues (an apple-to-apple comparison), they are only about 8 percent of revenues.[6]

The fallacy among devotees of zombie economics that you can draw meaningful conclusions by comparing 30-year unfunded liabilities with one-year state and local revenues or some other measure of economy such as GDP or personal income (PI) is constantly reanimated.[7] Comparing 30-year pension liabilities to one-year state and

4   Paul Krugman, *Arguing with Zombies: Economics, Politics, and the Fight for a Better Future* (New York: Norton, 2020).

5   Mark Glennon, "Commentary: The Path to Illinois Pension Reform," *Chicago Tribune*, September 1, 2020, www.chicagotribune.com/opinion/commentary/ct-opinion-commentary-illinois-pension-crisis-wirepoint-20200901-uyefp4ugs5awti4rfhnhcrffhm-story.html.

6   Author's calculation.

7   Andrew Biggs, "Can States Afford Rising Public Pension Debts?" *Forbes*, July 28, 2020, www.forbes.com/sites/andrewbiggs/2020/07/28/can-states-afford-rising-public-pension-debts/?sh=3907a6d597ee.

local revenues is like a bank telling the borrower his or her 30-year mortgage is due at the end of this year. Were that the case, almost no one would be able to buy a house. Just as a 30-year mortgage should be gauged against the 30-year potential income of the homebuyer (or some other measure such as the monthly mortgage's being equal to one-fourth of monthly income), the 30-year pension liabilities must be assessed against 30-year potential state and local revenues or economy.

There is no question that 30-year pension liabilities are rising. But so is the state and local economic capacity on which revenues depend. If we look at 30-year pension liabilities in isolation, they are rising and may seem scary and unsustainable. But if we look at them in the context of 30-year state and local economic capacity, they are relatively sustainable or can be made sustainable at moderate cost.

For the United States as a whole, the ratio between 30-year unfunded liabilities and 30-year economic capacity, as measured by PI, has fluctuated slightly – between about 0.002 less than and 0.002 greater than the past 17-year average. This insignificant fluctuation is hardly a reason to argue that public pensions in the United States are unsustainable and therefore should be converted into do-it-yourself defined-contribution plans. Some may say that the fluctuation of the ratio between its lowest and highest points during the 17 years can be translated into a 90 percent increase. That is true. But 90 percent of almost zero (0.002) is almost zero when considered in the time horizon under which pension systems amortize their unfunded liabilities. In other words, despite what Chicken Little says, the

sky is not falling. Instead of dismantling public pensions, the fluctuations in the ratio between unfunded liabilities and economic capacity can be stabilized at a moderate cost – about $141 billion or 0.8 percent of the economy.

Examining pension liabilities in the context of economic capacity is not new. For example, regarding pension liabilities, a July 2019 Brookings Institution study by Jamie Lenney of the Bank of England, Byron Lutz of the Federal Reserve Board of Governors, and Louise Sheiner of the Brookings Institution examines the liabilities in the context of economic capacity.[8] The Brookings study found that given the changes that public pension plans have already made, pension debt can be stabilized with relatively moderate fiscal adjustments. The study also found that there is little advantage to starting the stabilization process now versus a decade in the future – the difference in the contribution rate required to stabilize will not be that great. In other words, once again, the sky is not falling.

In addressing pension sustainability, the present study differs from the Brookings study in several ways. The Brookings study is based on a sample of 180 public pension plans included in the Public Plans Database that is maintained at Boston College.[9] The present study is based on aggregate state-by-state pension data from the Federal Reserve System.[10] Whereas the Brookings study analysis focuses on individual plans, our study focuses on national and state-by-state analysis. Both studies conclude there is no need for Chicken Little to whip the farmyard into mass hysteria because going forward, public pensions are sustainable with moderate fiscal adjustments.

8   Jamie Lenney, Byron Lutz, and Louise Sheiner, "The Sustainability of State and Local Government Pensions: A Public Finance Approach," Brookings Institution, July 14, 2019, www.brookings.edu/wp-content/uploads/2019/07/lenney_lutz_sheiner_MFC_Final.pdf.

9   publicplansdata.org/.

10   Board of Governors of the Federal Reserve System, "State and Local Government Defined Benefit Pension Plans: State-level Detail," www.federalreserve.gov/releases/z1/dataviz/pension/.

If the amount needed to stabilize unfunded liabilities is not available right away, state and local governments may consider paying the amount over an extended duration, say, during the next five years, by establishing stabilization funds. Stabilization funds are allowed under IRS Section 115 to help manage pension obligations.[11] The methodology developed in the present study can be used to monitor the progress toward fiscal sustainability and make adjustments to the amount of money that needs to be contributed to stabilization funds to ensure fiscal sustainability.

Simply put, as shown in Figure 1, we can enhance sustainability of public pensions by adding a "sustainability valuation" on top of current pension funding practices such as actuarial valuation, stress testing, employers' funding disciplines, and sound investment strategies. By *sustainability valuation* we mean monitoring sustainability on an ongoing basis and making fiscal adjustments to keep the ratio between unfunded liabilities and economic capacity stable at, say, the average of the past two decades.

Figure 1
Enhancing Sustainability of Public Pensions
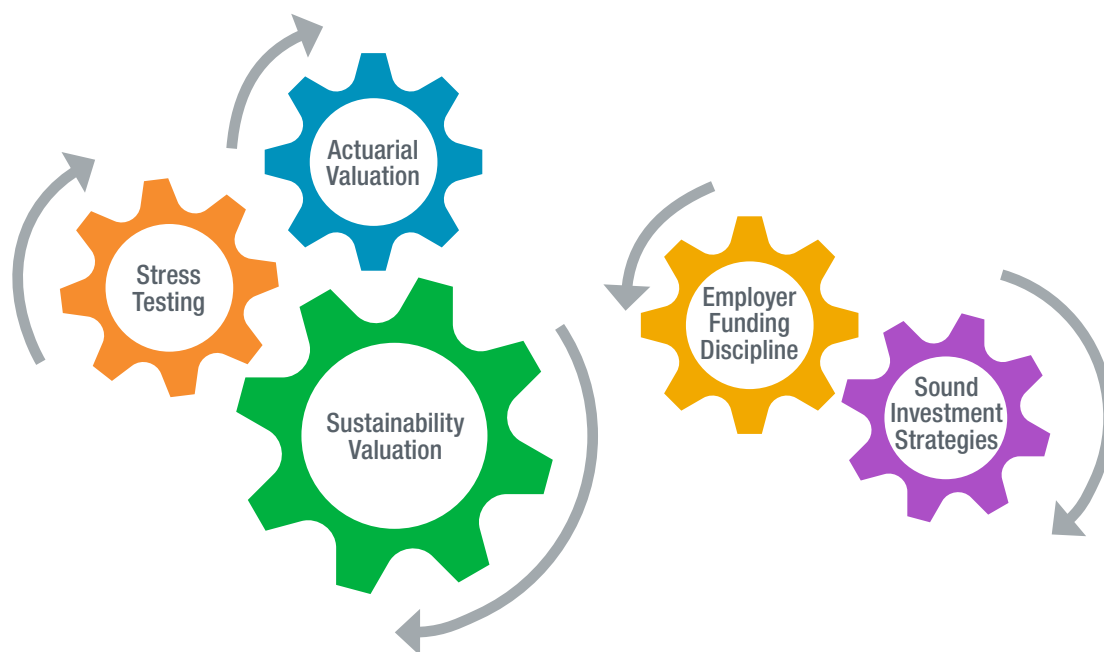
Section 1 will focus on a literature review, section 2 will discuss data and methodology, section 3 will present results, and section 4 will discuss conclusions.

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11   Jeff Chang, "Using a Section 115 Trust to Help Manage Pension Obligations," Focus on Public Benefits, September 13, 2017, focusonpublicbenefits. com/using-a-section-115-trust-to-help-manage-pension-obligations/#:~:text=A%20115%20trust%20is%20a,future%20pension%20 contributions%20or%20liabilities.&text=A%20115%20trust%20can%20also%20be%20used%20as%20a%20rate%20stabilization%20fund.

Section 1

LITERATURE REVIEW

What Is Fiscal Sustainability?

The seeds of fiscal sustainability were planted by Evsey Domar in a December 1944 article in *American Economic Review*.[12] As noted by Pradhan,[13] Domar's concept of fiscal sustainability is known as the "stability condition," which means the growth rate of national output exceeds the growth rate of debt or cost of borrowing. On the contrary, if the cost of borrowing exceeds the growth of national output, any deficit can lead to unsustainable fiscal policy.

An early conceptual framework of fiscal sustainability appeared in the work of Hamilton and Flavin in their 1985 paper, "On the Limitations of Government Borrowing."[14] This paper mainly focuses on examining two views: One view suggests that governments can run permanent budget deficits by paying interest due on growing debt by issuing new debt. The other view holds that creditors will be unwilling to buy debt unless governments commit to balancing their budgets. The paper is a widely referenced source on fiscal sustainability. The authors note, "If the government's borrowing cost equals or exceeds the economy's growth rate, then an unpaid deficit implies that debt must grow to become an infinite multiple of GNP (gross national product). … On the other hand, if the interest rate (r) is less than the economy's growth rate (q), then an infinitely lived government clearly could run a permanent deficit without having debt become a growing multiple of GNP."[15]

Another definition of sustainability emerged from the work of Blanchard et al. in 1990.[16] This study is broad and analyzes sustainability of various elements of fiscal policy, including government spending and transfers, taxes, and debt. The study includes the following definition of sustainability that is now commonly used: "Sustainable fiscal policy is defined as a policy such that the ratio of debt to GNP eventually converges back to its initial level."

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12 Evsey Domar, "The 'Burden of the Debt' and the National Income," *American Economic Review* 34, no. 4 (1944): 798–827, tmypfunam.files.wordpress.com/2013/01/domar-1944.pdf.

13 Krishanu Pradhan, "Analytical Framework for Fiscal Sustainability: A Review," *Review of Development and Change*, 24(1) 100–122, 2019. https://journals.sagepub.com/doi/pdf/10.1177/0972266119845951.

14 James D. Hamilton and Marjorie A. Flavin, "On the Limitations of Government Borrowing: A Framework for Empirical Testing" (working paper no. 1632, National Bureau of Economic Research, Cambridge, MA, 1985), www.nber.org/system/files/working_papers/w1632/w1632.pdf.

15 Of course, the size of the deficit matters. How high is too high? We'll discuss this in section 3.

16 Olivier Blanchard, Jean-Claude Chouraqui, Robert P. Hagemann, and Nicola Sartor, "The Sustainability of Fiscal Policy: New Answers to an Old Question," *OECD Economic Studies* 15 (Autumn 1990): 7–37, www.oecd.org/economy/outlook/34288870.pdf.

Today, even the federal government assesses fiscal sustainability using the ratio of debt to some measure of economy. For example, according to the "Executive Summary Fiscal Year 2020 Financial Report of U.S. Government,"[17] a sustainable fiscal policy is defined as one where the ratio of debt held by the public to GDP (the debt-to-GDP ratio) is stable or declining."

It should be noted that earlier studies used GNP (which includes net income inflow from abroad and net income outflow to overseas on top of GDP) as a measure of economy. Recent studies often use GDP (which measures the value of total output of the economy) as a measure of economy. In the present study we will use PI (which consists of all income, earned and unearned) as a measure of economy for reasons explained in the next section.

The Role of Assets in Explaining the Sustainability of Outstanding Debt

Apart from using various measures of economic capacity such as GNP and GDP, Page-Hoongrajok et al. use state and local assets to analyze sustainability of state and local fiscal situations from 1953 to 2007.[18] They find that there is no straightforward relationship between state and local balance sheets and the growth of outstanding state and local debt. Their analysis shows that debt growth during this period is explained by growth of state and local assets. They find that state and local debt was growing, especially in the 1980s, but assets were growing faster.

Figure 2
State and Local Debt and Assets, United States, 2012–2018
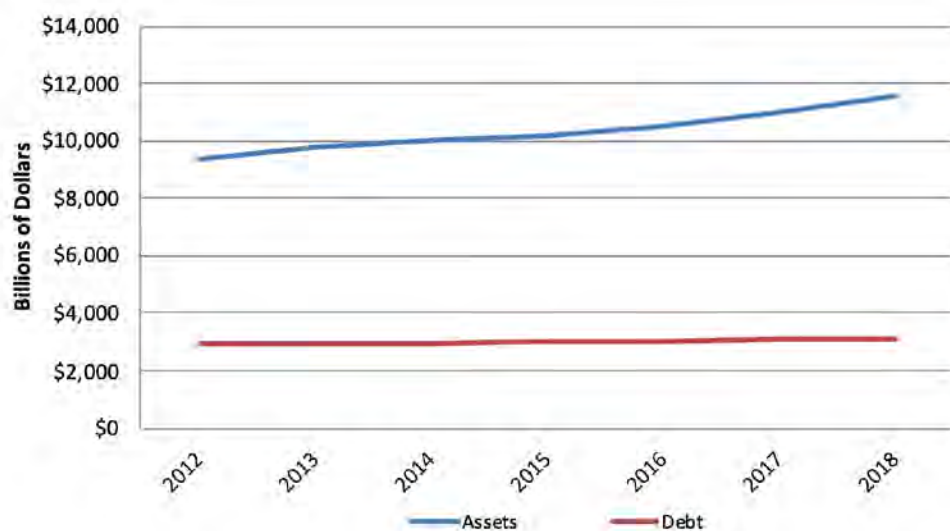
17 "Executive Summary to the Fiscal Year 2020 Financial Report of U.S. Government: An Unsustainable Fiscal Path," Bureau of the Fiscal Service, U.S. Department of the Treasury, fiscal.treasury.gov/reports-statements/financial-report/unsustainable-fiscal-path.html#:~:text=A%20 sustainable%20fiscal%20policy%20is,declining%20over%20the%20long%20term.

18 Amanda Page-Hoongrajok, J. W. Mason, and Arjun Jayadev, "The Evolution of State-local Balance Sheets in the United States, 1953–2013," *Journal of Post Keynesian Economics* 42, no. 1 (2019): 90–113, www.tandfonline.com/doi/abs/10.1080/01603477.2018.1532797.

Our own analysis of recent data supports Page-Hoongrajok et al.'s conclusion. Figure 2 shows that assets grew faster than outstanding debt from 2012 to 2018. For example, state and local assets grew from $9.3 trillion in 2012 to about $11.5 trillion in 2018. During the same period, outstanding debt grew from $2.9 trillion to $3.1 trillion. Although it is not shown in Figure 2, the outstanding debt-to-assets ratio declined to 13.9 percent in 2018 from 16.5 percent in 2012. That means that assets are rising faster than debt and that debt is sustainable.

Application of a Fiscal Sustainability Approach to Public Pensions

In the public pension arena, a March 2021 Brookings Institution study explores the fiscal sustainability of U.S. state and local government pension plans.[19] Using data from a sample of plans, the study finds that plan changes, including cutting benefits for new hires and cost-of-living adjustments, stabilized the funding of public pensions. Going forward, the study finds, even at moderate returns, pension funding can be stabilized with moderate fiscal adjustments. The study also finds that there is little advantage in terms of required contribution rates of starting the stabilization process now versus a decade in the future. In other words, the sky is not falling.

As noted earlier—and it's worth repeating—this study's approach differs from the Brookings study. For example, the Brookings study assesses sustainability based on benefit cuts and contribution increases that have already occurred or may occur as a result of projection of current law. The present study estimates the amount of money needed to stabilize funding (to keep the ratio of unfunded liabilities and economic capacity stable) and explores ensuring sustainability by paying down unfunded liabilities without cutting benefits and/or increasing employee contributions.

Bill Hallmark, a consulting actuary with Cheiron, underscores in his 2016 article in *Contingencies* that sustainability and solvency should be considered simultaneously along with other factors. He notes that although a plan does not have to be solvent to be sustainable, three factors must be kept in mind to ensure sustainability.[20]

These factors are

- the reliabilities of plan sponsor revenues,
- the size of the plan compared to its contribution base, and
- the degree of negative cash flow.

Hallmark's analysis at the plan level makes a lot of sense. In the present study, which is based on aggregate state-level data, we focus mainly on fiscal sustainability of public pensions by assessing and keeping the ratio between unfunded liabilities and PI stable over time. If the ratio is stable, public pensions are fiscally sustainable.

What data sources do we use? Why do we use PI instead of GDP as a measure of economy? How can we estimate the cost of stabilization? How can we examine whether stable plans are better funded and have lower contribution rates? We will address these questions in the next section.

19 Jamie Lenney, Byron Lutz, Finn Schüle, and Louise Sheiner, "The Sustainability of State and Local Government Pensions: A Public Finance Approach," Brookings Papers on Economic Activity, Brookings Institution, Washington, DC, March 2021, www.brookings.edu/bpea-articles/the-sustainability-of-state-and-local-government-pensions-a-public-finance-approach/.

20 Bill Hallmark, "When Is Solvency Important, and How Can Plan Sponsors Adjust over Time to Maintain Sustainability?" *Contingencies* (September/October 2016): 39, contingencies.org/wp-content/uploads/2017/06/Contingencies20160910.pdf.

Section 2

DATA AND METHODOLOGY

We have used data from various sources. These data contain state-by-state historical information about unfunded pension liabilities, economy, revenues, and outstanding debt. Our methodology consists of examining trends; assessing whether unfunded liabilities are sustainable and how much money is needed to make them sustainable; and using multivariate analysis to examine the relationship between funding levels, contribution rates, and sustainability.

Data

As discussed below, data used in the present study come from various sources.

Data on Unfunded Liabilities. We considered several data sources on state-by-state unfunded liabilities of public pensions and chose the enhanced financial accounts database of the Board of Governors of the Federal Reserve

System.[21] These data provide information about assets and liabilities of state and local defined-benefit plans from 2002 to 2018 for each state. The U.S. Census Bureau used to include state-by-state data on pension assets and pension obligations but discontinued publishing these data a few years ago.[22] Boston College's Public Plans Data includes information about assets and liabilities, but these data are for individual plans.[23] In short, Federal Reserve data are the most recent and best fit the purpose of the present study.

Data on Economic Capacity. There are various measures of economic capacity, including GNP, GDP, and PI.[24] We measure economic capacity using PI data from the Bureau of Economic Analysis.[25] These data provide state-by-state historical data on PI as well as GDP. We have extracted these data to match the pension data. The GDP data are used to examine trends, but we use PI data to analyze sustainability – the stability of the ratio of unfunded liabilities and PI.

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21 Board of Governors, "State and Local Government Defined Benefit Pension Plans."

22 "2020 Annual Survey of Public Pensions: State and Local Tables," United States Census Bureau, www.census.gov/programs-surveys/aspp/data/tables.html.

23 publicplansdata.org/.

24 GNP includes net income inflow from abroad and net income outflow to overseas on top of GDP, GDP measures the value of total output of the economy, and PI consists of all income, earned and unearned.

25 "Regional Data: GDP and Personal Income," Bureau of Economic Analysis, U.S. Department of Commerce, apps.bea.gov/iTable/iTable.cfm?acrdn=7&isuri=1&reqid=70&step=1#reqid=70&step=25&isuri=1&7022=20&7023=7&7024=non-industry&7001=720&7029=20&7090=70.

We use PI instead of GDP as a measure of state and local economic capacity for the following reasons:

- GDP measures output: the monetary value of all the goods and services produced in an economy. As Joseph Stiglitz notes in his 2020 article in *Scientific American,* the Great Recession of 2008–2009 highlighted the need for better ways to measure the economy and its sustainability. He says the American economy is more like an ordinary car whose owner saved on gas by removing the spare tire, which was fine until he got a flat. An economy that uses its resources more efficiently has higher GDP in the short run, but it may compromise the performance of the economy in the long run.[26]

- The production (GDP) in a state isn't necessarily owned by the residents of that state.

- According to the Advisory Commission on Intergovernmental Relations, PI is one of the key ways to measure tax capacity.[27] Tax capacity refers to the amount of revenue a jurisdiction can raise beyond what it raises now.

- The PI data are available at both state and local levels.

Data on Revenues and Outstanding Debt. To examine trends and interrelationships among various pension, economic, and fiscal variables used in the present study, we have derived state-by-state own-source data on revenues and total outstanding state and local debt, including interest on debt from the U.S. Census Bureau's Census of Governments. These data are compiled by the Urban-Brookings Tax Policy Center and are part of the center's interactive database.[28]

Methodology

The methodology of this study consists of the following five steps:

- Organization of data

- Examination of trends in key variables used in the present study including GDP, PI, own-source revenues, and total debt (outstanding debt + interest on debt + unfunded pension liabilities)[29]

- Examination of trends in the ratio of unfunded pension liabilities and economy (as measured by PI)

- Estimation of the amount of money needed to stabilize this ratio going forward, thus making the plan sustainable

- Analysis of the relationship between the stability of this ratio and funding status and contribution rates

Organization of Data. Data used in the present study use different units of measurement. For example, pension data are in billions of dollars; GDP and PI data are in millions; and revenues, outstanding debt, and interest on debt data are in thousands. We have converted all dollar values into millions.

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26 Joseph E. Stiglitz, "GDP Is the Wrong Tool for Measuring What Matters," *Scientific American*, August 1, 2020, www.scientificamerican.com/article/gdp-is-the-wrong-tool-for-measuring-what-matters/.

27 "Measures of State and Local Fiscal Capacity and Tax Effort," Advisory Commission on Intergovernmental Relations, October 1962, library.unt.edu/gpo/acir/Reports/information/M-16.pdf.

28 "State and Local Finance Data: Exploring the Census of Governments," Urban Institute, Urban-Brookings Tax Policy Center, https://state-local-finance-data.taxpolicycenter.org//pages.cfm.

29 By the same token, other liabilities such as retiree health care should be included here, but we do not have access to such data that will fit the state-by-state analysis design of the present study.

Census data on revenues for 2003 are available only at the national level. Therefore, our state-by-state analysis covers 2004–2018. The national-level analysis covers 2002–2018. While more recent data are available for some variables, including GDP and PI, the period covered in our study is constrained by the latest pension data available from the Federal Reserve Bank, which is dated 2018.

Examination of Trends in Key Variables. We examine trends in various key variables at national and state levels. The purpose is to visually present the trends in the time horizon under which public pensions operate, usually 30-year amortization (although some plans have reduced amortization periods, we assume 30 years for our aggregate state-by-state analysis). Presently, most of the pension articles show annual trends in economic and revenue variables and compare them with 30-year pension liabilities (by *30-year pension liabilities* we mean liabilities that are amortized over 30 years). This type of misinformation alarms policy makers and tends to lead to hasty and harmful decisions. In this study, we present graphics comparing trends in 30-year GDP, PI, and revenues with 30-year unfunded liabilities and 20-year outstanding state and local debt (including interest on debt) since 90 percent of state and local outstanding debt is long-term debt (by *long-term* we mean 20 years). These graphics represent a realistic picture, making an apples-to-apples comparison.

Examination of Trends in the Ratio of Unfunded Pension Liabilities and Economy (PI). To examine the stability of the ratio of 30-year unfunded pension liabilities to 30-year economy as measured by PI, we calculate the ratio over time for each year as well as the average ratio for the entire study period. We then present this information graphically to display the fluctuation of the ratio in relation to the average. This is done at the national level as well as the state level to reflect what has been prevalent and is politically

acceptable or doable in each state. The closer the ratio trend line to the average trend line, the more stable is the ratio and the more sustainable is the pension plan. Policy makers can see how stable the ratio has been by just looking at the graphics.

Estimation of Amount of Money Needed to Stabilize the Ratio. Once we have the ratio for each year during the study period, we examine the deviation from the mean and estimate the amount needed to stabilize the ratio (on top of the line that represents average). This can be translated into a mathematical equation:

$$\sum ADM(i) = [A - R(i)] \times PI(i),$$

where

$\sum$ = summation,

ADM(i) = additional money needed for year i,

A = average ratio of 30-year debt to 30-year PI,

R(i) = ratio of 30-year debt to 30-year PI in year i, and

PI(i) = annual PI in year i.

The additional money needed to stabilize is the sum of the amounts estimated using the above formula for years in which the ratio was above average. The formula will change if the payments to stabilize the ratio are actually made going forward. For example, we'll need to reduce unfunded liabilities for each year by the amount that was contributed plus earnings at the assumed rate of return.

Analysis of the Relationship Between the Stability of the Ratio and Funding Status and Contribution Rates. Do state and local pension plans with relatively stable ratios have better funding levels and lower contribution rates? To explore this, we use multivariate analysis using the latest data. In this analysis, we control for other factors that may affect funding levels. For example, one of

the important factors in determining funding level is plan sponsors' making 100 percent of the required contributions on a regular basis. Another factor that may affect funding levels is the nature of the state and local tax structure. We'll control for such factors to examine whether a stable ratio means better funding levels. In this model, funding level (percentage funded) is the dependent variable. Independent variables used to predict the funding level include sustainability (percentage of PI needed to stabilize the ratio), plan sponsor's funding discipline (average percentage of required contribution paid over time), and elasticity of revenue structure. By *elasticity* we mean the extent to which revenues grow in sync with the economy.

Similarly, in examining the relationship between sustainability and contribution rates, we control for other factors such as the volatility of the rate. We measure the contribution rate for each state in terms of percentage of own-source revenues and then calculate the average for each state during the study period, 2004–2018. We measure the volatility of the rate by estimating the standard deviation of the rate. Usually contribution rates are measured in terms of the percentage of payroll. However, such data are not available on an aggregate, state-by-state basis. In this model we use the contribution rate as the dependent variable. Independent variables in the model include sustainability and contribution volatility.

Section 3

RESULTS

Opponents of public pensions compare the unfunded liabilities that are amortized over 30 years with one-year state and local revenues to make the case that public pensions are unsustainable.[30] Comparing 30-year unfunded pension liabilities to one-year state and local revenues or another measure of economy is misleading and could lead policy makers to make hasty decisions. Figure 3 presents this kind of misleading information in a graphic form. Show this graphic to policy makers, and they will surely jump to the conclusions that we cannot sustain public pensions and that something must be done urgently. It shows that unfunded liabilities are more than revenues starting in 2007 but hides the fact that the unfunded liabilities are amortized over the next 30 years or over another amortization period (e.g., 27 years).

Figure 3

A Misleading Picture: Comparing 30-Year Pension Unfunded Liability with Annual Revenues, United States, 2002–2018
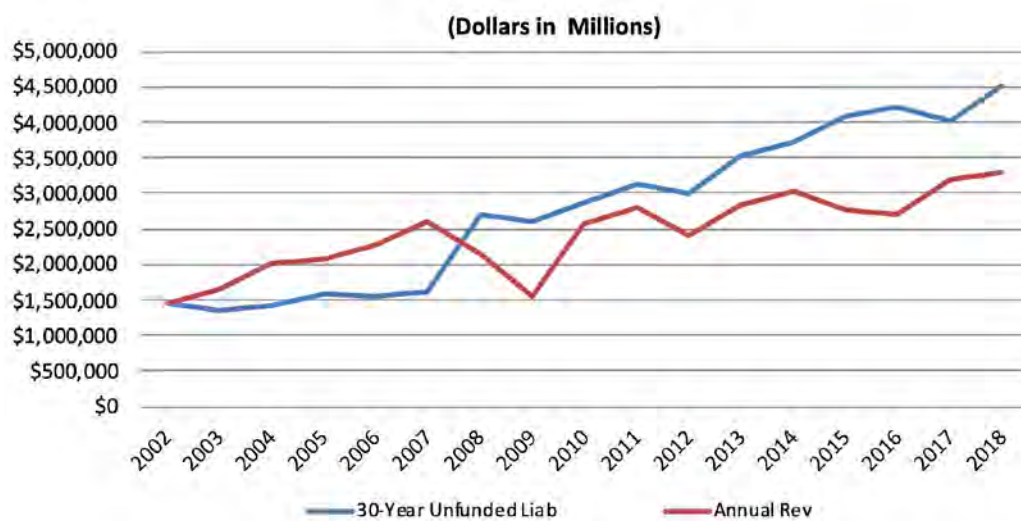
Note: Liab = liability; Rev = revenue.

30 Glennon, "Commentary."

However, if we show a realistic picture comparing 30-year unfunded liabilities with 30-year own-source revenues, as in Figure 4, policy makers may not rush to dismantle public pensions. Unfunded liabilities are a miniscule issue when viewed in the time horizon under which pension plan funding operates.

Figure 4
A Realistic Picture: Comparing 30-Year Pension Unfunded Liability with 30-Year Revenues, United States, 2002–2018
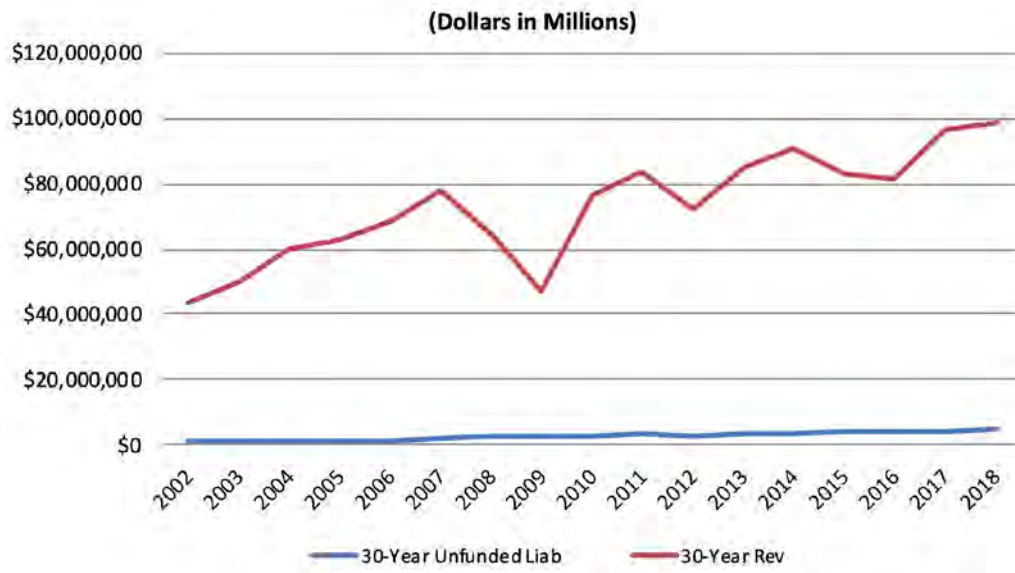
Note: Liab = liability; Rev = revenue.

Hasty decisions are harmful not only to the retirement security of public employees but also to employers and communities. Employers that have rushed to close pension plans have a hard time attracting and keeping quality workforces,[31] which in turn hurts the quality of public services and makes the locality a less desirable place to live, leading to a drop in housing values. And communities are hurt when pensions are dismantled. Public pensions make significant contributions to state and local economies and revenues. Pensions contribute to state and local economies when retirees spend their pension checks as well as when pension funds invest their assets. Although pension funds invest globally, the economic impact of these investments can be traced back to local communities.[32]

Fiscal sustainability is a well-defined theoretical concept in the economic literature. As shown in our Literature Review, the theory is that if the ratio between debt and economic capacity in a jurisdiction is stable or declining over time, the debt is sustainable. Our examination of the sustainability of unfunded liabilities of public pensions is founded on this theoretical

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31 Laura D. Quinby, Geoffrey T. Sanzenbacher, and Jean-Pierre Aubry, "How Have Pension Cuts Affected Public Sector Competitiveness?" *State and Local Pension Plans* 59 (April 2018), crr.bc.edu/wp-content/uploads/2018/04/slp_59.pdf.

32 "Unintended Consequences: How Scaling Back Public Pensions Puts Government Revenues at Risk, 2020 Update," National Conference on Public Employee Retirement Systems, Washington, DC, May 2020, www.ncpers.org/files/ncpers-research-unintended-consequences-2020-update.pdf.

framework. The rest of this section is organized to address the following questions that arise within this framework:

- What are the trends in various economic capacity measures and total debt, including unfunded pension liabilities, outstanding debt, and interest on debt?
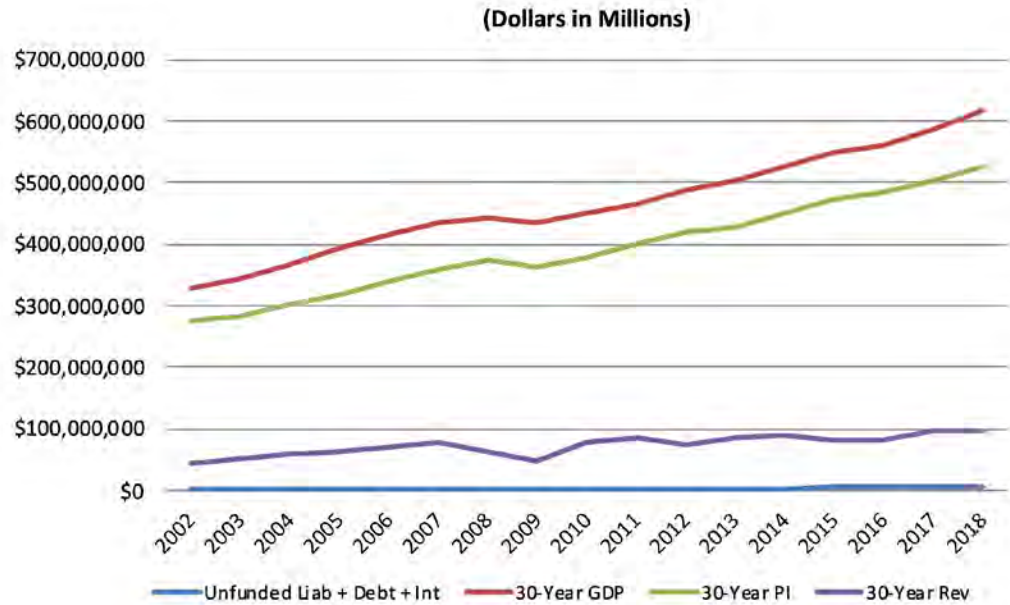
- Is outstanding state and local debt sustainable?

- Are unfunded pension liabilities sustainable?

- How much would it cost to stabilize the ratio between unfunded liabilities and economic capacity?

- Can we use stabilization funds to ensure sustainability?

- Are states with relatively sustainable unfunded liabilities better funded?

- Do states with relatively sustainable unfunded liabilities have lower contribution rates?

- How can pension plans with negative cash flows pursue sustainability strategies?

- What are the benefits of incorporating sustainability valuation in to pension funding policy?

There are other questions that cannot be addressed in the present study as it is based on aggregate data at the state-by-state level. However, they can be examined at the individual plan level, where data may be available. These questions include the following:

- What will the trend line for total debt look like if we are able to include liabilities for other postretirement employee benefits in the context of economic capacity variables?
- What affects variables such as reasonableness

of adequacy of actuarial assumptions, benefit adequacy, and legacy experience in the multivariate models used in this study?

What Are the Trends in Various Economic Capacity Measures and Total Debt, Including Unfunded Pension Liabilities, Outstanding Debt, and Interest on Debt?

It is helpful to get a visual picture of trends in various economic capacity measures in relationship to total state and local debt including outstanding debt, interest on debt, and unfunded pension liabilities in the context of the time horizon under which pension funds and long-term debt operate, which is 20 to 30 years.[33] We'll use 30 years as the time horizon for the purpose of this study for each of the 17 years (2002–2018). Economic capacity measures included in the visual presentation include GDP, PI, and state and local own-source revenues (revenues). For example, 30-year unfunded liabilities in 2002 are compared to 30-year GDP (2002 GDP multiplied by 30 – assuming no GDP growth).

Figure 5 depicts the trends between GDP, PI, and revenues and total debt in the 30-year time horizon. Total debt taken in isolation may raise an alarm. But taken in the context of the time horizon of pension funds and long-term debt (30 years), it seems to raise little, if any, concern. Figure 5 shows that while slopes of measures of economic capacity such as GDP, PI, and revenues are trending upward, the trend line for total debt doesn't seem to be even noteworthy. This is because of the magnitude of economic capacity variables in the graphic. Therefore, we need to take a microscopic look at outstanding debt and unfunded pension liabilities to explore their trends and determine whether each is sustainable. Let's look at state and local outstanding debt first.

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33 We could have included other postretirement employee benefits (e.g., retiree healthcare liabilities), but we do not have data for those variables at the state-by-state level.

Figure 5

Trends in 30-Year Total Debt (Pension Liabilities, Outstanding Bonds + Interest) and 30-Year GDP, Personal Income, and Revenues, United States, 2002–2018

Note: Liab = liabilities; Int = interest ; PI = personal income; Rev = revenues.

Is Outstanding State and Local Debt Sustainable?

Using the theory of sustainability discussed earlier, we examine the sustainability of state and local outstanding debt in terms of the ratio between outstanding debt and PI. In Figure 5, we have used a 30-year time horizon for outstanding debt for the sake of simplicity and to match all variables in the graphic to 30-year unfunded liabilities. To focus exclusively on outstanding debt, we examine the trend using a 20-year time horizon to accommodate the varying durations of outstanding debt (90 percent of which is long-term debt).

Figure 6 shows the trend in this ratio for the United States during 2002–2018. It shows that the ratio declined from 2010 onward. Recall from section 1 that the theory is that if the ratio between debt and economic capacity is stable or declining, debt is sustainable. Therefore, we can conclude that state and local outstanding debt is sustainable, especially since 2010. Despite the increase in the ratio between 2002 and 2010, the debt is more sustainable now than it was in 2002. For example, the debt was about 0.81 percent of PI in 2002, and in 2018, it was 0.78 percent.

Figure 6

Trends in Ratio Between 20-Year State and Local Outstanding Debt and 20-Year Personal Income, United States, 2002–2018
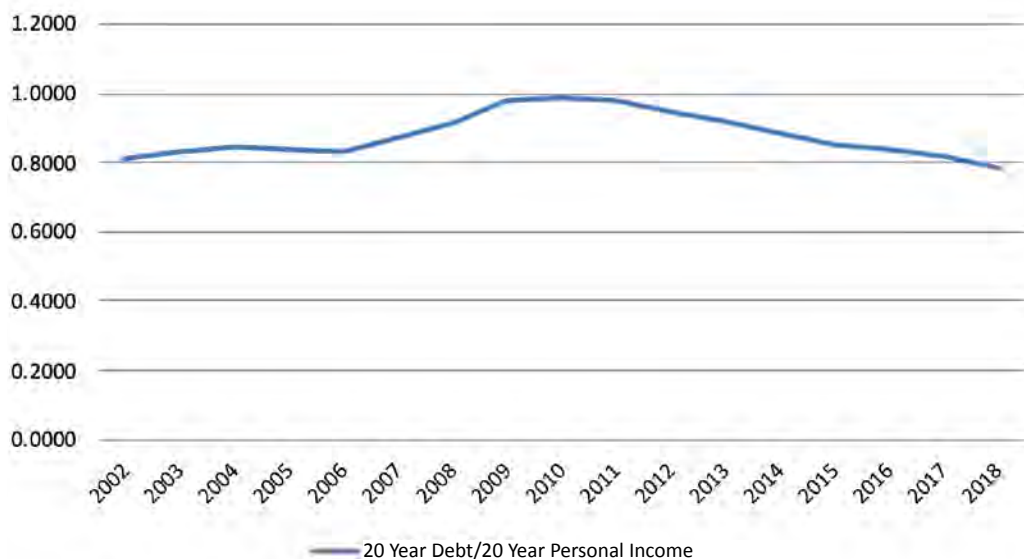
State-by-state graphic trends in sustainability of outstanding debt are shown in the appendix. Table 1 summarizes these results. It shows that debt is sustainable in all but five states. The five states where outstanding debt is growing faster than PI are Arkansas, Hawaii, North Dakota, Tennessee, and West Virginia.

Table 1

Is State and Local Outstanding Debt Sustainable (2004–2018)?

State	Is State and Local Outstanding Debt Sustainable?
Alabama	Yes. Personal income has been rising faster than debt since 2008.
Alaska	Yes. Personal income is rising faster than debt.
Arizona	Yes. Personal income has been rising faster than debt since 2009.
Arkansas	No clear pattern (see graphic in appendix).
California	Yes. Personal income has been rising faster than debt since 2010, except for a slight uptick in debt in 2017 and 2018.
Colorado	Yes. Personal income has been rising faster than debt since 2009.
Connecticut	Yes. The ratio has been almost stable since 2010.
Delaware	Yes. Personal income has been rising faster than debt since 2009, except for a blip in debt in 2013.
Florida	Yes. Personal income has been rising faster than debt since 2009.

Table 1
Is State and Local Outstanding Debt Sustainable (2004–2018)? (cont'd)

State	Is State and Local Outstanding Debt Sustainable?
Georgia	Yes. Personal income has been rising faster than debt since 2009.
Hawaii	No clear pattern (see graphic in appendix).
Idaho	Yes. Personal income has been rising faster than debt since 2010.
Illinois	Yes. Personal income has been rising faster than debt since 2011, except for minor blips in debt since 2015.
Indiana	Yes. Personal income has been rising faster than debt since 2009.
Iowa	Yes. Personal income has been rising faster than debt since 2010.
Kansas	Yes. Personal income has been rising faster than debt since 2010.
Kentucky	Yes. Personal income has been rising faster than debt since 2010, except for an upturn in debt since 2016.
Louisiana	Yes. Personal income has been rising faster than debt since 2011.
Maine	Yes. Personal income has been rising faster than debt since 2010.
Maryland	Yes. Personal income has been rising faster than debt since 2013.
Massachusetts	Yes. Personal income has been rising faster than debt since 2009.
Michigan	Yes. Personal income has been rising faster than debt since 2009.
Minnesota	Yes. Personal income has been rising faster than debt since 2009.
Mississippi	Yes. Personal income has been rising faster than debt since 2009.
Missouri	Yes. Personal income has been rising faster than debt since 2011.
Montana	Yes. Personal income has been rising faster than debt since 2008.
Nebraska	Yes. Personal income has been rising faster than debt since 2009.
Nevada	Yes. Personal income has been rising faster than debt since 2012.
New Hampshire	Yes. Personal income has been rising faster than debt since 2009, except for a slight upward blip in debt in 2013.
New Jersey	Yes. Personal income has been rising faster than debt since 2010.
New Mexico	Yes. Personal income has been rising faster than debt since 2010, except for a slight upward blip in debt in 2013.
New York	Yes. Personal income has been rising faster than debt since 2013 and was stable between 2008 and 2013.
North Carolina	Yes. Personal income has been rising faster than debt since 2010, except for a slight blip in debt in 2013.
North Dakota	No clear pattern (see graphic in appendix).
Ohio	Yes. Personal income has been rising faster than debt since 2009, except for a blip in debt in 2013.

Table 1
Is State and Local Outstanding Debt Sustainable (2004–2018)? (cont'd)

State	Is State and Local Outstanding Debt Sustainable?
Oklahoma	Yes. Personal income has been rising faster than debt since 2009, except for an upward blip in debt in 2016.
Oregon	Yes. Personal income has been rising faster than debt since 2009.
Pennsylvania	Yes. Personal income has been rising faster than debt since 2009.
Rhode Island	Yes. Personal income has been rising faster than debt since 2009, except for a slight blip in debt in 2013.
South Carolina	Yes. Personal income has been rising faster than debt since 2009.
South Dakota	Yes. Personal income has been rising faster than debt since 2009, except for an uptick in debt in 2016.
Tennessee	No clear pattern (see graphic in appendix).
Texas	Yes. Personal income has been rising faster than or in concert with debt since 2010.
Utah	Yes. Personal income has been rising faster than debt since 2010, except for a slight uptick in debt in 2016.
Vermont	Yes. Personal income has been rising faster than debt since 2008.
Virginia	Yes. Personal income has been rising faster than debt since 2010.
Washington	Yes. Personal income has been rising faster than debt since 2010.
West Virginia	No clear pattern (see graphic in appendix).
Wisconsin	Yes. Personal income has been rising faster than debt since 2010, and the ratio was stable before then.
Wyoming	Yes. Personal income has been rising faster than debt since 2010.

What debt level is too high? At the national level, according to Faria-e-Castro, senior economist at the Federal Reserve Bank of St. Louis, the magnitude is not important. However, three factors should be kept in mind.[34]

These factors are

- whether a country has strong institutions, an independent central bank, and an independent monetary policy;

- the level of interest rates on debt; and

- economic growth rates.

However, at the state and local government levels, there isn't a benchmark against which one can determine what level of debt is too high. One benchmark that may be relevant to consider in the context of state and local governments comes from the European Central Bank. Countries in the euro zone, just like state and local governments in the United States, cannot print their own currency. The European Central Bank requires a debt-to-GDP ratio of at or below 60 percent for a country to be able to participate in the euro zone.[35] Another benchmark may be the average debt-to-PI ratio of the past couple of decades.

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34 Heather Hennerich, "Debt-to-GDP Ratio: How High Is Too High? It Depends," Interview with Miguel Faria-e-Castro, *Open Vault Blog*, Federal Reserve Bank of St. Louis, October 07, 2020. https://www.stlouisfed.org/open-vault/2020/october/debt-gdp-ratio-how-high-too-high-it-depends.

35 European Central Bank, "Fiscal Policies," EuroSystem, November 2021. https://www.ecb.europa.eu/mopo/eaec/fiscal/html/index.en.html.

Are Unfunded Pension Liabilities Sustainable?

We examine the sustainability of unfunded pension liabilities using the ratio between 30-year unfunded liabilities and 30-year PI. It is true that some pension funds have reduced their amortization periods, but at the aggregate level we assume that unfunded liabilities are amortized over 30 years. Although state and local pension systems vary and must be examined individually, for the purpose of this analysis, let's assume the United States is one big state and local pension system – a combination of all state and local systems. Figure 7 shows the ratio between 30-year unfunded liabilities and 30-year PI for the United States as a whole. It shows that the average ratio from 2002 to 2018 was 0.0068. The ratio fluctuated from 0.0045 in 2007 to 0.0087 in 2016. That is a fluctuation from about 0.002 below average to 0.002 above average.

Ideally, to keep the system sustainable, one would like to keep this ratio stable, say, at its average. This can be done if we can figure out how much it would cost to keep this ratio at the average line shown in Figure 7. We will address that next.

Figure 7

Trends in Ratio of 30-Year Unfunded Liability to 30-Year Personal Income, United States, 2002–2018

Note: PI = personal income.

How Much Would It Cost to Stabilize the Ratio Between Unfunded Liabilities and Economic Capacity?

Assume we want to keep the line representing the ratio of 30-year unfunded liabilities and 30-year PI at or below the average ratio line shown in Figure 7. The trend line of this ratio for the nation as a whole is above average starting in 2008. We estimate the amount required to bring the portion of the ratio trend line down to the average ratio line in Figure 7. As discussed in section 2, we estimate this amount using a formula that estimates the deviation from mean for each year in which the ratio is above average and calculates the amount needed to bring the ratio down to the average line by multiplying the deviation by annual PI. This can be translated into a mathematical equation as follows:

$\sum ADM(i) = [A - R(i)] \times PI(i)$,

where

$\sum$ = summation,

ADM(i) = additional money needed for year i,

A = average ratio of 30-year debt to 30-year PI,

R(i) = ratio of 30-year debt to 30-year PI in year i, and

PI(i) = annual PI in year i.

To estimate the total additional money needed to stabilize the ratio at or below average, we simply add up the amounts estimated using the above formula for years in which the ratio was above average.

Since there is no nationwide state and local pension plan, we apply this formula to each state. The results are shown in Table 2. The results show that about $141 billion in additional payment toward reducing unfunded liabilities would have kept or stabilized the ratio at average and made unfunded liabilities sustainable in 2018. This is about 0.8 percent of PI. This figure may be lower now due to higher returns on investments in 2020.[36] Although we cannot go backward, we could pay $141 billion now (or during the next few years, perhaps using stabilization funds) to achieve sustainability, monitor the stability of the ratio, and make moderate fiscal adjustments to keep the ratio stable going forward to ensure sustainability.

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36   "State Pensions Reach Highest Funded Level in 13 Years," *Chief Investment Officer*, September 23, 2021. https://www.ai-cio.com/news/state-pensions-reach-highest-funded-level-in-13-years/.

Table 2

Amount and Percentage of Personal Income (PI) Needed to Stabilize Unfunded Liabilities, by State, 2018

State	Amount in Millions of Dollars	Percentage of PI
Alabama	1,367	0.661
Alaska	1,037	2.360
Arizona	1,645	0.525
Arkansas	994	0.737
California	30,256	1.222
Colorado	964	0.298
Connecticut	2,431	0.913
Delaware	202	0.405
Florida	5,980	0.568
Georgia	3,740	0.777
Hawaii	931	1.201
Idaho	353	0.466
Illinois	17,008	2.345
Indiana	1,446	0.463
Iowa	1,217	0.790
Kansas	783	0.536
Kentucky	2,886	1.546
Louisiana	1,379	0.650
Maine	14	0.022
Maryland	2,316	0.609
Massachusetts	4,403	0.910
Michigan	4,631	0.974
Minnesota	1,681	0.531
Mississippi	1,965	1.732
Missouri	2,202	0.771
Montana	354	0.707
Nebraska	520	0.517
Nevada	1,757	1.201
New Hampshire	348	0.418
New Jersey	1,640	0.272
New Mexico	1,289	1.493
New York	11,778	0.878

Amount and Percentage of Personal Income (PI) Needed to Stabilize Unfunded Liabilities, by State, 2018 (cont'd)

State	Amount in Millions of Dollars	Percentage of PI
North Carolina	3,599	0.756
North Dakota	292	0.707
Ohio	538	0.095
Oklahoma	325	0.179
Oregon	2,346	1.122
Pennsylvania	5,411	0.763
Rhode Island	52	0.090
South Carolina	2,123	0.977
South Dakota	311	0.703
Tennessee	1,361	0.426
Texas	7,501	0.532
Utah	1,016	0.709
Vermont	253	0.754
Virginia	2,775	0.572
Washington	3,222	0.703
West Virginia	7	0.010
Wisconsin	13	0.004
Wyoming	340	0.979
United States	**140,900**	**0.800**

Table 2 shows that the amount needed to stabilize the ratio between unfunded liabilities and the economy is large for several states, but given the size of their economies, the percentage of PI needed to stabilize is relatively small. For example, in California the amount required to stabilize unfunded liabilities is about $30 billion, but it is only 1.2 percent of the California economy. Compare this with Alaska. The amount needed to stabilize is about $1.04 billion, but that is about 2.4 percent of the Alaska economy because Alaska's economy is much smaller than California's. The table also shows that the Wisconsin, West Virginia, Rhode Island, and Maine systems seem to be the most stable and sustainable. Each state requires 0.09 percent or less of PI to stabilize its unfunded liabilities. Graphics of trend lines for individual states are shown in the appendix.

As shown in Figure 1, we can enhance sustainability of public pensions by adding the sustainability valuation on top of the prevailing funding policies and practices, including actuarial valuations, employers' funding disciplines, sound investment strategies, and stress testing. For example, actuarial valuation can keep a pension fund on track to paying benefits when due. Adding the novel sustainability valuation approach on top of actuarial valuation will restore the balance between unfunded liabilities and economy

to keep the pension fund fiscally sustainable. Recall that by *sustainability valuation* we mean monitoring the ratio between unfunded liabilities and economy and paying down unfunded liabilities to keep this ratio stable going forward.

If states cannot pay down their unfunded liabilities to make them sustainable right away, could they establish stabilization funds and pay down unfunded liabilities gradually? Let's examine that next.

Can We Use Stabilization Funds to Ensure Sustainability?

As mentioned in the foregoing discussion, it would cost about $141 billion to stabilize the ratio between unfunded pension liabilities and PI. This kind of money may not be found immediately but perhaps could be paid over, say, the next five years in small amounts using stabilization funds. Stabilization funds also may be used to keep the ratio stable going forward. These funds are, in effect, rainy-day funds that can be tapped into to correct imbalances in a pension system. When there is a shortfall, a stabilization fund provides a clear and legally mandated mechanism to cover it. Stabilization funds also can be used to prevent unfunded liabilities from growing beyond a certain level. Compared to appropriating tax revenues to stabilize unfunded liabilities each year for, say, the next five years, a stabilization fund earns interest and may be less expensive to taxpayers.

We are aware of only a few state-level stabilization funds, including those in Oklahoma, Louisiana, and North Carolina. However, there are many local stabilization funds, especially in California, to help local employers meet their pension contribution obligations. There is little information about how much money actually is available in the state-level stabilization funds. Local stabilization funds currently hold about $220 billion in assets.[37]

State-level Stabilization Funds. In 2013, Oklahoma created a pension stabilization fund. This fund can be used only when funding levels drop below 90 percent. The Oklahoma stabilization fund is funded by sin taxes, such as cigarette and alcohol taxes and lottery proceeds.

Voters approved a stabilization fund in Louisiana in 2016. The Louisiana stabilization trust fund is funded by recurring mineral and corporate tax revenues. Although it is not specifically designed for pensions, the legislature can appropriate money from this fund to address pension funding issues if certain conditions are met. These conditions include a two-thirds vote and the minimum balance in the stabilization fund not falling below $5 billion.

To the best of our knowledge, neither of these pension stabilization funds has been tapped, so in that respect, the concept is new and untested. However, these mechanisms bear watching, and the pension systems may wish to learn more about how they have been designed and how they are working.

North Carolina does not have a stabilization fund per se but has an employer contribution stabilization policy. As of 2017, boards of teachers' and state employees' retirement systems recommend an annual contribution that is the larger of (1) or (2), below but has a ceiling of (3).

(1) Current year's actuarially determined contribution (ADC)

(2) Prior year's appropriated contribution, increased by 0.35 percent of pay

(3) ADC determined using discount rate equal to 30-year Treasury yield

37 Maureen Toal and Brian Binley, "Stabilization Funds and Trusts" (presentation at NCPERS Public Pension Funding Forum, New York, August 23, 2021), www.ncpers.org/files/Conference%20Docs/PPFF/2021/PPTs/4_Maureen%20Toal%20and%20Brian%20Brinkley.pdf.

This stabilization policy was changed in 2019 to the greater of (1) or (2) plus additional funding that might be required for any recommended benefit improvements.

(1) Prior year's appropriation plus $2 million

(2) Current year's ADC

The North Carolina employer contribution stabilization policy is effective until 2022.

Local-level Stabilization Funds. According to Public Agency Retirement Services, 131 cities and towns, 30 counties, 50 school districts, and several other jurisdictions in California had stabilization funds.[38] These stabilization funds are established as trust funds under IRS Section 115 Trust.

What is a 115 trust, and how does it work? According to Jeff Chang, partner at Best, Best & Krieger LLP,

> a 115 trust can be used to set aside monies to meet future pension contributions or liabilities. Funds placed in a 115 trust are irrevocably committed for the essential government function(s) specified in the applicable trust agreement (e.g., pension obligations). Therefore, the monies held in such trusts can be invested in accordance with the rules governing such special purpose accounts. For example, 115 trust funds dedicated to satisfy pension obligations can be invested in the same manner as funds in a typical pension fund rather than as part of the agency's general fund. Thus, by setting aside funds in a 115 trust, agencies can potentially earn a higher rate of return on monies set aside for future pension obligations.[39]

There are other organizations that offer services to establish pension stabilization funds under the Section 115 Trust provision. We have used Public Agency Retirement Services for an illustrative purpose in this study.

Are States with Relatively Sustainable Unfunded Liabilities Better Funded?

We examine this question by using multivariate analysis, in which we predict funding levels (dependent variable) using sustainability and plan sponsors' funding disciplines as two independent variables. It is well known that the plans in which employers skip contributions or do not make the full required contributions have lower funding levels and vice versa.[40] We use National Association of State Retirement Administrators data to examine funding disciplines.[41] We included the nature of state and local tax structure, as measured by elasticity,[42] but we dropped it from the final model due to an almost zero and insignificant beta coefficient.

In our analysis, sustainability is measured by the percentage of annual PI needed to make the plan sustainable. Funding discipline is measured by the weighted average of the percentage of required contributions paid during 2001–2013 (the latest data available). The results are shown in Table 3. The analysis is based on 50 states' data on these variables.

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38 Public Agency Retirement Services, www.pars.org/.

39 Chang, "Using a Section 115 Trust."

40 Jun Peng and Ilana Boivie, "Lessons from Well-funded Public Pensions: An Analysis of Six Plans that Weathered the Financial Storm," National Institute on Retirement Security, June 2011, www.nirsonline.org/wp-content/uploads/2011/06/final_june_29_report_lessonsfromwellfundedpublicpensions1.pdf.

41 Keith Brainard and Alex Brown, "The Annual Required Contribution Experience of State Retirement Plans, FY 01 to FY 13," National Association of State Retirement Administrators, March 2015, www.nasra.org/files/JointPublications/NASRA_ARC_Spotlight.pdf.

42 Elasticity measures whether tax revenues grow in sync with the economy.

Table 3
Are More Sustainable State and Local Pension Plans Better Funded (United States, 2018)?

Variable	Beta Value	Level of Significance
Intercept	32.70	< .05
Percentage of personal incomeneeded to make the plan sustainable	−7.68	< .05
Percentage of actuarially required contribution paid – funding discipline	0.23	< .05

We found that the more sustainable the pension plans are in a state (i.e., they require less money to make them sustainable), the better funded they are. For each 1 percent of decline in PI needed to stabilize unfunded liabilities to make them sustainable, the funding level improves by 7.68 percent. This is controlling for funding discipline. Similarly, Table 3 shows that for each 1 percent of additional contribution closer to the required contribution by the plan sponsor, the funding level improves by 0.23 percent. This, in turn, is controlling for sustainability. The Level of Significance column in Table 3 indicates that we can say this with a 95 percent level of confidence.

Do States with Relatively Sustainable Unfunded Liabilities Have Lower Contribution Rates?

It is logical to expect that if unfunded liabilities are stabilized at fiscally sustainable levels, employer contribution rates will decline and will be less volatile. We tested this hypothesis through multivariate analysis, and the results are shown in Table 4.

Table 4
Do More Sustainable State and Local Pension Plans Have Lower Contribution Rates (United States, 2018)?

Variable	Beta Value	Level of Significance
Intercept	4.36	Not significant
Percentage of personal income needed to make the plan sustainable	0.86	< .10
Volatility of contribution rate	0.25	Not significant

In general, the contribution rate is measured as a percentage of payroll. However, such data are not available at the aggregate level by state. Therefore, we measure the contribution rate as a percentage of own-source revenues in each state during the study period, 2004–2018, and then calculate the average contribution rate for each state. The volatility of the contribution rate is measured by the standard deviation of the rate during the same period. We use contribution rate as the dependent variable and sustainability and contribution volatility as two independent variables. The results in Table 4 show that the more sustainable the plan is, the lower is the employer contribution rate. For example, if the percentage of PI needed to make the unfunded liabilities fiscally sustainable decreases by 1 percent, the employer contribution rate decreases by about 0.86 percent. This is controlling for the volatility of the contribution rate. Similarly, if contribution volatility declines by 1 percent, the contribution rate declines by about 0.25 percent. However, volatility is statistically insignificant. In short, the model suggests that the more sustainable the unfunded liabilities are, the lower is the contribution rate. We can say this with a 90 percent level of confidence.

How Can Pension Plans with Negative Cash Flows Pursue Sustainability Strategies?

As a pension plan matures – when the percentage of retirees receiving benefits from a pension plan is more than the percentage of actives who are contributing to the pension plan – it is natural to expect negative cash flow. It is not necessarily a bad thing, especially when the plan has sufficient assets. As shown in Figure 8, in the aggregate, public pension plans have enough assets to pay benefits for about 13.7 years.[43] By then, most of the baby boomers will have passed through the retirement phase, and the problem of negative cash flow may begin to disappear. In the meantime, there are various strategies to address the problem, including the alignment of investments with plan demographics and asset-liability matching strategies.[44]

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43 This is assuming everything is frozen. But if money from contributions and investment earnings is coming in and benefit payments vary, the 13.7 years figure may be different.

44 Michael Buchenholz, "Maturing Public Pension Plans: Strategies to Overcome Market Volatility and Portfolio Illiquidity," J.P. Morgan Asset Management, March 13, 2020, am.jpmorgan.com/us/en/asset-management/institutional/investment-strategies/pension-strategy/maturing-public-pension-plans-strategies-to-overcome-market-volatility-and-portfolio-illiquidity/.

Figure 8
Trends in Ratio of Assets to Benefit Payments, United States, 2009–2019
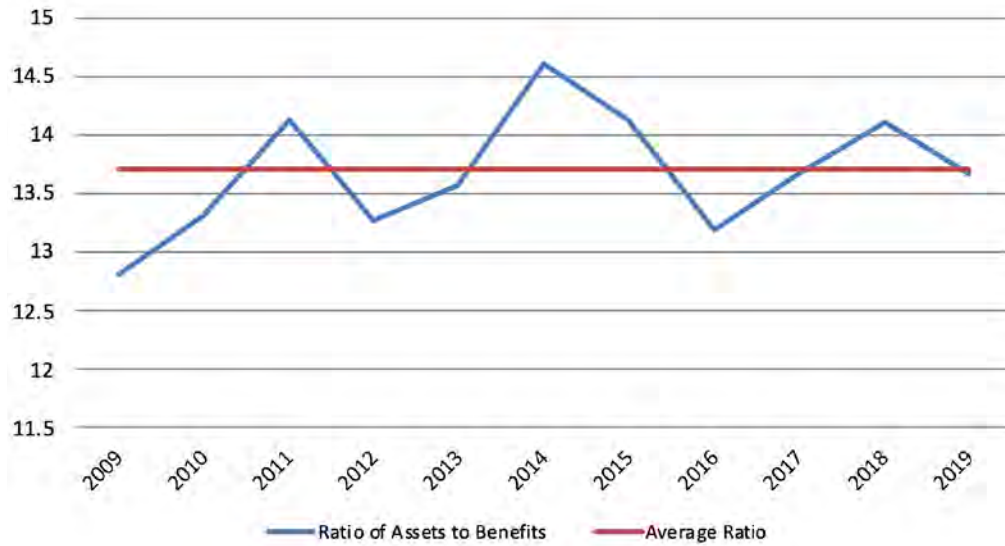
Adding a sustainability valuation strategy on top of the strategies to address negative cash flow is likely to improve funding and reduce employer contributions. It is better to enhance sustainability than to cut benefits or dismantle public pensions to address negative cash flow issues. This is because cutting benefits and dismantling public pensions have negative consequences for employers and communities. In the time horizon under which pension funds operate, state and local governments have more than enough economic capacity to sustain public pensions regardless of negative cash flow situations. Pensions won't be sustainable only if policy makers intentionally choose to follow their zombie economics ideology.[45]

What Are the Benefits of Incorporating Sustainability Valuation into Pension Funding Policy?

As shown in Tables 3 and 4, the key benefits of incorporating sustainability valuation in pension funding policy and practice are that funding levels are likely to increase and employer contributions are likely to decrease. If unfunded liabilities are stable, the growth in contributions can be slowed and stabilized.

Figure 9 shows trends in state and local contributions as percentages of state and local general revenues. It shows that the contributions,

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45   Krugman, *Arguing with Zombies.*

on average, were 5.74 percent of revenues during 2008–2018. The range was between 4.94 percent in 2008 and 6.72 percent in 2018 – an increase of about 36 percent. This increase can be slowed and eventually stabilized if we can get on a path to stabilizing the ratio between unfunded liabilities and economic capacity through sustainability valuation.

Another benefit of adding sustainability valuation is that it shifts the focus from "the sky is falling" (unfunded liabilities are too high) to the stabilization of unfunded liabilities to enhance sustainability. This approach will help policy makers to make better decisions. They are likely to focus on the stabilization of funding rather than cutting benefits or closing pension plans. Cutting benefits does more harm than good.[46]

Figure 9

Trends in State and Local Contributions as Percentage of General Revenues to Public Pensions, United States, 2008–2018
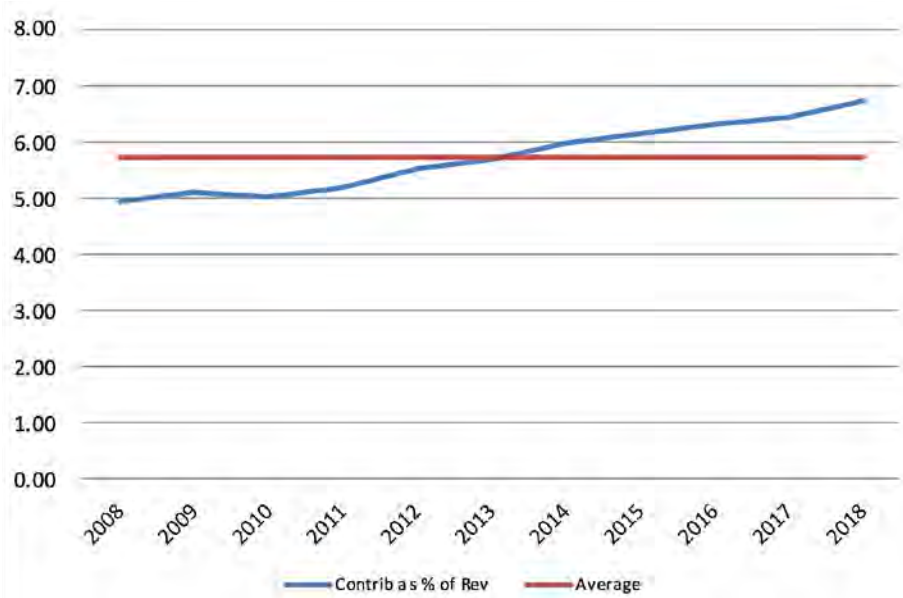
Note: Contrib = contribution; Rev = revenue.

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46 "Unintended Consequences."

Section 4

CONCLUSIONS

The current practice of simply looking at the magnitude of unfunded liabilities in isolation results in policy decisions that have the potential to undermine public pensions. This study suggests that we should focus on stabilization of unfunded liabilities in relationship to a plan sponsor's economic capacity to ensure fiscal sustainability. If we add the novel sustainability valuation component proposed in the present study to current practices such as actuarial valuation, stress testing, employer funding disciplines, and sound investment strategies, we can enhance sustainability of public pensions over the long haul. This study also shows that sustainable pension plans have higher funding levels and lower contribution levels. This is true even when we control for other factors such as employer funding disciplines.

In the Literature Review, we trace how the concept of fiscal sustainability evolved in economic literature, and the prevailing theory is that if the ratio between debt and economic capacity of a jurisdiction is stable over time, the debt is sustainable. The situation is similar to household finance. If household debt is growing faster than income, we are in big trouble. But if income is rising in concert with debt, we are okay.

The sustainability theory has been applied to state and local debt. This study uses the same concept for assessing state and local unfunded pension liabilities. Also, different studies have used different measures of economy, including GNP and GDP, over a time horizon that is usually limited to one fiscal year. In our study, we have used PI as a measure of economy over the time horizon under which pension funds operate – the amortization period, usually 30 years. The reasons for using PI are discussed fully in the Methodology section. It's worth repeating that an economy that uses its resources more efficiently (including laying off workers or paying them low wages) has a higher GDP in the short run, but it may compromise the performance of the economy in the long run.[47] Another reason is that production (GDP) is not necessarily owned by residents in a state.

Our main finding is that unfunded liabilities can be stabilized at a moderate cost. For example, for pensions sponsored by state and local governments in the United States as a whole, if unfunded liabilities had been reduced by $141 billion (about 3 percent of their 2018 level), they would have been fiscally sustainable. The unfunded liabilities vary by state and locality. The cost of stabilizing them and making them

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47   Stiglitz, "GDP Is the Wrong Tool for Measuring What Matters."

sustainable also varies by state and locality and is the responsibility of state and local governments. For that reason, we have estimated this cost for each state.

Focusing on the stabilization of unfunded liabilities to keep them at a sustainable level is a paradigm shift in assessing and ensuring the health of pension plans. It is better than the current practice of looking at the magnitude of unfunded liabilities in isolation and making changes such as cutting benefits, increasing employee contributions, and sometimes closing pension plans altogether. Such changes do more harm than good. While our analysis is aggregate at the state-by-state level, the sustainability analysis can be done for individual plans by using historical plan-level data and data on local economic capacity. Such plan-level analysis can include variables such as other postretirement employee benefits liabilities, legacy experience, and reasonableness of actuarial assumptions in the multivariate models.

The key benefit of adding sustainability analysis on top of current pension funding policies and practices is that it shifts the focus from simple fear that the sky is falling (unfunded liabilities are too high) to an understanding that stabilizing unfunded liabilities in relationship to the economic capacity of the plan sponsor can enhance sustainability. This approach will help policy makers to make better decisions. They are likely to focus on the stabilization and sustainability of pension funding rather than cutting benefits or closing pension plans. Cutting benefits does more harm than good.[48] Using a sustainability approach is likely to stop such harm.

Another benefit is that implementing the novel sustainability valuation approach proposed in this study will improve funding levels. Our analysis shows that plans with relatively sustainable unfunded liabilities are better funded. This is true even when we take into account employer funding disciplines. Finally, incorporating sustainability valuation in pension funding policy and practice is likely to lower employer contribution rates.

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48 "Unintended Consequences."

APPENDIX
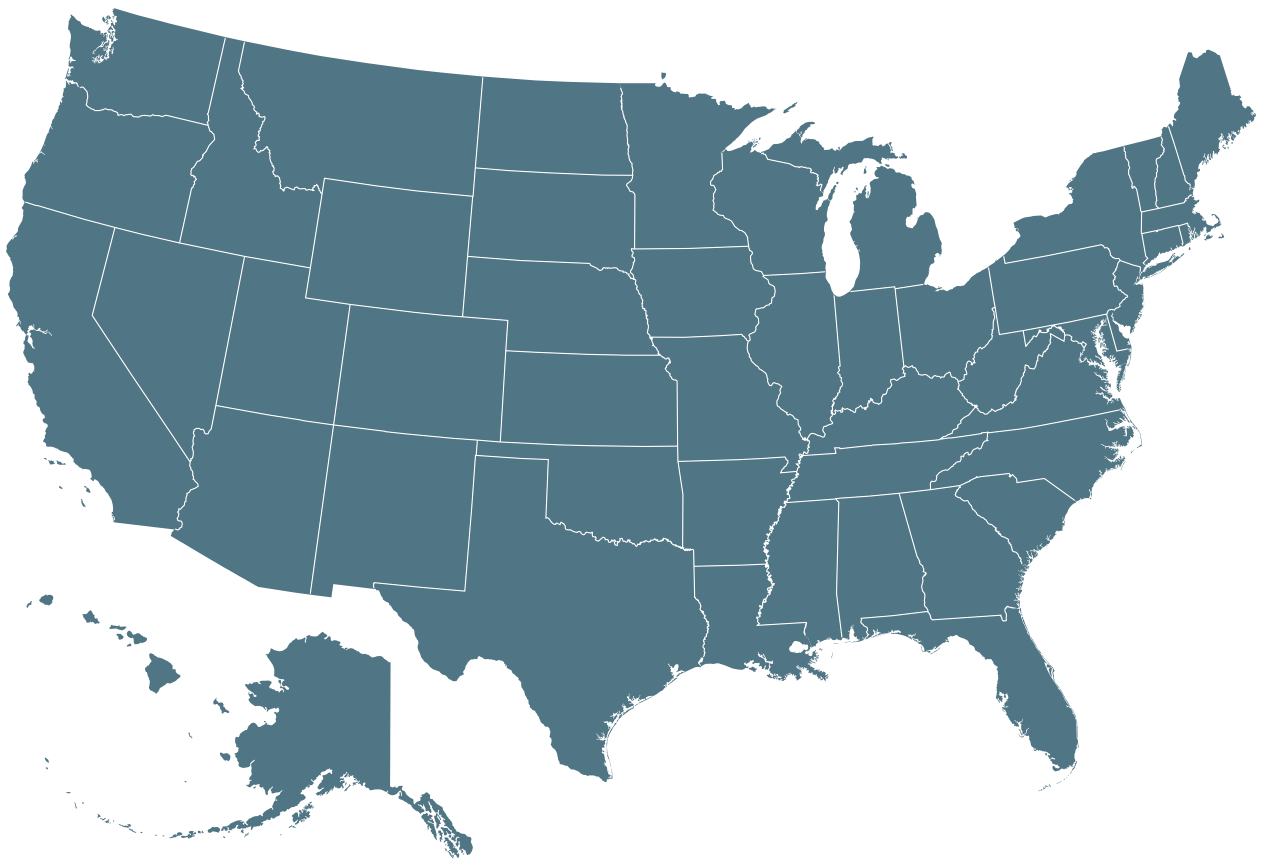
Alabama

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Alabama, 2004–2018
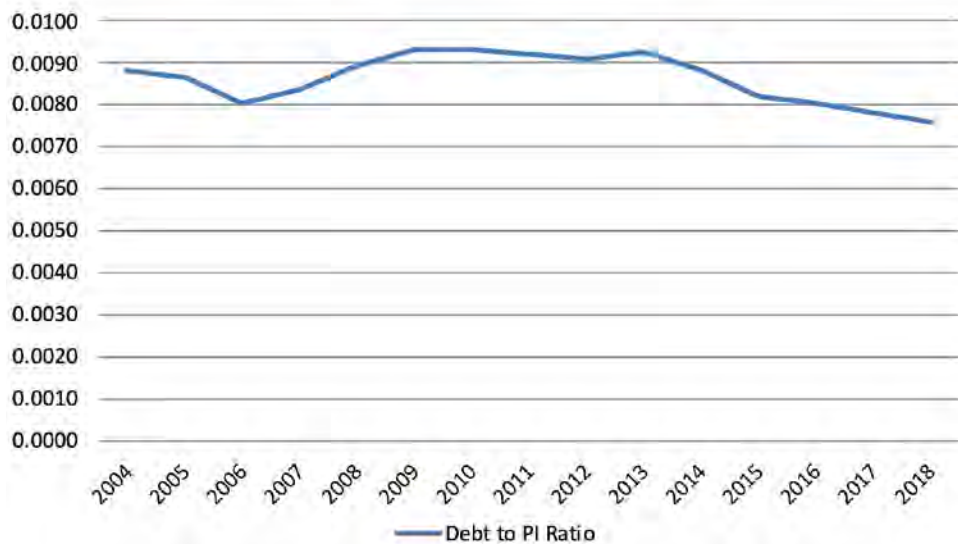
Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2008.

Alabama

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Alabama, 2004–2018
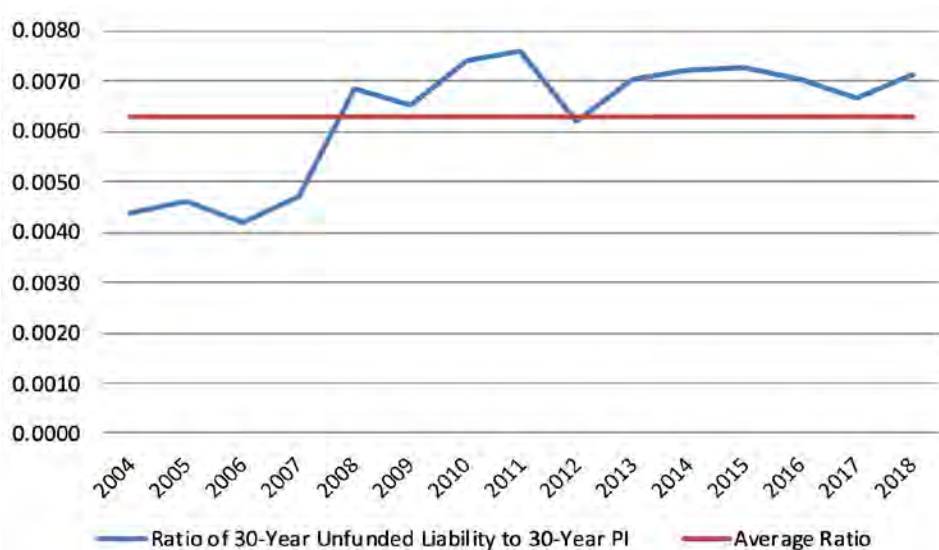
PI = personal income.

Amount needed to stabilize the ratio = $1,367 million.
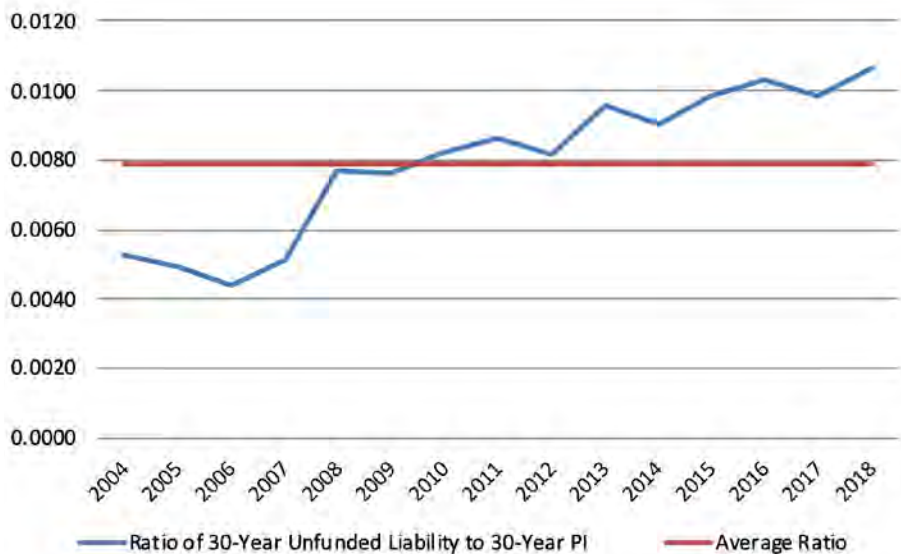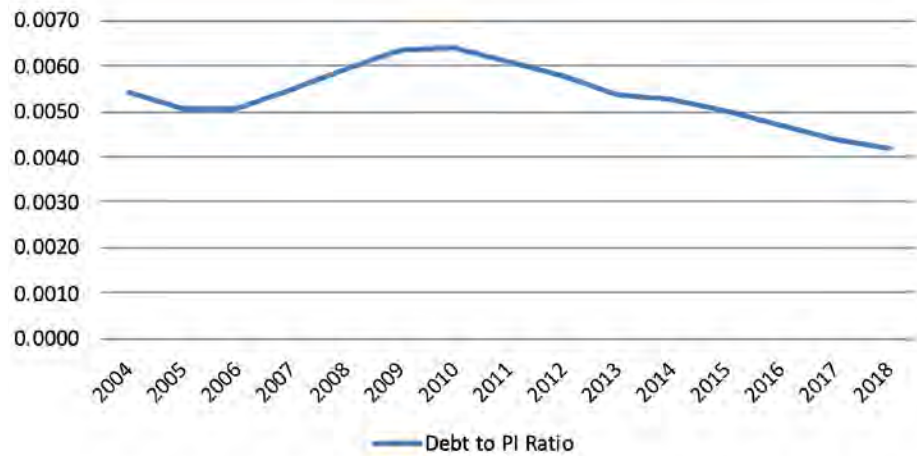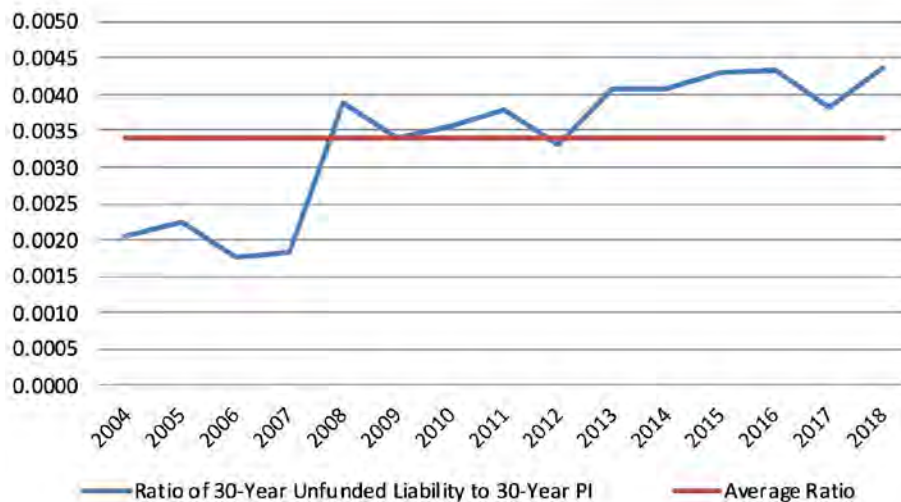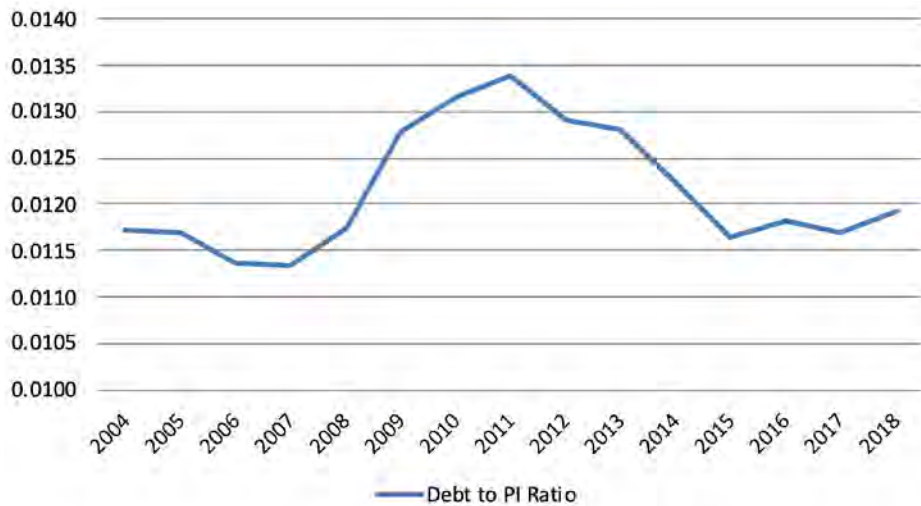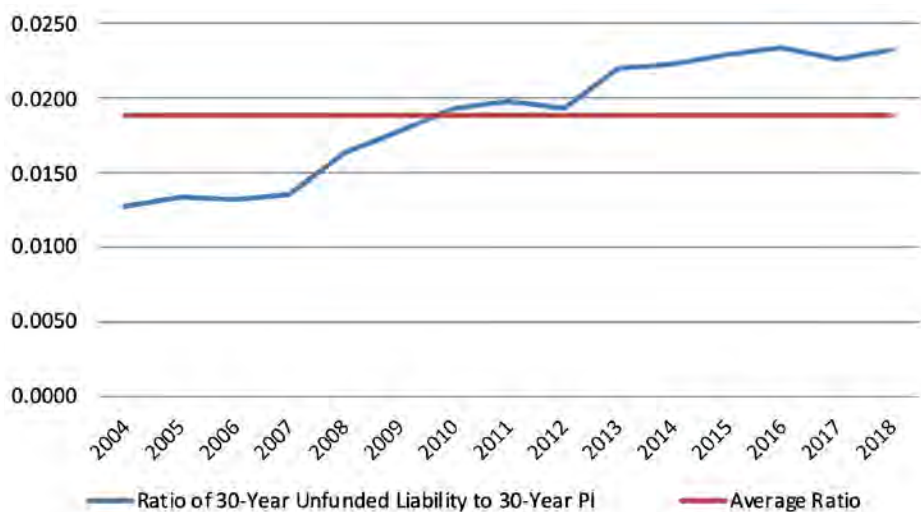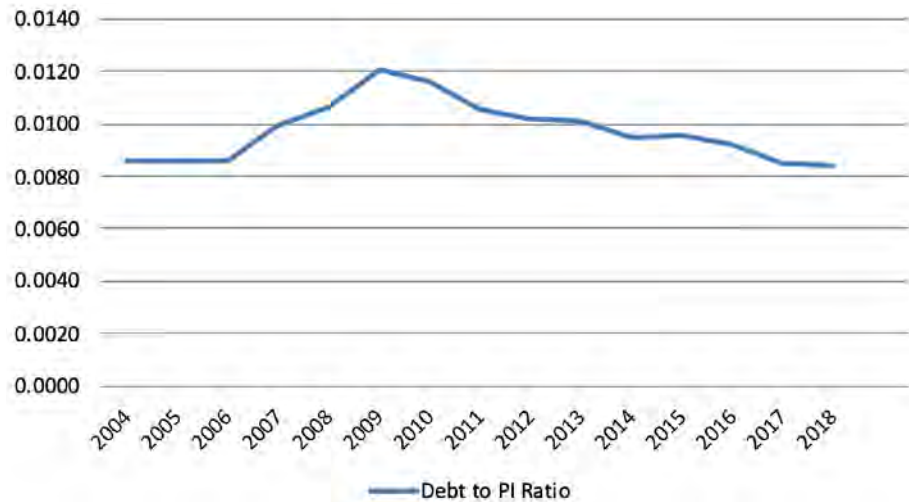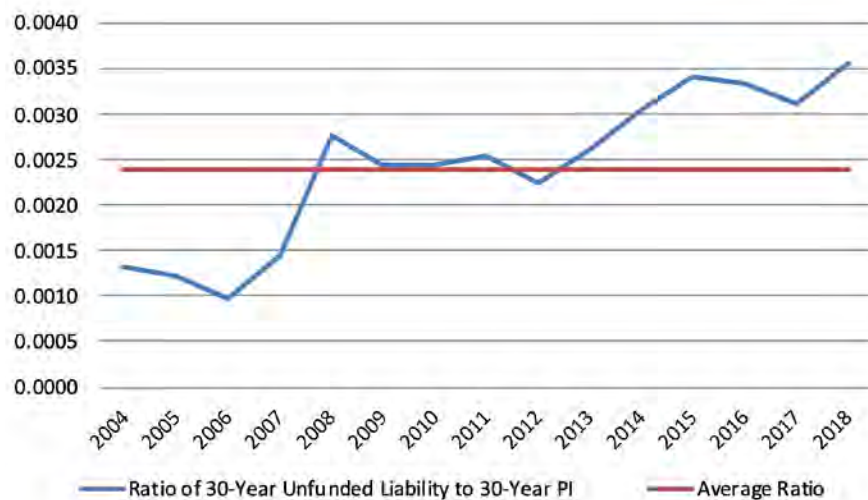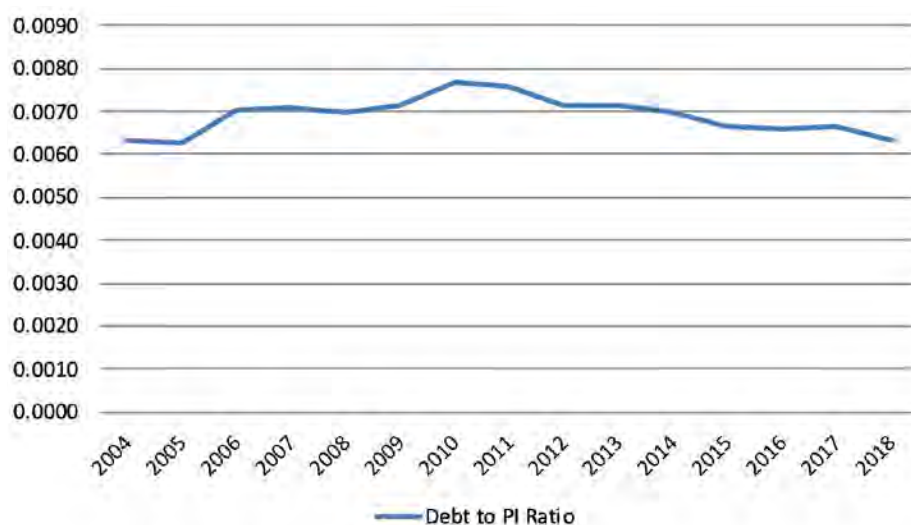
Percentage of annual personal income = 0.661.

Alaska

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Alaska, 2004–2018
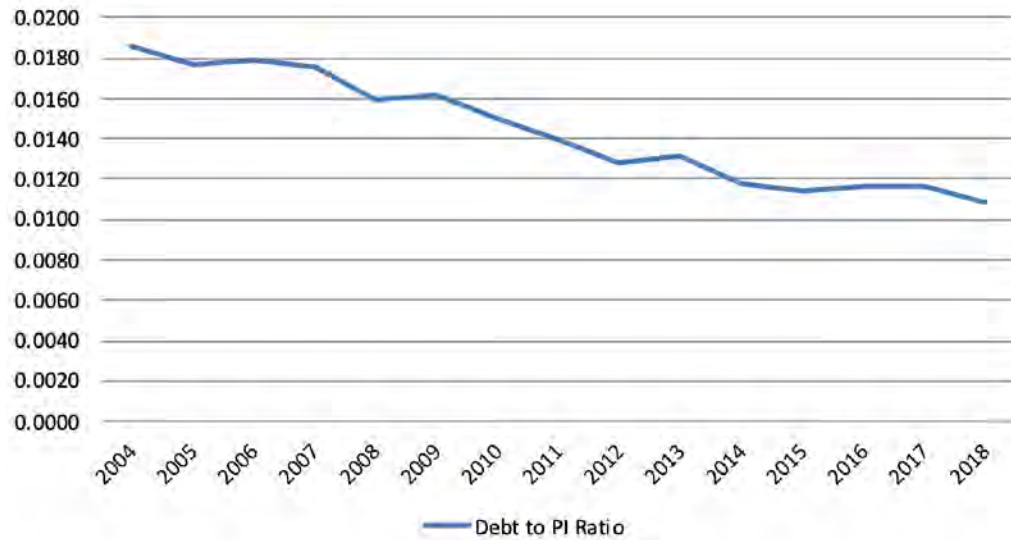
Is state and local debt sustainable? Yes. Personal income is rising faster than debt.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Alaska, 2004–2018
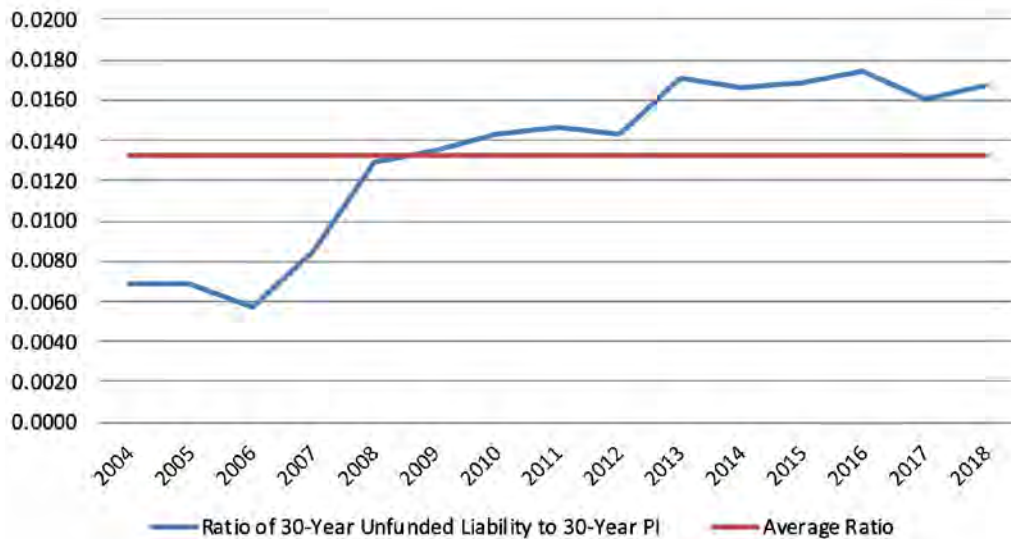
PI = personal income.

Amount needed to stabilize the ratio = $1,037 million.

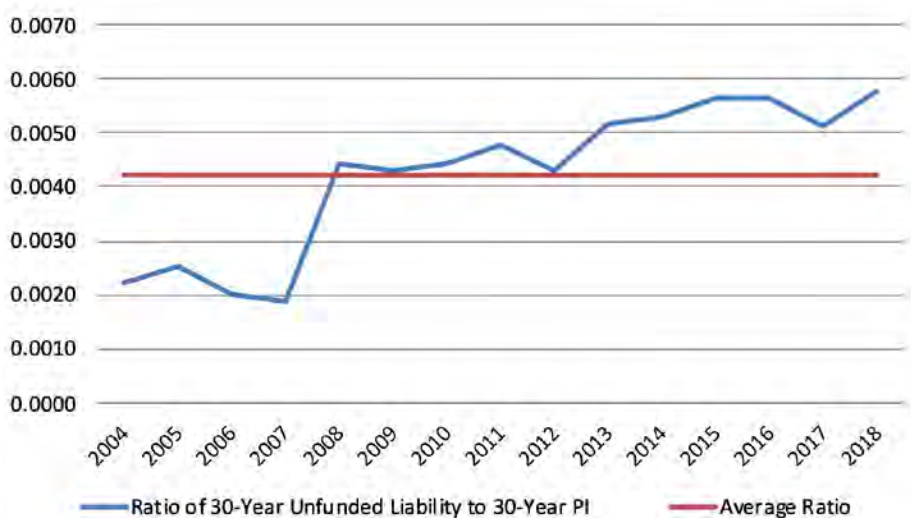Percentage of annual personal income = 2.36.

Arizona

Arizona
Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Arizona, 2004–2018
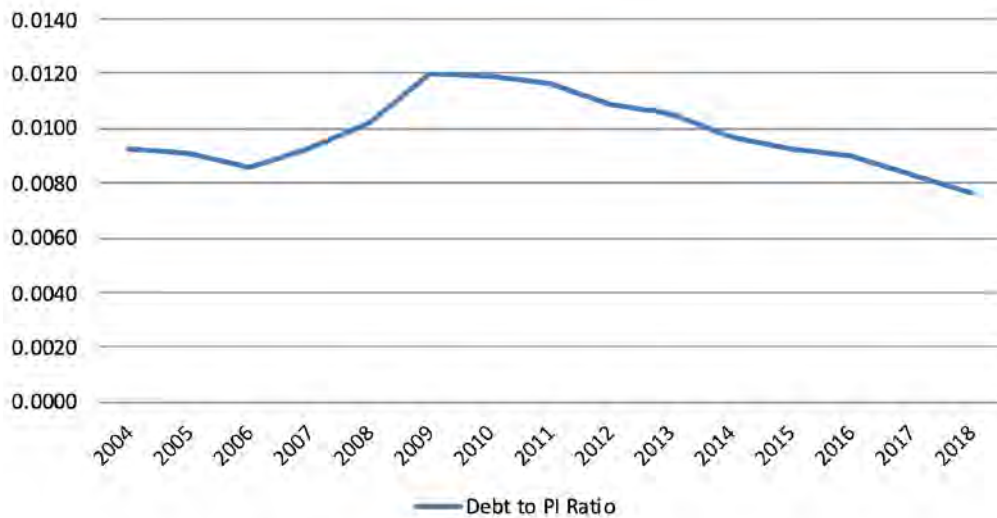
Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Arizona
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Arizona, 2004–2018
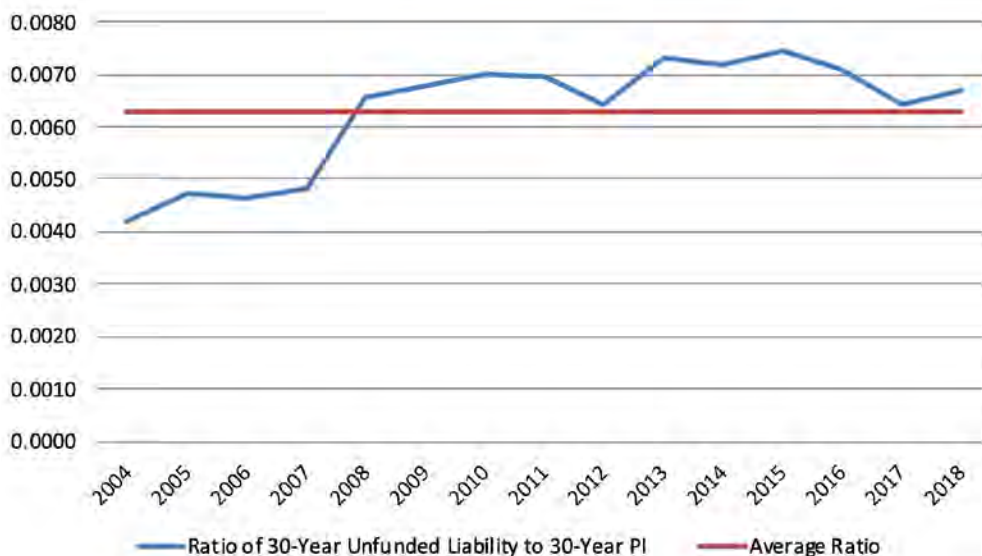
PI = personal income.
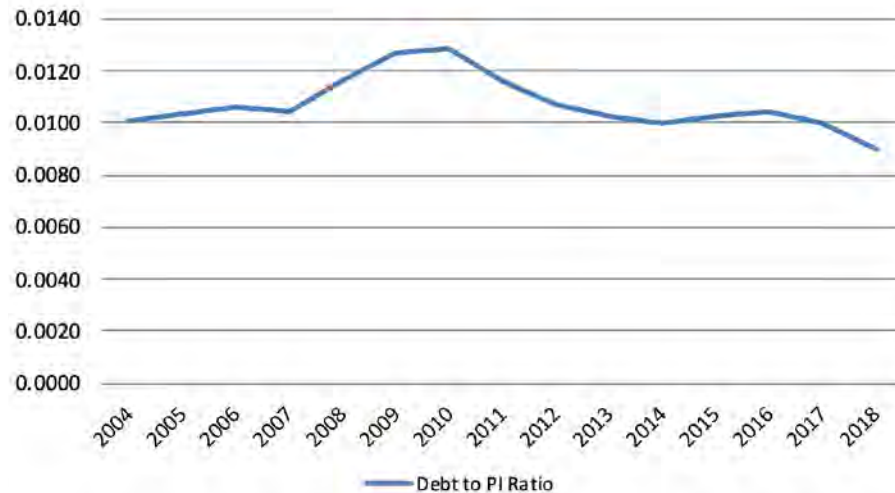
Amount needed to stabilize the ratio = $1,645 million.

Percentage of annual personal income = 0.525.

Arkansas

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Arkansas, 2004–2018
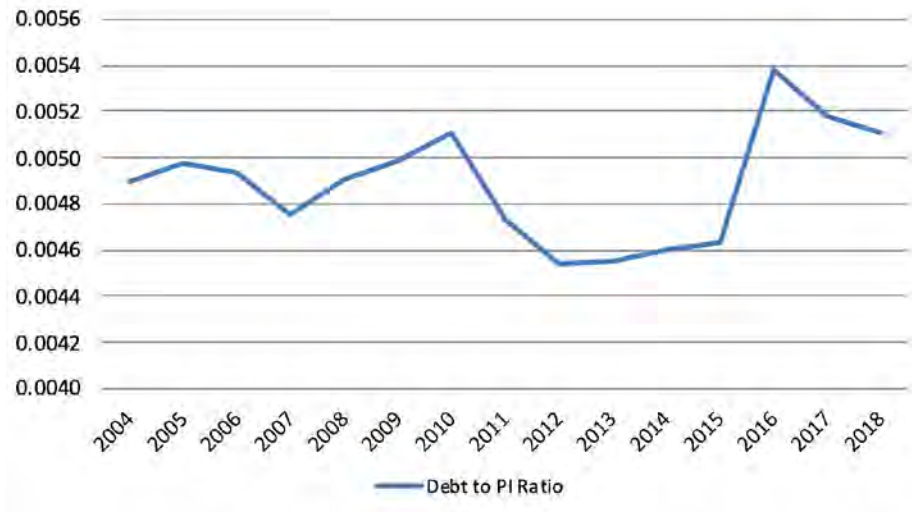
Is state and local debt sustainable? No clear pattern.

Arkansas

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Arkansas, 2004–2018
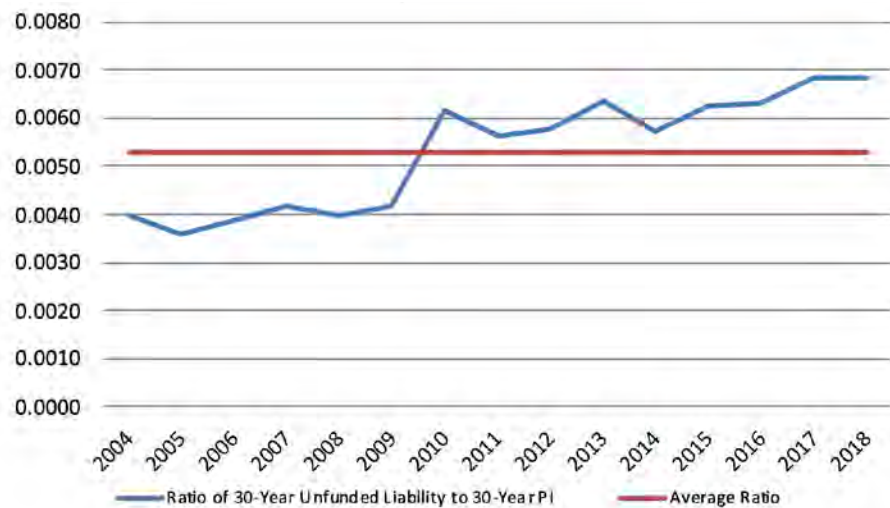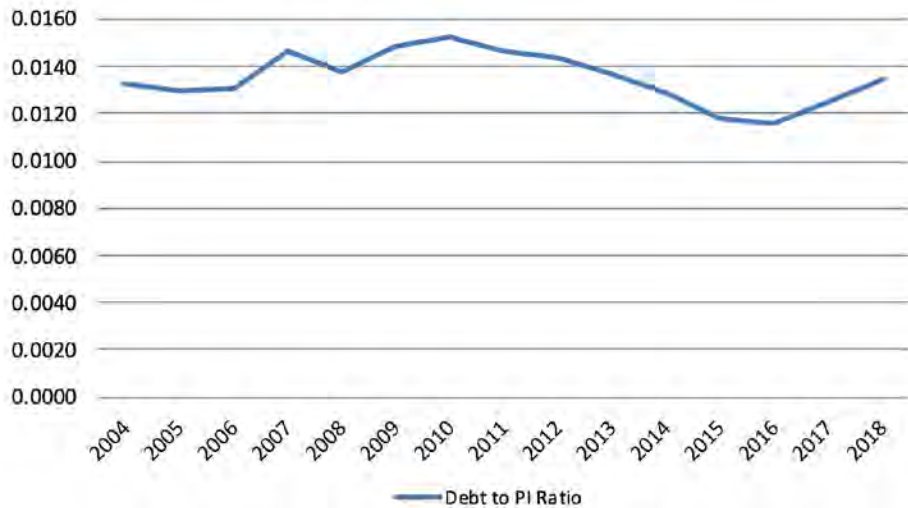

PI = personal income.

Amount needed to stabilize the ratio = $994 million.

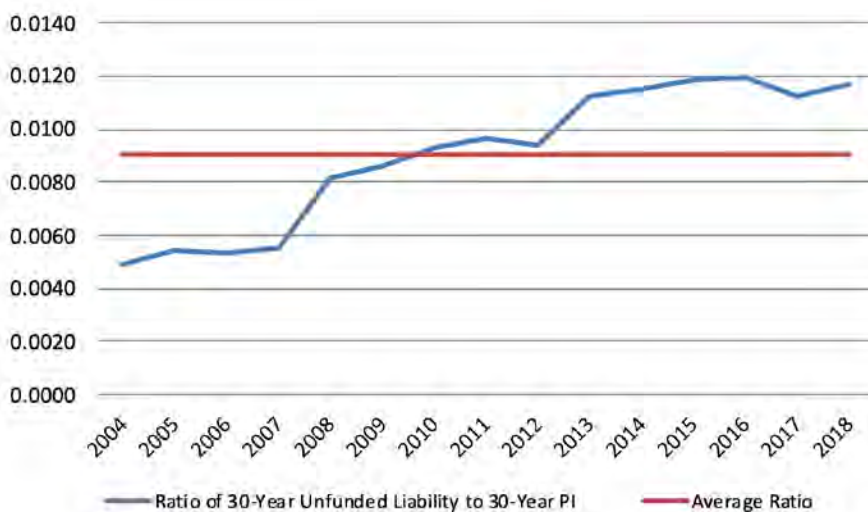Percentage of annual personal income = 0.737.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, California, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, except for a slight uptick in debt in 2017 and 2018.

California
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, California, 2004–2018
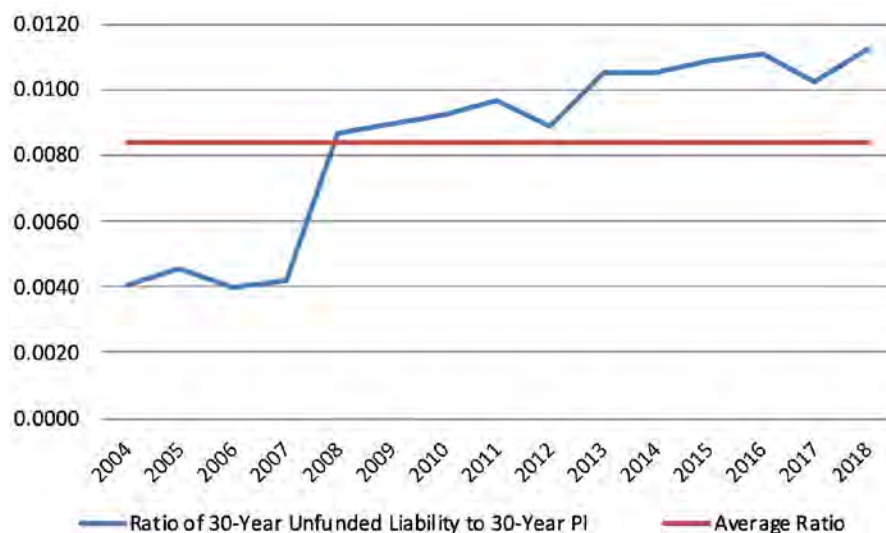
PI = personal income.
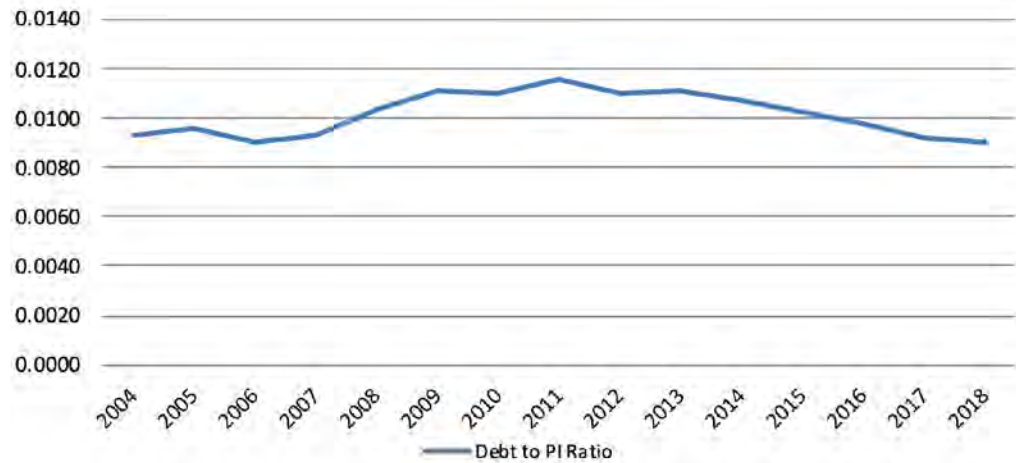
Amount needed to stabilize the ratio = $30,256 million.

Percentage of annual personal income = 1.222.

Colorado

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Colorado, 2004–2018
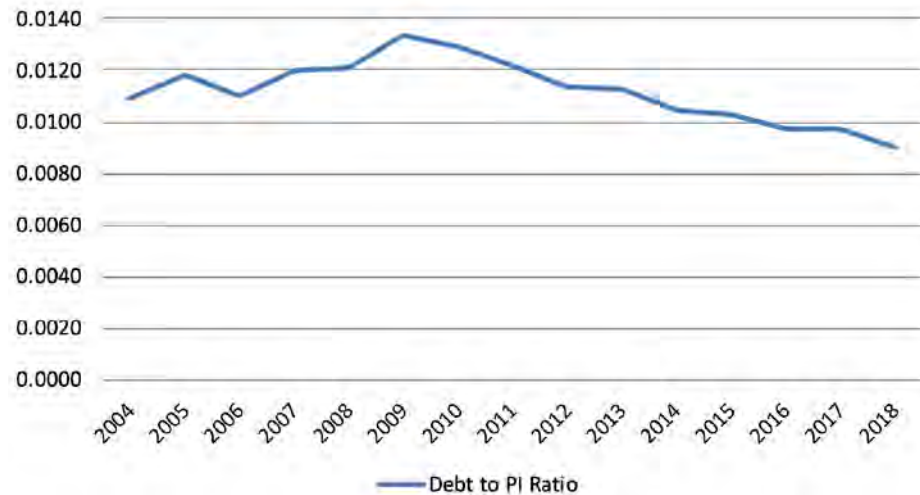
Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Colorado

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Colorado, 2004–2018
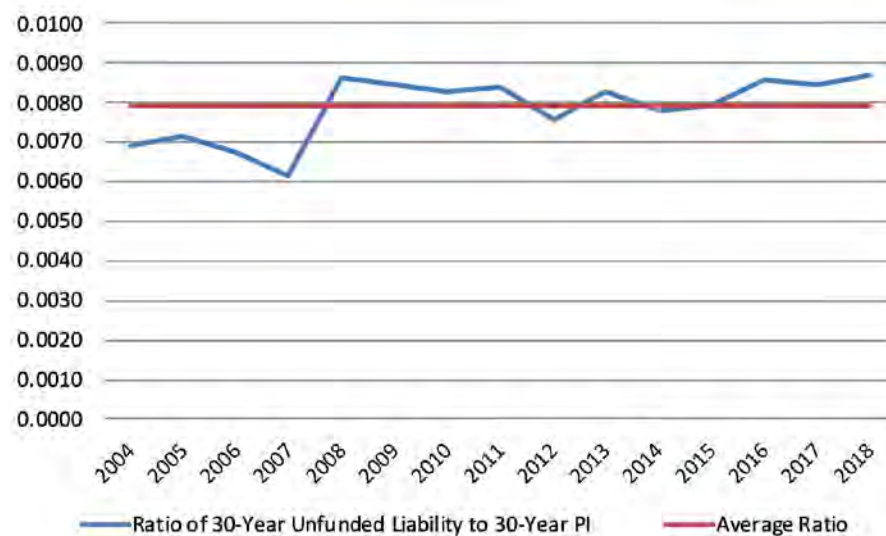
PI = personal income.

Amount needed to stabilize the ratio = $964 million.

Percentage of annual personal income = 0.298.

Connecticut

Connecticut

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Connecticut, 2004–2018
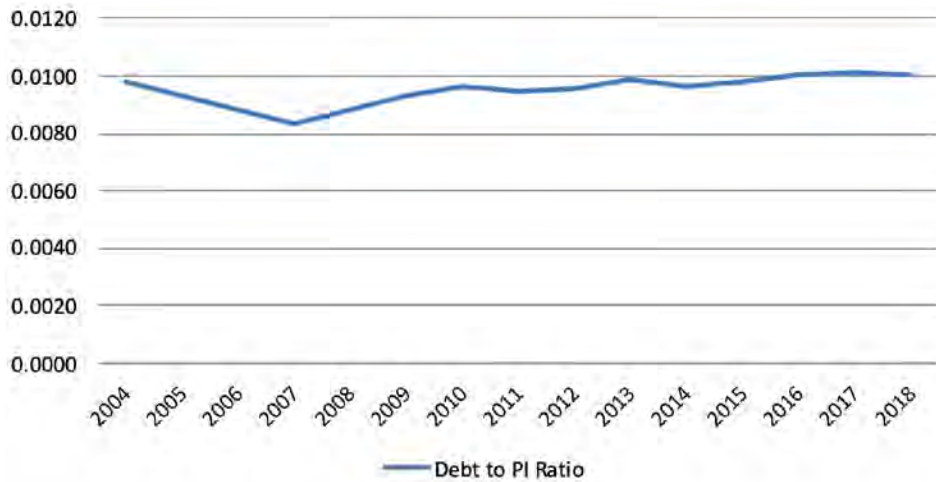
Is state and local debt sustainable? Yes. The ratio has been almost stable since 2010.

Connecticut

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Connecticut, 2004–2018
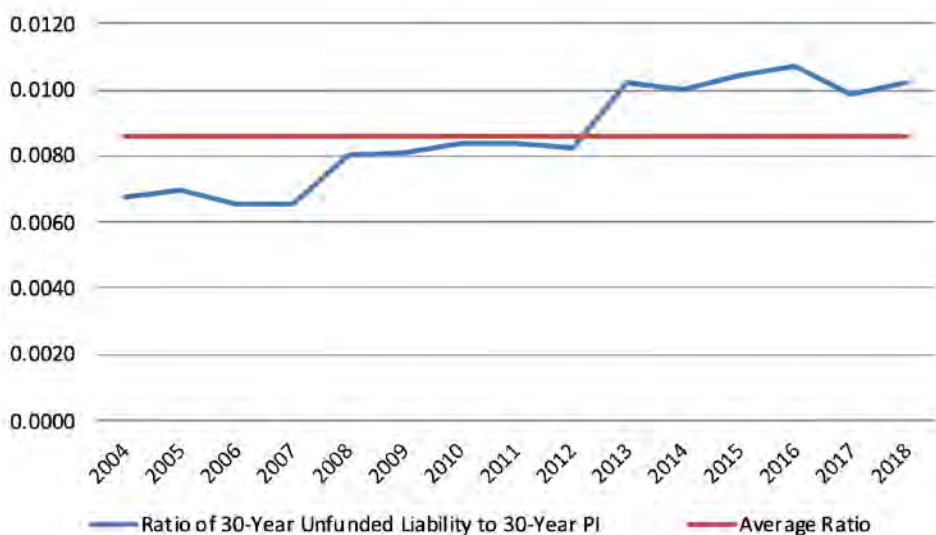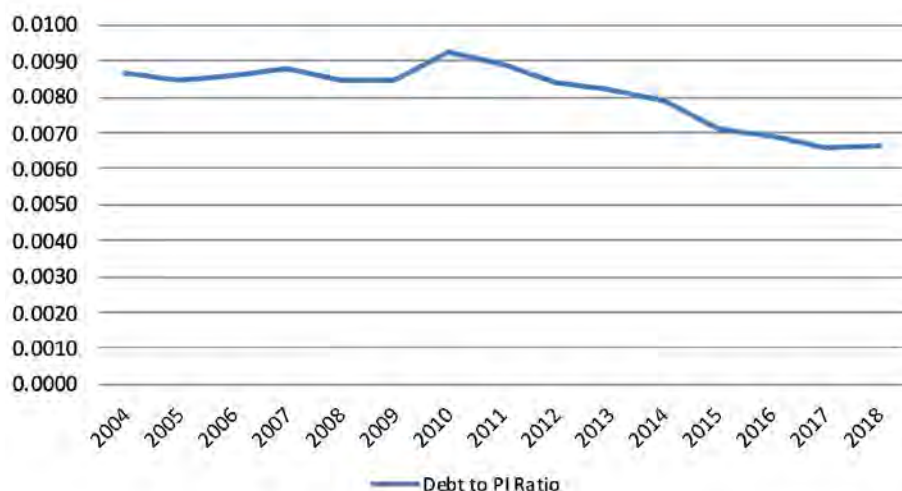

PI = personal income.

Amount needed to stabilize the ratio = $2,431 million.

Percentage of annual personal income = 0.913.

Delaware

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Delaware, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, except for a blip in debt in 2013.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Delaware, 2004–2018
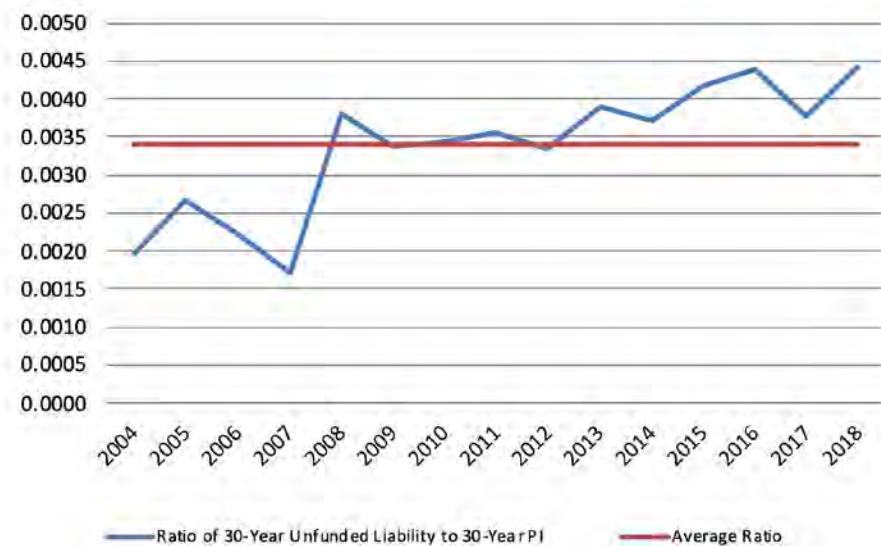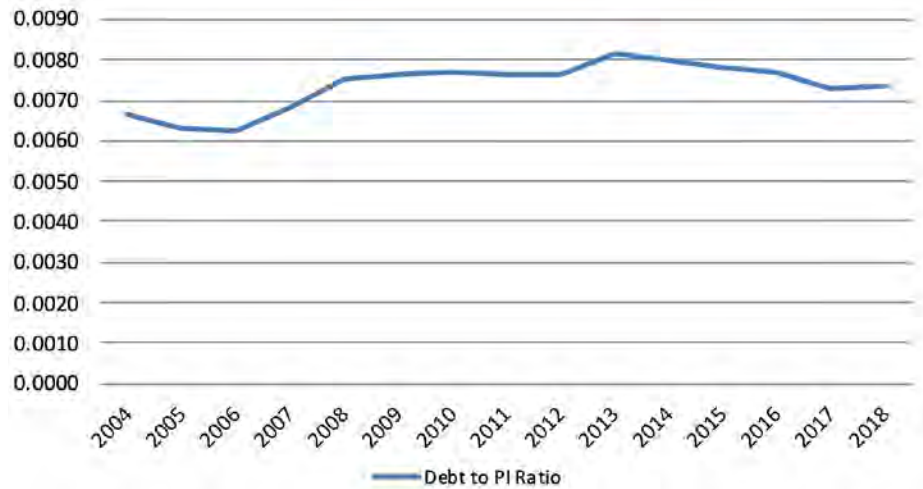

PI = personal income.

Amount needed to stabilize the ratio = $202 million.

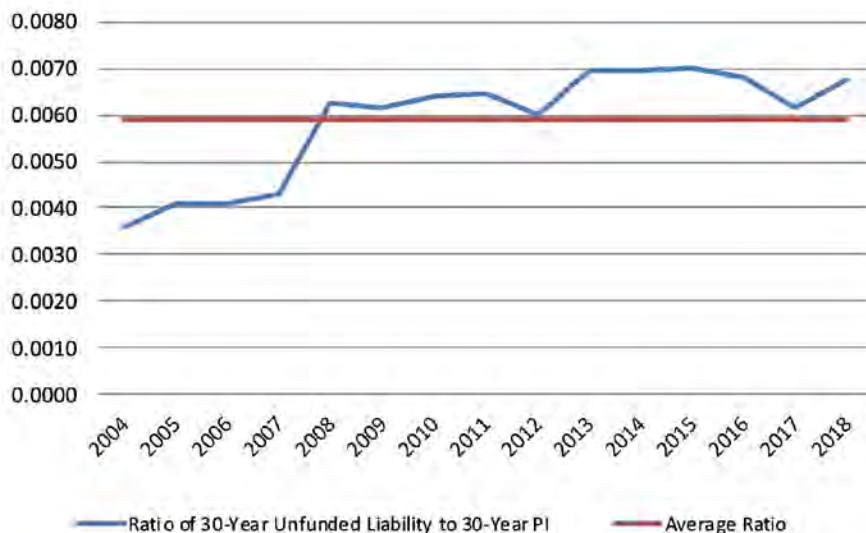Percentage of annual personal income = 0.405.

Florida

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Florida, 2004–2018
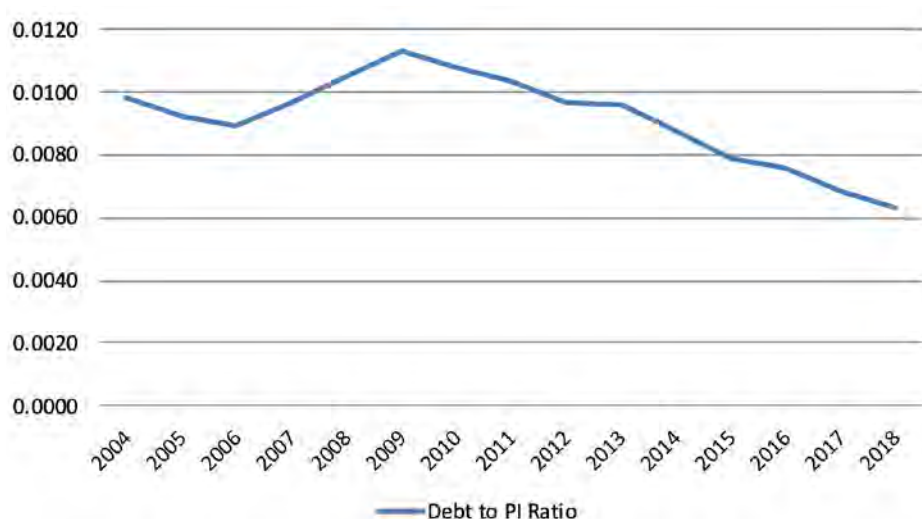
Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Florida

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Florida, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $5,980 million.

Percentage of annual personal income = 0.568.

Georgia

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Georgia, 2004–2018
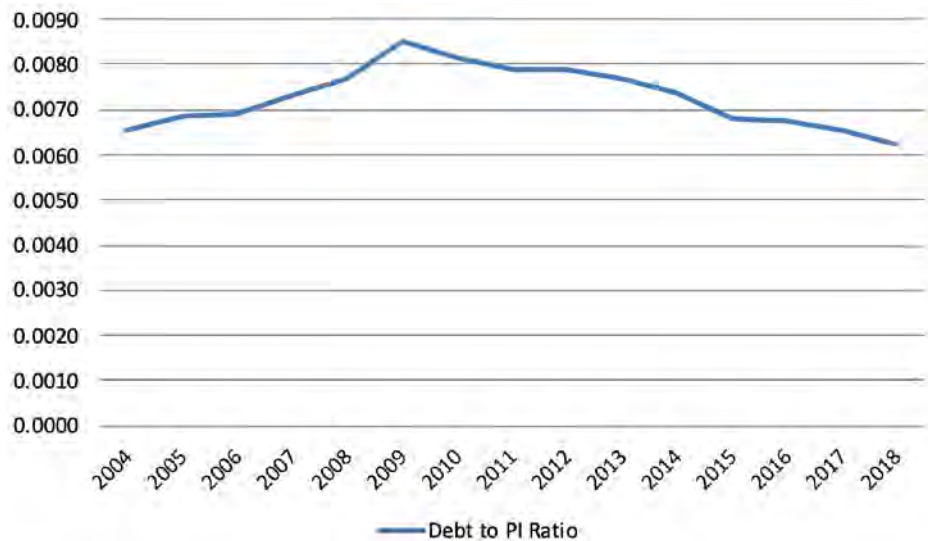
Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Georgia

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Georgia, 2004–2018
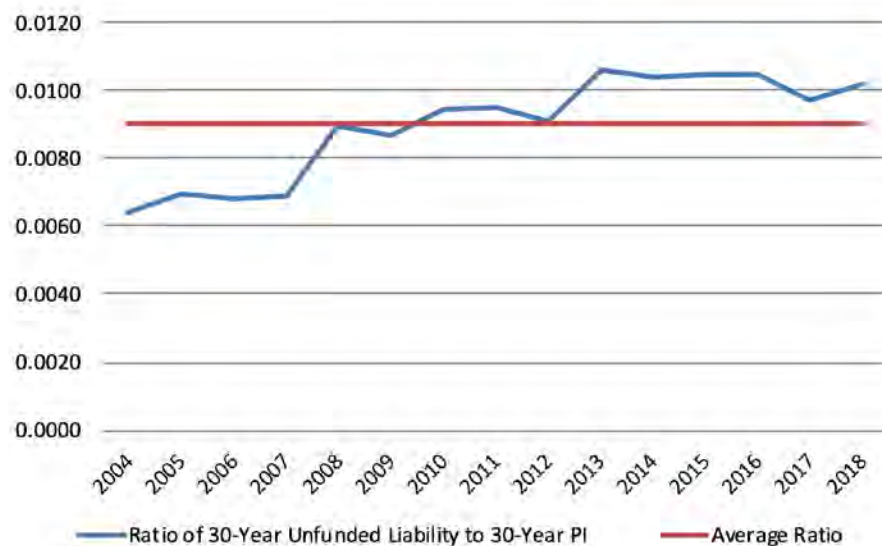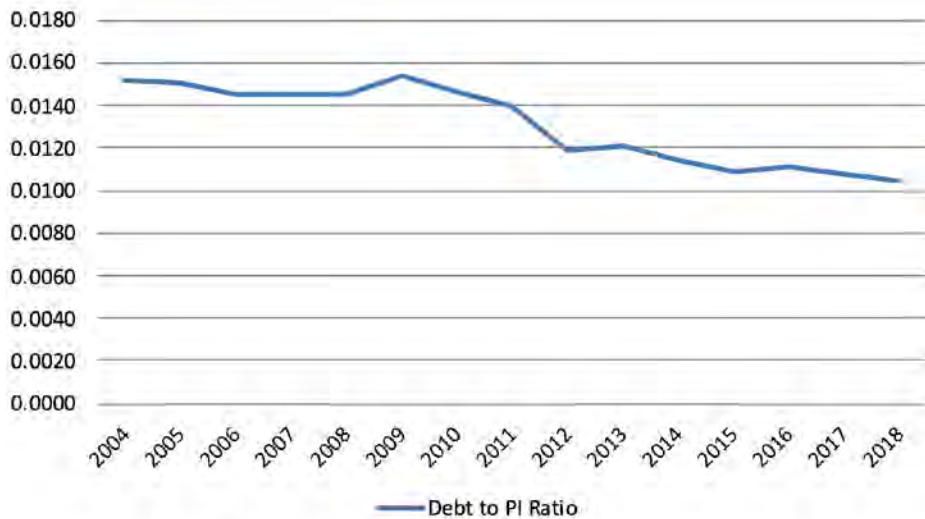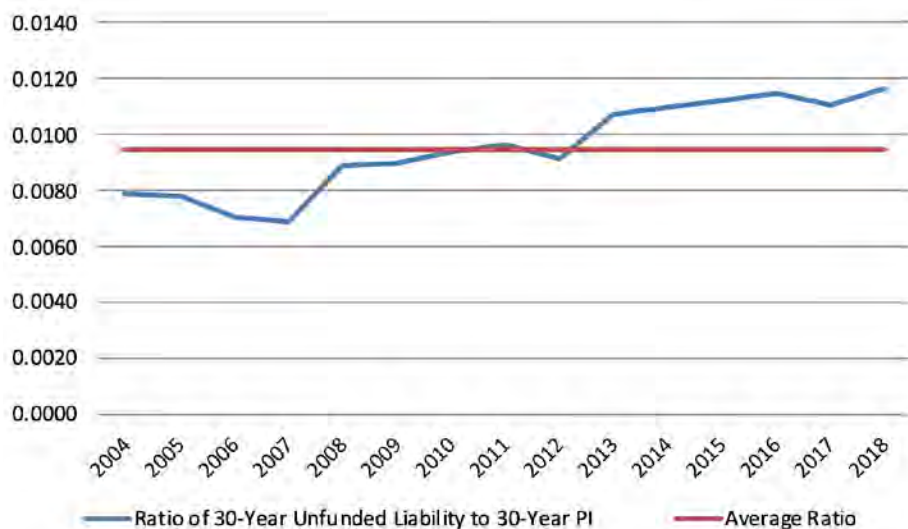

PI = personal income.

Amount needed to stabilize the ratio = $3,740 million.

Percentage of annual personal income = 0.777.

Hawaii
Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Hawaii, 2004–2018
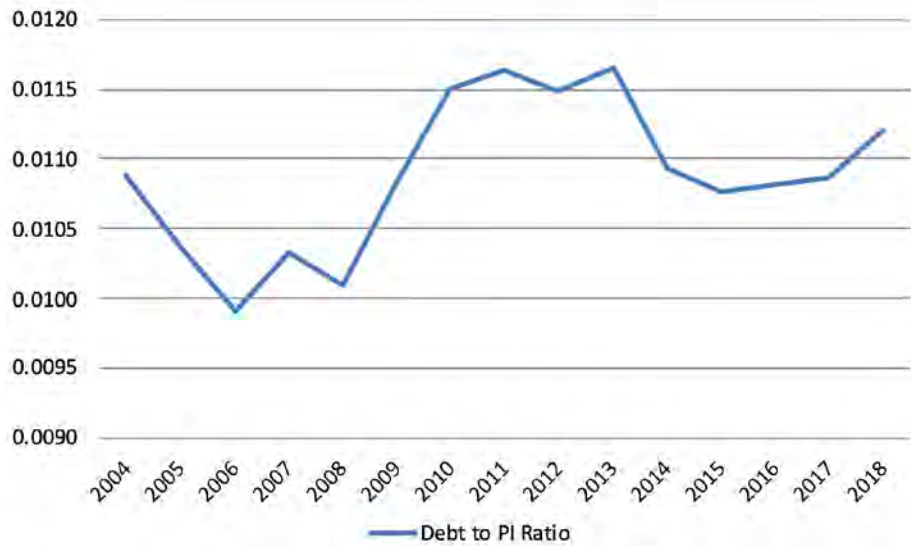
Is state and local debt sustainable? No clear pattern.

Hawaii
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Hawaii, 2004–2018

PI = personal income.

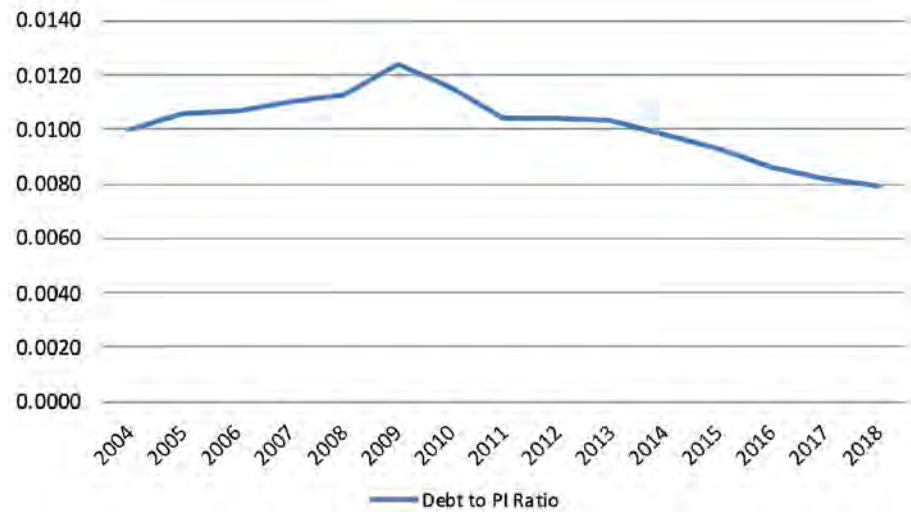Amount needed to stabilize the ratio = $931 million.

Percentage of annual personal income = 1.201.

Idaho

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Idaho, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Idaho, 2004–2018
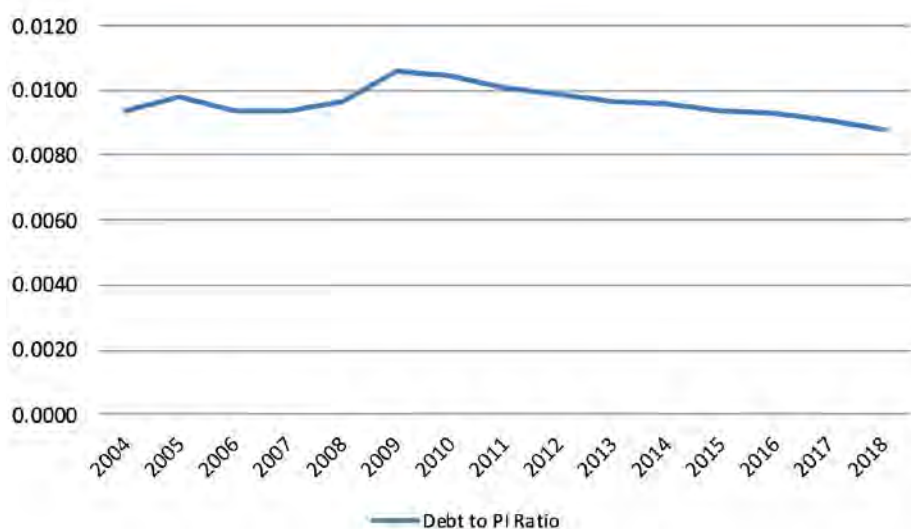

PI = personal income.

Amount needed to stabilize the ratio = $353 million.

Percentage of annual personal income = 0.466.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Illinois, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2011, except for minor blips in debt since 2015.

Illinois

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Illinois, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $17,008 million.

Percentage of annual personal income = 2.345.

Indiana

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Indiana, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Indiana, 2004–2018
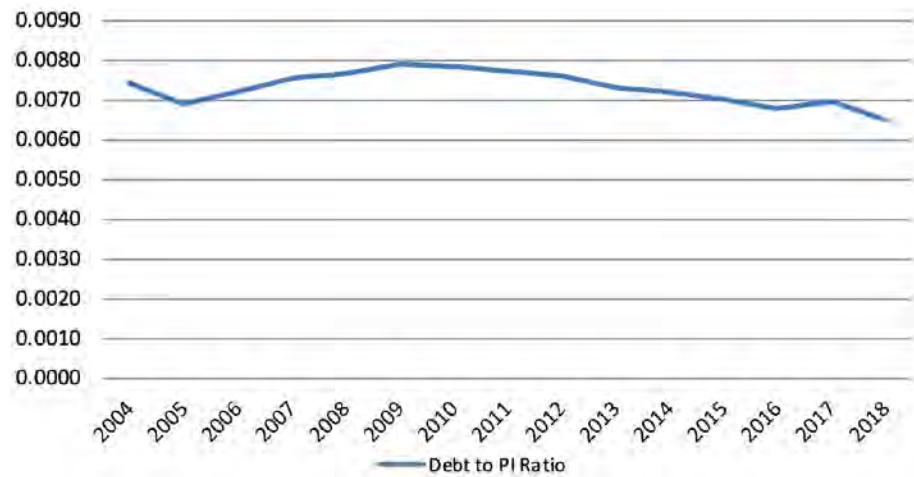

PI = personal income.
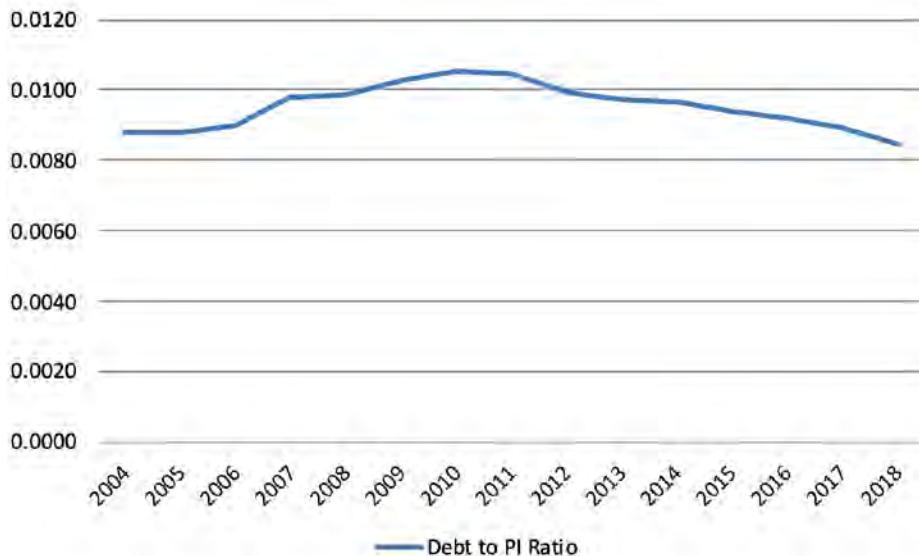
Amount needed to stabilize the ratio = $1,446 million.

Percentage of annual personal income = 0.463.

Iowa

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Iowa, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Iowa

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Iowa, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $1,217 million.
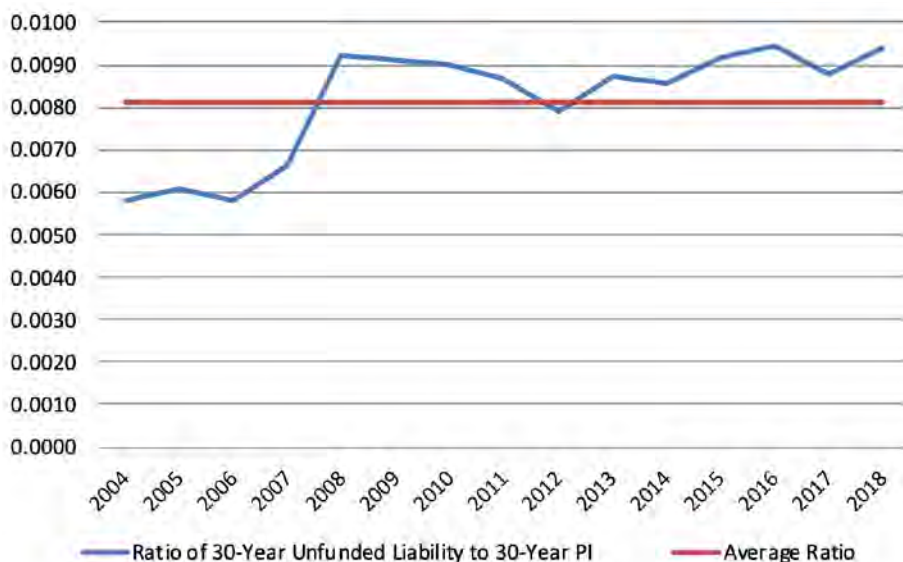
Percentage of annual personal income = 0.790.

Kansas

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Kansas, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Kansas

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Kansas, 2004–2018
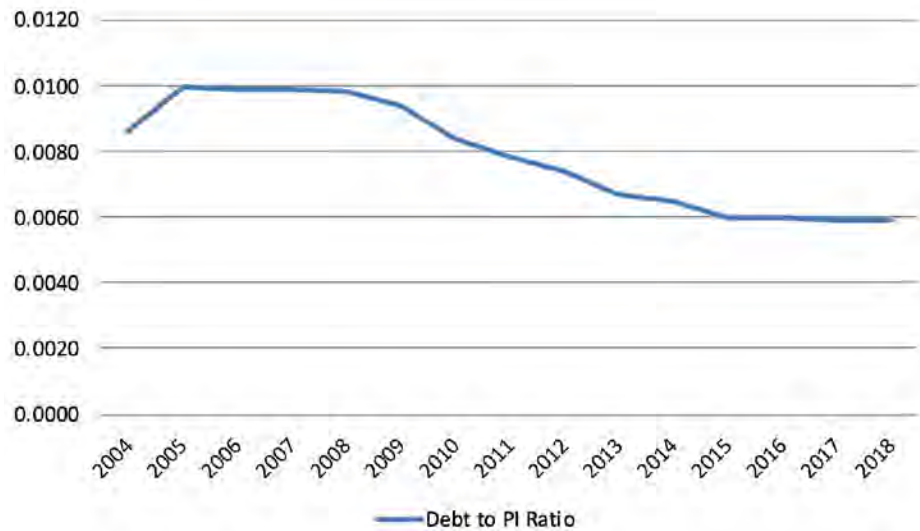

PI = personal income.

Amount needed to stabilize the ratio = $783 million.

Percentage of annual personal income = 0.536.
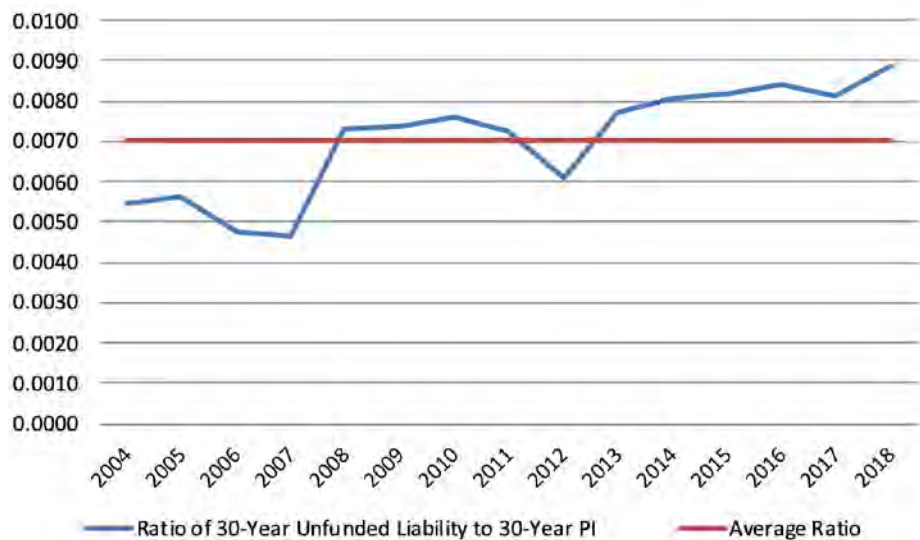
Kentucky

Kentucky
Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Kentucky, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, except for an upturn in debt since 2016.

Kentucky
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Kentucky, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $2,886 million.

Percentage of annual personal income = 1.546.

Louisiana

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Louisiana, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2011.

Louisiana

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Louisiana, 2004–2018
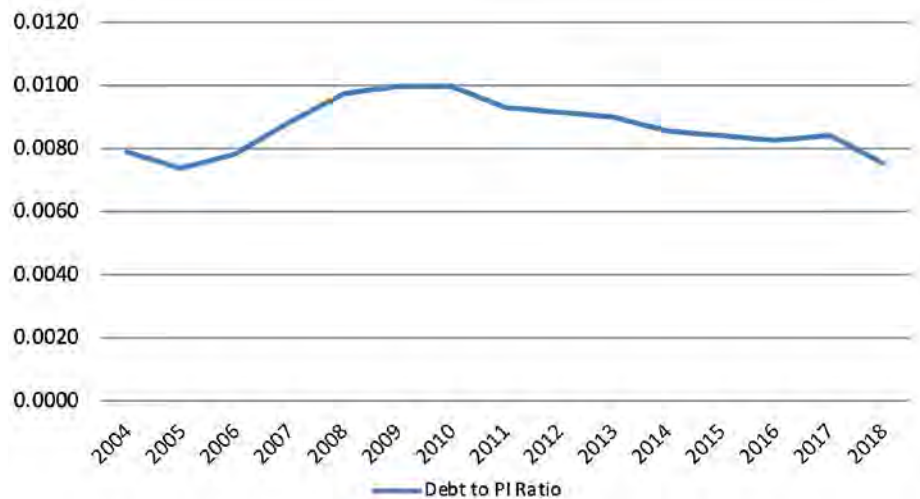

PI = personal income.

Amount needed to stabilize the ratio = $1,379 million.
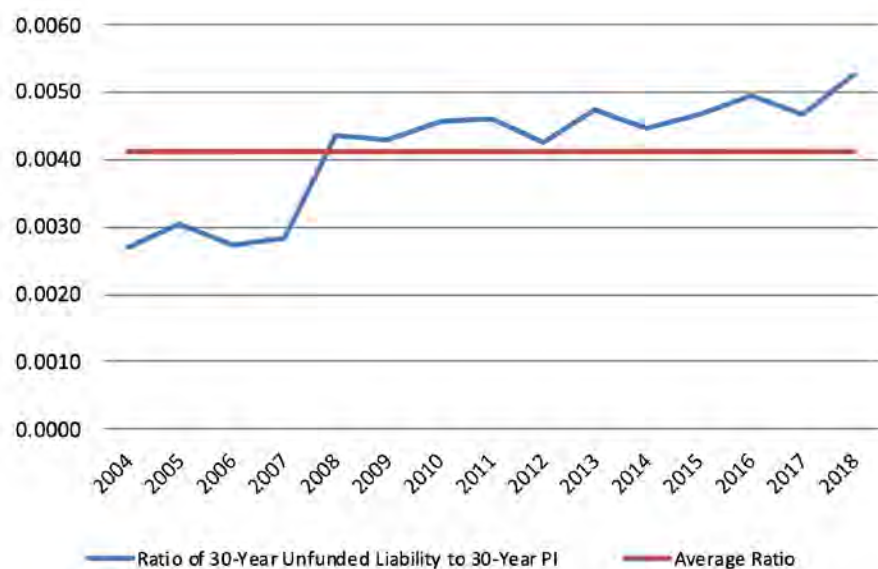
Percentage of annual personal income = 0.650.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Maine, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Maine

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Maine, 2004–2018
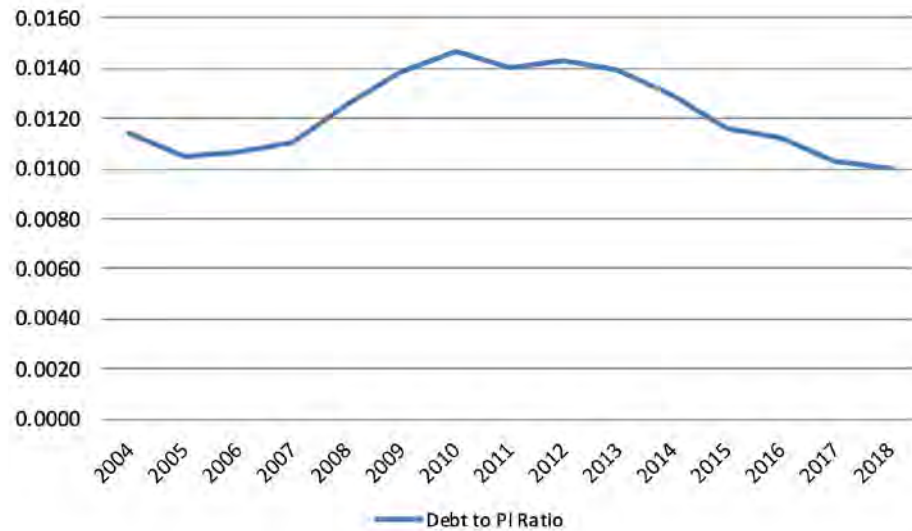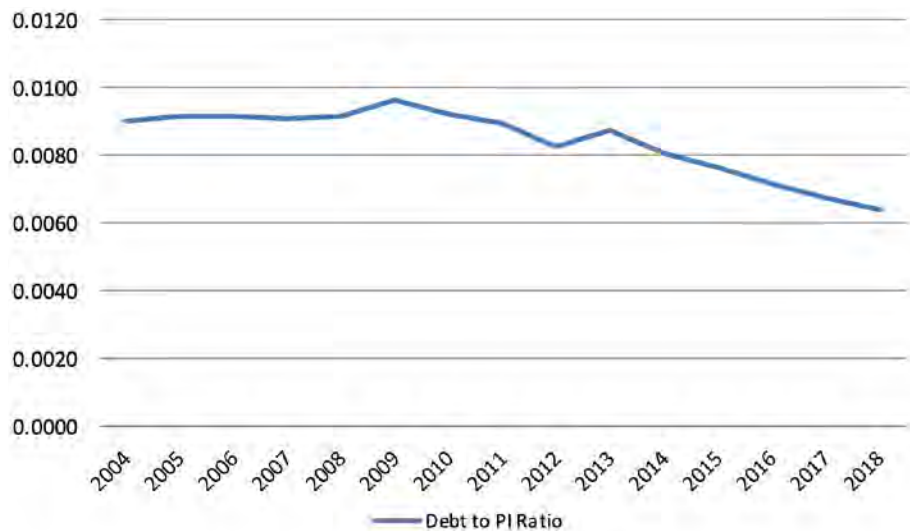

PI = personal income.

Amount needed to stabilize the ratio = $14 million.

Percentage of annual personal income = 0.022.

Maryland

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Maryland, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2013.

Maryland

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Maryland, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $2,316 million.

Percentage of annual personal income = 0.609.

Massachusetts

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Massachussetts, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Massachusetts

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Massachusetts, 2004–2018
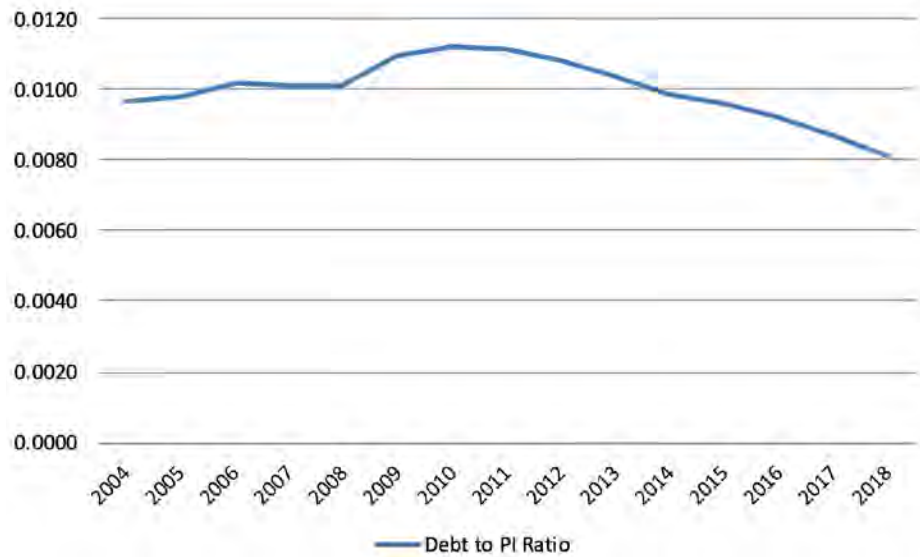

PI = personal income.

Amount needed to stabilize the ratio = $4,403 million.

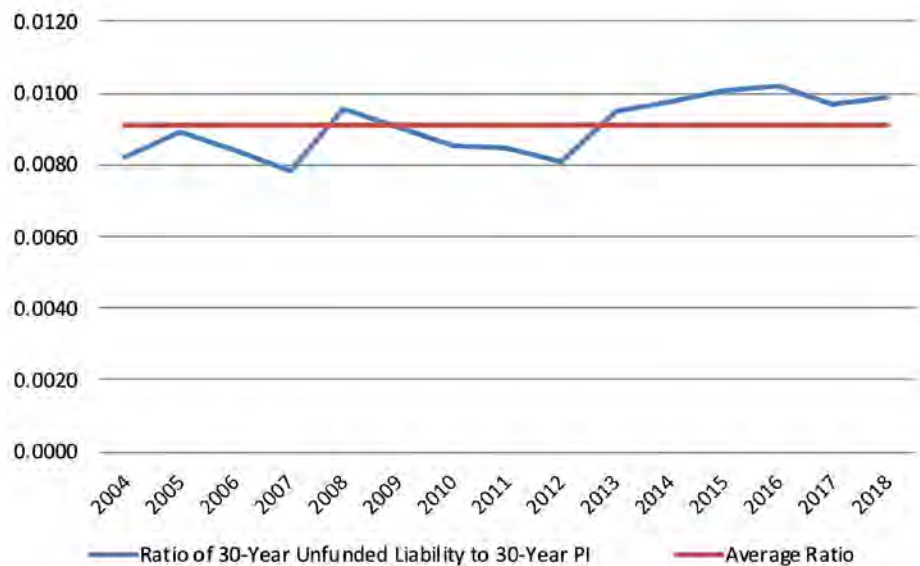Percentage of annual personal income = 0.910.

Michigan

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Michigan, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Michigan

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Michigan, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $4,631 million.

Percentage of annual personal income = 0.974.

Minnesota

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Minnesota, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Minnesota

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Minnesota, 2004–2018
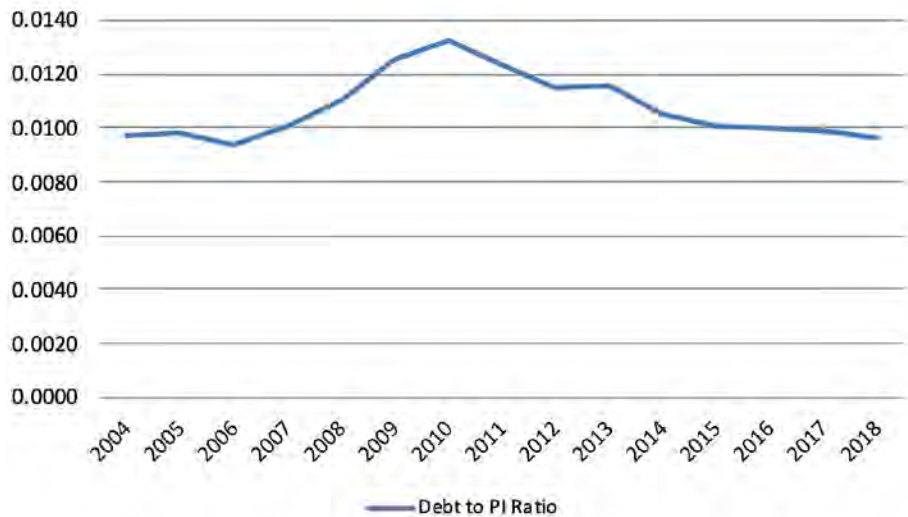

PI = personal income.

Amount needed to stabilize the ratio = $1,681 million.

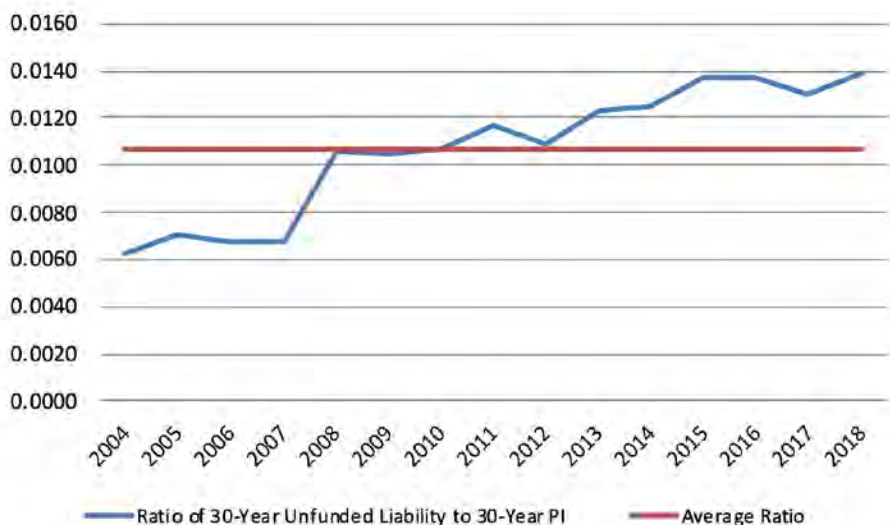Percentage of annual personal income = 0.531.

Mississippi

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Mississippi, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Mississippi, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $1,965 million.

Percentage of annual personal income = 1.732.

Missouri

Missouri

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Missouri, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2011.

Missouri

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Missouri, 2004–2018
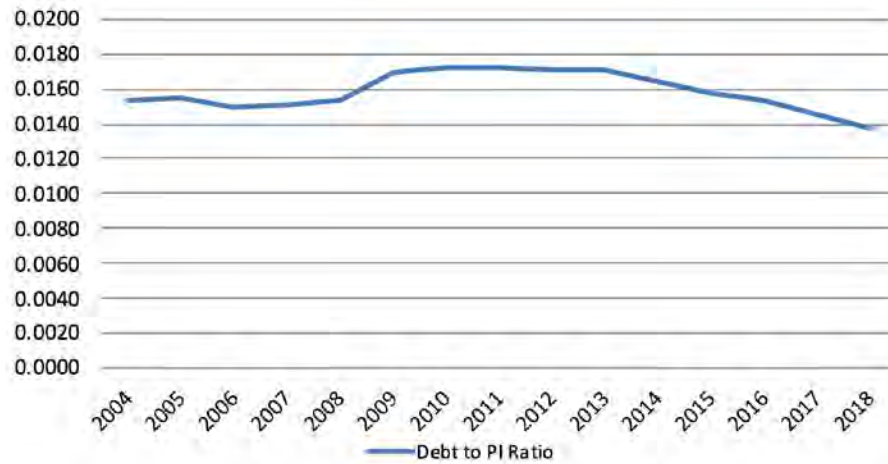

PI = personal income.

Amount needed to stabilize the ratio = $2,202 million.

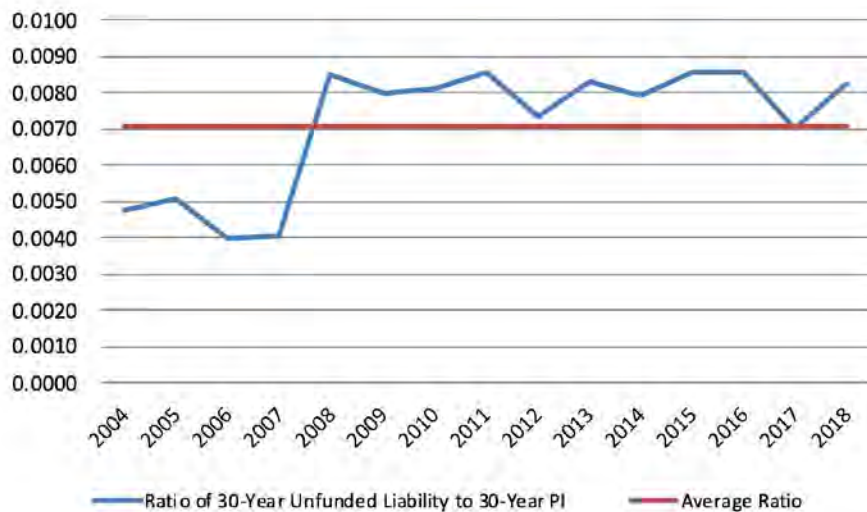Percentage of annual personal income = 0.771.

Montana

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Montana, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2008.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Montana, 2004–2018
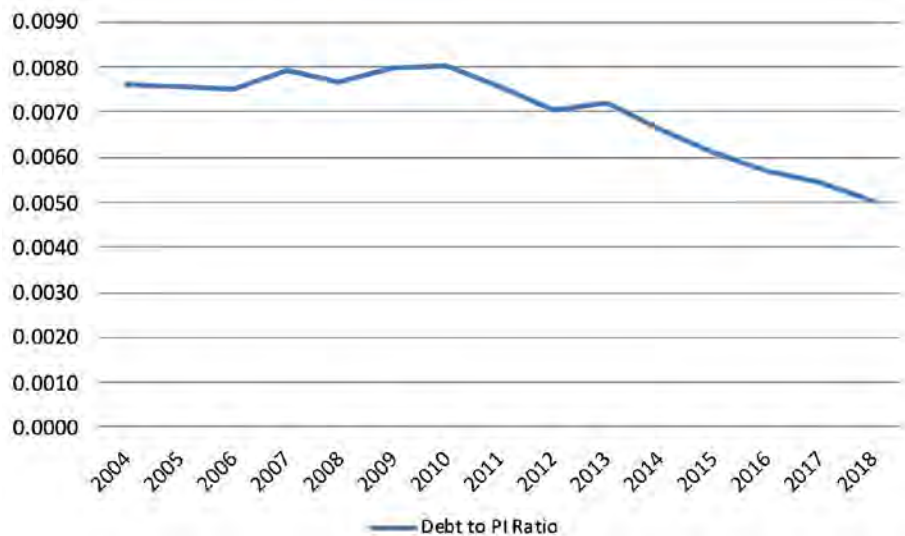

PI = personal income.

Amount needed to stabilize the ratio = $354 million.

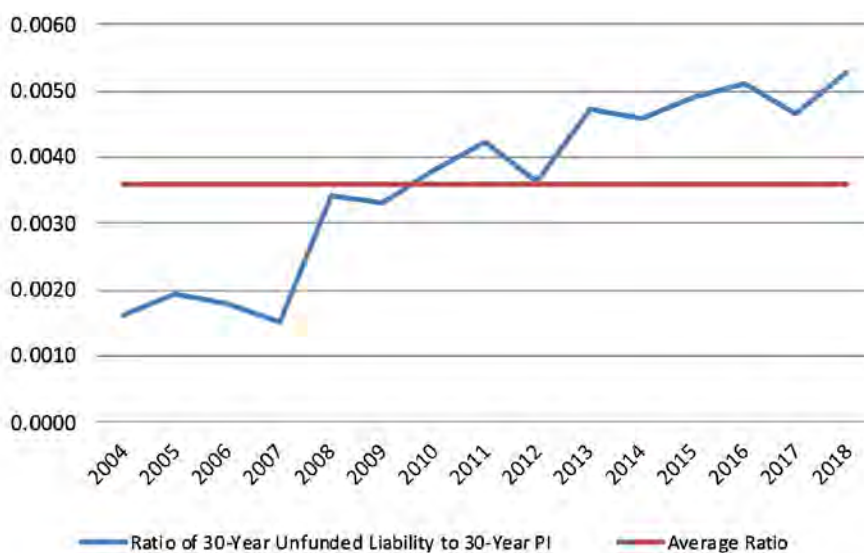Percentage of annual personal income = 0.707.

Nebraska

Nebraska

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Nebraska, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Nebraska

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Nebraska, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $520 million.

Percentage of annual personal income = 0.517.

Nevada

Nevada

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Nevada, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2012.

Nevada

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Nevada, 2004–2018

PI = personal income.

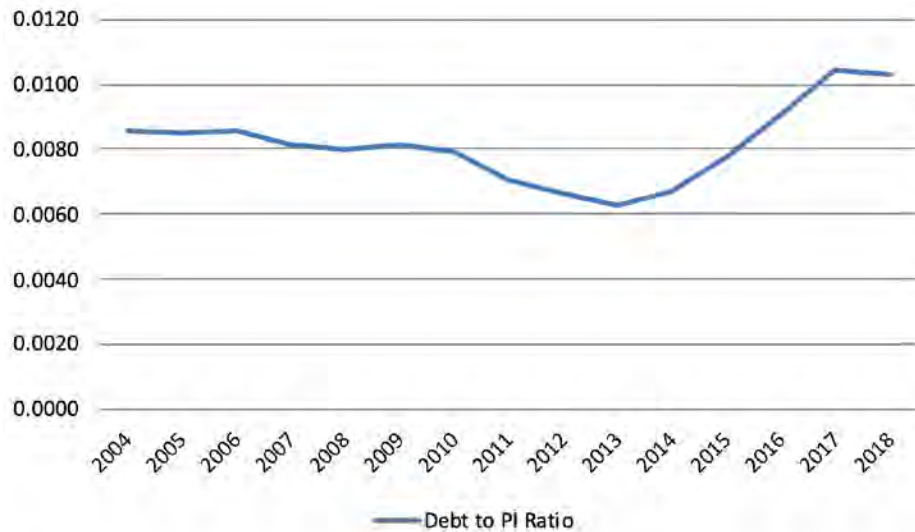Amount needed to stabilize the ratio = $1,757 million.

Percentage of annual personal income = 1.201.

New Hampshire

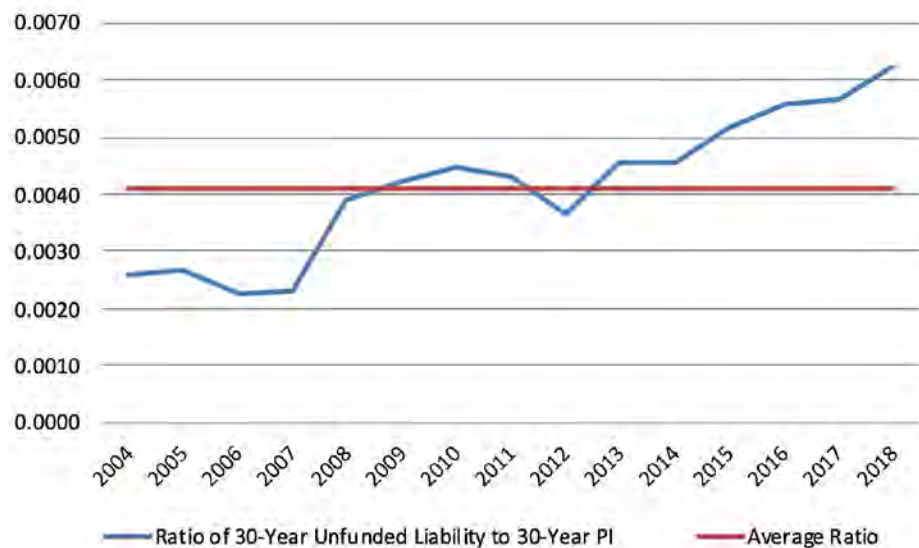**New Hampshire**

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, New Hampshire, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, except for a slight upward blip in debt in 2013.

New Hampshire

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, New Hampshire, 2004–2018
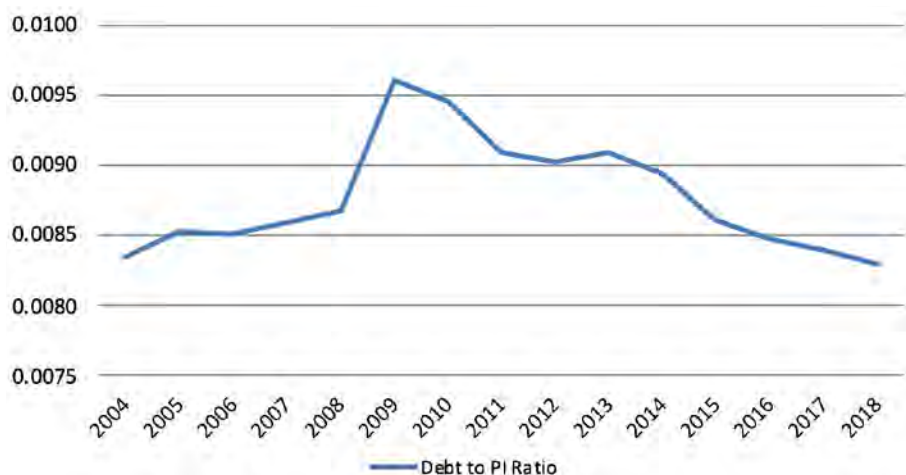

PI = personal income.

Amount needed to stabilize the ratio = $348 million.

Percentage of annual personal income = 0.418.

New Jersey

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, New Jersey, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

New Jersey
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, New Jersey, 2004–2018

PI = personal income.
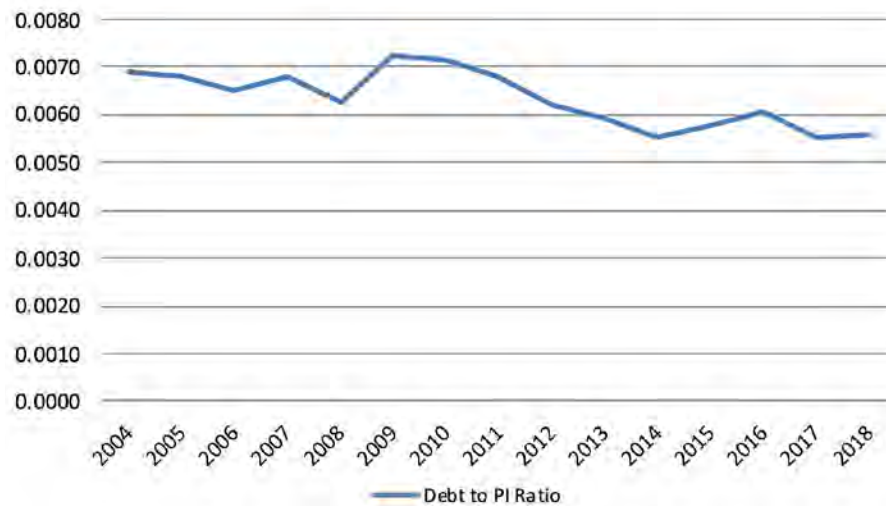
Amount needed to stabilize the ratio = $1,640 million.

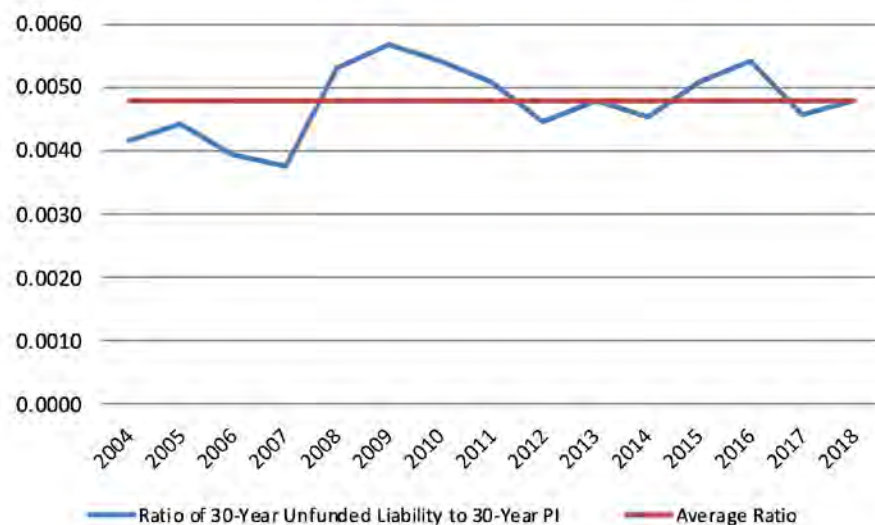Percentage of annual personal income = 0.272.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, New Mexico, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, except for a slight upward blip in debt in 2013.

New Mexico
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, New Mexico, 2004–2018
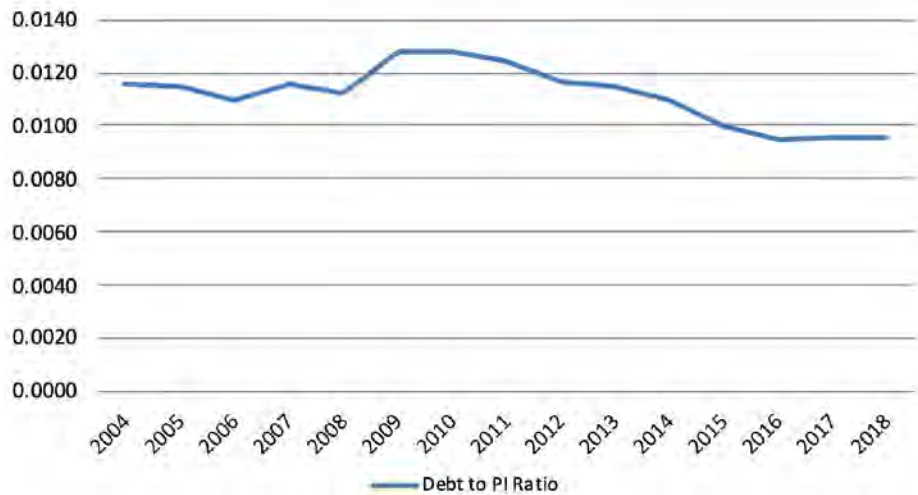

PI = personal income.

Amount needed to stabilize the ratio = $1,289 million.

Percentage of annual personal income = 1.493.

New York

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, New York, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2013 and was stable between 2008 and 2013.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, New York, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $11,778 million.

Percentage of annual personal income = 0.878.

North Carolina

North Carolina

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, North Carolina, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, except for a slight blip in debt in 2013.

North Carolina

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, North Carolina, 2004–2018

PI = personal income.

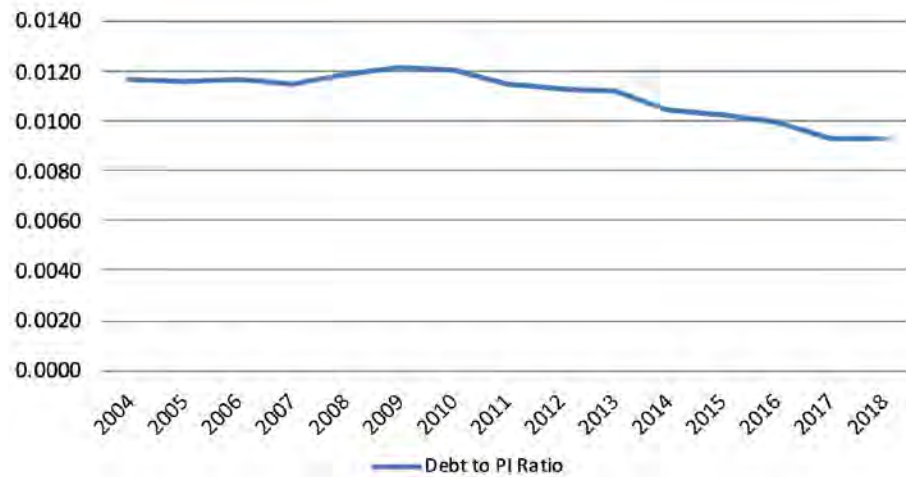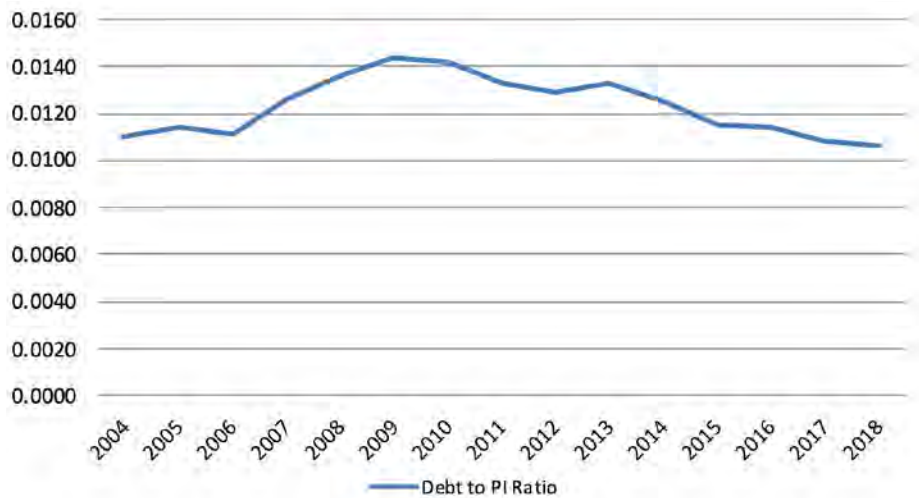Amount needed to stabilize the ratio = $3,599 million.

Percentage of annual personal income = 0.756.

North Dakota

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, North Dakota, 2004–2018

Is state and local debt sustainable? No clear pattern. Debt has been rising faster than personal income since 2013, with a slight stabilization since 2017.

North Dakota

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, North Dakota, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $292 million.
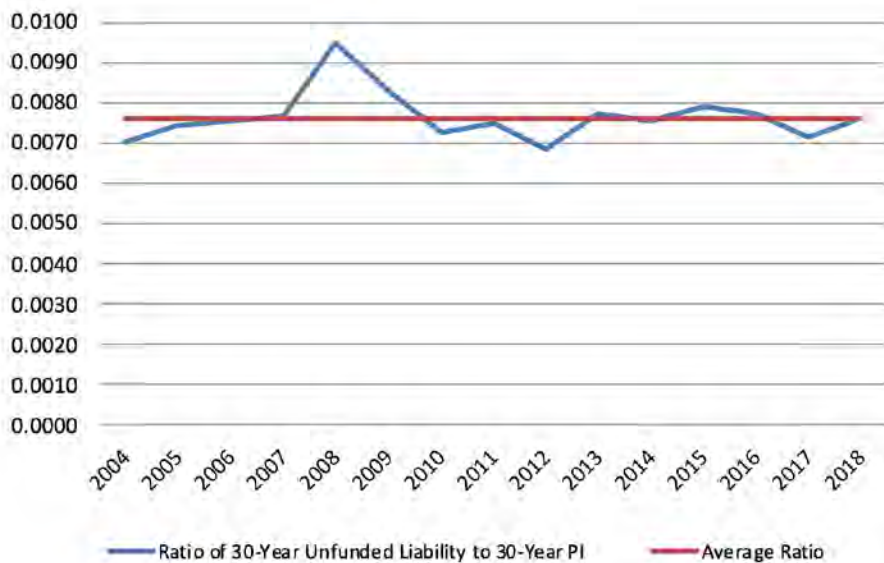
Percentage of annual personal income = 0.707.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Ohio, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, except for a blip in debt in 2013.

Ohio

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Ohio, 2004–2018
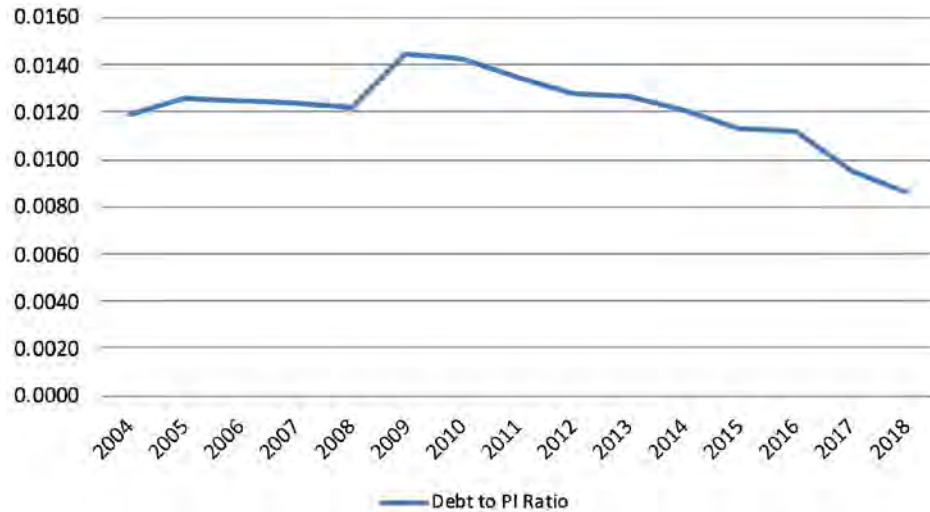

PI = personal income.

Amount needed to stabilize the ratio = $538 million.
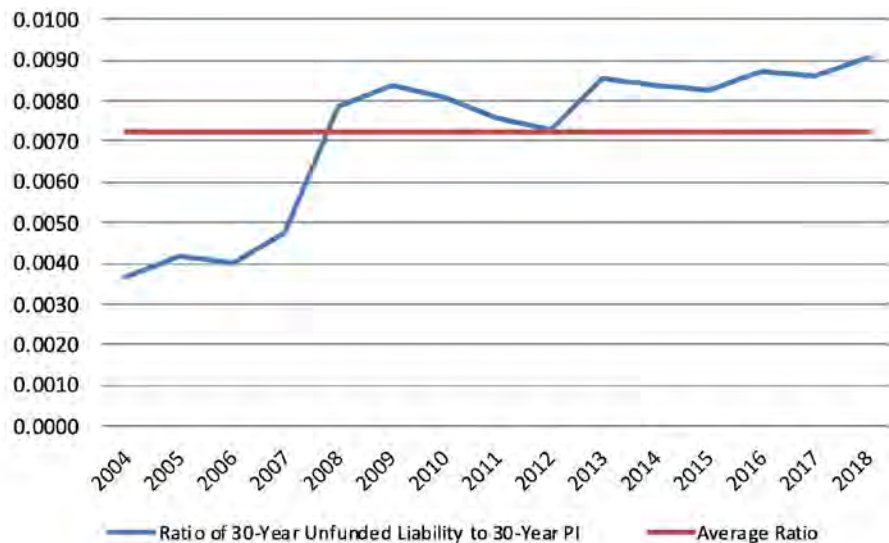
Percentage of annual personal income = 0.095.

Oklahoma

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Oklahoma, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, with an upward blip in debt in 2016.

Oklahoma

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Oklahoma, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $325 million.

Percentage of annual personal income = 0.179.

Oregon

Oregon

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Oregon, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Oregon

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Oregon, 2004–2018
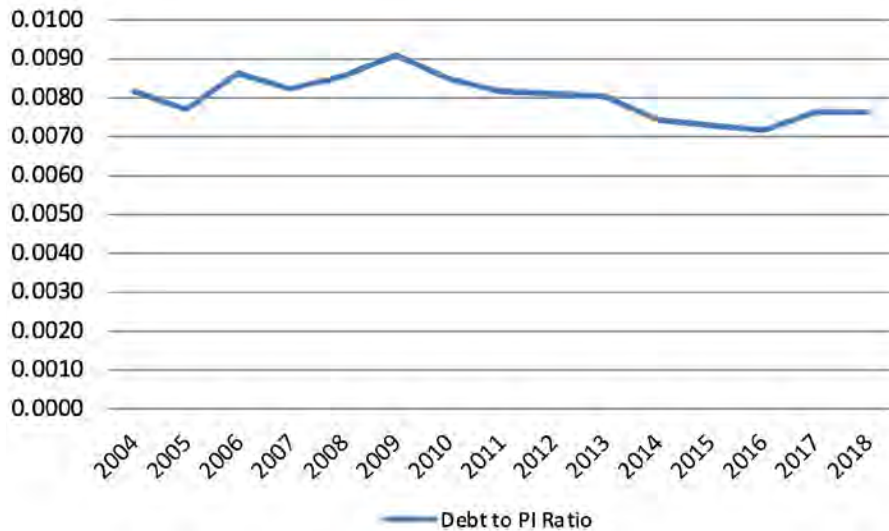

PI = personal income.

Amount needed to stabilize the ratio = $2,346 million.

Percentage of annual personal income = 1.122.
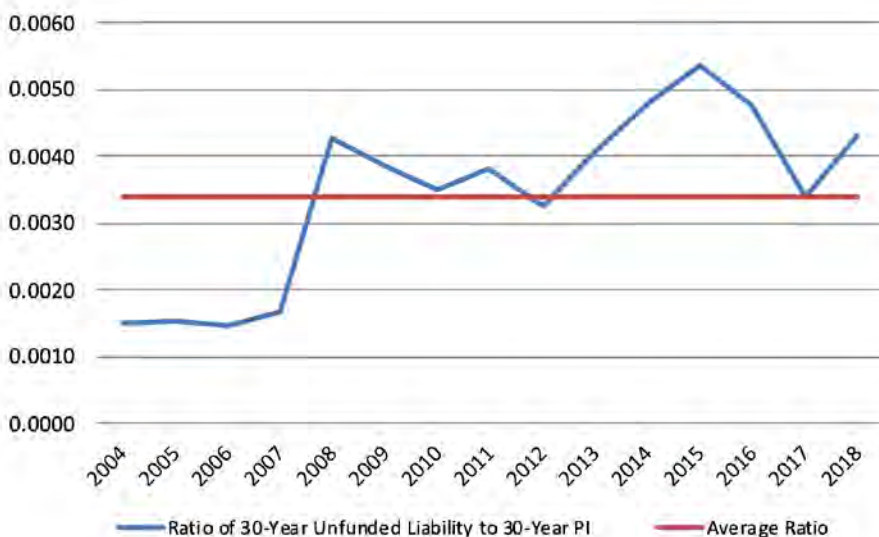
Pennsylvania

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Pennsylvania, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

Pennsylvania

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Pennsylvania, 2004–2018
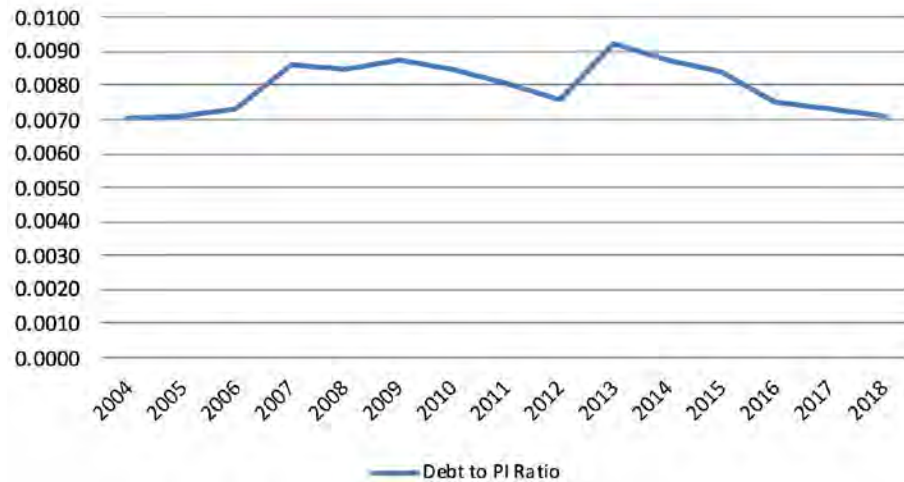

PI = personal income.

Amount needed to stabilize the ratio = $5,411 million.

Percentage of annual personal income = 0.763.

Rhode Island

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Rhode Island, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, except for a slight blip in debt in 2013.

Rhode Island
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Rhode Island, 2004–2018
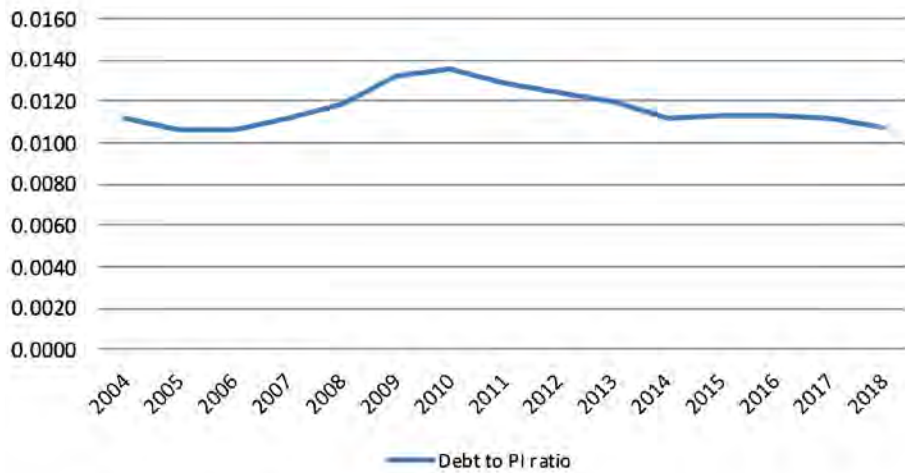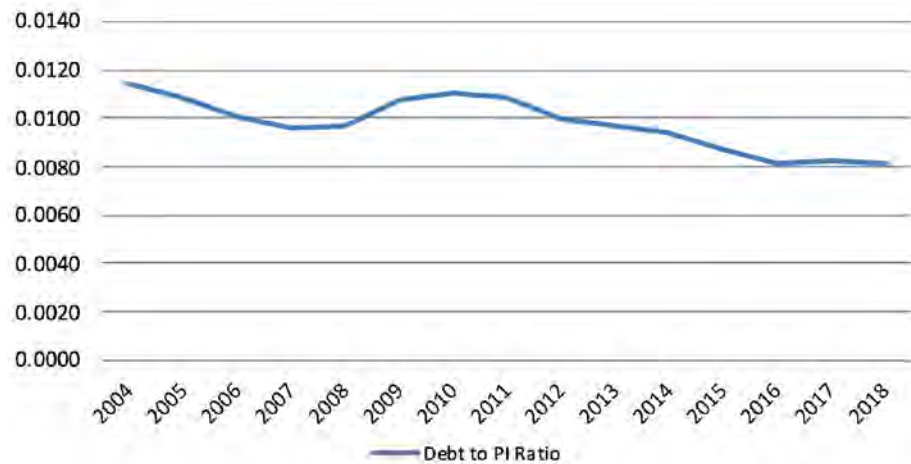

PI = personal income.

Amount needed to stabilize the ratio = $52 million.

Percentage of annual personal income = 0.090.

South Carolina

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, South Carolina, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009.

South Carolina

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, South Carolina, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $2,123 million.

Percentage of annual personal income = 0.977.
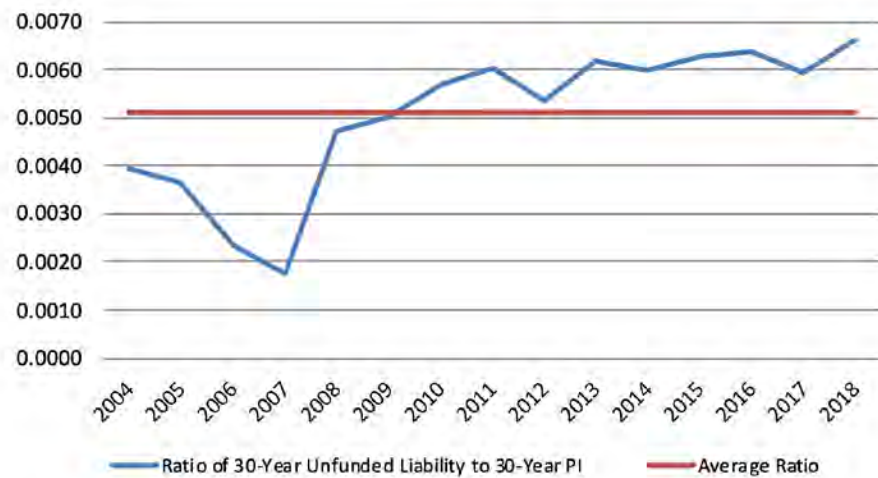
South Dakota

South Dakota

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, South Dakota, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2009, except for an uptick in debt in 2016.

South Dakota

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, South Dakota, 2004–2018

PI = personal income.
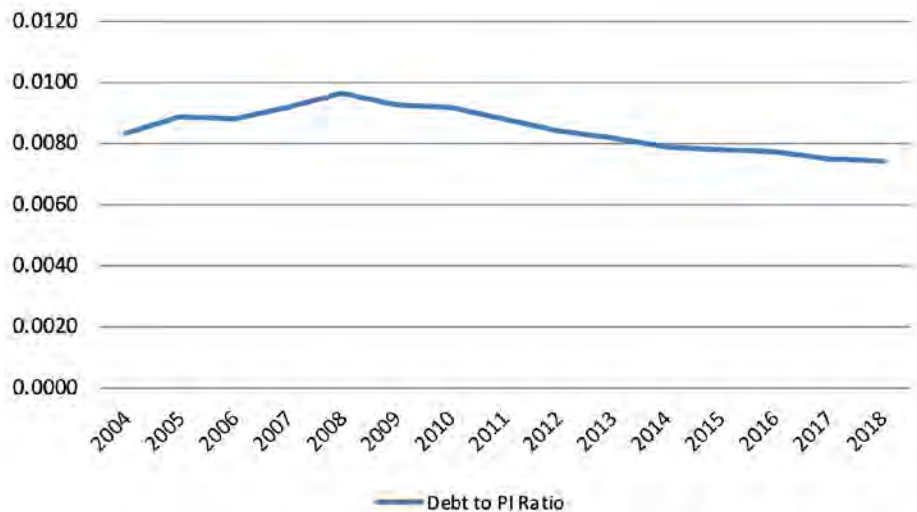
Amount needed to stabilize the ratio = $311 million.

Percentage of annual personal income = 0.703.

Tennessee

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Tennessee, 2004–2018

Is state and local debt sustainable? No clear pattern, although income has been rising faster than debt since 2013.

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Tennessee, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $1,361 million.
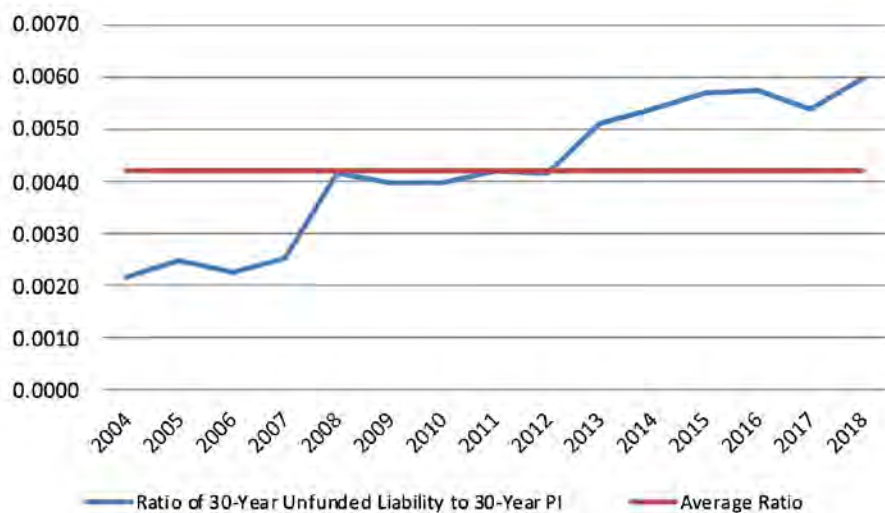
Percentage of annual personal income = 0.426.

Texas

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Texas, 2004–2018

Debt to PI ratio

Is state and local debt sustainable? Yes. Personal income has been rising faster than or in concert with debt since 2010.

Texas

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Texas, 2004–2018

Ratio of 30-Year Unfunded Liability to 30-Year PI   Average Ratio

PI = personal income.

Amount needed to stabilize the ratio = $7,501 million.

Percentage of annual personal income = 0.532.

Utah

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Utah, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, except for a slight uptick in debt in 2016.

Utah

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Utah, 2004–2018
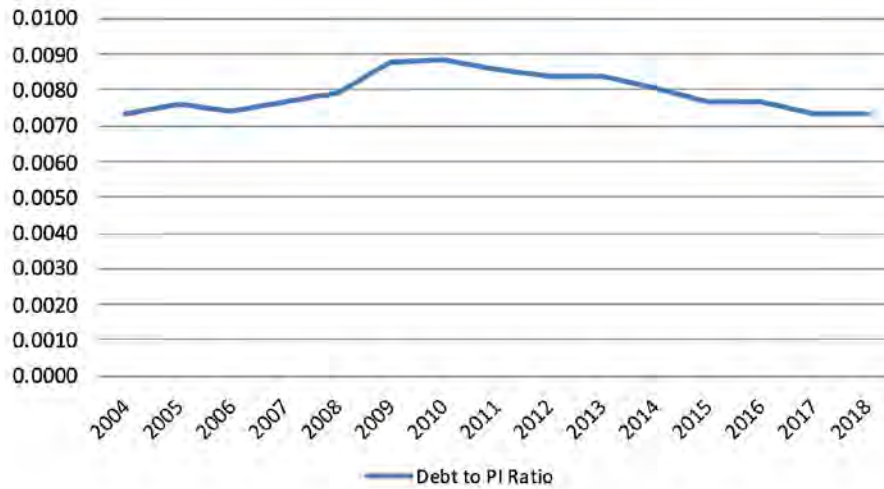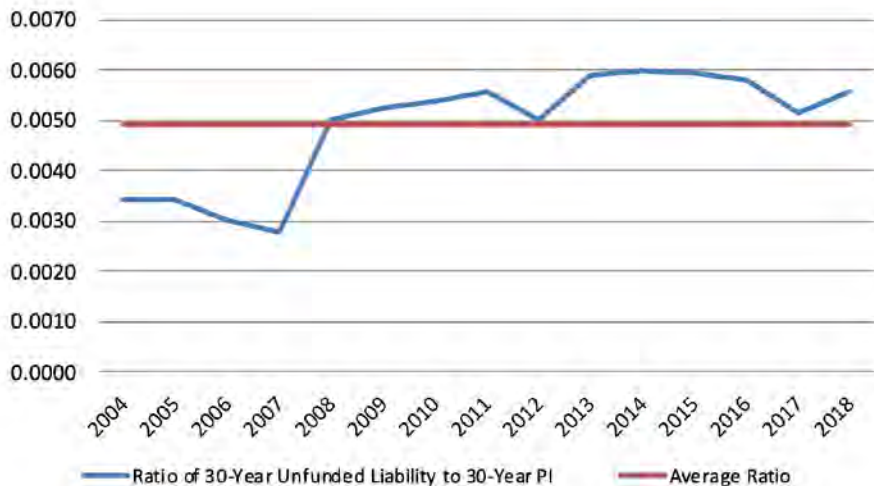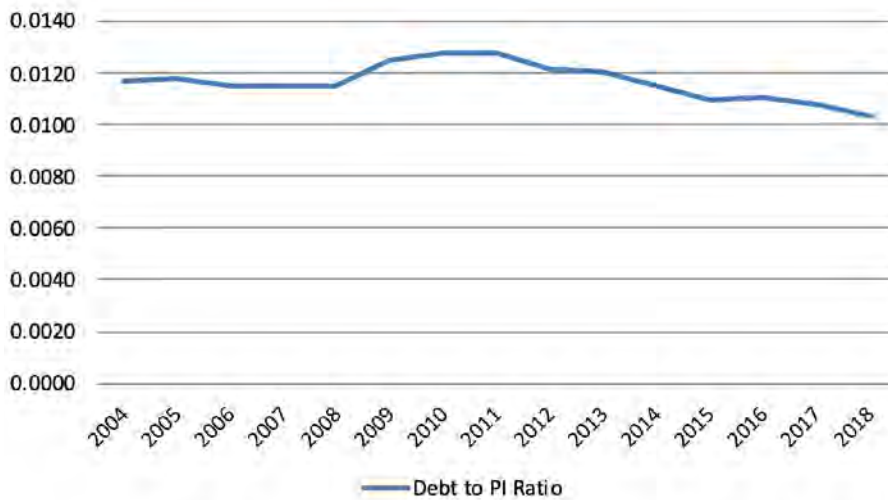

PI = personal income.

Amount needed to stabilize the ratio = $1,016 million.

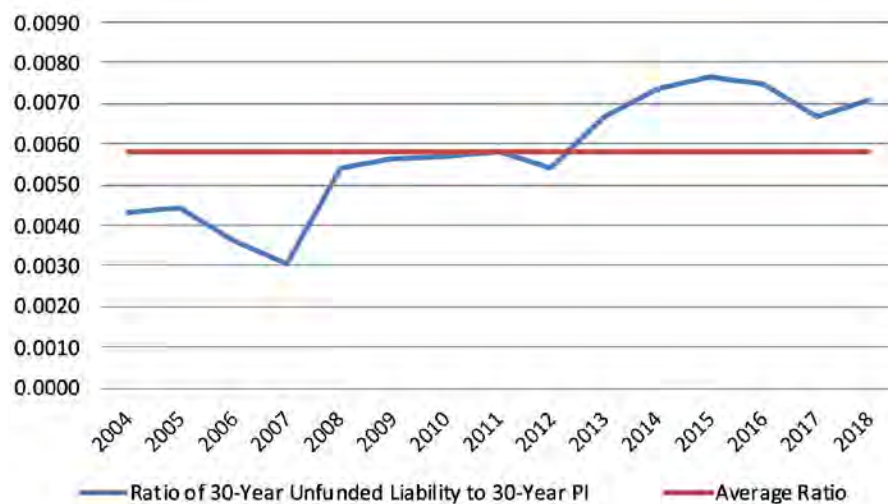Percentage of annual personal income = 0.709.

Vermont

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Vermont, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2008.

Vermont

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Vermont, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $253 million.

Percentage of annual personal income = 0.754.

Virginia

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Virginia, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Virginia

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Virginia, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $2,775 million.

Percentage of annual personal income = 0.572.

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Washington, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Washington
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Washington, 2004–2018
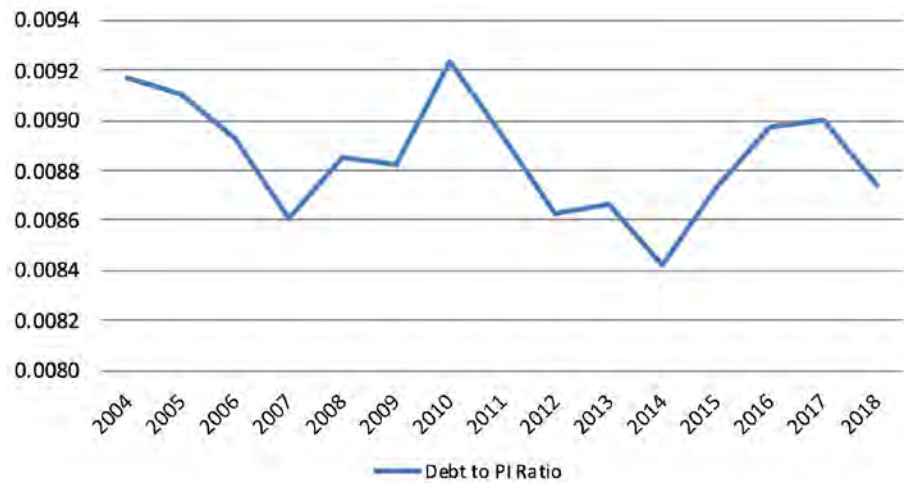

PI = personal income.

Amount needed to stabilize the ratio = $3,222 million.

Percentage of annual personal income = 0.703.

West Virginia

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, West Virginia, 2004–2018

Is state and local debt sustainable? No clear pattern.

West Virginia

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, West Virginia, 2004–2018
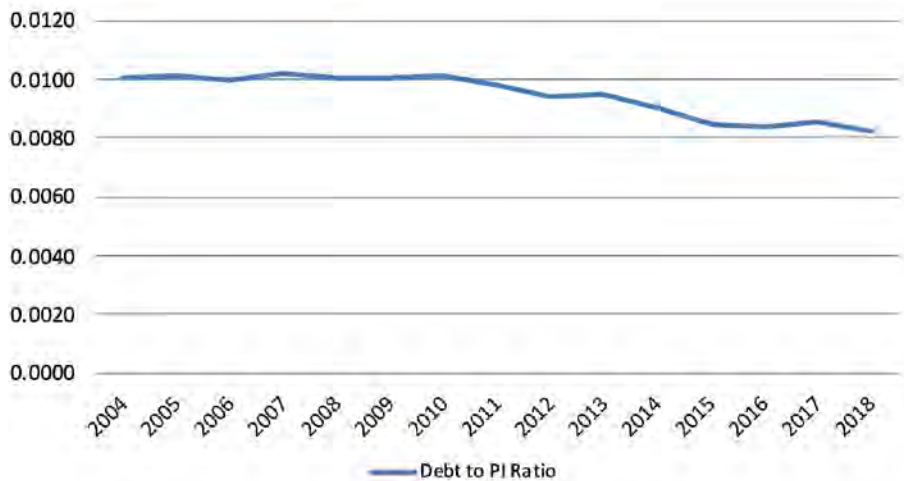

PI = personal income.

Amount needed to stabilize the ratio = $7 million.

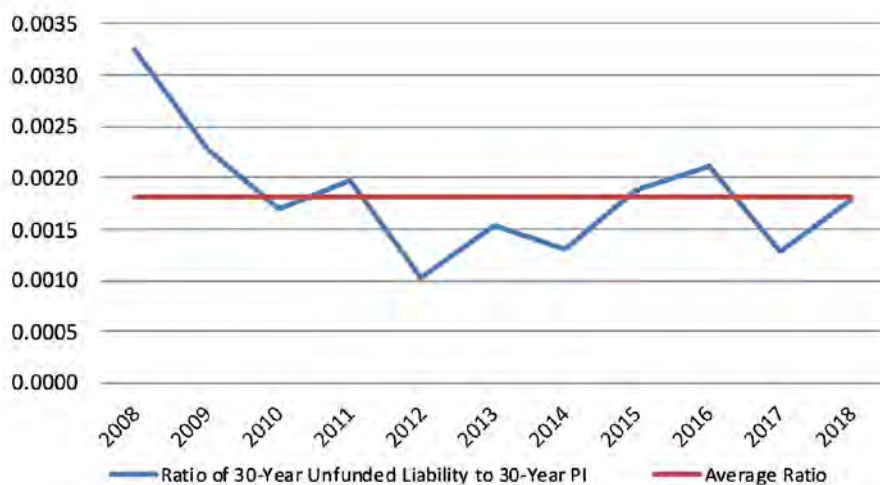Percentage of annual personal income = 0.01.

Wisconsin
Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Wisconsin, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010, and the ratio was stable before then.

Wisconsin
Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Wisconsin, 2008–2018

PI = personal income.

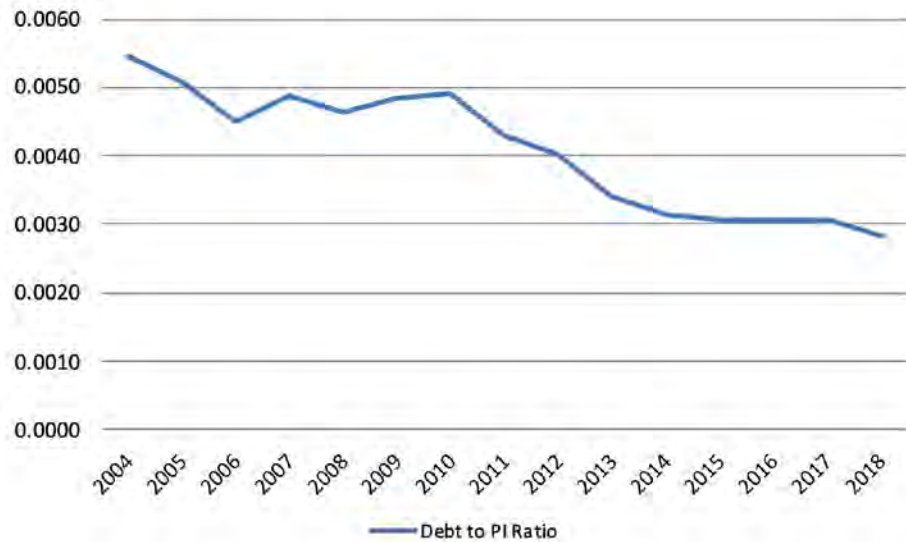Amount needed to stabilize the ratio = $13 million.

Percentage of annual personal income = 0.004.

Note: The analysis is limited to the 2008–2018 period because of the overfunded nature of Wisconsin pensions in prior years.
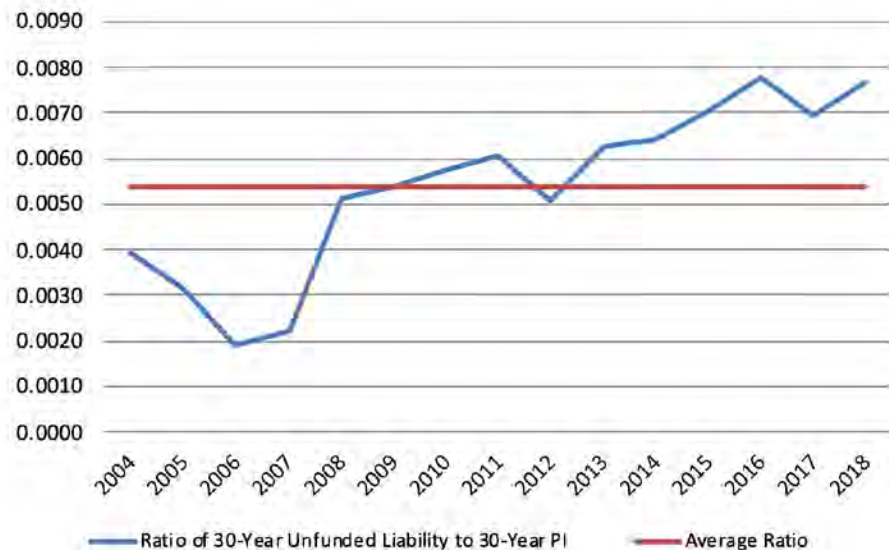
Wyoming

Trends in Ratio of 20-Year Debt to 20-Year Personal Income, Wyoming, 2004–2018

Is state and local debt sustainable? Yes. Personal income has been rising faster than debt since 2010.

Wyoming

Trends in Ratio of 30-Year Unfunded Pension Liability to 30-Year Personal Income, Wyoming, 2004–2018

PI = personal income.

Amount needed to stabilize the ratio = $340 million.

Percentage of annual personal income = 0.979.

The Voice for Public Pensions