



Retirement Adequacy in the United States: Should We Be Concerned?





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Executive Summary

The question of whether Americans are adequately prepared for the costs of their future retirements has been the subject of significant debate and research over the last few decades. This is a complex issue about which reasonable and educated minds can differ. The U.S. Government Accountability Office recently released a report (U.S. GAO 2017) that concludes that current and future retirees face many challenges and calls for an independent commission to comprehensively examine the U.S. retirement system. Retirement adequacy research has offered mixed conclusions, with some studies predicting that a large percentage of the population is at risk for significant hardship in retirement, and others providing a significantly more optimistic outlook. In this paper, we summarize the current research on retirement adequacy and clarify the differences in stakeholder perspectives, research objectives, empirical methodology, and model assumptions that have led to divergent conclusions.

Several major stakeholders are interested in measuring retirement income adequacy, but each may view the issue through a different lens. Employers and plan sponsors are interested in the adequacy of their own retirement plan offerings and how they compare with their competitors. Government and policy makers are interested in the health of the system as a whole. And individual households and their financial advisers are interested in whether the households will have a financially successful retirement, given their resources and goals. These different perspectives are summarized in **Table 1**. When interpreting the results of retirement adequacy research, it is important to consider the perspective of the research sponsor and the population group that is the focus of the particular study.

The most common method used for measuring retirement adequacy is to calculate a replacement ratio of post-retirement income to some measure of pre-retirement income, and then to compare this value to a target percentage replacement that is deemed to be “adequate.” The data for this calculation are generally drawn from national surveys or employee records, and the analysis can be at the population level or by subgroup (e.g., by income or age). This approach has four main problems: (1) there are many ways to measure both the numerator and the denominator of the ratio; (2) there isn’t an agreed-upon definition of what constitutes an “adequate” replacement ratio; (3) focusing on replacement ratios at the date of retirement ignores changes in income and expenses that may occur over the retirement period; and (4) target ratios do not consider individual circumstances. In contrast, wealth-based measures of adequacy often incorporate the full retirement period, estimating the ability of households to cover lifetime expected cash flow needs from their financial resources. This type of analysis can be done for particular representative households or adapted to an individual’s unique circumstances.

The two main empirical approaches used in U.S. retirement adequacy studies are simulation and survey analysis. In some cases, a comparison metric is developed that allows comparison of adequacy assessments for a population over time and across different populations.

- In retirement simulations, researchers forecast future income and expenses for one or more households, incorporating known information about the household’s finances and risk exposures. Risks are often modeled stochastically, using probability distributions to estimate risky events or

outcomes—e.g., using a random draw from historical investment returns in each year of a life path, rather than applying an average value to each year.

- Many studies use publicly available surveys, such as the Survey of Consumer Finances and the Health and Retirement Survey, or proprietary surveys to estimate replacement ratios and/or develop assumptions for simulation models.
- Several research groups have developed metrics for assessing retirement preparation at the population level. Examples include the National Retirement Risk Index (Center for Retirement Research at Boston College), the Aon Hewitt Real Deal, and the Retirement Readiness Rating (Employee Benefit Research Institute).

Although the major studies reviewed in this report have significant differences in empirical approaches, data, and measures of adequacy, they relatively consistently conclude that from 25% to 35% of the population is at risk of being unable to maintain their pre-retirement standard of living throughout the retirement period (See **Tables 3, 4 and 5**). However, these results should be tempered by SOA research based on surveys, focus groups, and in-depth interviews, which generally indicate that many retirees are quite content with living at lower standards of living in retirement than they maintained during their working years. When we use less generous measures of retiree needs (such as consumption-based measures or minimum needs measures), the percentage who are at risk is naturally lower.

After careful consideration of this body of research, it is clear that the U.S. retirement system lies somewhere between crisis and serendipity. The research shows that a large majority of Americans are on track to support a reasonably comfortable retirement. The people who are at least risk are those in the highest-income groups, who have many types of income and assets to support their retirement, and those who have participated in employer-sponsored pensions and retirement plans throughout their career. For the lowest-income groups, Social Security will replace a substantial proportion of pre-retirement earned income. Those who face the greatest challenges include vulnerable populations, such as the disabled, widowed, divorced, unemployed, and people employed in industries or jobs that typically do not provide retirement benefits to workers. These groups tend to be underrepresented in existing research studies.

Based on this literature survey, our main conclusions and recommendations for future research are as follows:

- The current system of voluntary employment-based retirement plans has been largely successful from the perspective of companies sponsoring plans for individuals with long-term employment covered by such plans. Although more can be done to encourage higher savings rates, and the shift from defined-benefit to defined-contribution plans may reduce retirement adequacy for younger generations, employer retirement plans are an important pillar of the retirement system. Encouraging more employers to sponsor plans and more employees to participate would strengthen the overall system.
- Similarly, the mandatory Social Security system has done much to reduce poverty in old age. However, adequacy studies using replacement ratios may overstate the success of this safety net for those in the lowest-income groups, because too many rely solely on Social Security as their sole source of support and therefore do not have any financial cushion to meet emergencies. Given that reliance, it will be important to understand solvency issues in a way that continues to protect our most vulnerable citizens.

- For households without access to employer retirement plans, Social Security will still prove a base level of lifetime inflation-adjusted income, but this alone will not allow them to maintain their pre-retirement standard of living. Considering the generally low levels of household wealth, these households will usually need some combination of delayed retirement and Social Security claiming, continued paid work at older ages, increased saving, downsizing of their spending, and reliance on family to meet their retirement needs.
- Although a lot of research has focused on median or typical households, there is a need for future research that delves into the retirement challenges of particularly vulnerable populations, such as those who are widowed, divorced, long-term disabled, or long-term unemployed. For the U.S. retirement system to be deemed “adequate,” modifications to the social safety net and/or employer programs will be necessary.
- The significant differences in methodologies that are used in retirement adequacy research makes direct comparisons of results more difficult. Some important distinctions based on assumptions in the models include the following:
 - Most studies do not adequately account for major unexpected expenses or shocks, such as poor investment performance, long-term care, death of a spouse, and unexpected out-of-pocket medical expenses. If these risks are not included in the models, the results will tend to overstate the degree of adequacy in the system.
 - Most studies assume that the adequacy objective is to maintain pre-retirement living standards. If retirees are satisfied and reasonably happy with a lower level of spending, this assumption may understate the degree of adequacy in the system.
 - Most studies assume that people retire at a “normal” retirement age. Important issues omitted from many of the studies include the impact of changes in retirement ages, phased retirement, and work during retirement.
 - Studies differ significantly in their treatment of housing wealth. If housing wealth is accessible to meet retirement needs, overall adequacy is higher.
 - Most studies focus on the retirement adequacy of current and near retirees. Future cohorts of U.S. retirees may face more difficulty than today’s retirees because of demographic issues, high debt load, lower likelihood of being married and owning a home, potential future reforms to Social Security, shifts in employment, and changes in the structure of employee benefit plans.

1: Introduction

With improved life expectancy and advances in medical care, current and future retiree households will, on average, experience longer retirement periods than in previous generations. The increased costs associated with longer retirements could present some challenges for the United States retirement system in the future. For this reason, the question of whether Americans are adequately prepared for the costs of their future retirements has been the subject of significant debate and research over the last few decades. Although Social Security provides nearly every American with a base level of income in old age, it will replace only a fraction of employment income for most households. Career employees at large firms and in public employment are likely to have participated in workplace pensions and retirement plans that can be expected to generate additional income in retirement. On average, however, Americans have relatively little accumulated retirement wealth, and this is particularly true for those who do not have employer-sponsored retirement plans. Some researchers predict that a large percentage of the population is at risk for significant hardship in retirement, whereas other researchers are significantly more optimistic.

The purpose of this paper is to summarize the current research on retirement adequacy and to clarify the differences in objectives, research methods and model assumptions that have led to such divergent conclusions. Clearly, this is a complex issue about which reasonable and educated minds can differ. The conclusions reached are dependent not only on theoretical framework and empirical methodology, but also on stakeholder perspective, political viewpoint and research objectives.

Assessing retirement adequacy presents several significant challenges, whether we are evaluating adequacy for a single individual or for entire generations of retirees:

1. **How should retirement adequacy be measured?** For reasons of simplicity and tractability, adequacy has often been defined by a replacement ratio: projected retirement income divided by pre-retirement income as a proxy for retirement income needs. As will be discussed in later sections, studies differ significantly in how they define the income numerator and needs denominator in that ratio. Other alternatives for measuring adequacy, such as projected dollar shortfalls and years until money runs out, similarly must project income and needs, so these issues are pivotal to understanding the differences between research studies.
2. **What will current workers do between now and retirement?** While it is difficult to project income and needs for current and near retirees, it is even harder to make these projections for younger generations, who often have not even begun to significantly save for retirement and who may face different risk exposures, employment histories, and changes in investment and tax environments between now and retirement.
3. **How do we measure success?** Even if we can accurately estimate success for an individual retiree, what proportion of the population, or of various population subgroups, need to meet the “adequacy” target for us to deem the U.S. retirement system a success? The success of the private retirement system should be considered in light of what it does for those with work histories, how it provides for a transition from work to retirement, and how it creates part-time employment opportunities for those who want or need to continue to work after formal retirement. Success for the total public system would more appropriately be judged based on the economic status of the overall elderly population.

Although there are many possible approaches to answering these questions, each of which requires many assumptions about the uncertain future, studies have fairly consistently concluded that there are wide disparities both within and across population subgroups. In this paper, we focus on identifying areas of agreement and disagreement among these research studies, and on explaining the differences in

conclusions based on choice of models, empirical techniques and data, as well as differences in researcher perspectives and objectives.

After carefully considering this body of research, it is clear that the answer lies somewhere in the middle of crisis and serendipity. A large percentage of Americans will be able to support a reasonably comfortable retirement. But there are definitely haves and have-nots in our current system. In addition to the highest-income groups, who have many types of income and assets to support their retirement, the haves also include employees who have participated in employer-sponsored pensions and retirement plans throughout their career. Depending on how adequacy is defined, the haves may also include those in the lowest-income groups for whom Social Security will replace a substantial proportion of pre-retirement earned income and who may be eligible for other support programs. Unfortunately, the have-nots come from subpopulations that are often underrepresented in research studies: the disabled, widowed, divorced, unemployed, and people employed in industries or jobs that typically do not provide retirement benefits to workers.

This report is organized as follows: In Section 2, we identify the various groups that have a vested interest in knowing whether U.S. retirees have adequate income in retirement to meet their needs: public-policy makers, government agencies, employers, unions, financial advisers and individuals. These various stakeholders have different objectives, which may lead them to study this research question from their own perspectives. Understanding these differences in stakeholder viewpoint can help to explain different choices made by researchers with respect to measurement of retirement needs, identification of resources to meet those needs, and the definitions of adequacy, which are discussed and defined in Section 3 of the report. In Section 4, we provide a survey of the literature on retirement adequacy with a deeper dive into several of the most influential studies. Although there have recently been several other papers summarizing some aspects of the retirement adequacy literature (Mackenzie 2017; U.S. GAO 2017), this report is unique in that we provide a detailed comparison of the major research studies based on methodology, risks incorporated in their models, model assumptions, and other factors. This lays the groundwork for articulating a more complete view, at the end of this report, of the current system's effectiveness at providing adequate retirement financial security in the United States.

In the interest of brevity, and for those who are less familiar with retirement research terminology, we have included a glossary of key terms at the end of this report.

2: Diversity of Stakeholders Leads to Diversity of Questions, Answers and Solutions

Several major stakeholders are interested in retirement income adequacy, and each of them may see the retirement adequacy goal differently. For example, some stakeholders may define adequacy as meeting a desired standard of living, often measured as a percentage of pre-retirement income or consumption. Alternatively, the goal could be to ensure that all retirees have at least enough resources to meet basic needs, even if the standard of living is lower than experienced prior to retirement. From an individual's perspective, the goal might simply be having enough to be comfortable or happy. In this section, we explore the rationales for various stakeholder viewpoints and the way their different objectives lead to different questions being asked and, potentially, to different research conclusions.

Key Point

When interpreting the results of retirement adequacy research, it is important to consider the perspective of the research sponsor and the population group that is the focus of the particular study. Different stakeholder groups are asking different questions, offering different solutions and measuring success in different ways.

2.1 GOVERNMENT AND POLICY MAKERS

A wide range of government and policy analysts are concerned about the impact of a retirement system on society at large. Government research commonly focuses on population averages rather than taking an individual approach. In this arena, political issues can often enter into the debate. Different ideological viewpoints on the size of government, individual responsibility, deficit spending and entitlement programs may influence research priorities, approaches and interpretation. In a broad sense, government should be concerned about the whole population, including households not participating in employer-sponsored retirement plans. However, practical considerations make it logical to focus research on policies and programs with the greatest impact, such as Social Security and tax-preferred savings.

Issues of importance to government agencies and public-policy makers include the level and structure of Social Security benefits, heavy reliance on Social Security by many retirees, the impact of increasing longevity on retirement adequacy, retirement ages, and the extent to which the tax system encourages and regulates private pension plans and individual retirement savings. The primary policy tool used to encourage individuals to save for retirement is tax incentives, but since these tax deductions benefit primarily upper-middle- and higher-income households, this policy tool has little effect on lower-income households, which pay very little in income taxes. Social Security is the primary policy tool used to provide retirement benefits to middle- and lower-income people. For higher-income households, Social Security represents a much smaller proportion of retirement income, and the benefits are more likely to be subject to income taxation. Not surprisingly, government research tends to place a heavier emphasis on overall costs of the system than on the relative levels and distribution of benefits.

2.2 EMPLOYERS AND PLAN SPONSORS

Employer-sponsored retirement plans are the primary retirement savings vehicle used by individuals and households. However, plan sponsorship and participation rates vary widely by employer type and industry group, type of employment, and employee characteristics (age, gender, ethnicity). Based on analysis of the March 2014 Current Population Survey, the Employee Benefit Research Institute reports that 51.3% of all workers are employed at a firm that sponsors a retirement plan, and 40.8% participate in the plan. Among

full-time, full-year workers, 49.2% of private-sector and 81.7% of public-sector workers participate in a plan. Higher participation rates are also found for individuals who are older, male, white, college-educated or higher-income. Larger firms and those with unionized workers are more likely to sponsor a retirement plan. Some industries, such as farming and retail, have very low sponsorship and participation rates (Copeland 2014).

Similar to government stakeholders, employers and plan sponsors are interested in the impact of policies and programs for a larger group and are therefore more likely to focus on measures of adequacy related to their own retirement plans and for typical workers. Most employers have labor market incentives to offer competitive compensation plans that will attract and retain the best workers. But plan design may also be motivated by other factors, such as incentivizing employee productivity, maintaining business reputation or achieving a certain bottom-line result. Employer plans with generous benefits and careful design can enable workers to retire when desired, increase job satisfaction and encourage retirement at ages that maximize overall firm productivity. Older employees who delay retirement due to inadequate resources can limit a firm's ability to promote qualified employees in the pipeline, who may then switch jobs for better advancement potential.

For these reasons, employers are primarily interested in the retirement adequacy effects of their retirement plans on long-term or career employees, which may include current, former and future workers. Because employers and plan sponsors are evaluating the efficacy of their overall plan, they generally focus on measuring adequacy at the group level and make simplifying assumptions, such as retirement at a certain age, which may or may not correspond to actual retirement ages. Typically, they will also assume that the employer plan only needs to satisfy some proportion of the employee's retirement income needs, with the remainder being supported by Social Security and saving outside of the retirement plan.

2.3 LABOR UNIONS

Labor unions have long been advocates for improving their members' access to employee benefits, including retirement plans. Although union workers are still more likely to have access to health and retirement benefits than nonunion members (94 % versus 66% in 2017), the percentage of Americans who are members of a union has significantly declined in recent decades, from 20.1% in 1983 to 11.1% in 2015 (Bureau of Labor Statistics 2017). Consequently, unions no longer have the power they once wielded in employer-employee contracts. In some ways, the unions' successes in securing comprehensive benefits packages, including pensions and early-retirement options, for their members have also contributed to the decline in union membership. Generous unfunded promises have resulted in bankruptcies of both public and private employers, leading to cancellation of union contracts.

Clearly, union leaders are primarily interested in the financial well-being of their members. Because they rely on member dues for their continued operations, they also want to attract new members. One of their strongest arguments for membership is enhanced retirement financial security.

2.4 INDIVIDUALS AND FINANCIAL PLANNERS

Each household and each individual has unique family situations, goals, and preferences. Therefore, retirement adequacy must be measured individually, by how well the actual plan meets those goals. It does little good for a married couple to know that, on average, U.S. households in their income group have sufficient retirement income, if they themselves do not. Studies looking at individual households often have an overarching goal of providing individuals and planners with targets for annual saving, overall wealth accumulation and spend-down rates in retirement, each of which can be adjusted based on individual

circumstances. Given that U.S. savings rates are relatively low (less than 4% in 2017), these retirement adequacy studies may also be intended to promote retirement saving and to enhance understanding of the financial costs of post-retirement risks.

Over the pre-retirement period, individuals should focus both on accumulating adequate funds and on having a feasible plan for post-retirement spending. They also need to be focused on risks that could negatively affect savings prior to retirement or post-retirement cash flows. During the accumulation stage, these risks may include disability before retirement, being forced to retire before planned retirement date, and economic risks related to investments and inflation. During the retirement period, retirees face risks related to investments, inflation, unexpected health expenditures, divorce, death of a spouse, household maintenance, mental-health decline, financial fraud, expenses for paid nursing care, and financial help needed by other family members.

For individuals and households, retirement preparation and adequacy can differ greatly both by career stage and by household situation. For example, some parents may delay retirement saving during their child-rearing and college-funding years, leaving insufficient time and resources for retirement accumulation. Some households pay off their mortgages before retirement, whereas others enter retirement with considerable debt obligations. Some are expecting to downsize their housing to reduce expenses, but many want to stay in their family home. Individuals will want to understand when they can retire with economic security and how their standard of living might change after retirement. In early and mid-career, individuals need to decide how much they should save and whether they are on target for a future retirement. As they near retirement, their needs and risks will be clearer, but they will have to make complex decisions related to a wide range of options, including the trade-offs associated with retiring versus working longer. The closer they get to retirement, the more important it is to be able to customize solutions to each unique situation.

The reality of the financial-planning profession is that most clients are high-wealth individuals. The issues that are of importance to planners and their clients are therefore quite different from those of households with low and moderate income and wealth. The latter group are more likely to be serviced by robo-advising services offered by the large financial-service providers. These firms provide online tools to help account holders make financial decisions (Fisch et al. 2017), but there may be a disconnect between the objectives of these firms and their robo-advising clients. Some individuals have access to education and guidance through employer-sponsored financial-wellness programs that provide information and analysis suitable to employees' financial needs. Although robo-advising and financial-wellness services are constantly evolving and may offer additional options in the future, they do not currently offer the range of customized solutions that are available in the one-on-one advising environment.

From an individual or planner perspective, the most important takeaway related to measuring retirement adequacy is that there is no "one size fits all." Households differ with regard to home ownership, mortgage and consumer debt load, spending and savings habits, household size, employment characteristics, marital status, resources diverted to other family members, health, disability and other characteristics. Although all of these factors affect retirement success and satisfaction to some extent, traditional adequacy measures do not (and cannot) take most of these issues into account. **Table 1** compares the different stakeholder groups based on their perspective and identifies the retirement adequacy questions that are of primary importance to each group.

Table 1
Comparison of Stakeholders Involved in Retirement Adequacy Research

Stakeholder and Perspective	Questions Being Asked	Unique Differences
<p>Government and policy makers</p> <p>Perspective: Society at large and population averages</p>	<ul style="list-style-type: none"> • Is the current retirement system meeting its objectives (e.g., minimizing dependence in old age)? • Are current retirement plan regulations improving retirement adequacy for U.S. retirees? • Are retirement plan incentives a good investment of tax dollars? • Which population subgroups are not adequately prepared for retirement? • What is a reasonable Social Security retirement age? • What reforms should be made to Social Security to ensure its long-run solvency? • What strains are placed on the retirement and retiree health care system by increased longevity? • What can we do for people without access to an employer-sponsored plan? Should we try to increase voluntary IRA participation, or should we do more? 	<p>Focus is on system-wide averages and sustainability.</p> <p>Research may be influenced by partisan politics.</p>
<p>Employers and plan sponsors</p> <p>Perspective: Plan participants and workforce management</p>	<ul style="list-style-type: none"> • Are our retirement plans competitive and cost-effective? • Are our retirement plans adequate to enable workers to retire comfortably, given their other sources of retirement income? • When will our employees be able and willing to retire? 	<p>Samples are often limited to employer plan participants or to peer groups.</p> <p>Research is limited by lack of data on employee and spouse personal finances.</p>
<p>Labor organizations</p> <p>Perspective: Union members' financial security</p>	<ul style="list-style-type: none"> • Are our members protected well? • How do the needs for retirement benefits balance against other needs? 	<p>Focus is on securing beneficial contracts for members.</p> <p>Desire is to increase membership.</p>
<p>Financial planners and investment advisers</p> <p>Perspective: Clients' saving and investing plan</p>	<ul style="list-style-type: none"> • What savings and decumulation strategies will provide my clients with an adequate retirement income stream? • Are my clients adequately prepared for various post-retirement risks? 	<p>Models must be customizable to unique situations.</p> <p>Most clients are high-wealth persons with employer plans.</p>
<p>Households and individuals</p> <p>Perspective: Self and family members</p>	<ul style="list-style-type: none"> • Can I retire when desired with adequate resources to meet my needs and avoid dependence on family or public assistance? • What trade-offs will I need to make if I retire earlier? • How much do I need to save? • Will I be able to maintain my pre-retirement standard of living in retirement? • If I switch jobs, what impact will this have on my retirement? • Am I protected against post-retirement risks? 	<p>Models must be customizable to unique situations.</p> <p>Results should be simple to understand without special skills or knowledge.</p> <p>Goal is often to encourage better financial decision making.</p>

3: Challenges to Measuring Retirement Adequacy

As discussed in the previous section, retirement income adequacy and retiree well-being may be defined differently, depending on the perspective of the researcher and the objectives of the research study. Therefore, comparison of research conclusions requires clear definition of the measures being used and their applicability to each stakeholder group. In this section, we provide a summary and comparison of the various definitions of retirement adequacy, retirement needs and retirement income. For reasons of clarity and brevity, this overview does not include reference to specific studies. However, in the literature review that follows, we compare the major studies based on differences in these identified assumptions and metrics.

3.1 RETIREMENT ADEQUACY METRICS

Any discussion of retirement adequacy necessarily must define a target or goal. The assessment of adequacy then judges actual or projected retirement outcomes against that adequacy target. The three main approaches used are income replacement ratios relative to a target, wealth relative to the present value of future expenditures, and success or failure rates based on personalized planning forecasts. In this section, we explain and compare these metrics.

3.1.1 Replacement Ratios

The last major federal study of pension policy in the United States was the President's Commission on Pension Policy during the Carter administration. The commission report suggested replacement ratios as a way to measure the adequacy of pension benefits. It defined the replacement ratio as the ratio of post-retirement income to pre-retirement income, and developed targets for replacement ratios, adjusting for expected post-retirement differences in Social Security and income taxes and changes in retirement savings and work-related expenses (President's Commission 1979).

The primary advantages of replacement ratios for analysis of retirement income adequacy are that the ratios are easily explained, can be compared over time, and may be used for individuals, groups of individuals or the entire retiree population. Although replacement ratios are by far the most common way to assess adequacy of retirement income, these measures are often criticized, sometimes even by those who are using them. There are four main problems: (1) there are many ways to measure both the numerator and the denominator of the ratio; (2) there isn't an agreed-upon definition of what constitutes an "adequate" replacement ratio; (3) focusing on replacement ratios at the date of retirement ignores changes in income and expenses that may occur over the retirement period; and (4) target ratios do not consider individual circumstances.

What should the target replacement be? This, of course, depends on who is asking the question. Whether a certain level of replacement is "adequate" depends on how we measure pre- and post-retirement income and how we measure retirement needs. For example, an employer might consider his or her retirement plan successful if the average replacement ratio for a full-career employee is 40%, on the assumption that the remainder of the employee's needs will be met by Social Security and personal savings. Social Security might have a target replacement ratio for the overall system and separate targets for different income groups. Similarly, other government entities and policy analysts may set population-based targets that, on average, ensure that retirees can meet their consumption needs. A financial planner and client should be targeting a replacement ratio that will meet 100% of the client's needs, however they are defined. If the client household does not currently spend all of their pre-retirement income, the target replacement ratio will be based on actual cash flow needs divided by pre-retirement income. Because each stakeholder is

measuring different aspects of retirement “success,” this leads to significant variation in the calculated and target replacement ratios.

A further variation on the replacement ratio concept is to measure the percentage of actual consumption needs that will be met by expected retirement income. Compared with ratios calculated as a percentage of pre-retirement income, this formulation is a better measure of adequacy, because anything less than 100% means retirees would experience current shortfalls (due to cutbacks in current consumption) and/or future shortfalls (caused by spending down assets too quickly). Most ratio-based studies define the target as something less than 100% income replacement, but the adequacy bar can be much lower if the income measure being used is pre-retirement income, as opposed to postretirement consumption.

Group-based measures and those that set a target as a percentage of those who meet a particular bar are more likely to overstate the adequacy of retirement income for smaller disadvantaged groups. For example, if 80% of the population meet the adequacy bar, the system might be deemed a success, while the other 20% may be short by a large margin. Social Security has an important counterbalancing effect, in that nearly all retirees receive at least some base level of benefits, lower-income participants receive higher income replacement, and there are important protections for retired widows and the disabled.

Key Point

The primary advantages of replacement ratios for analysis of retirement income adequacy are that they are easily explained, can be compared over time, and may be used for individuals, groups of individuals or the entire retiree population. However, there is no universally agreed-upon definition or consensus on what constitutes an adequate replacement ratio or on how to adjust for differences in individual circumstances.

3.1.2 Wealth-Based Measures

An alternative measure of adequacy that addresses some of the shortcomings of income or consumption replacement ratios is to measure adequacy of wealth or savings to meet expected future expenses (after subtracting any guaranteed lifetime income such as Social Security and pensions). If wealth at retirement is forecast to be less than the present value of forecast retirement spending needs, the retiree will have insufficient funds to make it through retirement without running out of money. The percentage of people who do not meet this bar can be a measure of retirement system adequacy. A problem with this methodology is that the discount rate used to calculate the present value of future spending makes a big difference to the conclusion. For example, using an inflation rate instead of a moderate investment rate of return can double the present value of retirement needs. Other wealth-based variations measure the average percentage of needs-to-wealth for a group, estimate the average time until the household runs out of money, and define a wealth target for younger workers.

Wealth-based methods have the advantage of measuring adequacy for the entire retirement period, rather than just at the beginning of retirement, and they also can be adapted to individual circumstances. However, measurement of wealth and future expenditures requires substantially more information on household finances and expected lifetime expenditure patterns, making it less practical for some types of research.

3.1.3 Individualized Measures

Similar to the wealth-based adequacy measures described in the previous section, retirement adequacy estimates can be individualized for particular households with a personalized forecast of needs and resources. The household can specify their desires for increased or decreased spending in retirement, bequest motives (which are completely ignored in this literature), investment risk preferences, and willingness to manage risk with insurance, reverse mortgages or other products. Financial planners routinely provide financial forecasts for their clients as part of the planning process, but the sophistication of their forecast models can vary greatly. Several of the studies discussed in the next section use empirical models that can address individual circumstances in place of population averages and, more importantly can incorporate various post-retirement risks.

3.1.4 Measures Used for International Comparisons

Although not the focus of this report, it is worthwhile to mention that concerns about retirement adequacy are not unique to the United States. Retirement systems in other industrialized nations are facing parallel challenges: population aging, declining labor force participation at older ages, and suboptimal levels of personal savings. The annual Melbourne Mercer Global Pension Index study provides a brief summary of the retirement systems in 27 countries, and evaluates and scores these systems based on a framework that includes adequacy, sustainability and integrity (Katiforis, 2017). The United States earned a grade of C in 2016, while the top scorers were Denmark and the Netherlands. Twenty-five percent of a country's adequacy score is based on median earner's replacement rate. Unlike the replacement rates discussed in the previous sections, this calculation includes only universal benefits (such as Social Security). The average replacement rate from mandatory pension schemes averages 63% for median earners in OECD countries and 75% for low earners. The United States and other countries with mandatory safety nets but primarily voluntary private systems tend to receive lower adequacy scores in this analysis. In addition to the replacement rate for the median earner, other factors that weigh heavily (at least 10%) in the adequacy scoring system include minimum guaranteed replacement rate, household savings rate, minimum age to receive private plan benefits, and required annuitization of private pensions. This study is an interesting counterpoint to the U.S. adequacy research, because it offers a broader perspective and different methodology to enable comparison between countries.

3.2 MEASURING RETIREMENT NEEDS

Whether individual retirees or groups of retirees will have adequate retirement income to meet their needs is highly dependent of the definition of needs. As discussed in the previous section, retiree cash flow needs are an essential input to all retirement adequacy metrics, including income replacement ratios, sufficiency of retirement wealth to meet lifetime spending needs, and personalized assessment of retirement adequacy. There are several components to this goal: the level of spending required, the length of the retirement period and changes in spending that may occur over the retirement period. It should be noted however, that many studies focus only on measuring needs at the beginning of retirement and assume that these needs will be consistent over the retirement period. This would, for example, result in underestimation of retirement preparation if actual consumption is lower later in the retirement period than at the beginning.

Key Point

Assessment of retirement adequacy depends heavily on how we define retirement needs, which can range from fully maintaining the pre-retirement standard of living to only meeting minimum or essential expenses. Lifetime spending needs are also highly dependent on the length of the retirement period, changes that occur over time and whether a household experiences a spending shock during retirement.

3.2.1 Alternative Measures of Retirement Needs

Economists have long posited that consumption and savings decisions are optimally designed to spread consumption over the lifetime. Because people differ in their preference for current versus future consumption and have different expectations about how long they will live, the model can result in different solutions for different individuals. In the retirement adequacy literature, we find that retirement needs have been defined in several different ways, most of which are consistent with an underlying assumption of consumption smoothing:

1. Enough to cover only essential expenses, often defined with reference to the poverty level or some other minimum needs measure
2. Enough to cover expected consumption in retirement, based on actual average consumption levels observed in national surveys of retirees
3. Enough to maintain the pre-retirement standard of living, estimated as a percentage of pre-retirement income, adjusted for expected spending changes in retirement
4. Enough to maintain the pre-retirement standard of living, including all forecast expenses and shocks to income or assets, using statistical models to incorporate post-retirement expense shocks
5. Enough to be happy or satisfied, even if income is less than required to maintain the pre-retirement standard of living

Within these categories, there are multiple variations. For example, researchers might make different assumptions about consumption changes after retirement (reductions for work expenses, paid-off debts, children who leave the home, increases or decreases for changes in leisure expenditures). What years should be used as the reference—the year immediately preceding retirement, an average over the working career or some number of years preceding retirement? How much will needs increase over time (adjusted using a wage index versus a price index)?¹ For example, a retiree who needs \$50,000 per year to maintain his or her current standard of living, which might be measured as a percentage of final average salary, might need only \$25,000 to meet minimum needs or might need \$75,000 in a given year to meet basic expenses plus unexpected home repairs.

When retirement needs are defined narrowly to include only essential expenses, the percentage of retirees who meet the hurdle will obviously be higher. The Elder Economic Sufficiency Index (EESI), developed by Wider Opportunities for Women and the Gerontology Institute at University of Massachusetts Boston,

¹ These issues are discussed in some detail in Mackenzie (2017), who suggests that these modeling choices in various studies can have a large effect on measures of needs and consequently on conclusions about adequacy. Increasing assumed needs based on a wage index, as is used to adjust career earnings in the calculation of Social Security benefits, will allow retirees to share in productivity improvements over time, whereas a price index maintains the retiree's purchasing power.

establishes a minimum level of retirement income needed to maintain independence and meet basic needs, including health care (Gerontology Institute 2012).² Although significantly lower than most of the other adequacy targets we discuss in this paper, the EESI is significantly higher than established poverty levels. This is consistent with Butrica et al. (2007), who conclude that increased out-of-pocket health spending in the 2004 Health and Retirement Study, particularly at higher ages, causes the normal poverty level to understate minimum spending needs for the elderly.

Although most retirement adequacy studies measure needs based on pre-retirement income or consumption, as in the first four definitions previously listed, Society of Actuaries focus group and in-depth interview research suggests that many retirees are satisfied with much less. Although it is difficult to measure, individuals clearly place a value on leisure. Unlike most adequacy studies, which take a purely financial point of view, the Sightlines Project at the Stanford Center on Longevity (Stanford 2016) is unique in measuring system “adequacy” in three dimensions: financial security, healthy living and social engagement. The Sightlines Project originated with the goal of helping people enhance their chances of living long, healthy, financially secure lives. Consistent with the EESI, the Sightlines Project concludes that minimum spending needs are about two times the federal poverty level, with lower levels resulting in increased mortality and morbidity, and decreases in social engagement. While financial security and health have long been recognized as part of successful retirement, many people have not recognized the importance of social engagement.

3.2.2 Length of the Assumed Retirement Period

Given that not all retirement income sources provide the lifetime income guarantees and inflation protection of Social Security, the length of the retirement period is an important factor in measuring retirement needs. The two relevant model variables determining the number of years of retirement consumption are the date of retirement and the date of death. It is common to assume that retirement will occur at the normal retirement age under Social Security and that retirees will live average life spans based on their birth cohort. Data on actual retirement decisions shows, however, that many people retire earlier, by choice, necessity or layoff. Phased retirement and part-time work in retirement are also increasingly common, and many spouses do not retire at the same time. Although these issues are not commonly addressed in retirement adequacy research studies, the more complex simulation models incorporate mortality distributions, and some have considered retirement timing alternatives.

Assumptions used for measuring needs are influenced by available data, the stakeholder’s objectives and convenience. For example, plan sponsors have access to salary and retirement plan data, so by necessity they may default to needs measures based on these variables. It is fairly common for employers to define the replacement ratio relative to a measure of career earnings or average final salary. In contrast, researchers using large nationally representative surveys have a wide range of household data on income, expenditures, wealth and actual or intended retirement ages. This makes it feasible to develop more individualized measures of needs and to parse the data and results for various subgroups. Although simulation research can draw assumptions from many sources, making it possible to customize the inputs and the results, most simulations use population or subpopulation averages as the basis for the inputs to the models. This makes sense if the research goal is to make broad conclusions about the population, but is

² EESI tables by state, county and city can be found at the Elder Index website of the Institute for Women’s Policy Research, National Council on Aging, and University of Massachusetts Boston, <http://www.basiceconomicsecurity.org/EI/>.

less useful for evaluating the retirement prospects for individuals or for subgroups that are quite different from the averages for the population.

3.2.3 Income versus Consumption and Changing Needs over Time

Much of the criticism of replacement ratios for measuring retirement adequacy has focused on income-based ratios that make the simplifying assumption that $x\%$ of pre-retirement income is equivalent to consumption needs. Adjustments are usually made for changes in consumption relative to the working years. For example, Aon Hewitt's Real Deal project reduces expected consumption for work-related expenditures, savings and taxes, and increases health care expenditures to arrive at their estimate that retirees will need to replace about 85% of average pre-retirement income (Aon Hewitt 2015).

For employers, government and policy analysts, defining the target as a percentage of easily observable pre-retirement income (or a career average) is much easier than trying to estimate actual retiree expenditures or consumption needs, due to limited nationally representative data on actual retiree consumption. Although the Bureau of Labor Statistics Consumer Expenditure Survey (CES) and the Consumption and Activities Mail Survey (CAMS) subsample of the Health and Retirement Survey (HRS) can be used to develop these estimates, both surveys report information at the household level.

For most preretirees, replacement ratios are not a very useful long-term planning tool. At younger ages, limited information about future earnings, career interruptions, investment returns and retirement age make the ratios highly speculative. In midlife, financial planners usually advise their clients to think about retirement consumption needs by reference to current consumption, making adjustments for expected changes in retirement spending, such as reduced child-rearing and education costs, mortgage payoff and potential downsizing. However, it is still difficult for most people to interpret what it means to say they will need \$50,000 per year retirement income *in today's dollars*. As households near retirement, this is less of an issue, and it is easier to estimate the level of spending required to maintain their desired lifestyle. Survey and focus group research suggests that most individuals tend to focus on short-term cash flow needs, considering primarily whether their expected retirement income will be sufficient to cover regular expenses (SOA 2016b). Since many households do not keep good records or have detailed household budgets, a rough rule of thumb, such as a minimum replacement ratio, could be helpful for deciding whether they can afford to retire. The downside is that they do not take individual circumstance into account and cannot incorporate future risks into projected cash flows.

In addition to estimating retirement consumption at the beginning of retirement, many simulation studies also forecast increases in consumption over time, either with inflation or wage growth. As summarized in **Table 2**, the Employee Benefit Research Institute's analysis of the HRS data show that, with the exception of health, household spending is found to decline with age cohort on average (Banerjee 2014). To the extent that this analysis is cross-sectional rather than longitudinal, this does not necessarily imply that households in the same cohort will spend less as they age. More to the point on the estimation of first-year retiree consumption, Banerjee (2014) finds that spending declines, on average, in the first few years after retirement, but there is great variation within group, with 28% of households spending at least 20% more in the first two years of retirement than they spent pre-retirement. Similarly, analysis by the Government Accountability Office (U.S. GAO 2013) shows that older-cohort households spend less than younger cohorts in the CES data. The declines at higher ages may be attributable to the larger proportion of singles in the older cohorts (average household size is 1.5 people for old versus 2.1 for young retirees). It should also be noted that spending goes up and is often unmanageable when assisted living, nursing home care or extensive paid long-term care is needed. Nevertheless, these results imply that adequacy measures based on pre-retirement income or consumption could overstate post-retirement needs.

Table 2
EBRI Analysis of Declines in Household Spending by Age Cohort in the Health and Retirement Study (in 2013 dollars)

Expenditure Category	Age Cohort					
	Age 65–75		Age 75–84		Age 85+	
	Mean	Median	Mean	Median	Mean	Median
Home	\$18,720	\$12,642	\$14,732	\$10,805	\$13,111	\$ 8,781
Food	4,526	3,982	3,994	3,228	2,520	2,152
Health	4,383	3,104	4,624	3,109	6,603	2,814
Transportation	5,169	4,025	3,666	2,794	1,972	1,241
Clothing	1,311	724	950	569	888	434
Entertainment	4,300	2,380	3,277	1,655	1,609	714
Other	3,583	1,148	3,565	1,034	3,188	734
Total	\$42, 805	\$34,036	\$35,315	\$29,884	\$30,610	\$22,263

Source: Data from Banerjee (2014), Figure 2.

While declining consumption with age is an important observation and could imply lower needs in retirement, it may also be that observed consumption is the product of necessity rather than choice, particularly for lower-income groups. If the researcher assumes that reductions in post-retirement consumption in the HRS data should apply to all retirees, thereby reducing the definition of needs, then this will result in rosier conclusions about overall retirement adequacy or may reduce savings incentives for current workers. Recent SOA focus group and in-depth interview research indicates that reductions in spending in retirement may be the result of changed activity patterns, preferences with regard to managing finances, flexibility on the part of retirees, changes in needs, and insufficient income and/or assets.

3.2.4 Shocks to Consumption

One of the most difficult and complex problems in measuring retirement needs is modeling unexpected and large expenditures that are not part of the household’s normal budget. These “shocks” may include unexpected medical expenses, home repairs, investment losses and/or family emergencies. Many studies do not include these risks explicitly, although some add average costs for some categories, such as out-of-pocket medical expenses and long-term care. Any study of adequacy that fails to incorporate these risks has likely overstated retiree preparation for retirement. Simulation studies are best able to incorporate shocks to household expenses, but as will be discussed in the next section, they differ in which risks are specifically modeled and the source of the modeling assumptions.

Ongoing SOA research projects, including the Risks and Processes of Retirement Surveys, Focus Groups, and In-Depth Interviews, provide confirmation that these issues are all important considerations in the design of retirement models and the estimation of retiree consumption needs. In fact, individual spending behavior deviates substantially from what would be predicted by a lifetime consumption model. Instead of making retirement decisions to smooth consumption, retirees report that they make decisions based on short-term cash flow forecasts. Although some people’s retirement decisions are forced on them by circumstances such as poor health or layoff, voluntary retirement often depends on the person’s self-assessment of ability to afford retirement. The decision is commonly based on whether expected household income is sufficient to cover current expenses, but most individuals do not specifically plan for

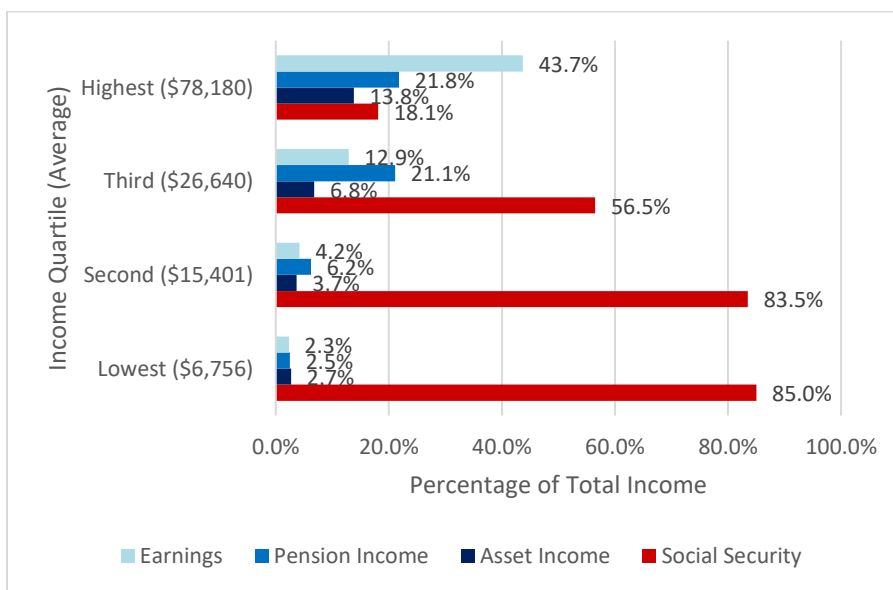
uncertainties or irregular expenses like major home repairs. Most say that their objective is to use regular income, such as Social Security and pension income, to meet regular expenses, and to use savings to meet emergencies. Retirees are often willing to make substantial adjustments in spending rather than drawing down assets. In the SOA Risk Surveys, retirees express a great deal of concern about post-retirement risks, but few have taken any action to mitigate those risks beyond attempting to hold onto savings as long as possible.

3.3 MEASURING RETIREE INCOME AND RESOURCES

The second input to retirement adequacy measurement is an estimate of resources to be used by individual households to meet their needs. When adequacy is measured based on a replacement ratio, annual expected retirement income is usually the numerator, with the pre-retirement income or consumption as the denominator of the ratio. When needs are measured based on a multiple of first-year cash flow needs or a present value of cash flow needs for the entire retirement period, retiree resources are often measured by accumulated wealth at retirement (e.g., Bajtelsmit et al. 2015).

As with the measurement of needs discussed in the previous section, retirement adequacy studies differ in how they measure retirement income and resources. Potential sources of income in retirement can include Social Security, withdrawal from tax-deferred savings, pension benefits, home equity, income from assets and investments, insurance and annuity products, and employment earnings. Some models assume accumulated wealth will be annuitized, and others assume it will be invested to be drawn down as needed. National survey data is often criticized for understating retiree income because it does not reliably or consistently capture income from assets. With that caveat, **Figure 1** shows the percentage of income received from various sources. There are substantial differences by income quartile, making broad generalizations difficult. The most striking conclusions from this figure are the low levels of total income and the heavy reliance on Social Security in all but the top income quartile. Given that this analysis is at the individual level and most older men are married, the individuals in the lowest-income quartile are more likely to be single women living alone.

Figure 1
Percentage of Income Received from Each Source, Individuals Age 65+, 2013



Source: Based on March 2013 Current Population Survey data as reported in Poterba et al. (2014, Table 6). This analysis is at the individual level and allocates joint income to one spouse or the other.

3.3.1 Estimation of Social Security Income

Social Security is undoubtedly the most important source of retiree income for all but the highest-income quartile. The program also provides lifetime retirement income for current and former spouses of eligible Social Security beneficiaries. For most retirees, Social Security represents their only guaranteed lifetime income, and unlike workplace pensions, the benefits are annually adjusted for inflation, improving the chances of maintaining purchasing power over time. Clearly, any study of retiree financial well-being must incorporate forecasts of this important income source.

Current Social Security retirement benefits are based on an established formula, so the most accurate way to estimate an individual's benefit is to have the person's full earnings history and planned retirement date, although this data is not included in public-use data sets. Although Social Security earnings histories can be obtained for certain projects and datasets, it is fairly common to use program rules to estimate benefits. For cash flow forecast models such as Bajtelsmit et al. (2015), a simplified approach is to estimate the first-year retirement benefit assuming that individuals' wage-indexed income is constant over their lifetime and that they have participated sufficiently to get their maximum benefit. Population simulations such as VanDerhei (2015) can incorporate population averages for career earnings and retirement dates. Future years are increased for inflation, and for married-couple households, spousal benefits are estimated based on relative income and retirement date. Some studies have also estimated the impact of future cuts in Social Security benefits (e.g., Hurd and Rohwedder 2011; VanDerhei 2014a).

Delayed claiming of Social Security benefits can improve retirement outcomes significantly (see Bajtelsmit et al. 2013b), provided there are sufficient assets or worker earnings to meet living expenses prior to claiming. Simulation models typically assume that people will retire and claim Social Security at the same age, such as their normal retirement age. The fact that most people claim early, resulting in reduced lifetime benefits, biases these models to overstating Social Security benefits and thereby overstating retirement adequacy. Survey-based research can use actual retirement and claiming dates for those in the survey who have already retired, but must also make assumptions about future behavior of younger survey participants.

3.3.2 Treatment of Income from Assets

The treatment of investments and income from assets presents many challenges, both in replacement ratio studies and in simulations of retirement cash flows. Although assumptions about ownership of assets, such as homes, savings accounts, IRAs and employer retirement plans, are often drawn from national survey data, information about investment earnings, withdrawals from retirement plans, and investment allocation may not be available or may be inconsistently reported in the surveys. In a comparison of income reported on surveys with administrative records, Bee and Mitchell (2017) find significant underreporting of income from defined-benefit pensions and retirement account withdrawals.

About 80% of retirees own their homes, and most have paid off their mortgage prior to retirement, making home equity one of the largest asset categories for lower- and middle-income retirees. In assessing retirement preparedness, should home equity be treated as a consumable asset? The primary argument against doing so is that the household would otherwise have to pay rent or the cost of assisted living or a nursing home stay. So to the extent that the home equity substitutes for the present value of future rent payments, the net effect on household resources would be negligible. This issue is dealt with differently in the various retirement adequacy studies. Munnell, Hou and Webb (2014) include the value of imputed rent

as retirement income in the numerator of the replacement ratio and also in the denominator as a component of pre-retirement income. Hurd and Rohwedder (2011) assume that the household will retain the home until all other wealth has been drawn down. The base case in Bajtelsmit et al. (2015) also assumes the household will retain the home, but analyzes other alternatives, such as downsizing the house and using a reverse mortgage to access the home equity.

Increasingly, households are retiring with investment wealth, which may or may not be in tax-deferred accounts. Based on their analysis of the 2010 Survey of Consumer Finances, Brady, Burham and Holden (2012) report that median household income was \$67,090 and retirement assets were \$101,350 (29% of net worth). In practice, few retirees convert their wealth to life annuities, but instead draw it down as needed.

Retirement adequacy studies generally take two approaches to including investment wealth in their analysis. One approach, commonly used in simulations (e.g., VanDerhei 2015; Bajtelsmit et al. 2015), is to assume that the wealth is invested to earn investment returns and will be drawn down to meet any budget shortfalls (when consumption needs are greater than pension and Social Security income in a given year). The second approach is to assume that the household will follow a drawdown rule that will spread their accumulated wealth over their expected lifetime. For example, the NRRRI research assumes that the household will use its financial assets to purchase an inflation-indexed annuity. Favreault et al. (2012) alternatively assume that households either annuitize financial wealth or just spend interest and dividends. In either case, it is necessary to make assumptions about the rate of return that will be earned on the account, and there is some disagreement as to whether it is appropriate to use historical average market returns for this purpose. For wealthier households, current rules for required minimum distributions (RMDs) from tax-deferred accounts can result in annual income in excess of spending, but for low- and moderate-income households, these rules may have the opposite effect, forcing them to withdraw funds when they would be better off leaving the account for emergencies

Key Point

Although survey and focus group research shows that retirees try to rely solely on regular income sources rather than to draw down financial assets, most retirement adequacy studies assume that financial assets will be fully consumed in retirement.

4: Comparison of the Major Studies: Retirement Adequacy Is in the Eye of the Beholder

It is beyond the scope of this review to provide details on all of the many studies of retirement adequacy published during the last several years. We focus here on a selection of studies from well-respected research teams, many of whom have multiple papers covering related topics. These studies reach a variety of seemingly inconsistent conclusions, some saying that we have a retirement crisis and others that the current retirement system is quite successful. These differences can be reconciled by reference to differences in research objectives, methodology, assumptions and adequacy metrics that were discussed in the previous section of this report.

Key Point

Although some studies conclude that there is a retirement crisis in the United States and others conclude that the system is in good shape, the inconsistent outcomes can be shown to be due to differences in research objectives, methodology, assumptions, definition of adequacy and population studied. The truth is that our retirement system has both successes and failures.

4.1 RESEARCH APPROACHES AND OVERVIEW OF CONCLUSIONS

The two major empirical methods used to evaluate the adequacy of the retirement system are simulation analysis and survey analysis. There is some overlap between these methodologies in that the simulation assumptions are often drawn from a variety of sources on household spending and saving, including large national surveys, and the analysis of survey data may involve forecasting retirement outcomes based on reported financials at younger ages. In this section, we identify the major studies and differentiate them based on the methodologies employed and their major conclusions.

4.1.1 Studies Using Simulations to Analyze Retirement Adequacy

A simulation is a scientific model that incorporates estimates of the effects of future unknown events or alternative outcomes. For retirement simulations, researchers forecast future income and expenses for one or more households, incorporating known information about the household's finances and risk exposures. Risks are often modeled stochastically, using probability distributions to estimate risky events or outcomes, e.g., using a random draw from past historical investment returns in each year of a life path. Note that the alternative, assuming long-run average investment returns are earned in every year, does not adequately capture the household's risk associated with, for example, a stock market crash, particularly if that event occurred early in the retirement period. Similarly, most retirement simulations do not assume that everyone lives to the average life expectancy, instead incorporating mortality risk as a random draw from the population mortality distribution. By running the model for many possible life paths in which different outcomes occur (different mortality, inflation, investment returns, health outcomes), the researcher is able to estimate the probability of retirement success or failure and to evaluate the impact of different choices made by the household and circumstances experienced.

Researchers who have developed proprietary retirement simulation models have each published several papers using the same model, often updating results over time, analyzing additional scenarios and/or adding additional model features. In **Table 3**, we provide a brief overview of the most recent papers using a simulation methodology. Although these studies use different models and assumptions, they all conclude that a significant proportion of the population will not be able to maintain their pre-retirement standard of living throughout the retirement period.

Table 3
Major Retirement Adequacy Studies Using a Simulation Model

Study [Sponsor]	Objective	Simulation Information	Conclusions
Bajtelsmit, Rappaport & Wang (2015) [Society of Actuaries]	Retirement wealth needed to maintain the pre-retirement standard of living	Simulates retirement period cash flows for household; stochastic modeling of inflation, investment, health, mortality and long-term care risks; multiple scenarios testing various methods of mitigating the risk of shortfall	U.S. households at the median and 75th percentile by income and wealth have about 1/3 the pre-retirement wealth they need to maintain their standard of living if they retire at age 66.
VanDerhei (2014a) [Employee Benefit Research Institute]	Retirement Readiness Rating (RRR), the percentage who will not run out of money	Retirement Security Projection Model simulates household cash flows before and after retirement; stochastic modeling of investment, mortality and long-term care risks.	About 60% will make it through retirement without running out of money, with wide variation by pre-retirement wages. Modeling health and LTC costs stochastically reduces the percentage.
Hurd & Rohwedder (2011) [Michigan Retirement Research Center]	Percent with 95% chance of dying with positive wealth	Simulates life cycle consumption paths using consumption changes observed in panel data (HRS-CAM). Stochastic mortality and out-of-pocket health costs	70% of individuals age 66–69 are adequately financially prepared to retire (i.e., projected to die with positive wealth).
Favreault, Johnson, Smith & Zedlewski (2012) [Urban Institute]	Percentage maintaining pre-retirement standard of living	Uses equations and hazard models to forecast income, savings, health and other factors for families in the 1990–91 SIPP; alternate definitions of retirement income; compares by generations	29%–39% will not be able to maintain their pre-retirement standard of living (measured as 75% of pre-retirement earnings).

Note: See References for complete citations for more details on each study. For most of the studies listed in this table, the sponsoring organization and/or authors have published multiple papers. The purpose of this table is to provide a broad overview of their methodology and conclusions, with a focus on more recent work.

Bajtelsmit, Rappaport and Wang (2015) define the objective for their representative households as maintaining the pre-retirement standard of living throughout retirement, and they base their estimate of retirement income needs on pre-retirement income adjusted for expected changes in consumption. Their model then forecasts cash flows for the retirement period to estimate shortfalls for each year. They calculate the present value of shortfalls to estimate the retirement savings that would have been sufficient to meet all household needs, including stochastically modeled shocks. This metric can then be compared across different scenarios to assess various financial strategies for mitigating the risk of running out of money. The simulated households needed about three times as much wealth at retirement as the amount that had actually been saved by households with comparable income and wealth.

The Employee Benefit Research Institute’s Retirement Security Model® was originally developed in 2003 to evaluate the health of the retirement system. The model simulates income, retirement plan participation, and savings for current workers, and forecasts post-retirement cash flows to death, with assumptions drawn from the rich EBRI-ICI database and various national survey databases. Because the model forecast is simultaneously run at the population level (as opposed to the individual-household level in the Bajtelsmit model), it is very useful for comparison across groups. Although it has typically been used to analyze the current retirement system, the model has also occasionally been used to evaluate the impact of potential changes to Social Security and retirement plans (see, e.g., VanDerhei 2014a; 2015). The analysis focuses on four output metrics: (1) Retirement Readiness Rating (RRR), or the percentage of households that will *not* run out of money in retirement; (2) Retirement Savings Shortfall, or the present value of annual shortfalls;

(3) years until the household runs short of money; and (4) the percentage of additional compensation that must be saved annually until retirement to have a 50%, 75%, or 90% chance of covering expenses (EBRI 2016). In general, VanDerhei's results have consistently shown a fairly large percentage of the population to be at risk of shortfalls, but with substantial differences by income. For example, VanDerhei (2014a) estimates that only 16.8% of the lowest-income quartile and 52.6% of the second quartile will not run out of money, whereas the success percentages for the top two income quartiles are 71.7% and 86.4%, respectively. On average, he does not find much difference in retirement readiness across age cohorts, with the average RRR being 57% to 58% for early boomers, late boomers and Gen Xers.

Hurd and Rohwedder (2011) provide a more optimistic assessment of the health of the retirement system. Compared with other studies that assume that discretionary spending increases with inflation throughout retirement, they estimate consumption paths through retirement using actual spending changes through four waves of the HRS CAMS (2001 through 2007), beginning at a point just past the normal retirement age. Other than mortality and health risk, household cash flows are deterministic based on patterns of previous spending. For each household, they evaluate whether household resources can support the projected consumption path through the death of the second spouse. Their results show that 49.3% of singles and 76.8% of married persons have at least a 95% chance of dying with positive wealth. Those with lower education fare worse. They also use their simulation to estimate the impact of various scenarios, including a reduction in consumption and a Social Security benefit cut. Using consumption-based replacement ratios, Hurd and Rohwedder (2015) find that 59% of singles and 81% of couples are economically prepared for retirement. With income-based replacement ratios, the percentage who are prepared is significantly lower.

Using the Urban Institute's DYNASIM3 microsimulation model, Favreault, Johnson, Smith and Zedlewski (2012) forecast replacement ratios at age 70. They find that, despite some positive changes, such as higher lifetime earnings in more recent generations, the baby boomers will have lower replacement rates than previous generations. By their estimates, at least 29% of baby boomers are not on track to maintain their standard of living throughout retirement (75% replacement ratio). They identify several factors influencing this outcome, including greater longevity, lower levels of pension coverage and lower returns on financial assets.

4.1.2 Studies Using a Comparison Metric or Survey Data to Analyze Retirement Adequacy

As noted in the previous section, several studies have developed metrics that can be used for assessing retirement preparation at the population level. Although some are based on simulations of the future, such as the EBRI Retirement Readiness Rating, others are based on projections from survey data. **Table 4** compares studies that employ comparison metrics, and **Table 5** compares studies using surveys to evaluate retirement adequacy.

Table 4
Major Retirement Adequacy Studies Using a Comparison Metric

Study [Sponsor]	Objective	Methodology	Metric and Conclusions
Munnell, Hou & Webb (2014) [Center for Retirement Research at Boston College]	Estimated percentage of the population that will not be able to maintain their pre-retirement standard of living	Estimates projected replacement rate for households (retirement income from all sources divided by pre-retirement income) and compares to a 75% target replacement rate	National Retirement Risk Index (NRRI) equals the percentage of households that fall more than 10% short of the target. Half of households at risk in 2013, only a slight improvement over 2010 SCF.
VanDerhei (2015) [EBRI]	Comparison metric that can be used to test the effects of policy initiatives	Uses Retirement Security Projection Model to project retirement period cash flows for U.S. households through death	Retirement Readiness Rating (RRR) equals percent who will not run out of money. Retirement Savings Shortfall equals present value of annual simulated shortfalls. About 60% of households are prepared for retirement.
Aon Hewitt (2016) [Aon Hewitt]	For employers, an assessment of the retirement readiness of career employees	Compares projected retirement resources and needs of 2.2 million career workers who participate in employer plans at 77 large U.S. companies	About 40% are on track to retire with sufficient retirement income to retire at age 65, and at least 35% are significantly short of the target.
Mutchler, Li & Xu (2016) [University of Massachusetts Boston & National Council on Aging]	Estimated percentage of certain retiree groups that are economically secure	Compares retiree income in American Community Survey PUMS data with the minimum needed to cover basic and necessary living expenses and age in their homes; separate calculations for couples and singles, and by geography	Elder Economic Security Index (EESI) measures the minimum needs for retirees living independently. More than half of older adults living alone and 26% of elder-couple households have annual incomes below the EESI.

Note: See References for complete citations for more details on each study. For most of the studies listed in this table, the sponsoring organization and/or authors have published multiple papers. The purpose of this table is to provide a broad overview of their methodology and conclusions, with a focus on more recent work.

The National Retirement Risk Index (NRRI), developed in 2004 by researchers at the Center for Retirement Research at Boston College, compares households' projected replacement rates with target rates that would allow them to maintain their pre-retirement consumption level. The NRRI is the percentage of all households that fall more than 10% short of their target, a measure that can be tracked over time for specific populations (Munnell et al. 2014). Based on the 2013 Survey of Consumer Finances (SCF) data, Munnell et al. conclude that more than half of all households are at risk of not having enough retirement income to retire at 65 and maintain their pre-retirement standard of living, consistent with results found with previous SCF surveys. It is important to note that the NRRI calculations make several assumptions that differ from other studies. First, they assume that all financial wealth, including housing equity, is converted to an inflation-adjusted stream of income. Second, they do not adjust consumption downward when children leave the home, resulting in higher target replacement ratios.

Table 5
Major Retirement Adequacy Studies Analyzing Survey Data

Study [Sponsor]	Objective	Methodology	Outputs/Conclusions
Aon Hewitt (2016) [Aon Hewitt]	Estimated percentage of workers who are preparing adequately for retirement	Compares projected retirement resources and needs of 2.2 million workers who participate in employer plans at 77 large U.S. companies	About 40% are on track to retire with sufficient retirement income to retire at age 65, and at least 35% are significantly short of the target.
American Council of Life Insurers (2017)	Assessment of financial security of American households	Analyzes data on 4,500 households in the Strategic Business Insights' MacroMonitor Survey; assigns weights to various financial decisions, some fixed and others age adjusted	Most households are in good shape, with 45% on track for retirement, 20% needing some improvement, and 35% needing significant improvement.
Brady, Burham, and Holden (2012) [Investment Company Institute]	Evaluation of the effectiveness of the U.S. retirement system	Analyzes SCF data for near-retiree households age 55–64 on retirement resources and income; compares with previous cohorts of retirees	The system is in good shape, with retirement assets increasing over time, high rates of home ownership, lower elder poverty rates, and most able to maintain their standard of living in retirement.

Note: See References for complete citations for more details on each study. For most of the studies listed in this table, the sponsoring organization and/or authors have published multiple papers. The purpose of this table is to provide a broad overview of their methodology and conclusions, with a focus on more recent work.

The Aon Hewitt Real Deal study analyzed retirement readiness for 2.1 million employees of 77 large U.S. employers. The study estimates target retirement savings as a multiple of final pay (11 times final pay at age 65, on average) and compares this with projected financial resources based on current savings behavior. The authors project that only 22% will retire with sufficient resources and 35% will be significantly short of the target. Since these results are for full-career contributing employees, the results are significantly worse for noncontributors and midcareer hires. Extending the working years can improve these outcomes, but even at age 75, 16% would not have adequate resources, based on their current savings behavior.

The Elder Economic Security Standard Index (EESI) defines retirement adequacy much less generously than other studies as the income level at which elders are able to cover basic and necessary living expenses and age in their homes. Because this analysis uses a community-based measure of household income, it is able to capture differences in regional costs of living. By this measure, Mutchler et al. (2016) conclude that half of older adults living alone (range by state is 45% to 63%), and one in four in two-person households (range by state, 15% to 34%) lack the financial resources to pay for basic needs.

Considering this research as a whole, the results of papers summarized in Tables 3, 4 and 5 suggest that 30% to 40% of U.S. households are at risk of not having an “adequate” retirement. For the country as a whole, 70% success might be acceptable, but a 30% failure rate may not be acceptable to those in the 30%.

4.2 COMPARISON OF THE MAJOR STUDIES BASED ON MEASUREMENTS OF NEEDS AND RISKS

Two of the most striking differences between recent studies on retirement adequacy are the variation in approaches to measuring needs and the variation in treatment of post-retirement risks in the models. Some of these differences can be attributable to the goals of the stakeholders sponsoring the research, as this will influence the data used to develop assumptions and the level of granularity required in the conclusions.

4.2.1 Measurement of Needs

With only a few exceptions, a consistent feature of the retirement adequacy studies is that the stated goal is to determine whether individuals and/or households can maintain their pre-retirement standards of living. For some households, the pre-retirement standard of living may actually be poverty-level subsistence, in which case meeting that bar does not necessarily imply an adequate retirement. Exceptions to the standard of living approach include Hurd and Rohwedder (2011), which identifies the objective as meeting consumption needs, the minimum needs measures used by the National Council on Aging (Elder Economic Sufficiency Index) and the Stanford Center on Longevity. However, the measurement of the standard of living differs substantially across the studies. **Table 6** summarizes the different needs measures used in the major studies.

Table 6
Comparison of Retirement Adequacy Studies: Measurement of Needs

Study [Sponsor]	Measurement of Needs
VanDerhei (2014a) [EBRI]	Maintain pre-retirement standard of living , measured as regular expenses (from the CES) and stochastic uninsured health care and long-term care costs until death.
Bajtelsmit et al. (2015) [SOA]	Maintain pre-retirement standard of living based on adjusted pre-retirement income (CES); thereafter, model regular expenses, discretionary expenses and stochastic risks separately.
Hurd & Rohwedder (2011) [MRRC]	Pay for postretirement consumption needs based on actual consumption by retirees in the HRS CAMS.
Favreault, et al. (2012) [Urban Institute]	Maintain pre-retirement standard of living , measured as 75% of average pre-retirement earnings, estimated by aging younger households in the SIPP.
Munnell, Hou & Webb (2014) [CRR]	Maintain pre-retirement standard of living based on SCF consumption data.
Aon Hewitt (2016) [Aon Hewitt]	Maintain pre-retirement standard of living based on percentage of pre-retirement income. Target expressed as a replacement ratio for the first year of retirement or wealth that is 11 times pre-retirement income.
Stanford Sightlines	Minimum required to meet basic needs.
Mutchler, Li & Xu (2016) [UMass Boston & NCOA]	Minimum required to meet basic needs (EESI).

4.2.2 Risks Modeled or Analyzed in the Major Studies

As discussed in an earlier section of this report, retirees face numerous post-retirement risks and shocks that can easily derail their spending plan. The distribution of lifetime expenses exposes retirees to tail risks that are difficult to estimate and plan for. How should these factors, such as uninsured medical expenses, the cost of long-term care, inflation risk and investment risk be accounted for in whether households are adequately prepared for a successful retirement? In addition to individual risks, systemwide changes, such

as cuts in Social Security benefits or changes in tax rules, could affect retirement cash flows. Simple replacement ratio models are unable to address these issues adequately, but simulation models are ideally suited to incorporating risk factors.

With a simulation model, a researcher can incorporate many different risks and estimate probabilities of success or failure. In contrast, deterministic modeling focuses on a single situation with one set of results. Either can be run with different assumptions, e.g., change in retirement ages or more favorable investment returns. How much difference does it make to model expenditures with a full probability distribution rather than just taking the average expenditure? Hurd and Rohwedder (2010) found that changing their model from fixed health costs to a random draw from a distribution of out-of-pocket health expenditures reduced the proportion of households who were economically prepared for retirement by several percentage points. This result would also be true for other types of risks that have skewed probability distributions (small probability of very large negative outcomes), such as the risk of an extended nursing home stay or the risk of financial-market crash. SOA focus groups and interviews with retirees and their children indicate that large long-term care expenses usually cause major problems with finances for middle-income retirees.

Key Point
 In assessing whether a household has sufficient resources to meet its needs, it is insufficient to consider only average expenses, because large expense shocks have a significant negative effect on retiree finances. Models that do not stochastically model these risks overstate retirement preparedness.

Table 7 provides a comparison of the major studies based on the inclusion of certain risks in their analysis, with a distinction made between studies that model the risk stochastically versus those that incorporate the risk using a single average value or table of values that varies by age or some other index.

Table 7
Comparison of Retirement Adequacy Studies: Risks Modeled or Analyzed

Study	Risks Included in Model					
	Investments	Inflation	Longevity	Long-Term Care	Health	Tax System
VanDerhei (2014a) [EBRI]	X		X	X	X	X
Bajtelsmit et al. (2015) [SOA]	X	X	X	X	X	
Hurd & Rohwedder (2011) [MRRC]	X*	X*	X	X	X	
Favreault et al. (2012) [Urban Institute]	X*	X	X*			
Aon Hewitt (2016) [Aon Hewitt]	X*	X*	X*		X*	
ICI/ACLI	X	X		X	X	

*Not modeled stochastically.

4.3 COMPARISON OF THE MAJOR STUDIES BASED ON MEASUREMENT OF INCOME SOURCES

As discussed in Section 3.2, retiree income can come from many sources. **Table 8** compares the major studies based on what they have included in their estimate of retiree income. Notably, even though continued employment income is relatively common after formal retirement, we have not included income from employment in this table because none of the studies except Bajtelsmit et al. consider phased retirement and part-time employment options. Where studies have assumed that financial wealth is

converted to income (e.g., Munnell et al.), we have included these in the column for withdrawal from tax-deferred saving. Only the VanDerhei and Hurd models incorporate required minimum distributions (RMDs). According to SOA focus group research, many retirees use the RMD to determine annual withdrawals from tax-sheltered accounts, but they may not actually treat the withdrawal as income.

Table 8
Comparison of Retirement Adequacy Studies: Assumed Retirement Income Sources

Study	Primary Sources for Income Source Assumptions	Assumed Income Sources in Retirement				
		Defined-Benefit Pension	Social Security	Withdrawal from Tax-Deferred Saving	Home Equity	RMDs
VanDerhei (2014a) [EBRI]	CES, EBRI/ICI database	X*	X	X		X
Bajtelsmit et al. (2015) [SOA]	SCF and CES	X*	X	X (as needed to meet expenses)	X (reverse mortgage, downsizing, or sale to pay for LTC)	
Hurd & Rohwedder (2011) [MRRC]	HRS CAMS	X*	X	X (assume 4% drawdown)		X
Favreault et al. (2012) [Urban Institute]	SIPP	X*	X	X	X	
Munnell, Hou & Webb (2014) [CRR]	SCF	X	X	X (spread over assumed lifetime)	X (imputed rent)	
Aon Hewitt (2016) [Aon Hewitt]	Survey data from 77 large U.S. firms for full-career employees (30+ years)	X	X	X (spread over assumed lifetime)		
ACLI, ABC & ACLI (2013)	Data from various surveys, including SCF, HRS-CAMS, CPS, NBS, PSID, CEX, UPC and EBRI/ICI	X	X	X	X	

*Only in some modeled scenarios.

4.4 COMPARISON OF THE MAJOR STUDIES BASED ON POPULATION SUBGROUPS CONSIDERED

Nearly all of the studies discussed in this report focus primarily on assessment of retirement adequacy for broad population groups. Thus, their conclusions are not necessarily generalizable. In cases where comparisons are made, it is clear that breaking down results by subgroup is very important. Elder singles, for example, are generally worse off in retirement than couples. Higher-income households are usually better off than lower-income households. Those who retire later are often better off than those who retire earlier.

Table 9 identifies the population subgroups that have been considered or compared in the major retirement adequacy studies. Despite the wide range of studies, there has been little research that sheds

light on retirement adequacy for vulnerable populations that we would expect to be particularly at risk. These overlooked groups include the following:

- Long-term disabled
- Long-term unemployed
- Divorced
- Widowed

Table 9
Comparison of Retirement Adequacy Studies: Special Populations Considered

Study [Sponsor]	Gender and Marital Status	Age	Income	Geography
VanDerhei (2014a) [EBRI]	Single males and females	Considers different ages and averages by generations	Various income levels	National and some states
Bajtelsmit et al. (2015) [SOA]	Married couples	Simulation begins at ages 63–66	Median and 75th percentile	National average households
Hurd & Rohwedder (2011) [MRRC]	Households	Immediately after retirement at age 67–69 and spouse 62+	HRS CAM 2008 sample	National
Favreault, et al. (2012) [Urban Institute]	Households	Baby-boomer households until death	HRS sample	National
Munnell, Hou, and Webb (2014) [CRR]	Married couples and singles	All preretirees in sample	Bottom, middle and top tercile of income; 1- and 2-earners	National
Aon Hewitt (2016) [Aon Hewitt]	Single males and females	All preretirees in sample	\$20,000–\$90,000	National and some states
ICI/ACLI	Married couples and singles	Near-retirees aged 55–64	Various income levels; excludes bottom and top 1% of income distribution	National

Key Points
 Existing retirement adequacy research has focused primarily on representative households and population averages, with very little focus on vulnerable population subgroups.

4.5 COMPARISON OF THE MAJOR STUDIES BASED ON OTHER ASSUMPTIONS

Many other differences in households and household financial decisions can affect retirement adequacy, and many of these can make a big difference in outcomes. With only a few exceptions, the following issues are largely ignored in the retirement adequacy studies:

- **Retirement timing.** Delaying retirement reduces the number of years of income that must be covered and allows continued contributions to and growth of retirement savings. Bajtelsmit et

al. (2015) show that target wealth at age 66 is significantly lower for households planning to retire at age 70.

- **Social Security claiming.** Delaying Social Security claiming from the normal retirement age to age 70 results in an 8% increase in benefits per year under current rules. Similarly, early claiming results in a reduced benefit. This choice can have a large impact on lifetime Social Security income, particularly for those who exceed the average life expectancy.
- **Phased retirement or continued work after retirement.** For many retirees, retirement is a process rather than a point in time. Most studies assume that retirement occurs at a particular age and do not incorporate continued income from employment in retiree income estimates. An exception is work by Bajtelsmit, Rappaport and Foster (2013b), which investigates many different retirement-phasing scenarios.
- **Purchase of annuities.** Although still more the exception than the rule, many experts suggest that retirees should annuitize at least a portion of their wealth to create guaranteed income to cover regular expenses. With relatively low wealth accumulation and the low-interest-rate environment of the last decade, annuities have not been a popular choice for retirees. This could change if there is increased awareness of the importance of lifetime income, and if rates and product offerings improve. Longevity annuities are a possible way of mitigating the risk of financial stress for the longest lived at modest cost, but they are not well understood or appreciated at present.
- **Purchase of long-term care insurance.** Only a small percentage of retirees report having long-term care policies in force. However, this insurance can reduce the depletion of financial assets for surviving spouses.
- **Risk of Social Security insolvency.** Despite the Social Security system being potentially unable to survive in its current form beyond the retirement of the baby-boom generation, most studies assume that the current system rules will be in effect. Not surprisingly, a future reduction in benefits results in a reduction in retirement preparation (VanDerhei 2015).
- **Housing choices.** Most retirees in recent generations have owned their own home and paid off their mortgages prior to retirement, resulting in much lower housing expenses in retirement. In recent years, however, the low-interest-rate environment has led many people in their 50s and 60s to refinance mortgages. If these mortgages are repaid at retirement, the annual expenses will be comparable, but financial assets will be lower. A second issue related to housing is whether retirees do or should downsize at retirement. Bajtelsmit et al. (2015) find that downsizing housing improves retirement outcomes to a small degree.

5: Major Themes Emerging from This Literature Review

The objective of this report is to carefully examine major retirement adequacy studies in an attempt to reconcile some seemingly contradictory conclusions about the health of the U.S. retirement system. Although some research concludes that most people will be able to retire comfortably, others argue that there is a current or pending crisis. Considering this research as a whole, the results of papers summarized in Tables 3, 4 and 5 suggest that 60% to 70% of U.S. households are on track to have an “adequate” retirement. Interpretation of this result depends to a large extent on the perspective you bring to the question: a 70% success rate may be acceptable for the overall system, but not for the individuals and households in the remaining 30%.

In this section, we summarize the major themes that have emerged from this literature review and identify the areas of agreement and discord. In comparing the research studies, we find that the differences in conclusions are attributable to multiple issues, including the following:

- Stakeholder perspective and purpose of the research
- Definition of retirement adequacy
- Methodology and data sources employed
- Post-retirement risks considered
- Subject populations studied
- Focus on a single-year measure versus the full retirement period

The most common definition of retirement adequacy used in this research is the ability to retire at conventional retirement ages and maintain a pre-retirement standard of living. Although there are different approaches to measurement, most studies evaluate the extent to which some measure of retirement income replaces some measure of pre-retirement income. Based on these replacement ratio approaches, many Americans are predicted to fall short of the goal, potentially necessitating downsizing, delayed retirement and/or continued work during retirement.

Because a replacement ratio is typically calculated at the beginning of retirement, it cannot incorporate the changes in spending that occur over the retirement period or shocks to financial resources. In contrast, models that simulate the entire retirement period can include these factors and therefore better estimate adequacy from an individual’s viewpoint. Using this type of methodology, however, produces conclusions similar to those based on simple replacement ratios: 30% to 40% of the population will not be able to sustain their standard of living throughout retirement.

Career employees at firms offering retirement plans are generally in good shape, because these plans combined with Social Security benefits replace a sufficient percentage of pre-retirement income to allow participants a satisfactory retirement. Therefore, from the perspective of plan sponsors, the retirement system can be deemed a success. At the lower end of the income spectrum, replacement rates are also acceptable, because Social Security and other social programs replace a sufficient percentage of earned income. Those predicted to fare worst in retirement are middle-income households without access to employer plans, non-homeowners and single people. Because most of the research has focused on population averages, certain vulnerable populations, including the disabled, long-term unemployed and divorced or widowed older women, have generally been ignored in this literature. Therefore, the results tend to understate the difficulties faced by these groups.

Survey and focus group evidence suggests that many retiree households are satisfied, despite having much lower income relative to their working years than would be defined as adequate in the models targeting a continued standard of living. When the adequacy objective is based on the ability to meet basic or minimum living expenses, a larger percentage of retirees will be able to meet this goal. The research suggests that the most appropriate measure of minimum needs is approximately two times the federal poverty level.

With few exceptions, the research does not adequately capture the effects of various pre- and post-retirement risks on retirement cash flows. These risks include the following:

- Health events that require extensive out-of-pocket spending
- Extended period of paid long-term care
- Financial-market downturns, particularly if early in retirement
- Large household and vehicle repairs
- Extended period of unemployment or disability prior to retirement
- Financial support required by a family member
- High debt load
- Divorce during retirement
- Death of spouse

6: Putting the Research Results in Perspective

The primary goal of this report is to summarize the existing research on retirement adequacy, so that readers can better understand the seemingly conflicting conclusions about the health of the U.S. retirement system. Interpretation of these results can benefit from a broader social context. In this section, we consider factors that may both temper and exacerbate the future of retirement in the United States, and we offer some thoughts on how the U.S. retirement system should or could be judged.

6.1 UNDERSTANDING INDIVIDUAL BEHAVIORS: RESULTS FROM SOA POST-RETIREMENT RISK RESEARCH

Each of the studies we have compared in this report uses a particular measure of adequacy, but the common theme is that an adequate retirement is one that allows people to maintain their standard of living. Many models also assume that financial wealth at retirement will be converted into a regular stream of income to support retirement spending. It turns out that these assumptions about level of spending and method of asset drawdown are not at all consistent with how retirees actually make spending and consumption decisions.

To better understand the experiences of retirees, the Society of Actuaries Committee on Post-Retirement Needs and Risks has regularly surveyed retirees in their biannual Needs and Risks Surveys, most recently in 2017. The committee also conducted focus groups or in-depth interviews with relatively recent retirees (10 years or less), mid-retirees (15 years or more) and older retirees (over 85 years old) in 2013, 2015 and 2017, respectively. This research found that even though most of the participants are spending less in retirement than before retirement, they are for the most part quite content. Most households focus on covering expenses from regular income, and avoid dipping into savings as much as possible. With limited financial resources, on average, these households have very little cushion for large unexpected expenses and often have no plan for how they will manage financial shocks if they do occur. Research participants report being able to adapt to small financial emergencies but not to a major long-term care event requiring ongoing substantial paid care, divorce after retirement or children requiring long-term and ongoing help.

There are two important takeaways from the SOA focus group and survey research. On the positive side, it raises questions about the relationship of traditional adequacy measures to satisfaction in retirement. If retirees are happy to live more conservatively than they did during their working years, this may imply that a more appropriate metric for assessing adequacy is something less than the pre-retirement standard of living, perhaps even a minimum needs standard. On the negative side, the fact that surveyed retirees have little savings and no plan for dealing with long-term care expenses or other large financial shocks is a serious concern. Whereas small unexpected expenses can be dealt with by short-term cutbacks in other areas, these financial shocks can completely derail retirement finances. This can be particularly problematic for the surviving spouse if the household has spent down resources for the deceased's care. In our opinion, any study of retirement adequacy that does not consider the impact of financial shocks is missing an important piece of the puzzle.

Key Point

Interview, focus group and survey data show that most retirees are frugal and are satisfied with a lower standard of living in retirement than what is considered adequate in most research studies. However, the potential for unexpected large expenses or shocks to deplete financial resources is often overlooked.

6.2 TRENDS THAT WILL AFFECT RETIREMENT OF FUTURE GENERATIONS

Although many of the research studies discussed in this report focus on households closer to retirement age, several consider retirement preparation of younger generations and find them to be generally in worse shape than older generations. To make this assessment, the researcher must make assumptions about income, spending and saving behavior of younger workers over their working career, which is admittedly speculative. However, the effort is worthwhile, given that forewarned is forearmed: these younger cohorts have sufficient time to make spending and saving decisions that improve on the currently pessimistic predictions.

Why might younger generations be more challenged than current retirees? Many secular trends contribute to this outcome, including the following:

- **Increased longevity.** Without corresponding increases in retirement ages, increased longevity results in longer retirement periods, requiring greater saving.
- **Changes in household demographics.** Millennials are marrying later, taking on more student loan debt, saving less, and buying homes later, if at all.
- **Social Security solvency.** If there are future reductions in Social Security Benefits, this will reduce replacement ratios.
- **Fewer defined-benefit plans.** The shift from defined-benefit to defined-contribution plans means that fewer future retirees will have lifetime income from employer retirement plans.
- **Changing employment landscape.** More employment at smaller employers and self-employment through independent contracting and the gig economy may mean fewer will have career employment at a firm that sponsors a retirement plan. Employers may also be more willing to downsize than in the past, reducing job security.
- **Flat real earnings.** Particularly for lower- and middle-income households, flat real earnings makes it more difficult for households to meet expenses and save.
- **Greater concentration of wealth.** Increasing concentration of income and wealth means that the median household is much worse off than the average.
- **Tax reform.** Although lower tax rates could result in higher savings rates, the new tax law reduces the tax incentives for home ownership. Future generations may also have to deal with the impact of greater budget deficits and government debt.

Key Point

Future cohorts of retirees may have a more difficult situation than today's retirees given current trends.

6.3 HOW SHOULD THE U.S. RETIREMENT SYSTEM BE JUDGED?

In our opinion, a healthy retirement system should include three elements: a safety net for its most vulnerable citizens (including assistance with both income and health care), opportunities for individual savings (including home equity), and access to employer-sponsored retirement plans. A recent report from the Government Accountability Office evaluates these three pillars in the United States and finds them lacking because of too much reliance on Social Security, too little personal saving, and lack of access to employer plans for many workers. Some of the factors contributing to the problems include slow wage growth, high levels of household debt, increased longevity and the decline of traditional defined-benefit plans (U.S. GAO, 2017).

A retirement system can be judged on the basis of how well it serves people with longer-term employment, or it can be judged based on the economic status of older Americans. The U.S. system is centered on people with work histories (e.g., qualification for Social Security, IRA contributions, employment retirement benefits).

The private retirement system should be considered in light of what it does for those with substantial work histories and how it provides for a transition from work to retirement. The total public system may be judged more on the basis of the economic status of the overall elderly population.

People with low or no earnings can be a major challenge if keeping people out of poverty is the goal. The two basic methods that might be used to provide for people without earnings are establishing a minimum benefit amount and providing pay-related per person “demogrants.” U.S. Social Security benefits are slanted to the lower paid, with the formula providing a relatively much larger benefit replacement for the first tier of earnings, as well as a minimum. Measures of success for this group could include the percentage who are living above an established poverty rate or another minimum needs measure, and the way these percentages change over time.

7: Conclusions and Recommendations for Future Research

In the last several years, many studies have looked at retirement adequacy and retiree well-being. In this report, we review recent studies that evaluate these issues. They originate from various perspectives: employers and plan sponsors who are interested in the adequacy of their retirement plan offerings, government and policy makers who are interested in the health of the system as a whole, and individual households and their financial advisers, who are interested in whether the client will have a financially successful retirement. Although approaches and measurement of adequacy in these studies differ depending on the perspective of the researcher and the objectives of the research study, the results fairly consistently tell a story of haves and have-nots in the U.S. retirement system. Although most U.S. workers will be able to meet their retirement needs, a substantial portion will face challenges in doing so.

After careful consideration of this body of research, it is clear that the U.S. retirement system lies somewhere between crisis and serendipity. The research shows that a large majority of Americans are on track to support a reasonably comfortable retirement. The people who are at least risk are those in the highest-income groups, who have many types of income and assets to support their retirement, and those who have participated in employer-sponsored pensions and retirement plans throughout their career. For the lowest-income groups, Social Security will replace a substantial proportion of pre-retirement earned income. Those who face the greatest challenges include vulnerable populations, such as the disabled, widowed, divorced, long-term unemployed and people employed in industries or jobs that typically do not provide retirement benefits to workers. These groups tend to be underrepresented in existing research studies, and their specific needs are not recognized.

Based on this literature survey, our main overall conclusions and recommendations for future study are as follows:

- The current system of voluntary employment-based retirement plans has been largely successful from the perspective of companies sponsoring plans for individuals with long-term employment covered by such plans. Although more might be done to encourage higher savings rates, and the shift from defined-benefit to defined-contribution plans may reduce retirement adequacy for younger generations, employer retirement plans are an important pillar of the retirement system.
- Similarly, the mandatory Social Security system has done much to reduce poverty in old age. However, adequacy studies using replacement ratios may overstate the success of this safety net for those in the lowest-income groups, because too many rely solely on Social Security as their sole source of support and therefore do not have any financial cushion to meet emergencies. Given that reliance, it will be important to assess solvency issues in a way that continues to protect our most vulnerable citizens.
- For households without access to employer retirement plans, Social Security will still provide a base level of lifetime inflation-adjusted income, but this alone will not allow these households to maintain their pre-retirement standard of living. Considering the generally low levels of household wealth, these households will usually need some combination of delayed retirement and Social Security claiming, continued paid work at older ages, increased saving, downsizing of their spending, and reliance on family to meet their retirement needs.
- Although a lot of research has focused on median or typical households, there is a need for future research that delves into the retirement challenges of particularly vulnerable populations, such as those who are widowed, disabled or long-term unemployed.

- The significant differences in methodologies that are used in retirement adequacy research make direct comparisons of results more difficult. Some important distinctions based on assumptions in the models include the following:
 - Most studies do not adequately account for major unexpected expenses or shocks, such as poor investment performance, long-term care, death of a spouse and unexpected out-of-pocket medical expenses. If these risks are not included in the models, the results will tend to overstate the degree of adequacy in the system.
 - Most studies assume that the adequacy objective is to maintain pre-retirement living standards. If retirees are satisfied and reasonably happy with a lower level of spending, this assumption may understate the degree of adequacy in the system.
 - Most studies assume that people retire at a “normal” retirement age. Important issues omitted from many of the studies include the impact of changes in retirement ages, phased retirement and work during retirement.
 - Studies differ significantly in their treatment of housing wealth. If housing wealth is accessible to meet retirement needs, overall adequacy is higher.
 - Most studies focus on the retirement adequacy of current and near retirees. Future cohorts of U.S. retirees may face more difficulty than today’s retirees because of demographic issues, high debt load, lower likelihood of being married and owning a home, future reforms to Social Security, shifts in employment, and changes in the structure of employee benefit plans.

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Glossary

Annuity: A fixed sum of money that is paid to someone each year. A person can use some of his or her retirement wealth to buy the right to receive payments in retirement, either for a fixed period of time or for life.

Defined-benefit plan: An employer retirement plan that promises retirees a benefit at retirement that usually depends on years of service and final average salary.

Defined-contribution plan: An employer retirement plan in which the employer promises to make contributions to a retirement account for an employee. Account accumulation depends on contributions made and investment returns earned on plan balances.

Disability risk: The risk that a person will have a physical or mental condition that limits the person's movements, senses or activities. If disability limits the income that can be earned through paid employment, it may also result in lower savings and reduced participation in employer retirement plans.

Drawdown: The act of withdrawing money from savings during the retirement period.

Inflation risk: The risk that a general increase in the prices of goods or services will result in reduced purchasing power for those on fixed incomes.

Investment risk: The risk that invested assets will not earn their expected return, as a result of fluctuation in the value of invested assets over time.

Longevity annuity: Annuity where payments are deferred and start at a high age such as 80 or 85 and continue for life. These annuities offer a form of insurance protecting against long life.

Long-term care: Services and support required to meet the medical and nonmedical needs of people who cannot completely care for themselves for long periods.

Pension: An employer defined-benefit retirement plan that promises retirees a benefit at retirement that usually depends on years of service and final average salary.

Plan sponsor: An employer or company that sets up a retirement plan for the benefit of the organization's employees, determine eligibility for the plan, and, in most cases, contribute funds to the plan. Some plan sponsors directly manage plan assets, but most use third-party administrators and money managers.

Required minimum distribution (RMD): The amount of a tax-deferred account that must be withdrawn each year following the year in which the account holder reaches the age of 70½. This IRS rule is designed to spread the withdrawals over the person's remaining lifetime.

Simulation: A scientific computer or mathematical model that incorporates estimates of the effects of future unknown events or hypothetical outcomes. For retirement simulations, researchers forecast future income and expenses for one or more households, incorporating known information about the household's finances and risk exposures. Risks are often modeled stochastically, using probability distributions to estimate risky events or outcomes, e.g., using a random draw from historical investment returns in each year of a life path.

Stochastic: Involving a randomly determined process or outcome; commonly implemented with a Monte Carlo model in which the realization of a particular variable (such as investment return, inflation or mortality) is determined by a random draw from a known probability distribution such as the normal, binomial or exponential.

Tax-deferred retirement plan: A retirement plan authorized by the IRS that allows employers and/or employees to make contributions to the plan from pretax earnings. Taxes are owed when the funds are withdrawn in retirement.

About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world, dedicated to serving 28,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public-policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policy makers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public-policy makers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policy makers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public-policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

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Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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