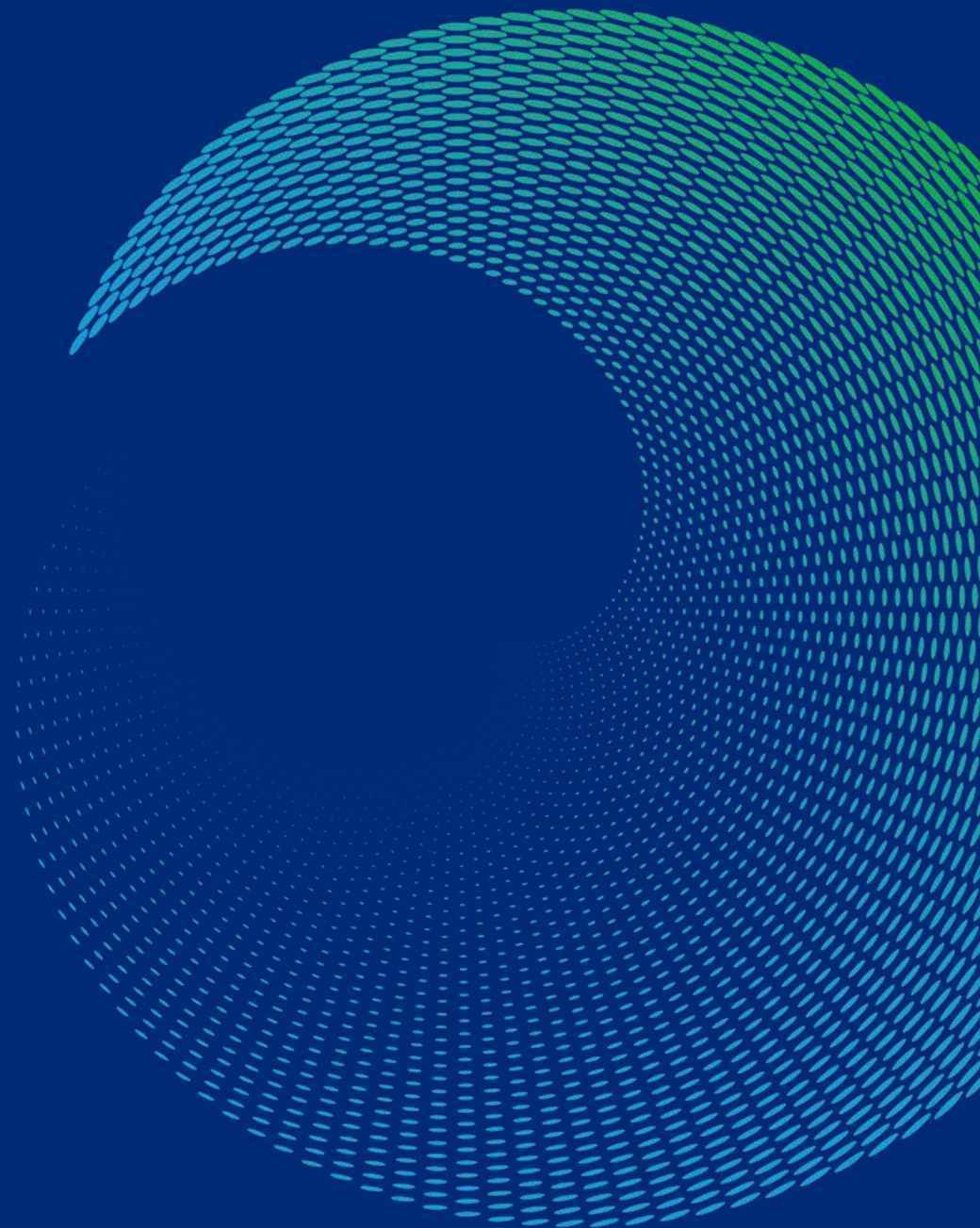




# Mercer CFA Institute Global Pension Index 2023

Feature chapter: The growing  
impact of AI on pension systems  
and their members

welcome to brighter



# Contents

# 01. Mercer preface

Retirement income systems around the world are under pressure as never before. Several factors are emerging that will affect the long-term efficacy of these systems.

The demographic structure of most countries is changing significantly as birth rates continue to fall. This development has major consequences for pay-as-you-go pension arrangements, which rely on the next generation of taxpayers to fund the pensions paid to previous generations. Many governments will need to tackle the very tricky issues of reducing the benefits or increasing the eligibility age for these pensions.

Inflation has also reemerged and has damaged the community's confidence in the ability of pension programs to deliver adequate retirement benefits over the longer term. Although inflation may be falling in some economies, its reemergence has highlighted this risk to current and future retirees.

At the same time, we are witnessing the ongoing global trend of moving from defined benefit (DB) to defined contribution (DC) arrangements, in which

individuals carry all the risks relating to investment returns, inflation and, often, longevity. Very few systems have solved the dilemma of how to move from an individual-based DC accumulation system to a postretirement system that provides adequate and secure income to retirees while also providing them with the same flexibility that was available during their working years.

An ongoing challenge facing many pension systems is the inclusion of gig workers and those in the informal labor market. In many economies, the labor market is becoming fractured so that the stable or structured employer-employee relationship is disappearing. In such circumstances, the pension arrangements must become more individually focused and less reliant on third parties. Technology may be part of the answer to improving pension coverage, but this also requires strong government leadership.

Planning for the long term is therefore more critical than ever.

The Mercer CFA Institute Global Pension Index 2023 compares 47 retirement income systems with regard to adequacy, sustainability and integrity. Or, to put it another way:

- What benefits are future retirees likely to receive?
- Can the existing systems continue to deliver, notwithstanding the demographic and financial challenges?
- Are the private pension plans regulated in a manner that encourages long-term community confidence?

The primary objective of the research covered by this report is to benchmark each retirement income system using more than 50 indicators.

An important secondary purpose is to highlight some shortcomings in each system and to suggest areas of reform that would provide more adequate retirement benefits, increased sustainability and greater community trust in the pension system. These include:

- Increasing the coverage of many private pension systems
- Encouraging people to work a little longer
- Increasing the level of funding set aside for retirement
- Reducing leakage from the system before retirement
- Improving disclosure and transparency to pension plan members

This year's report also tackles an emerging technological development that will affect everyone — the impact of artificial intelligence (AI) on pension systems and their members. Although there are many aspects of this development, AI will affect the operations of pension systems around the world. It has the potential to greatly improve the member experience as well as members' retirement outcomes. However, it is not without significant challenges and risks, some of which are explored in Chapter 4.

I am delighted to recognize CFA Institute as our major sponsor and sincerely thank the Institute for its enthusiasm and participation. The Index is a real partnership between two respected global organizations.

I would also like to thank the members of our Advisory Board, established by the Monash Centre for Financial Studies, for their continued involvement and valuable insights.

Finally, I am very grateful to the Mercer consultants and our other correspondents around the world who have been invaluable in providing information about their retirement income systems and checking our interpretation of the data. We also appreciate the support of the Finnish Centre for Pensions, the Icelandic Pension Funds Association, the Association of Pension Funds Management Companies and Pension Insurance Companies in Croatia, and the Unified Accumulative Pension Fund of Kazakhstan.

This second edition of the 2023 Index report has been updated to reflect new information. These revisions do not change the overall index grade for any system.

We hope you enjoy reading this report and that it continues to encourage pension reform to improve the provision of financial security for all retirees.



**Dr. David Knox AM**  
Lead author and Senior Partner, Mercer



# 01. CFA Institute preface

CFA Institute is honored to sponsor the Mercer CFA Institute Global Pension Index and to again collaborate with Mercer and the Monash Centre for Financial Studies to continue to develop and distribute this important research on a topic of significant importance around the world.

We at CFA Institute believe an urgency exists to address the very real challenges that persist throughout the globe in relation to pensions. Each year, this index serves as a critical reminder that there is a long way to go in many jurisdictions to make pension schemes function at their best and for the long-term financial security of beneficiaries. Pension systems and retirement plans also serve as vital aspects of the capital markets, and yet the effectiveness of these systems varies significantly.

The average age of populations around the world continues to rise, particularly in more mature markets. Mounting inflation and rising interest rates have created a new market dynamic that poses significant challenges to pension plans. And we see continued fracturing as it relates to deglobalization. These are just a few of the increasingly complex challenges pension funds face, which, in turn, impact the end-beneficiaries in significant ways. More and more often, it is becoming evident that individuals will have an increasingly important role to play regarding their own retirement. We as investment professionals need to help them prepare for that inevitability.

This year, the report also examines important technological advances that are creating opportunities, as well as new challenges, throughout the financial services industry: namely, artificial intelligence as one example. The potential impact of AI on the pensions industry is likely to be widespread. It may unlock

and enable capabilities that end-beneficiaries will benefit from, and it may optimize the role of investment professionals who are investing on their behalf. Much remains to be seen as to understanding the nature and the scale of the impact AI will have, but we are committed to helping the industry understand these developments as they unfold. Research such as this report contributes to that goal.

At CFA Institute, we hold ethics at the center of all we do. The same is true of working with AI in the investment industry. While we are learning how to integrate AI into our processes, we must consider each decision through an ethical lens. Humans will continue to play a critical role in the investment industry, providing oversight and application for AI technologies. We believe the combination of human intelligence and artificial intelligence will benefit our industry as a whole.

On behalf of our organization, I would like to extend our thanks to Dr. David Knox of Mercer and the entire Mercer team who work tirelessly on the Mercer CFA Institute Global Pension Index every year. We also thank the Monash Centre for Financial Studies for their continued dedication to the accuracy of the Index. We know this requires an immense amount of work each year; however, the benefits of examining pension schemes on a global scale remain hugely valuable for the betterment of this industry.



**Margaret Franklin, CFA**  
President and CEO, CFA Institute

## 02. Executive summary

The provision of financial security in retirement is critical for both individuals and societies as most countries are now grappling with the social, economic and financial effects of aging populations. As the World Economic Forum has noted: “For the first time in human history, people aged 65 and over outnumber children aged five or younger.”<sup>1</sup>

In the post-pandemic world, retirees are also facing increasing risks with the reemergence of inflation and rising interest rates, which increase the cost of existing government debt and therefore the ability of some governments to continue with their current level of services. In addition, there is growing geopolitical uncertainty, which inevitably affects investment returns.

As the OECD notes: “The current financial and economic uncertainty as well as the rising cost of living may lead policy makers, regulators and supervisors to postpone reforms that could improve their pension systems. However, delaying needed reforms would put at risk the well-being of current and future pensioners.”<sup>2</sup>

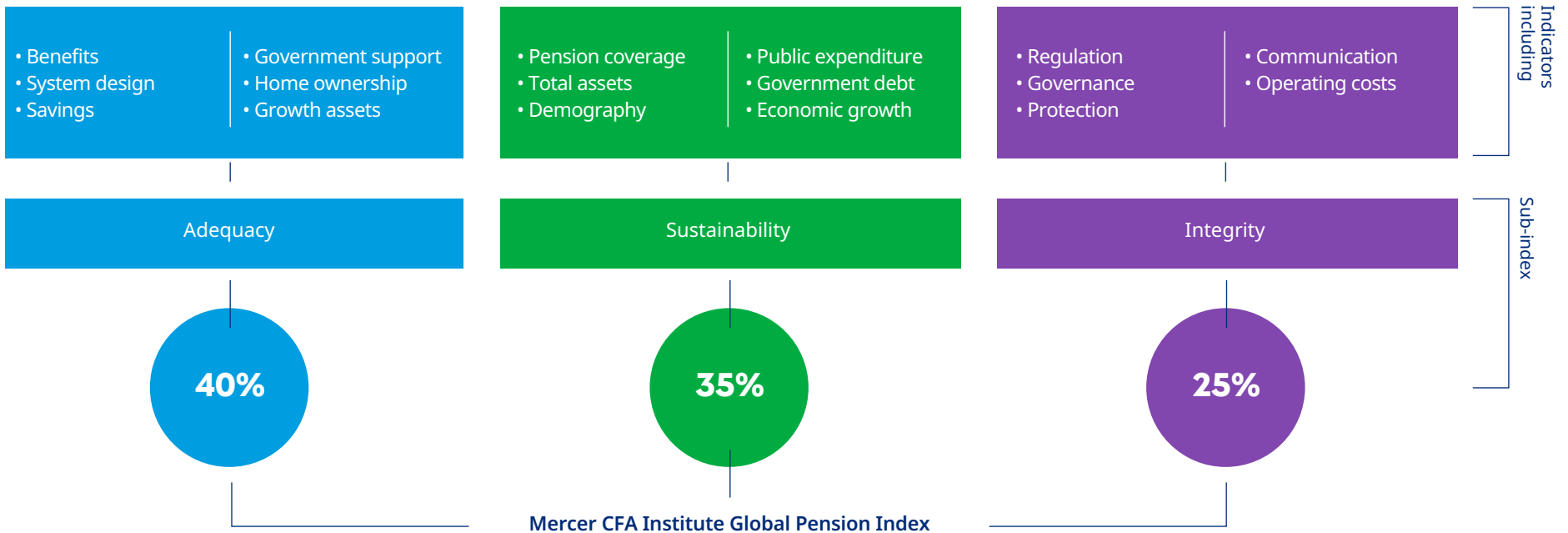
Within this context of uncertainties and long-term challenges, a comparison of the different pension systems around the world can be invaluable for policymakers, governments and the pension industry itself. Yet such a comparison is not straightforward.

As the OECD comments: “Retirement-income regimes are diverse and often involve a number of different programmes.”<sup>3</sup>

Any comparative ranking of systems is likely to be controversial as each system has evolved from particular economic, social, cultural, political and historical circumstances. This means there is no single system that can be transplanted from one country and applied, without change, to another. However, certain features and characteristics are likely to lead to improved financial benefits for the older members of society, an increased likelihood of future sustainability of the system, and a greater level of community trust and confidence.

With these desirable outcomes in mind, the Mercer CFA Institute Global Pension Index (the Index) uses three sub-indices — adequacy, sustainability and integrity — to measure each retirement income system against more than 50 indicators. The following diagram highlights some of the topics covered in each sub-index.

**Figure 1. Calculating the Mercer CFA Institute Global Pension Index**





The overall index value for each system represents the weighted average of the three sub-indices. The weightings used are 40% for the adequacy sub-index, 35% for the sustainability sub-index and 25% for the integrity sub-index. These have remained unchanged since the first Index was published in 2009.

The different weightings used reflect the primary importance of the adequacy sub-index, which represents the benefits provided, together with some important system design features. The sustainability sub-index has a focus on the future and uses various indicators that will influence the likelihood that the current system will be able to provide benefits in the future. The integrity sub-index includes many legislative requirements that influence the overall governance and operations of the system, which affect the level of confidence that the citizens of each country have in their system.

With the inclusion of Botswana, Croatia and Kazakhstan in 2023, this study now includes 47 retirement income systems, representing 64% of the world's population. This demonstrates the great diversity between the systems around the world, with the index scores ranging from 42.3 for Argentina to 85.0 for the Netherlands.



## This year's results

Figure 2. Summary of the 2023 results

Grade	Index value	Systems	Description
A	>80	Netherlands Iceland Denmark Israel	A first-class and robust retirement income system that delivers good benefits, is sustainable and has a high level of integrity
B+	75–80	Australia Finland Singapore	A system that has a sound structure, with many good features but has some areas for improvement that differentiate it from an A-grade system
B	65–75	Norway Sweden UK Switzerland Canada Ireland Chile Uruguay Belgium New Zealand Portugal Germany	
C+	60–65	Kazakhstan Hong Kong SAR US UAE Croatia France Colombia Spain	A system that has some good features but also has major risks and/or shortcomings that should be addressed; without these improvements, its efficacy and/or long-term sustainability can be questioned
C	50–60	Saudi Arabia Poland Japan Italy Malaysia Brazil Peru China* Mexico Botswana South Africa Taiwan Austria Indonesia Korea (South)	
D	35–50	Thailand Turkey India Philippines Argentina	A system that has some desirable features but also has major weaknesses and/or omissions that need to be addressed; without these improvements, its efficacy and sustainability are in doubt
E	<35	Nil	A poor system that may be in the early stages of development or nonexistent

\*In this report, "China" refers to the pension system in mainland China. The results for Hong Kong SAR and Taiwan are shown separately as they have different pension systems.



This study shows that the Netherlands, Iceland, Denmark and Israel have the best systems, each of them receiving an A grade in 2023. Although the Netherlands is currently undertaking significant pension reform, moving from a mostly collective benefit structure to a more individual DC approach, its system has received the highest index value in 2023. The reason for this rating is that, notwithstanding these changes, the system will continue to provide very good benefits, supported by a strong asset base and very sound regulation.

No system in this year's Index is an E-grade system, which would be represented by an index value below 35. A score between 35 and 50, representing a D-grade system, indicates a system that has some sound features but also major omissions or weaknesses. A D-grade classification may also occur in the relatively early stages of the development of a particular retirement income system.

Figure 3 below shows the overall index value for each system, together with the index value for each of the three sub-indices: adequacy, sustainability and integrity. Each index value represents a score between 0 and 100.

**Figure 3. Overall index value for each system, including the three sub-indices**

System	Overall index value	Sub-index values		
		Adequacy	Sustainability	Integrity
Argentina	42.3	56.3	29.5	37.8
Australia	77.3	70.7	78.4	86.1
Austria	52.5	66.8	22.6	71.6
Belgium	68.6	82.0	39.4	88.2
Botswana	54.5	39.8	52.8	80.6
Brazil	55.7	70.4	28.5	70.1
Canada	70.2	71.1	64.5	76.7
Chile	69.9	60.0	71.3	84.0
China	55.3	64.2	39.0	63.7
Colombia	61.9	62.9	55.4	69.3
Croatia	62.3	57.1	56.0	79.3
Denmark	81.3	82.5	82.5	77.8

System	Overall index value	Sub-index values		
		Adequacy	Sustainability	Integrity
Finland	76.6	77.4	65.6	90.9
France	62.0	84.5	41.8	54.4
Germany	66.8	79.8	45.3	76.3
Hong Kong SAR	64.0	51.9	61.1	87.6
Iceland	84.8	85.5	83.8	85.0
India	45.9	41.9	43.0	56.5
Indonesia	51.8	41.6	50.6	69.8
Ireland	70.2	77.1	54.4	81.1
Israel	80.8	77.0	82.7	84.4
Italy	56.3	72.7	23.7	75.9
Japan	56.3	59.2	46.5	65.6
Kazakhstan	64.9	46.9	74.8	80.0
Korea (South)	51.2	39.0	52.7	68.5
Malaysia	56.0	44.3	56.1	74.6
Mexico	55.1	63.5	58.4	37.0
Netherlands	85.0	85.6	82.4	87.7
New Zealand	68.3	65.6	64.3	78.3
Norway	74.4	79.4	59.1	87.8
Peru	55.5	55.0	50.4	63.5
Philippines	45.2	41.8	63.2	25.7
Poland	57.6	59.8	45.4	71.2

System	Overall index value	Sub-index values		
		Adequacy	Sustainability	Integrity
Portugal	67.4	86.7	32.0	85.9
Saudi Arabia	59.5	61.5	54.9	62.9
Singapore	76.3	79.8	71.6	77.0
South Africa	54.0	44.2	49.1	76.6
Spain	61.6	79.7	28.5	79.2
Sweden	74.0	72.1	75.6	75.0
Switzerland	72.0	69.6	70.6	77.9
Taiwan	53.6	47.6	52.9	64.1
Thailand	46.4	45.4	42.2	53.9
Turkey	46.3	46.5	31.1	67.3
UAE	62.5	72.2	45.4	70.8
UK	73.0	77.3	62.7	80.6
Uruguay	68.9	84.0	46.2	76.5
US	63.0	66.7	61.1	59.5
<b>Average</b>	<b>63.0</b>	<b>64.8</b>	<b>54.2</b>	<b>72.2</b>

Each overall index value takes into account more than 50 indicators, some of which are based on data measurements that can be difficult to compare between countries. For this reason, when the difference in the overall index value is less than two or three points, a definitive statement that one system is better than another should be avoided. On the other hand, when the difference is five or more, it can be fairly concluded that the higher index value indicates a better retirement income system.

Figure 4 below shows the grade for each system's sub-index values as well as the overall grade. This approach highlights the fact that some systems may have a weakness in one area (for example, sustainability) while being much stronger in the other two areas. Such a weakness highlights areas for future reforms.

**Figure 4. Overall index grades for each system, including the three sub-indices**

System	Overall index grade	Sub-index grades		
		Adequacy	Sustainability	Integrity
Argentina	D	C	E	D
Australia	B+	B	B+	A
Austria	C	B	E	B
Belgium	B	A	D	A
Botswana	C	D	C	A
Brazil	C	B	E	B
Canada	B	B	C+	B+
Chile	B	C+	B	A
China	C	C+	D	C+
Colombia	C+	C+	C	B
Croatia	C+	C	C	B+
Denmark	A	A	A	B+
Finland	B+	B+	B	A
France	C+	A	D	C
Germany	B	B+	D	B+
Hong Kong SAR	C+	C	C+	A

System	Overall index grade	Sub-index grades		
		Adequacy	Sustainability	Integrity
Iceland	A	A	A	A
India	D	D	D	C
Indonesia	C	D	C	B
Ireland	B	B+	C	A
Israel	A	B+	A	A
Italy	C	B	E	B+
Japan	C	C	D	B
Kazakhstan	C+	D	B	A
Korea (South)	C	D	C	B
Malaysia	C	D	C	B
Mexico	C	C+	C	D
Netherlands	A	A	A	A
New Zealand	B	B	C+	B+
Norway	B	B+	C	A
Peru	C	C	C	C+
Philippines	D	D	C+	E
Poland	C	C	D	B
Portugal	B	A	E	A
Saudi Arabia	C	C+	C	C+
Singapore	B+	B+	B	B+



System	Overall index grade	Sub-index grades		
		Adequacy	Sustainability	Integrity
South Africa	C	D	D	B+
Spain	C+	B+	E	B+
Sweden	B	B	B+	B+
Switzerland	B	B	B	B+
Taiwan	C	D	C	C+
Thailand	D	D	D	C
Turkey	D	D	E	B
UAE	C+	B	D	B
UK	B	B+	C+	A
Uruguay	B	A	D	B+
US	C+	B	C+	C

## Overall recommendations

Chapter 5 makes several suggestions to improve each retirement income system. Although each system reflects a unique history, there are some common themes for improvement as many systems face similar problems in the decades ahead.

Significant pension reform is never easy, but an important starting point is to express the objectives of the overall system. As van Popta and Steenbeek note: “The objective of pension reform must be crystal clear and the perspectives of all stakeholders — consumers, employers, government, industry — must be addressed.”<sup>4</sup>

As the recent review into Australia’s retirement income system commented: “An agreed objective is needed to anchor the direction of policy settings, help ensure the purpose of the system is understood and provide a framework for assessing the performance of the system.”<sup>5</sup>

The World Economic Forum highlighted the three key areas that will have the biggest impact on the overall level of financial security in retirement. Each of these factors is critical, and each has been highlighted within the adequacy or sustainability sub-indices.

These were to:

- 1 **Provide a “safety net” pension for all**
- 2 **Improve ease of access to well-managed, cost-effective retirement plans**
- 3 **Support initiatives to increase contribution rates**<sup>6</sup>

A range of reforms that can be implemented to improve the long-term outcomes from our retirement income systems include:

- Increasing coverage of employees (including nonstandard workers) and the self-employed in the private pension system, recognizing that many individuals will not save for the future without an element of compulsion or automatic enrollment
- Increasing the state pension age and/or retirement age to reflect increasing health-adjusted life expectancy, both now and into the future, thereby reducing the costs of publicly financed pension benefits<sup>7</sup>
- Promoting higher labor force participation at older ages, which will increase the savings available for retirement and limit the continuing increase in the length of retirement
- Encouraging higher levels of private saving, both within and beyond the pension system, to reduce the future dependence on the public pension while also adjusting the expectations of many workers
- Introducing measures to reduce the gender pension gap and gaps that exist for minority groups in many retirement income systems
- Reducing the leakage from the retirement savings system prior to retirement, thereby ensuring that the funds saved, often with associated taxation support, are used for the provision of retirement income
- Improving the governance of private pension plans and introducing greater transparency to improve the confidence of plan members

## 03. Background to the Index

The structure and characteristics of pension systems around the world exhibit great diversity, with a wide range of features and norms. Comparisons are not straightforward. In addition, the lack of readily available and comparable data relating to many systems provides additional challenges for such a comparison. Therefore, this report uses a variety of data sources, drawing on publicly available data wherever possible.



These challenges of data and benchmarking should not, however, prevent the comparison of retirement income systems. Within the context of our aging populations and current economic conditions, it is too important to ignore. Furthermore, programs, policies and practices adopted in some retirement income systems provide valuable lessons, experience or ideas for the development or reform of other systems.

This 15th edition of the Index compares 47 retirement income systems, highlighting both the considerable diversity and the positive features of many systems. Notwithstanding these highlights, the study also confirms that no pension system is perfect and that every system has some shortcomings. In Chapter 5, we make suggestions to improve the efficacy of each retirement income system. This study acts as a reference for governments and policymakers around the world as they review retirement income systems and so improve the outcomes for future retirees.

In its influential report *Averting the Old Age Crisis*, the World Bank<sup>8</sup> recommended a multipillar system for the provision of old-age income security, comprising:

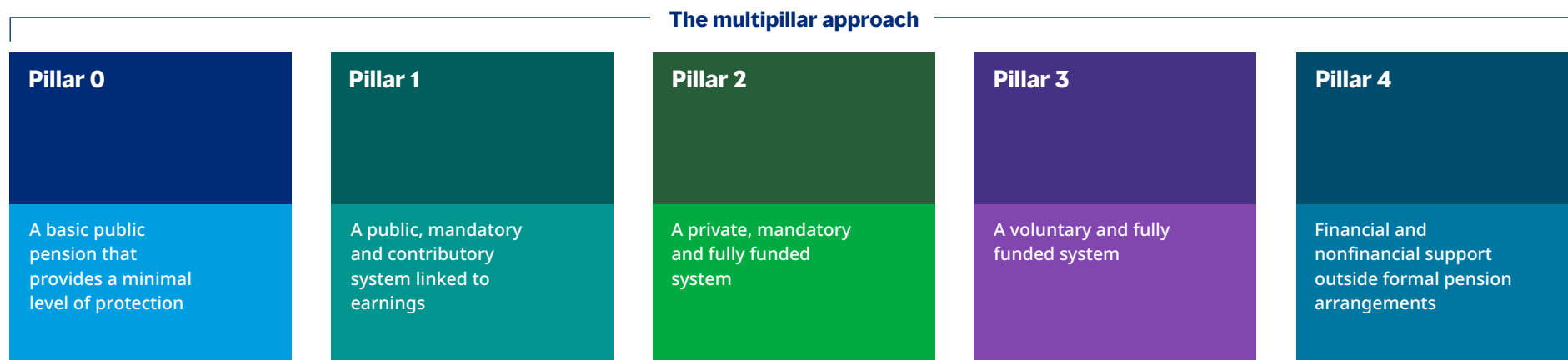
- **Pillar 1:** A mandatory, publicly managed, tax-financed public pension
- **Pillar 2:** Mandatory, privately managed, fully funded benefits
- **Pillar 3:** Voluntary, privately managed, fully funded personal savings

Subsequently, the World Bank's *Pension Conceptual Framework*<sup>9</sup> extended this three-pillar system to the following five-pillar approach:

- **Zero pillar:** A non-contributory basic pension from public finances to deal explicitly with the poverty-alleviation objective
- **First pillar:** A mandated public pension plan with contributions linked to earnings, with the objective of replacing some preretirement income
- **Second pillar:** Typically, mandated DC, with individual accounts in occupational or personal pension plans with financial assets
- **Third pillar:** Voluntary and fully funded occupational or personal pension plans with financial assets that can provide some flexibility when compared to mandatory schemes
- **Fourth pillar:** A voluntary system outside the pension system with access to a range of financial and nonfinancial assets and informal support, such as family, healthcare and housing

The World Bank noted that multipillar designs provide more flexibility than single pillars in meeting the core objectives of pension systems; namely, protection against the risk of poverty in old age and smoothing some consumption from one's work life into retirement. Sangho Kim has recently added that: "To mitigate problems connected with unfunded public pension schemes, multipillar systems for incomes in retirement need to be reinforced."<sup>10</sup>

Figure 5. The World Bank Pension Conceptual Framework



This five-pillar approach provides a good basis for comparing retirement income systems around the world. Hence, the range of indicators used in this report considers features or results associated with each pillar.

The International Labour Organization also supports the concept of a multipillar pension system, noting “the possibility of combining a set of social protection instruments, each of which plays one or more functions, to guarantee the whole range of objectives of a national pension system.”<sup>11</sup> Their four pillars are similar to Pillars 0–3 of the World Bank’s framework.

In contrast to the World Bank, the OECD adopts a three-tier system,<sup>12</sup> namely:

- **Tier 1:** A universal or targeted pension
- **Tier 2:** A mandatory savings system, provided by either the public or private sector
- **Tier 3:** A voluntary savings system in the private sector

The ARC Centre of Excellence in Population Ageing Research suggests that the first tier is primarily a safety net designed for those unable to provide for themselves.<sup>13</sup> On the other hand, the second tier represents some consumption

smoothing from a person’s working years to the retirement years. The third tier is voluntary and enables some households to save more than required under the mandatory system.

Although this three-tier approach clarifies the different roles for each type of pension, the Index continues to include non-pension factors, such as home ownership, non-pension savings and household debt, which can have a significant influence on financial security during retirement. That is, an individual’s financial wellness in retirement does not depend solely on government and employment-related pensions.

The “best” system for a particular country at a particular time must also consider that country’s economic, social, cultural, political and historical context. In addition, regulatory philosophies vary over time and between countries. No pension system is perfect for every country at the same time. It’s not that simple. However, some characteristics of all pension systems can be tested or compared to give us a better understanding of how each system is tackling the provision of retirement income.

Since its inception, the Index has grouped these desirable characteristics into adequacy, sustainability and integrity.



## Adequacy

The adequacy of benefits is perhaps the most obvious way to compare different systems. After all, the primary objective of any pension system is to provide adequate retirement income. Hence, this sub-index considers the base (or safety-net) level of income provided by each system as well as the net replacement rate at income levels ranging from 50% to 150% of the average wage. The net replacement rates use the OECD economic assumptions and allow for country-specific projections of mortality rates and the relevant retirement ages.

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### Taxation support

Are **voluntary member contributions** made by a full-time earner on the median income to a funded pension plan treated more favorably by the tax system than similar savings in a bank account? Is the investment income earned by the pension plan exempt from tax in the preretirement and/or postretirement periods? The first question assesses whether the government provides any incentives to encourage average-income earners to save for retirement. It is recognized that the taxation treatment of pensions varies greatly around the world, so this question assesses whether an incentive exists or not, not the value of the concession. The second question recognizes that the level of investment earnings is critical, especially for DC plans. A tax on investment income reduces the compounding effect and will therefore reduce the adequacy of future benefits.

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### Preservation

Is there a **minimum access age** to receive benefits from private pension plans (except for death, ill health, disability and cases of significant financial hardship)? This question determines whether the private pension system permits the undesirable leakage of accumulated benefits from the system before retirement or whether the regulations are focused on the provision of benefits at and during retirement.

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### Vesting and portability

Upon **resignation** from an employer, are plan members normally entitled to the full vesting of their accrued benefits? After resignation, is the value of the member's accrued benefit normally maintained in real terms (either by inflation-linked indexation or through market investment returns)? Can a member's benefit entitlements normally be transferred to another pension plan upon the member's resignation from an employer? These questions focus on what happens to the individual's accrued benefit when they change employment. Traditionally, many private pension designs penalized resigning members, which, in turn, affected the level of benefits available at retirement.

Critical to the delivery of adequate benefits are the design features of the private pension system (that is, the Second and Third Pillars). Although we could assess many features, we have considered the following six broad topics, each of which represents a feature that will improve the likelihood that adequate retirement benefits are provided.

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### Retirement benefit design

Is it a requirement to take part or all of the retirement benefit as an **annuity or income stream for life**? If so, are lump-sum benefits also available? In lump-sum-based schemes, are there any incentives or rules that encourage taking income streams? Many systems require lifetime annuities, whereas others provide lump-sum retirement benefits that are not necessarily converted into an income stream. A flexible hybrid arrangement probably delivers the best outcome for many retirees.

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### Separation

Upon a couple's **divorce or separation**, are the individuals' accrued pension benefits normally considered in the overall division of assets? This question recognizes that the financial treatment of accrued pension assets can have a major effect on the future financial security of one or both partners following a divorce or separation.

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### Continued accrual

Is it a requirement that individuals **continue to accrue** their retirement benefits when they receive income such as a disability pension or paid parental leave? Does the system provide any pension contributions or benefits for parents who are caring for young children while the parent is not in the paid workforce? These questions recognize that the adequacy of an individual's retirement income can be affected if there is no requirement for benefits to continue to accrue when a worker is temporarily out of the workforce; for example, due to parental leave, ill health, or disability or to care for young children.

In addition to these design issues, we consider savings from outside formal pension programs, highlighting the fact that, as the World Bank notes, the Fourth Pillar can play an important role in providing financial security in retirement. These indicators cover the rate of household savings, the level of household debt and the level of home ownership. This pillar also includes access to informal family support, but the extent of this support is difficult to measure in an objective manner.

Finally, we recognize that the net investment return over the long term represents a critical factor in determining whether an adequate retirement benefit will be provided. This is particularly true given the increasing importance of DC plans. Although investment and administrative costs are considered part of the integrity sub-index, the long-term return is likely to be affected by the types and diversity of assets held by the pension fund. Hence, the adequacy sub-index includes an indicator representing an assessment of the percentage of investments held in growth assets (including equities and property).



## Sustainability

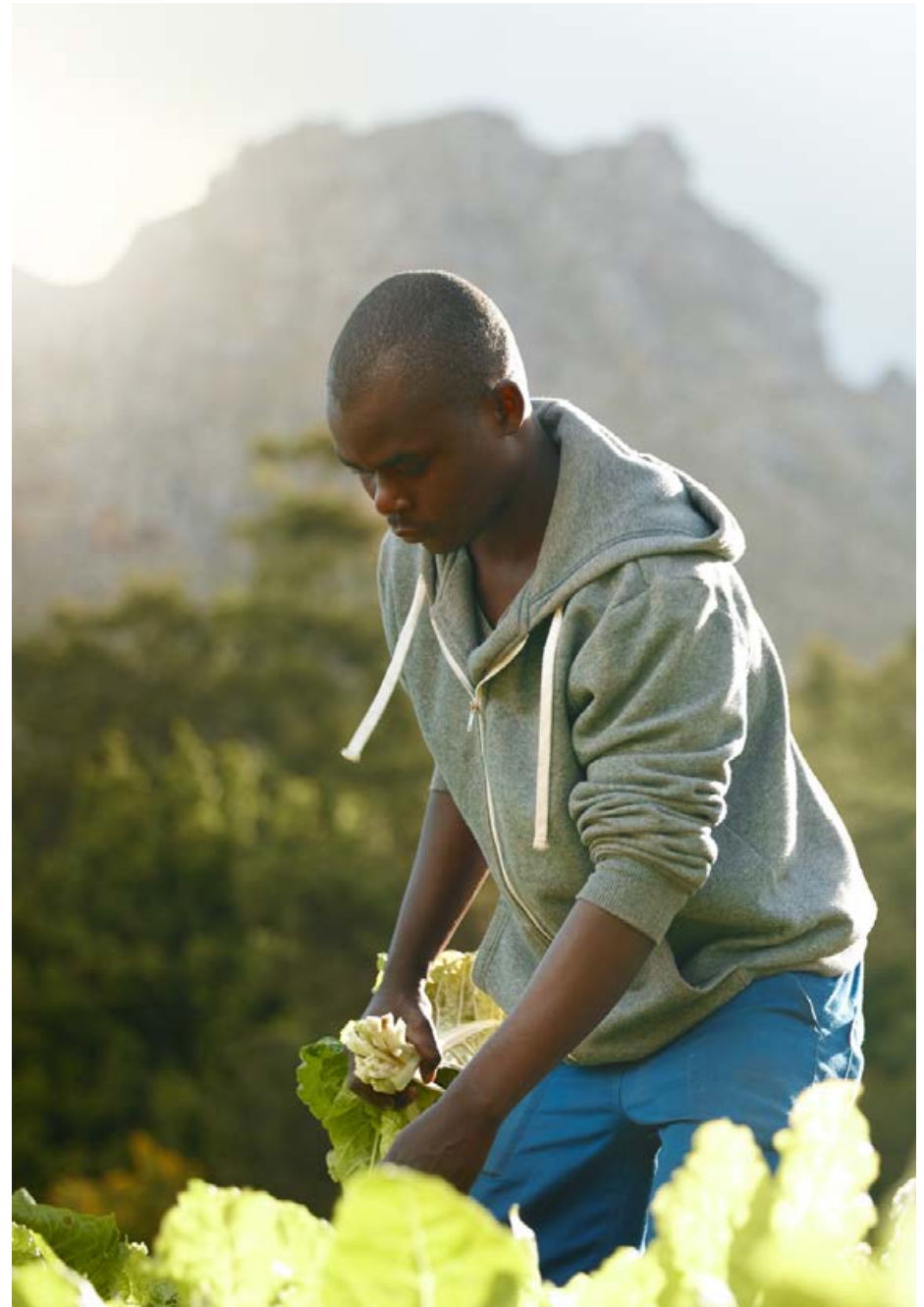
The long-term sustainability of the existing retirement income system is a concern in many countries, particularly in light of the aging population, the increasing old-age dependency ratio, the public expenditure on pensions, substantial government debt and rising inflation. Indeed, the World Bank notes that “most public pension schemes are not viable financially and cannot therefore keep their promises to younger cohorts that will retire in the future.”<sup>14</sup>

This sub-index therefore brings together several measures that affect the sustainability of current programs. Although some demographic measures, such as the old-age dependency ratio (both now and in the future), are difficult to change, others, such as the state pension age, the opportunity for phased retirement and the labor force participation rate among older workers, can be influenced, either directly or indirectly, by government policy.

An important feature of sustainability is the level of funding in advance, which is particularly important where the ratio of workers to retirees is declining. Hence, this sub-index considers contribution rates, the level of pension assets and the coverage of the private pension system. In addition, real economic growth over the long term has a significant impact on the sustainability of pensions as it affects employment, saving rates and investment returns.

Given the growing importance and impact of climate change and other global effects on future investment returns, the sub-index also explores the relevance of economic, social and governance (ESG) factors on the investment policies or strategies adopted within each system.

Finally, given the key role the provision of a public pension plays in most systems, the levels of government debt and public pension expenditure represent important factors affecting a system's long-term sustainability and the future level of these pensions.



## Integrity

The third sub-index considers the integrity of the overall pension system but with a focus on funded schemes that are normally found in the private sector. As most systems are relying on private pensions to play an increasingly important role in the provision of retirement income, it is critical that the community has confidence in the ability of private-sector pension providers to deliver retirement benefits over many years into the future.

This sub-index therefore considers the role of regulation and governance, the protection provided to plan members from a range of risks and the level of communication provided to individuals. In each case, we consider the requirements set out in the relevant legislation and not the best practice delivered by some pension plans.

In addition, the Worldwide Governance Indicators published by the World Bank are used to provide a broader perspective of governance within each country.

An important contributor to the long-term confidence of members is that they receive good value from their pension plans and that costs are kept to a reasonable level. Although an objective comparison of the total costs of operating each system is impractical, this sub-index includes some proxy measures relating to industry structure and scale that should provide a good indication.





## The construction of the Index

In the construction of the Index, we have endeavored to be as objective as possible in calculating each system's index value. Of course, we recognize that the Index is artificial, at least to some extent, as it does not calculate the pension that any retired individual will actually receive. Furthermore, it cannot recognize every aspect of a pension system, particularly the more subjective matters, such as community confidence. We also recognize that comparable international data are not available for every desirable feature.

Nevertheless, where international data are available, we have used those data. In other cases, we have developed objective questions to obtain a better understanding of each system's operations and outcomes. Some countries have more than one system, or different regulations exist in different parts of the country. Where this occurs, we have concentrated on the most common system or taken an average position.

Each system's overall index value is calculated by taking 40% of the adequacy sub-index, 35% of the sustainability sub-index and 25% of the integrity sub-index. These weightings have remained constant since the first edition of the Index in 2009.

Although each sub-index is not weighted equally, the overall results are not materially impacted by the weightings; for example, re-weighting each sub-index equally does not provide any significant changes to the results. Of course, the weighting of each indicator within each sub-index is subjective as there is no "correct" answer. Our approach has been to give higher weightings to the more important indicators.<sup>15</sup>

Living standards in retirement are also affected by several other factors, including the provision and costs of healthcare services and aged care, through both the public and private sectors. However, some of these factors can be difficult to measure within different systems and, in particular, difficult to compare. We therefore decided to concentrate on indicators that directly affect the provision of financial security in retirement, both now and in the future. The Index does not claim to be a comprehensive measure of living standards in retirement; rather, it is focused on the provision of financial security in retirement.

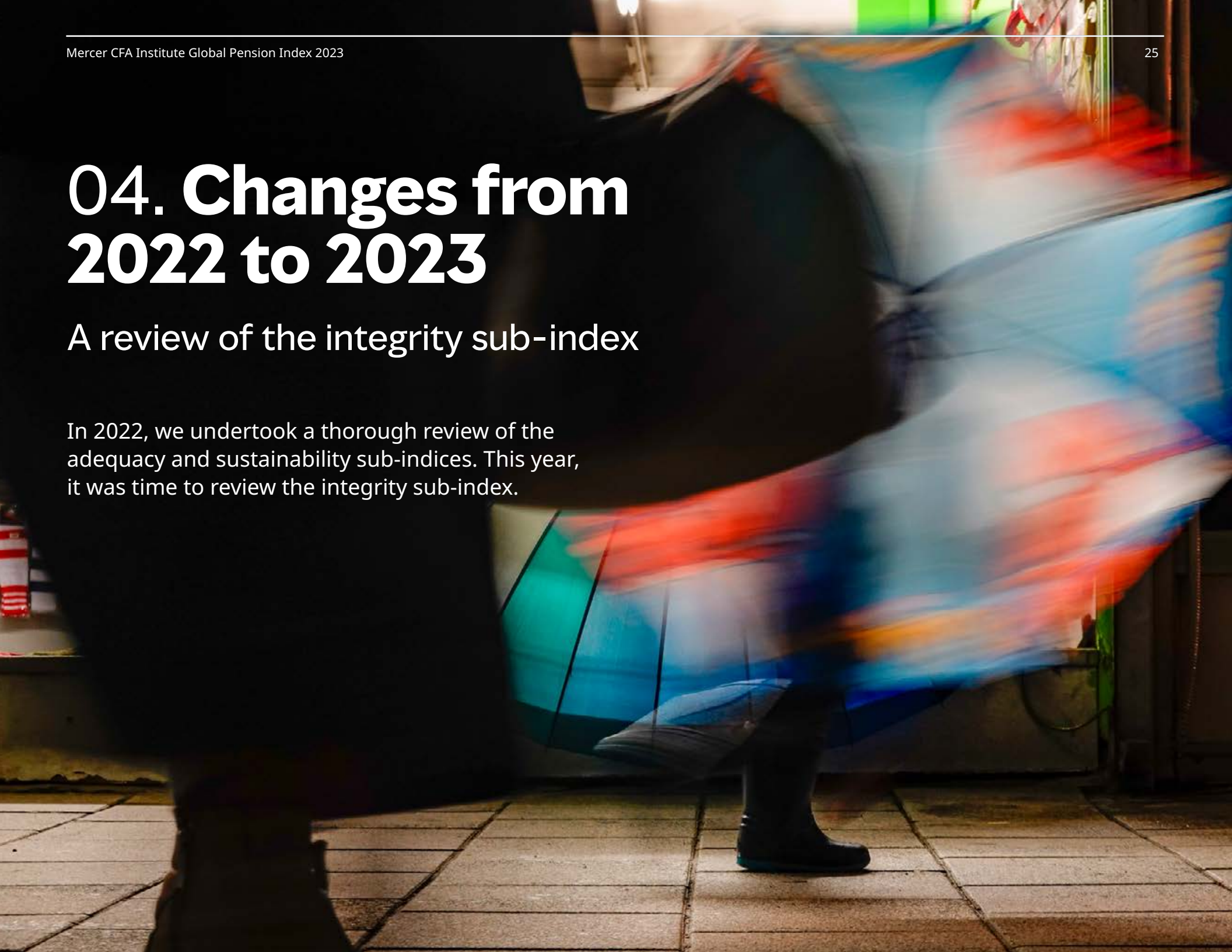




# 04. Changes from 2022 to 2023

## A review of the integrity sub-index

In 2022, we undertook a thorough review of the adequacy and sustainability sub-indices. This year, it was time to review the integrity sub-index.



As private pension plans invest their members' money for many decades, it is critical that the behavior of their staff are beyond reproach. Hence, we have added Questions 1 and 2, shown below. Further, with DC plans becoming more prevalent around the world, it is essential that the plan's investment strategy and performance be disclosed to plan members. This has led to the addition of Questions 3 and 4.

- 1 Is it a requirement for the pension plan to have an anti-bribery and corruption policy?
- 2 Is it a requirement for the pension plan to have a code of personal conduct (or equivalent) for its trustees/fiduciaries, senior executives and employees?
- 3 Are pension plans required to grant members access to information about their plan's investment strategy, for example, on the plan's website?
- 4 Are pension plans required to provide information to members on the plan's investment performance?

Of course, the addition of new questions requires a reassessment of the existing questions. We decided to remove questions relating to the need for auditors and funding of DC arrangements as almost all pension systems required audited financial statements, and DC arrangements, by their definition, are normally fully funded.

As a result of these changes, the average integrity sub-index score for the 44 systems in the 2022 Index decreased by 2.30, leading to a decrease in the overall index value of 0.58. However, due to some reforms in these systems, the average integrity sub-index score fell by only 1.43.

## Additional systems

The Index has been expanded in 2023 to include three new retirement income systems — Botswana, Croatia and Kazakhstan. This addition continues our longstanding practice of considering a variety of systems from different economic, historical and political backgrounds. This approach highlights an important purpose of the Index: to enable comparisons of different systems around the world with a range of design features operating within different contexts and cultures. The Index now includes 47 retirement income systems covering more than 64% of the world's population.

## Updated OECD data

Since the publication of last year's Index, the OECD has published an updated version of *Pensions at a Glance Asia/Pacific 2022*, which updated several data items for the relevant systems. In particular, the net replacement rates were halved for Malaysia and dropped by more than 5% for China and Hong Kong SAR. These changes affect the adequacy sub-index score for these systems.

## A comparison from 2022 to 2023

Figure 6 below compares the results for 44 systems from 2022 to 2023, which show that the average value for the overall index has increased slightly. However, this marginal change masks some more significant changes, both up and down, for individual systems.

Comments about each system are made in Chapter 5.

**Figure 6. Comparison index values for each system, including the three sub-indices**

System	Total		Adequacy		Sustainability		Integrity	
	2022	2023	2022	2023	2022	2023	2022	2023
Argentina	43.3	42.3	55.6	56.3	29.4	29.5	42.9	37.8
Australia	76.8	77.3	70.2	70.7	77.2	78.4	86.8	86.1
Austria	55.0	52.5	69.8	66.8	22.7	22.6	76.5	71.6
Belgium	67.9	68.6	80.8	82.0	39.1	39.4	87.5	88.2
Brazil	55.8	55.7	71.1	70.4	27.8	28.5	70.5	70.1
Canada	70.6	70.2	70.8	71.1	64.7	64.5	78.6	76.7
Chile	68.3	69.9	60.0	60.0	70.3	71.3	78.9	84.0
China	54.5	55.3	64.4	64.2	39.3	39.0	60.0	63.7
Colombia	63.2	61.9	65.2	62.9	55.3	55.4	71.3	69.3

System	Total		Adequacy		Sustainability		Integrity	
	2022	2023	2022	2023	2022	2023	2022	2023
Denmark	82.0	81.3	81.4	82.5	82.5	82.5	82.1	77.8
Finland	77.2	76.6	77.5	77.4	65.3	65.6	93.3	90.9
France	63.2	62.0	84.6	84.5	40.9	41.8	60.1	54.4
Germany	67.9	66.8	80.5	79.8	44.3	45.3	80.9	76.3
Hong Kong SAR	64.7	64.0	61.5	51.9	52.1	61.1	87.6	87.6
Iceland	84.7	84.8	85.8	85.5	83.8	83.8	84.4	85.0
India	44.4	45.9	37.6	41.9	40.7	43.0	60.4	56.5
Indonesia	49.2	51.8	39.3	41.6	44.5	50.6	71.5	69.8
Ireland	70.0	70.2	75.9	77.1	53.5	54.4	83.7	81.1
Israel	79.8	80.8	75.7	77.0	81.9	82.7	83.2	84.4
Italy	55.7	56.3	72.3	72.7	23.1	23.7	74.7	75.9
Japan	54.5	56.3	58.0	59.2	44.5	46.5	63.0	65.6
Korea (South)	51.1	51.2	40.1	39.0	54.9	52.7	63.5	68.5
Malaysia	63.1	56.0	57.2	44.3	60.2	56.1	76.9	74.6

System	Total		Adequacy		Sustainability		Integrity	
	2022	2023	2022	2023	2022	2023	2022	2023
Mexico	56.1	55.1	63.1	63.5	57.1	58.4	43.6	37.0
Netherlands	84.6	85.0	84.9	85.6	81.9	82.4	87.8	87.7
New Zealand	68.8	68.3	64.0	65.6	64.7	64.3	82.1	78.3
Norway	75.3	74.4	79.0	79.4	60.4	59.1	90.3	87.8
Peru	55.8	55.5	54.7	55.0	51.5	50.4	63.7	63.5
Philippines	42.0	45.2	40.5	41.8	52.3	63.2	30.0	25.7
Poland	57.5	57.6	59.5	59.8	45.4	45.4	71.2	71.2
Portugal	62.8	67.4	84.9	86.7	29.7	32.0	73.9	85.9
Saudi Arabia	59.2	59.5	61.4	61.5	54.3	54.9	62.5	62.9
Singapore	74.1	76.3	77.3	79.8	65.4	71.6	81.0	77.0
South Africa	54.7	54.0	44.2	44.2	49.7	49.1	78.4	76.6
Spain	61.8	61.6	80.0	79.7	28.7	28.5	78.9	79.2
Sweden	74.6	74.0	70.6	72.1	75.7	75.6	79.5	75.0
Switzerland	72.3	72.0	68.7	69.6	70.5	70.6	80.7	77.9

System	Total		Adequacy		Sustainability		Integrity	
	2022	2023	2022	2023	2022	2023	2022	2023
Taiwan	52.9	53.6	42.0	47.6	53.2	52.9	69.8	64.1
Thailand	41.7	46.4	41.3	45.4	36.4	42.2	50.0	53.9
Turkey	45.3	46.3	45.6	46.5	29.8	31.1	66.6	67.3
UAE	61.8	62.5	63.8	72.2	51.9	45.4	72.6	70.8
UK	73.7	73.0	76.5	77.3	63.9	62.7	83.0	80.6
Uruguay	71.5	68.9	84.5	84.0	50.6	46.2	79.8	76.5
US	63.9	63.0	67.5	66.7	61.2	61.1	61.7	59.5
<b>Average</b>	<b>63.0</b>	<b>63.1</b>	<b>65.7</b>	<b>66.0</b>	<b>53.0</b>	<b>53.8</b>	<b>72.9</b>	<b>71.7</b>



Feature chapter

# 05. The growing impact of artificial intelligence on pension systems and their members



## Introduction

Artificial intelligence (AI) has been with us for years and is affecting our lives in many ways, from the use of search engines to institutional investment decisions. Yet, during the next decade, its prevalence is likely to increase significantly so that it will affect every aspect of our pension and social security systems.

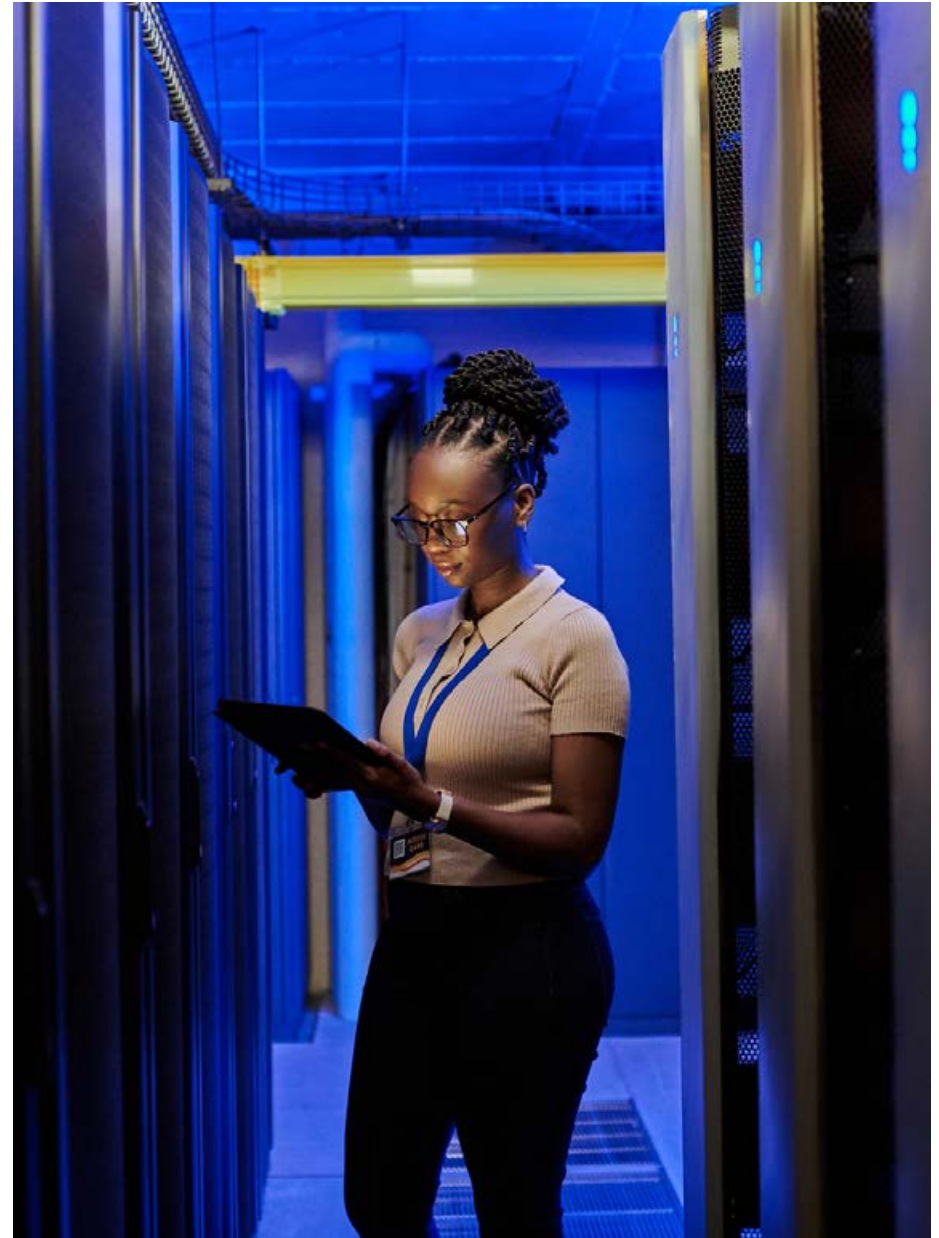
However, before we get into the details, a couple of definitions may help.

**Predictive or traditional AI systems** are models that are designed to respond to a particular set of inputs. These systems have primarily been used to analyze data quickly and make predictions using a set of rules or predefined strategies. That is, this form of AI excels at recognizing existing patterns and, by using algorithms, improves the decision-making process.

**Generative AI** takes us into a very different world, with greater opportunities as well as additional challenges and risks. This form of AI learns and can create something new that is quite different from previous stories, patterns or outcomes. That is, it connects many pieces of information to draw inferences and thereby innovate and provide new insights and relationships as well as communicate in human-like text, images, code or voice.

AI represents a huge potential to improve our pension and social security systems by analyzing data more quickly, improving accuracy, highlighting future risks, reducing costs, improving outcomes and communication, and helping members in a more personalized way. This should provide individuals with a much better experience as they interact with our complex retirement systems.

AI is already here and evolving quickly. It is a work in progress, but there is no doubt its increasing impact will be profound in the years to come. In this chapter, we consider the broad impacts of AI on our retirement income systems, including the benefits and some of the risks involved in this development.



## Pension systems and the investment markets

Capital and financial markets play a critical role in the investment of pension contributions made by employers, employees and the self-employed to ensure that adequate and sustainable retirement benefits can be provided. In fact, the level of investment returns during an individual's working and retirement years is much more important than the level of actual contributions. Hence, it's important that we understand the existing and future impact of AI on these returns over the longer term.

The investment returns received by a pension plan — whether DB or DC — depend on a number of factors, including the investment beliefs and strategies of the governing body, the costs of managing the investments, tactical asset allocations, economic conditions, and the local legislation and taxation. In DC plans, it may also depend on the risk preferences of the members and, in some cases, decisions made by the individual member, particularly during times of financial crisis or uncertainty.

So the question is whether AI has the potential to increase investment returns and thereby improve retirement outcomes for plan members.

Initially, it's important to recognize that AI is already being used in investment markets to make investment decisions based on the analysis of data, reports, risks and market trends. This development dates back to the early 1980s and the introduction of program trading, particularly in areas of high-frequency trading. In these markets, decisions are being made using predefined rules or criteria with no human involvement. A 2019 study showed that around 92% of trading in the Forex market was performed by trading algorithms rather than humans.<sup>16</sup> But algorithmic trading now facilitates automatic trading across all asset classes and market segments. For example, algorithmic trading contributed 60%–73% of all US equity trading in 2018 and continues to grow in importance.<sup>17</sup>

This approach may be particularly relevant for short-term market anomalies in which the improved speed of data analysis can highlight opportunities until they are arbitrated away. Such outcomes can lead to more efficient financial markets

but may also increase the risk of crowd behavior and the associated risks of excessive volatility and greater uncertainty.

Second, and perhaps more important for pension plans, AI provides the ability for fund managers to analyze reams of data from a wide variety of sources, including alternative and unexpected sources. This analysis can identify patterns and discover market sentiment or signals and thereby suggest future opportunities for investment that may go beyond the traditional or expected. This can lead to improved asset allocation and/or better diversification, resulting in higher long-term returns and lower volatility.

Third, an increasing number of individual investors wish to consider ethical or ESG factors in their investment decisions. Although this may be a more challenging area due to the complexity and subjectivity of these decisions, AI presents the opportunity to provide improved alignment between investor preferences and investment products.

Fourth, AI can enable automation of middle and back offices and thus reduce costs. These lower costs may also narrow the differential between active and passive investment strategies.

Such procedures can also introduce real-time monitoring and identification of potential risks, leading to the introduction of appropriate responses to reduce or manage these risks much earlier than would otherwise occur. These include liquidity risks, counterparty risks, concentration risks, operational risks, conduct risk by employees, regulatory reporting and reputational risks.

Finally, AI can predict member behavior under a range of possible economic or political circumstances that may have an impact on future cash flows within the pension fund, which, in turn, should influence future investment decisions. For example, a stock market crash can lead to members switching to defensive asset classes, whereas a newly elected government may lead to some retirees withdrawing their accrued benefits.

Assuming AI is able to predict such behavior, it should also be able to initiate interventions to limit or block inappropriate member behavior.

AI is already having an impact on the investments industry. CFA Institute recently surveyed its members and found that AI and big data are helping firms in the following ways:<sup>18</sup>

- Allows staff to use their time more productively by automating repetitive activities (45%)
- Provides additional insights that lead to better products and services (41%)
- Facilitates better decision-making through enhanced modeling (41%)

On balance, the ongoing expansion of AI within the operations and decisions of investment managers should lead to more efficient and better-informed decision-making processes, producing higher real investment returns for pension plan members and therefore improved retirement outcomes. However, AI will also significantly affect the investment ecosystem, leading to changes in activities, methods, policies and regulations. These developments may be a challenge for some institutions or entities.

Of course, notwithstanding these developments, AI is unlikely to be able to predict market prices with accuracy; uncertainty will therefore remain.

Figure 7 below summarizes some of the applications of AI in investment management and their potential benefits to pension plans and other investors.

**Figure 7. A summary of the use of AI in investment management<sup>19</sup>**

Use	Example application	Potential benefit
Portfolio management	Fundamental analysis	Infer sentiment, discover signals, develop buy/sell recommendations.
	Mean-variance optimization	Determine asset allocation with improved parameter estimates.
Risk management	Forecasting market risk	Identify common factors driving market variables and suggest actions to mitigate risks.
	Backtesting and validation	Detect market anomalies.
	Credit risk estimation	Improve measurement of risks.
Trading	Pre-trade analysis	Identify opportunities.
	Trade execution	Optimize executions.
Automated advice	Investment recommendations	Build customized portfolios, allowing for client risk and return preferences.
Client onboarding	Compliance with Know Your Customer standards	Improve compliance and anti-money-laundering regulations.



## The pension plan's operations

There are many opportunities for AI to improve the operations of a pension plan, thereby improving efficiency, reducing costs and enhancing the member experience. These include:

- Removing repetitive or routine tasks through automation, which leads to greater accuracy, fewer complaints and improved efficiency
- Improving the assessment and understanding of future risks through significantly increasing data analysis associated with the growth of regulation and compliance requirements; for instance, greater analysis relating to financial fraud, cyberattacks, partnerships with third parties and vendors, employee behavior, and political announcements
- Improving identity-fraud detection, which is a growing issue, especially as the importance of DC pension arrangements continues to increase around the world
- Modeling member behavior relating to contributions, tax changes, withdrawals, retirement rates and changing economic conditions
- Modeling future business opportunities and challenges, with the related demand for financial and human resources due to the inevitable impact of demographic, economic, labor force and policy changes

In short, pension plans can potentially obtain a much improved understanding of their operations, risks and opportunities through AI, over both the short and longer terms, and so deliver better outcomes for their active and retired members. However, these developments will only be beneficial if the pension systems have accurate and complete data to train and deploy AI models.

It is also important that AI be introduced in a manner that is consistent with the cost structure, values, culture and mission of the pension organization. Otherwise, there is the real risk of increased uncertainties leading to unhelpful disruption from employees and reduced confidence from plan members.

Generative AI may be able to develop new pension products that go beyond current thinking or constraints. For example, a new low-cost hybrid product for retirees encompassing real investment returns, risk aversion and longevity protection may provide a better outcome than traditional retirement products.



## Member engagement

AI, in all its forms, can lead to significant improvement in the level of engagement and understanding by pension plan members and those within social security arrangements. This development is needed as many pension arrangements are poorly understood or appreciated by individuals. However, this is not solely the fault of members. It must also be accepted that the communication provided by social security and pension plans can be opaque, verbose or expressed in legal language. Sometimes this unfortunate outcome is driven by legislation and compliance requirements.

Now is the time to improve the standard of this communication through the help of AI. For example, the use of similar terminology by all components within an overall pension system, expressed in language appropriate to the individual, may lead to a significant improvement in understanding for workers and retirees.

In addition, with the growth of DC pension arrangements around the world, individuals now have more responsibility and are taking greater control, and there is a growing demand for real-time information. The pension industry must now communicate better than in the days of DB pensions when employers bore the risks.

Fortunately, AI can be used in various ways to improve member communications and enhance understanding of future benefits and available options.

A current example used by many leading pension plans is the development of chatbots —interfaces that aim to mimic human conversations through text or voice interaction. Although the initial version of these communication tools may be limited, they continue to improve as they integrate previous questions, commentary and answers.

An obvious extension from current arrangements is to use all accessible data and data analytics to modify the communication received by each member. For example, the communication can be personalized (at least to some extent) in the member's preferred format and take into account the individual's pension benefits from all sources as well as their previous financial decisions about contributions or investment strategy.

However, we can go much further with AI. For example, the pension plan could understand more about individual members by applying natural language processing to analyze the language individuals use in their emails, texts and phone calls. That is, the language used by the pension plan can be adapted so it is relevant to individuals and their education, financial position, opinions and attitudes. Improved understanding of its members should deliver greater efficacy for the pension plan and better results for individuals and households.

## Retirement planning

With the ongoing growth of DC plans and individual savings accounts around the world, many individuals are required to make long-term financial decisions at retirement. These decisions are not straightforward as every individual has different characteristics relating to:

- The presence of a partner
- Their health and that of their partner (if relevant)
- Aspirations for their retirement lifestyle, both immediately and in the decades ahead
- Other sources of income
- The level of government support available, including social security and health costs
- Taxation issues
- Home ownership
- Their attitude toward a range of risks, including market risk, inflation risk and longevity risk
- Estate planning

Pension plans should be well placed to assist. However, in many cases, they have limited information regarding the household's financial position or understanding of the retiree's goals for the next two or three decades.

In some jurisdictions, an open banking regime may permit a pension plan to obtain additional financial information relevant to the individual. However, this is unlikely to be sufficient to provide an adequate overview. Additional financial and personal data will be required before an appropriate recommendation can be made.

Hence, there is a need for the development of AI tools to provide members with meaningful options and recommendations for these complex decisions. This is likely to be an area where AI could be used to provide a more affordable and realistic outcome than expecting every retiree to see a personal financial advisor.

On the other hand, this potentially efficient production of personalized recommendations to retirees may run counter to existing regulations or compliance requirements relating to the provision of personal financial advice. Of course, recommendations must be relevant and sensible, but do they require the presence of a human advisor, or should a machine be acceptable?

There is no doubt that financial decisions approaching and during retirement are difficult, and there is no single answer. Yet we must find a way for individuals to be able to understand the options available to them after considering all the relevant information relating to their personal circumstances.

AI has the potential to have a significant role in improving the decision-making processes of individuals and households by tailoring the guidance and recommendations to provide better long-term outcomes for millions of retirees.

## Challenges and risks

The above comments suggest that there are significant opportunities for pension plans to use AI to increase investment returns, improve member engagement and produce better outcomes for members. Yet such developments are not cheap, and there are significant challenges and risks along the way.

One challenge present in developing all AI tools is whether the right questions are being asked and therefore answered by the AI tool. After all, different questions will lead to different answers. Hence, prompt engineers are now in strong demand to ensure the right questions are being asked. Although the financial questions may be relatively straightforward, questions relating to a retiree's aspirations or risk tolerance are much more difficult.

A second challenge relates to the development of the model itself. One danger is that a model or algorithm that worked well in a previous setting may be extended to a new situation or a broader context for which the original framework may no longer be appropriate. The model may also generate fake or misleading information. These examples highlight the need to test and validate all models, which will normally involve some human beings who have an excellent understanding of the context and the range of circumstances or answers that may apply.

It should also be noted that although the current generative AI models produce excellent results in terms of language outputs, their understanding and application of mathematics is much more limited, at least at the moment. Of course, we would expect this shortcoming to be reduced in the future.

A third challenge relates to data privacy and the need to protect and safeguard members' data and inputs. This suggests that pension plan models and

algorithms must be private and not available to the global AI world. Such challenges highlight the need for strong defenses against cyberattacks, scammers and other security breaches. Members must have absolute confidence in the system if AI is to be appropriately leveraged for its full benefit.

A fourth challenge relates to the fact that AI can faithfully reproduce a person's voice, writing style, photo or video. This, combined with the growth of sophisticated cyber-breaching security programs, will probably lead to an increased incidence of identity fraud, which may threaten public confidence in long-term pension systems.

A fifth challenge is that AI algorithms may have biases, offer unjustified responses (known as hallucinations) and not know right from wrong. It is important that the models be fully tested to ensure that inappropriate outcomes do not occur and that the recommendations are sensitive to the context of the individual.

A classic example of wrong outcomes is Robodebt in Australia, where unlawful and incorrect automated debt collection letters were sent to 470,000 social security recipients, resulting in some suicides and considerable mental illness among many recipients.

In addressing these challenges, strong governance and clear accountability arrangements will be essential in the development of all AI models. They are not in a world of their own! Such models must be reviewed and tested regularly as conditions change to ensure that their outcomes are sensible and consistent with existing legislation and compliance requirements as well as changing legislation or economic conditions.

## Ethical concerns

The growing use of machines to make predictions, prepare communications and recommend solutions or behavior to individuals based on available data without any direct input from the relevant individual raises important ethical and moral questions.

For example, could specific options or solutions be removed for some individuals based on certain characteristics, such as age, address, race, language, religion, gender, sexual orientation or ideology? Such outcomes are likely to run counter to existing discrimination or human rights legislation in some jurisdictions.

A lack of transparency relating to a model's working is also likely to lead to confusion and lack of trust. It may also lead to adverse media stories. Yet pension plans rely on long-term trust from their members as the plans invest funds for decades. An inappropriate use of AI can quickly lead to a destruction of trust, which may be very hard to recover.

It is therefore critical that predictions or recommendations be easily explainable and justifiable to plan members, even when the personal data is incomplete. This will require careful planning and explanation by pension plans that choose to adopt these models.

Active governance and clear accountability are essential in the development of all AI models and algorithms. This will require experienced pension professionals to be involved, for, without that experience, judgment and oversight, there is the real risk that some outcomes will be unhelpful or misleading, and possibly even wrong, in the complex world of pensions and social security.

As CFA Institute notes:

**“This underscores the importance of the AI + HI paradigm; human intelligence (HI) provides supplemental cognitive capabilities that, when combined with AI, provide for a more effective and robust overall solution.”<sup>20</sup>**

## Conclusion

Artificial intelligence in all its forms provides a great opportunity to significantly improve the experience and outcomes for individuals and households.

As highlighted above, AI can be used in many aspects of pension arrangements to potentially improve returns, reduce costs and develop new products, thereby delivering a higher standard of living in retirement — a worthwhile objective for all pension systems.

However, it will not happen quickly, and there are significant challenges to overcome. Nevertheless, with appropriate policies, legislation, governance and development, future retirees can look forward to greater engagement, better understanding and improved outcomes for many years, at potentially lower costs and with improved accessibility.

Finally, and from a nonfinancial perspective, most retirees face reduced cognitive and communication abilities later in life. AI can potentially help maintain some of these abilities and thereby improve the quality of life in these years.





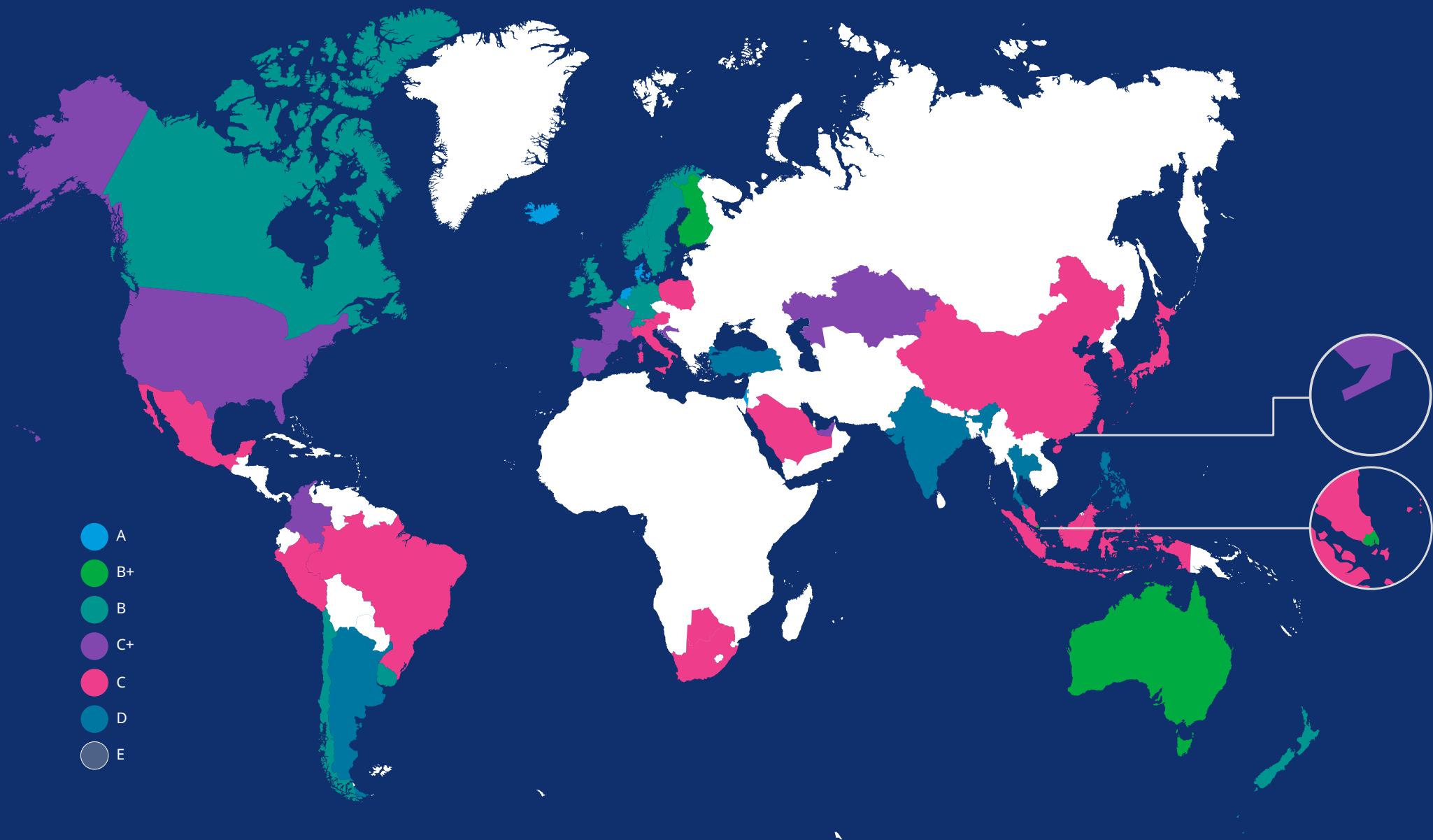
# 06. A brief review of each system

This chapter provides a summary of each retirement system and potential areas for improvement. Whether such developments are appropriate in the short term depends on the current social, political and economic situation.

We have provided some comments on changes from 2022 to 2023 where relevant. Some of these were due to the review of the integrity sub-index as detailed in Chapter 3 and updated data from the OECD for the Asia-Pacific region.

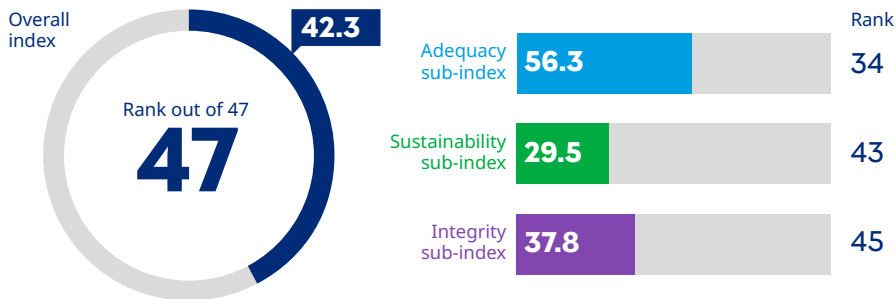


Figure 8. Global grades





## Argentina



Argentina's retirement income system is composed of a pay-as-you-go social security system (comprising a basic pension and an earnings-related benefit) together with voluntary occupational corporate and individual pension plans that may be offered through employer book reserves, insurance companies or pension trusts.

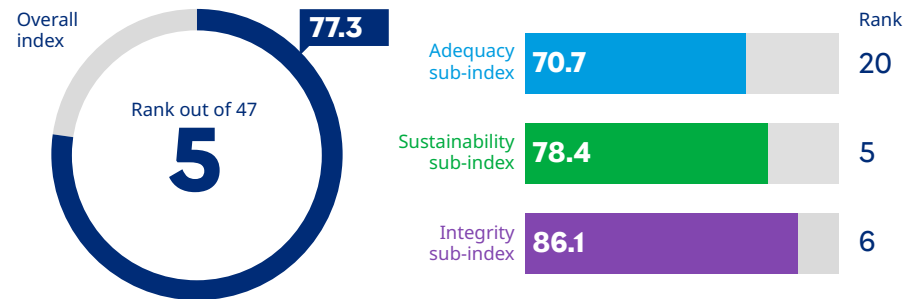
The overall index value for the Argentinian system could be increased by:

- Expanding coverage of employees in occupational pension schemes through automatic membership or enrollment, thereby increasing the level of contributions and assets
- Introducing a minimum level of mandatory contributions into a retirement savings fund
- Introducing a minimum age to access benefits from private pension plans
- Improving the regulatory requirements for the private pension system

The Argentinian index value decreased from 43.3 in 2022 to 42.3 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.



## Australia



Australia's retirement income system comprises a means-tested age pension (paid from general government revenue); a mandatory employer contribution paid into private-sector arrangements and additional voluntary contributions from employers, employees or the self-employed paid into private-sector plans.

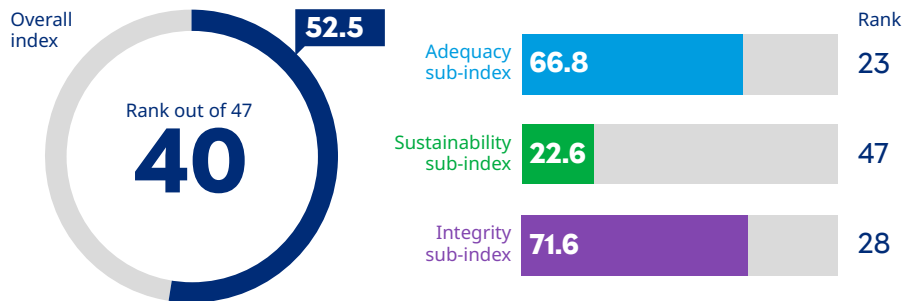
The overall index value for the Australian system could be increased by:

- Moderating the assets test on the means-tested age pension to increase the net replacement rate for average income earners
- Introducing a requirement that part of the retirement benefit be taken as an income stream in most circumstances
- Introducing a government superannuation contribution to primary carers of young children
- Introducing a requirement to show benefit projections on members' annual statements

The Australian index value increased from 76.8 in 2022 to 77.3 in 2023, primarily due to higher mandatory contributions and increased pension assets.



## Austria



Austria's retirement income system consists of a DB public pension scheme with an income-tested top-up for low-income pensioners and voluntary private pension plans.

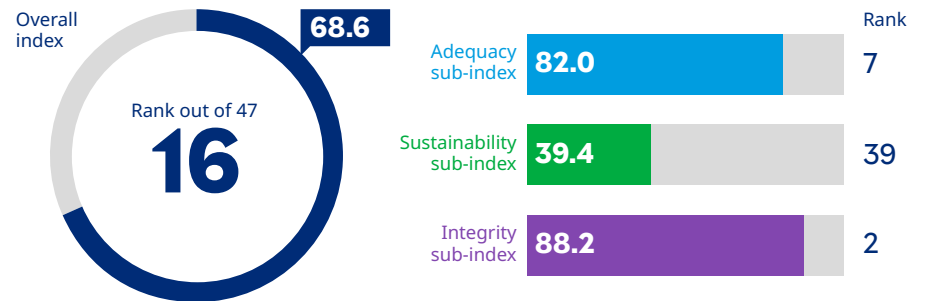
The overall index value for the Austrian system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Introducing a minimum access age so that the benefits from private pension plans are preserved for retirement purposes
- Expanding coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets (which could be done by collective bargaining agreements or tax-effective regulation)
- Introducing arrangements to protect the pension interests of both parties in a divorce
- Increasing the labor force participation rate at older ages

The Austrian index value decreased from 55.0 in 2022 to 52.5 in 2023, primarily due to a corrected answer from 2022 and the changes in the integrity sub-index outlined in Chapter 3.



## Belgium



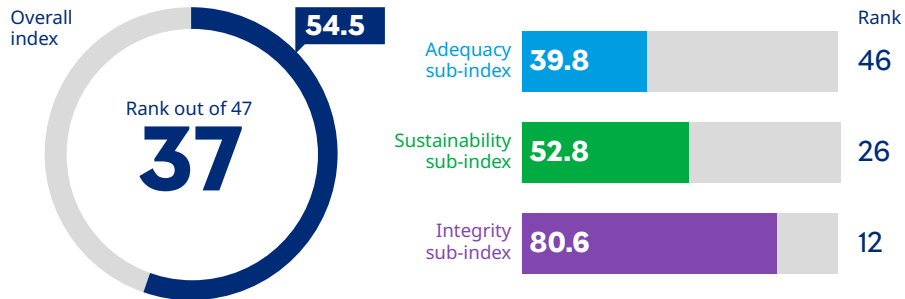
Belgium's retirement income system comprises public, occupational and private pension schemes. The public pension scheme is earnings-related with a means-tested safety net. Voluntary private pension arrangements are typically operated by insurance companies.

The overall index value for the Belgian system could be increased by:

- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Introducing a minimum level of mandatory contributions into a retirement savings fund, thereby increasing the level of pension assets over time
- Introducing greater flexibility relating to pension design as individuals transition into retirement
- Increasing the labor force participation rate at older ages as life expectancies rise

The Belgian index value increased from 67.9 in 2022 to 68.6 in 2023 due to small improvements in each sub-index.

## Botswana



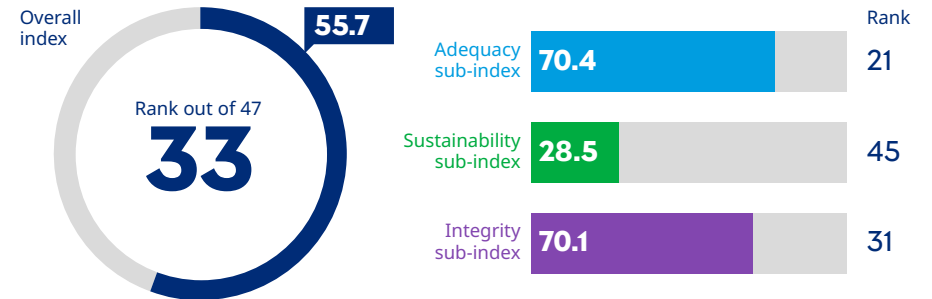
Botswana's retirement income system consists of private and public pension systems. The Public Old Age Pension (POAP) is fully funded by the government and provides a benefit to all citizens above age 65 living in Botswana. The benefit is adjusted periodically based on cost of living and is non-means tested. Private pensions consist of a mandatory pension scheme for public-sector employees and a voluntary pension system for private-sector employees. Private pensions include both DB and DC arrangements.

The overall index value for the Botswanan system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Expanding coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets
- Increasing the level of home ownership

The Botswanan index value for 2023 is 54.5.

## Brazil

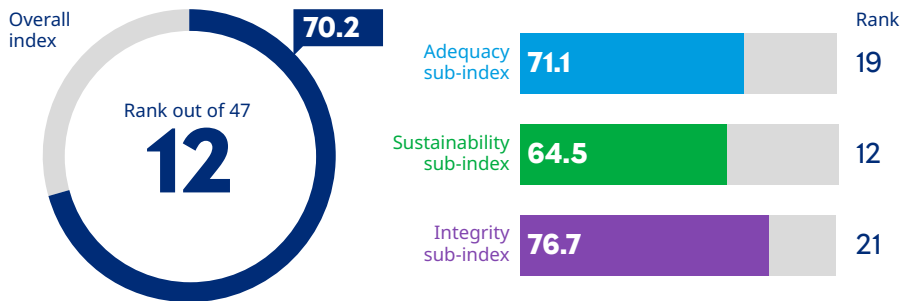


Brazil's retirement income system comprises a pay-as-you-go social security system and voluntary occupational corporate and individual pension plans. These plans may be offered through insurance companies or pension trusts.

The overall index value for the Brazilian system could be increased by:

- Increasing coverage of employees in occupational pension schemes through automatic membership or enrollment, thereby increasing the level of contributions and assets
- Introducing a minimum level of mandatory contributions into a retirement savings fund
- Introducing a minimum access age so that the benefits are preserved for retirement purposes, including the pension plans operated by insurance companies
- Enabling individuals to retire gradually while receiving a part pension

The Brazilian index value decreased slightly from 55.8 in 2022 to 55.7 in 2023 due to several minor changes.

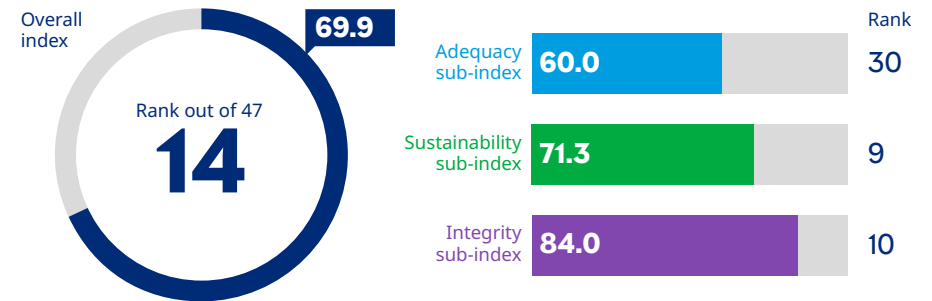


Canada’s retirement income system comprises a universal flat-rate pension supported by a means-tested income supplement, base and enhanced earnings-related pensions based on revalued lifetime earnings provided through a national program, voluntary occupational pension schemes (many of which are DB schemes), and voluntary individual retirement savings plans.

The overall index value for the Canadian system could be increased by:

- Increasing the coverage of employees in occupational pension schemes through the development of an attractive product for those without an employer-sponsored scheme
- Introducing a minimum access age for all pension products
- Increasing the level of household savings and reducing the level of household debt
- Reducing government debt as a percentage of GDP

The Canadian index value decreased slightly from 70.6 in 2022 to 70.2 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.



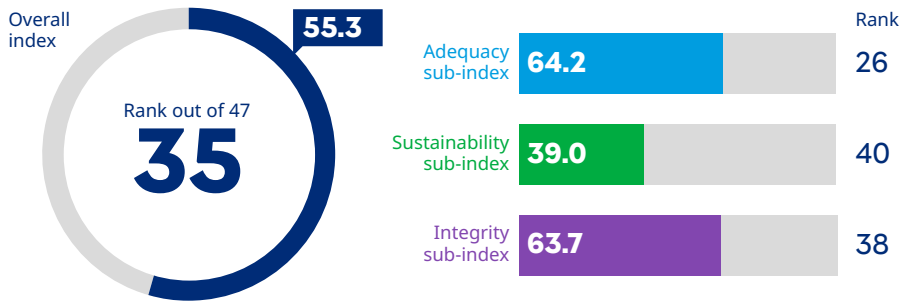
Chile’s retirement income system comprises means-tested social assistance, a mandatory privately-managed DC system based on employee contributions with individual accounts managed by a small number of Administradoras de Fondos de Pensiones (AFPs) and a framework for voluntary contributions.

The overall index value for the Chilean system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Increasing the pension age for women
- Introducing a government pension contribution for those caring for young children
- Increasing coverage of employer-sponsored plans, thereby increasing the level of assets over time

The Chilean index value increased from 68.3 in 2022 to 69.9 in 2023, primarily due to improved regulations.



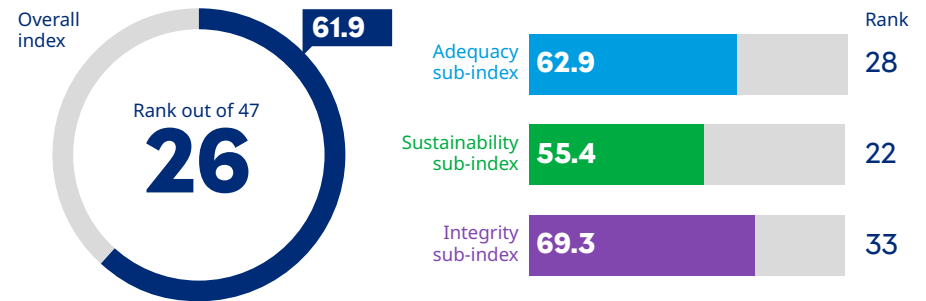


China's retirement income system comprises a mandatory pillar-one state pension, a voluntary employer-sponsored pillar two (enterprise annuity for corporates and occupational annuity for the public sector) and a voluntary pillar-three private pension arrangement unveiled in 2022. The state pension comprises an urban employee basic pension and an urban/rural residents (non-employed) basic pension system. State pension has a pay-as-you-go social pooling account (combination of contribution and fiscal expenditure) and funded individual accounts (from employee contributions).

The overall index value for the Chinese system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Continuing to increase the coverage of the pension systems
- Introducing a requirement that part of the supplementary retirement benefit be taken as an income stream
- Increasing the state pension age over time
- Offering more investment options to members and thereby permitting a greater exposure to growth assets

The Chinese index value increased from 54.5 in 2022 to 55.3 in 2023, primarily due to updated data relating to the integrity sub-index score.

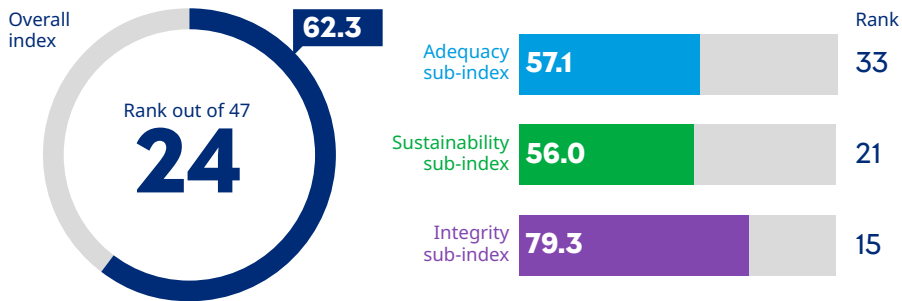


Colombia's retirement income system comprises a means-tested pension paid to the needy and two parallel and mutually exclusive pension systems. The first is a pay-as-you-go DB plan managed by a public-sector entity, and the second is a system of funded individual accounts offered through qualified financial institutions in the private sector. Individuals can make additional voluntary contributions to increase retirement benefits and/or reduce taxes. An employee elects to join one system, although there is the option to change later, with certain restrictions. The employer and employee contribution rates are the same for both systems, but retirement benefits differ between systems (DB versus individual accounts).

The overall index for the Colombian system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Raising the level of household savings
- Increasing coverage of employees in the pension schemes, thereby gradually increasing the level of pension assets
- Raising the state pension age over time, particularly for women
- Introducing arrangements to protect the pension interests of both parties in a divorce

The Colombian index value decreased from 63.2 in 2022 to 61.9 in 2023, primarily due to a corrected answer from 2022.

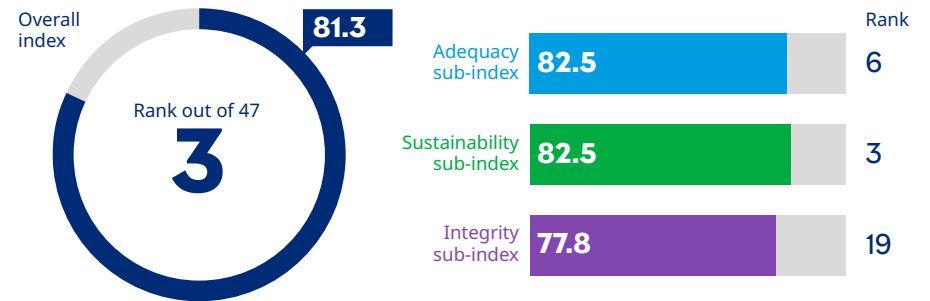


Croatia's retirement income system has seen major reform since 2002, resulting in a three-pillar retirement system. The first pillar comprises mandatory contributions of 15% of salary, resulting in a DB pension paid on retirement. The second pillar is DC, where employees contribute 5% of salary into an individual pot from which members draw a retirement pension. There is also a voluntary pension fund that members can choose to contribute to.

The overall index for the Croatian system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Increasing the level of funded contributions in private pension plans, thereby increasing the level of assets over time
- Increasing the labor force participation rate, particularly at older ages as life expectancies rise

The Croatian index value for 2023 is 62.3.



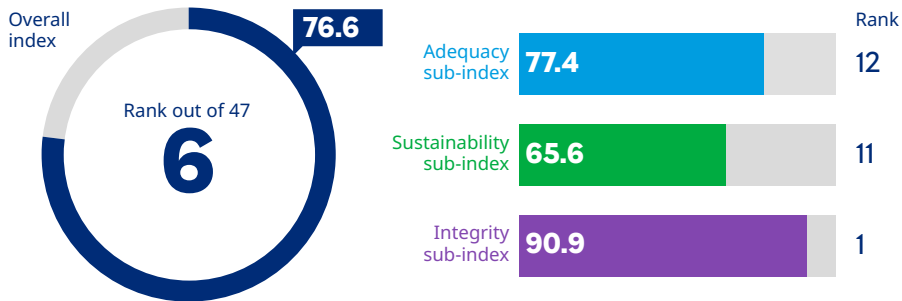
Denmark's retirement income system comprises a public basic pension scheme, a means-tested supplementary pension benefit, a fully funded DC scheme providing lifelong pensions and mandatory occupational DC schemes.

The overall index value for the Danish system could be increased by:

- Raising the level of household savings and reducing the level of household debt
- Introducing arrangements to protect the interests of both parties in a divorce
- Requiring all pension plans to produce an annual report available to all members

The Danish index value decreased from 82.0 in 2022 to 81.3 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **Finland**



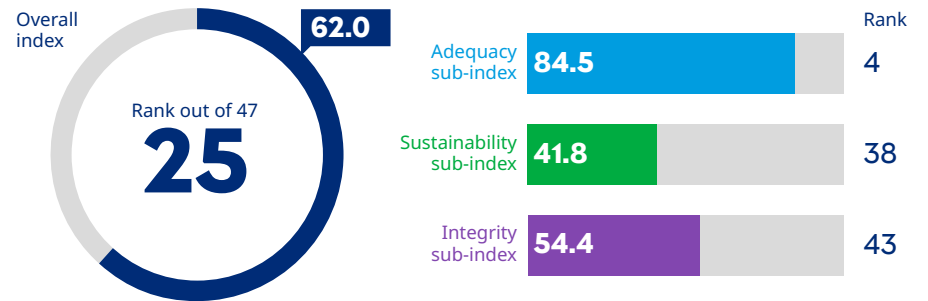
Finland’s retirement income system consists of a basic state pension, which is income tested, and a range of statutory earnings-related schemes.

The overall index value for the Finnish system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Raising the level of household savings and reducing the level of household debt
- Continuing to raise the level of mandatory contributions set aside for future retirement benefits
- Introducing arrangements to protect the pension interests of both parties in a divorce

The Finnish index value decreased from 77.2 in 2022 to 76.6 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **France**



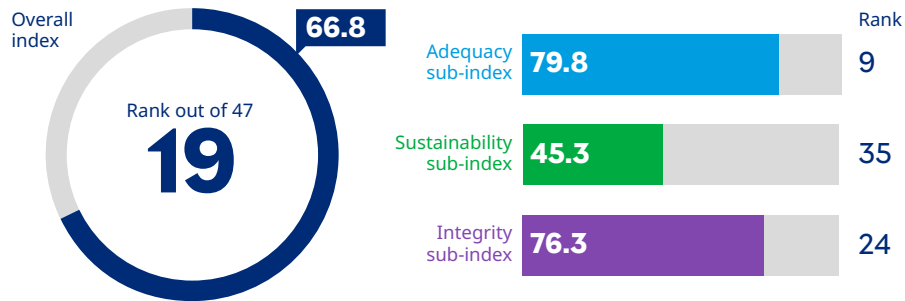
France’s retirement income system comprises an earnings-related public pension with a minimum pension and a supplementary retirement pension scheme for private-sector workers (known as AGIRC-ARRCO). France also has voluntary occupational plans.

The overall index value for the French system could be increased by:

- Increasing the level of funded contributions, thereby increasing the level of assets over time
- Increasing the labor force participation rate at older ages as life expectancies rise
- Improving the regulatory requirements for the private pension system

The French index value decreased from 62.0 in 2022 to 61.7 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **Germany**



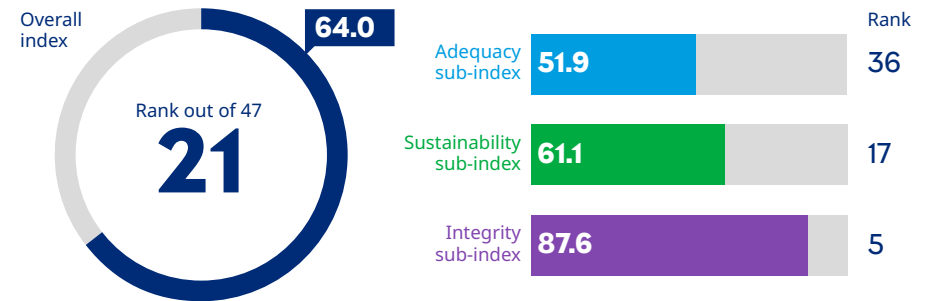
Germany's retirement income system comprises an earnings-related pay-as-you-go system based on the number of pension points earned during an individual's career, a means-tested safety net for low-income pensioners and supplementary pension plans that are common among major employers. These plans typically adopt either a book-reserving approach, with or without segregated assets, or an insured-pensions approach.

The overall index value for the German system could be increased by:

- Increasing the minimum pension for low-income pensioners
- Increasing the level of funded contributions in private pension plans, thereby increasing the level of assets over time
- Increasing coverage of employees in occupational pension plans

The German index value decreased from 67.9 in 2022 to 66.8 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **Hong Kong SAR, China**



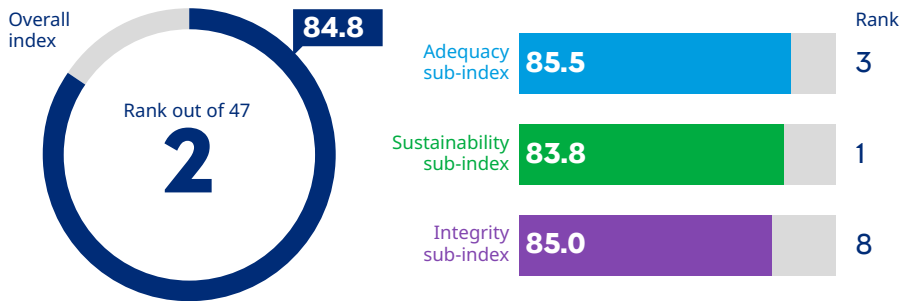
Hong Kong's retirement income system consists of Mandatory Provident Funds (MPFs) in which employers, most employees and the self-employed are each required to make mandatory contributions of 5% of relevant income to the MPF scheme, subject to minimum and maximum relevant income levels. Scheme members who have reached age 65, or who have reached age 60 and have decided to retire early, can choose either to withdraw their MPF benefits as a lump sum or by installments, or to retain all their MPF benefits in their accounts for continuous investment.

The overall index value for the Hong Kong SAR system could be increased by:

- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Increasing the minimum pension for low-income pensioners
- Increasing the level of household savings and reducing the level of household debt
- Increasing the labor force participation rate at older ages as life expectancies rise
- Introducing requirements to protect all the pension interests of both parties in a divorce

The index value for Hong Kong SAR decreased from 64.7 in 2022 to 64.0 in 2023, primarily due to the updated OECD data.

 **Iceland**



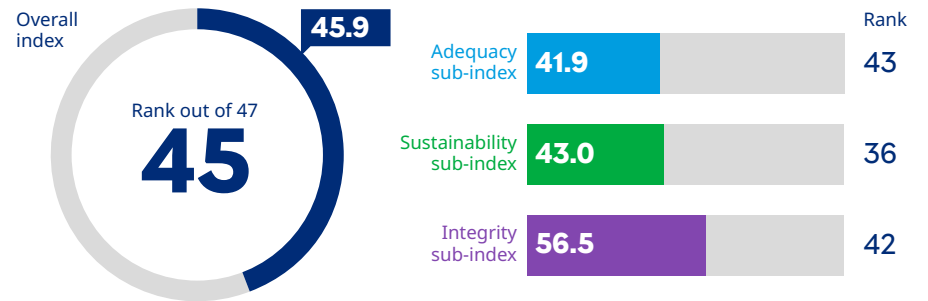
Iceland’s retirement income system comprises a basic state pension and a pension supplement (both of which are income tested according to different rules), mandatory occupational private pension schemes with contributions from both employers and employees, and voluntary personal pensions.

The overall index value for the Icelandic system could be increased by:

- Reducing the level of household debt as a percentage of GDP
- Introducing arrangements to protect all the pension interests of both parties in a divorce
- Reducing government debt as a percentage of GDP

The index value for Iceland increased slightly from 84.7 in 2022 to 84.8 in 2023.

 **India**



India’s retirement income system comprises an earnings-related employee pension scheme, a DC employee provident fund (EPFO) and supplementary employer-managed pension schemes that are largely DC in nature. Government schemes have been launched as part of the universal social security program aimed at benefiting the unorganized sector.

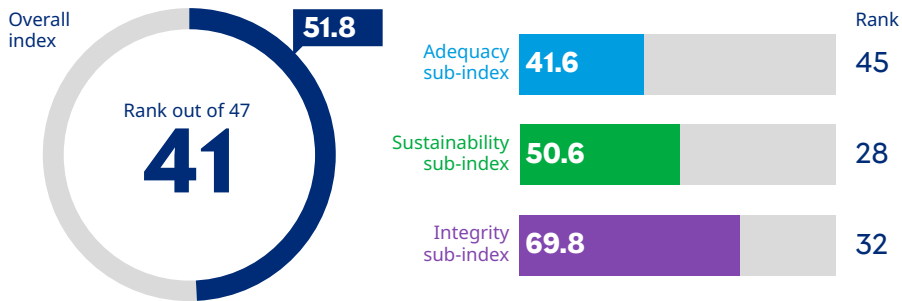
The overall index value for the Indian system could be increased by:

- Introducing a minimum level of support for the poorest aged individuals
- Increasing coverage of pension arrangements for the unorganized working class
- Introducing a minimum access age so that benefits are preserved for retirement purposes
- Improving the regulatory requirements for the private pension system

The Indian index value increased from 44.4 in 2022 to 45.9 in 2023, primarily due to an improvement in the adequacy sub-index.



## Indonesia



Indonesia's retirement income system comprises earnings-related civil-service pensions and DB/DC plans for private-sector workers. The Government Social Security Program is a mandatory DC-based scheme funded through regular employer and employee contributions. The national statutory pension provides a DB-based payout with two components: severance pay and long-service pay.

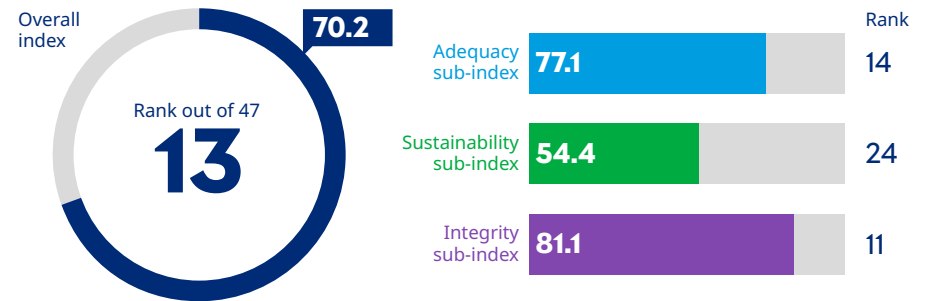
The overall index value for the Indonesian system could be increased by:

- Introducing a minimum level of support for the poorest aged individuals
- Expanding coverage of employees in occupational pension schemes, thereby increasing the level of assets over time
- Continuing to improve the regulatory requirements for the private pension system
- Introducing a requirement to show benefit projections on members' annual statements

The Indonesian index value increased from 49.2 in 2022 to 51.8 in 2023, primarily due to improved regulations relating to retirement incomes.



## Ireland



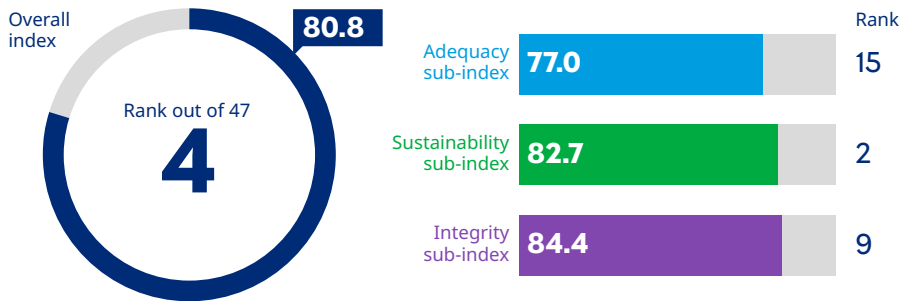
Ireland's retirement income system comprises a flat-rate basic social security scheme and a means-tested benefit for those without sufficient social insurance contributions. Voluntary occupational pension schemes and personal pension schemes provide supplementary income in retirement. Currently, the occupational pensions market in Ireland is experiencing a period of rationalization and consolidation due to the introduction of the IORP II regime. As a result, several plans are consolidating into master trusts, which will increase the governance, operational standards and regulatory supervision of these plans over time.

The overall index value for the Irish system could be increased by:

- Implementing government plans to introduce an automatic enrollment retirement savings regime, thereby increasing pensions coverage for many employees and increasing the level of contributions and assets, whether through employer-sponsored occupational pension schemes or the state-operated auto-enrollment
- Increasing the labor force participation rate at older ages as life expectancies rise
- Providing greater protection of members' accrued benefits

The Irish index value increased slightly from 70.0 in 2022 to 70.2 in 2023 due to several minor improvements.



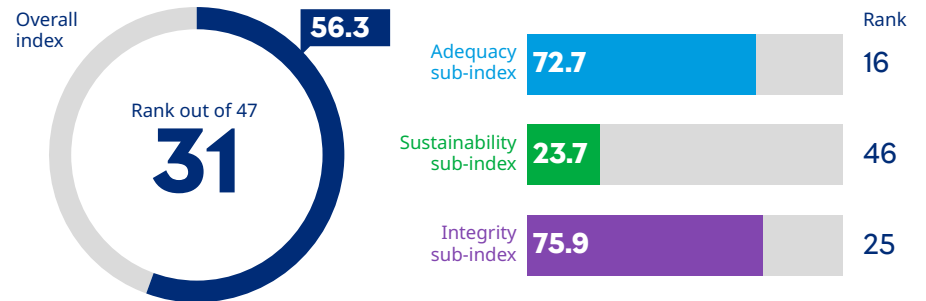


Israel's retirement income system comprises a universal state pension with an income-tested supplement and private pensions with compulsory employer and employee contributions. Since 2008, there has been a requirement to take a minimum annuity.

The overall index value for the Israeli system could be increased by:

- Reducing government debt as a percentage of GDP
- Improving protection for members of private pension plans in the event of mismanagement or fraud
- Introducing a carer's pension credit for those caring for young children

The Israeli index value increased from 79.8 in 2022 to 80.8 in 2023 due to small improvements in each sub-index.



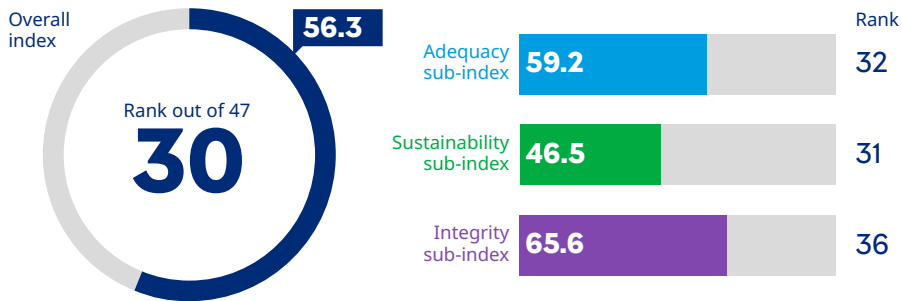
Italy's retirement income system comprises a notional DC scheme for workers and a minimum means-tested social assistance benefit. Voluntary supplementary occupational schemes also exist.

The overall index value for the Italian system could be increased by:

- Expanding coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets
- Continuing to raise the labor force participation rate at older ages as life expectancies rise
- Restricting the availability of benefits before retirement (other than bridge pensions)
- Reducing government debt and government spending on pensions as a percentage of GDP

The Italian index value increased from 55.7 in 2022 to 56.3 in 2023 due to small improvements in each sub-index.

 **Japan**



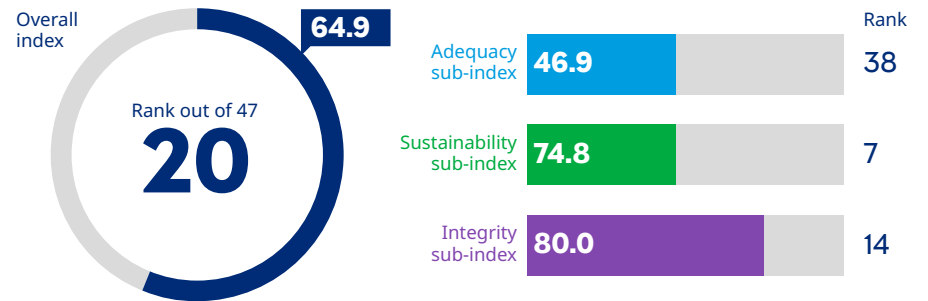
Japan's retirement income system comprises a flat-rate basic pension, an earnings-related public pension and voluntary private pension plans.

The overall index value for the Japanese system could be increased by:

- Continuing to increase the level of private pension coverage and thereby increase the level of contributions and pension plan assets
- Introducing an encouragement that part of the retirement benefit be taken as an income stream, such as an annuity payment
- Announcing a further increase in the future state pension age as life expectancy continues to increase
- Reducing the level of government debt as a percentage of GDP

The Japanese index value increased from 54.5 in 2022 to 56.3 in 2023 due to improvements in each sub-index.

 **Kazakhstan**



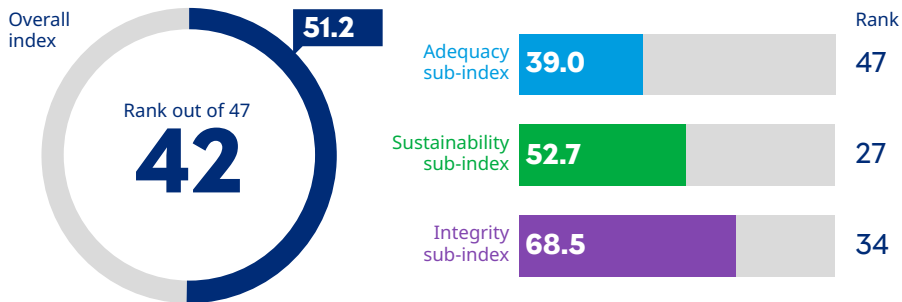
Kazakhstan's retirement income system comprises a basic pension and an earnings-related benefit (for retirees with service records before 1998), both paid from general government revenue. In 1998, a fully funded mandatory DC component was launched, currently with a compulsory employee contribution of 10% paid into individual accounts (with an additional 5% compulsory contribution sponsored by employers in favor of employees working in hazardous conditions). There are also additional voluntary DC plans.

The overall index value for the Kazakhstani system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Raising the level of household savings
- Reducing preretirement leakage by limiting the access to private pension funds before retirement
- Increasing the labor force participation rate at older ages as life expectancies rise
- Introducing a requirement to show benefit projections on members' annual statements

The Kazakhstani index value for 2023 is 64.9.

 **Korea (South)**



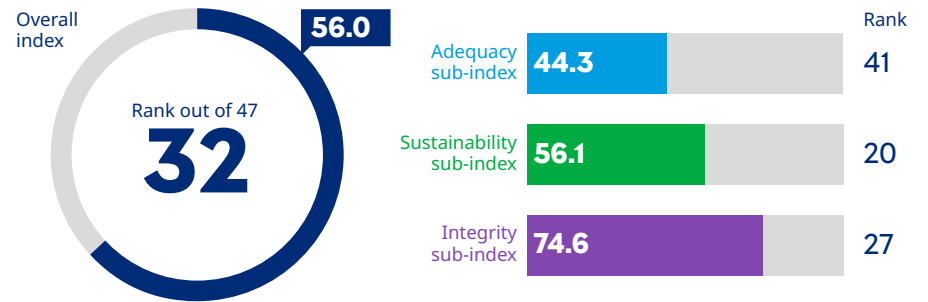
Korea’s retirement income system comprises a public earnings-related pension scheme with a progressive formula, based on both individual earnings and the average earnings of the insured as a whole, and statutory private pension plans.

The overall index value for the Korean system could be increased by:

- Improving the level of support provided to the poorest pensioners
- Introducing a requirement that part of the retirement benefit from private pension arrangements be taken as an income stream
- Increasing the level of funded contributions, thereby increasing the level of assets over time
- Improving the governance and communication requirements for the private pension system

The Korean index value increased slightly from 51.1 in 2022 to 51.2 in 2023 due to several minor changes offsetting each other.

 **Malaysia**

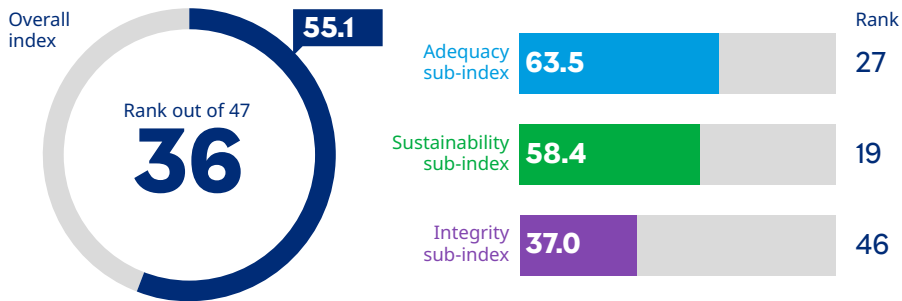


Malaysia’s retirement income system is based on the Employee Provident Fund (EPF), which covers all private-sector employees and non-pensionable public-sector employees. Under the EPF, some benefits are available to be withdrawn at any time (under predefined circumstances, including education, home loans and severe ill health), with other benefits preserved for retirement.

The overall index value for the Malaysian system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Raising the level of household savings and lowering the level of household debt
- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Increasing the pension age and the labor force participation rate at older ages as life expectancy continues to rise

The Malaysian index value decreased from 63.1 in 2022 to 56.0 in 2023, primarily due to the significant reduction in the net replacement rates published by the OECD from the rates previously used.

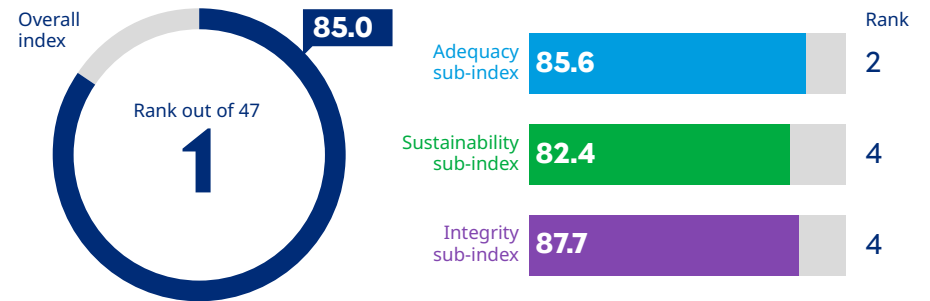


Mexico’s retirement income system comprises a social security retirement system with a means-tested age pension, a mandatory funded DC system that includes a minimum pension and voluntary occupational pension schemes. There is also a universal pension for all Mexicans from age 68.

The overall index value for the Mexican system could be increased by:

- Increasing the level of the pension paid to the poorest aged individuals
- Increasing the pension coverage for those in the informal labor market
- Introducing a requirement that part of the retirement benefit from private pension arrangements be taken as an income stream
- Increasing the level of funded contributions, thereby increasing the level of assets over time
- Improving the governance requirements for the private pension system, including the need for minimum levels of funding in DB plans
- Improving the level of communication required to members from pension plans

The Mexican index value decreased from 56.1 in 2022 to 55.1 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.



The Netherlands’ retirement income system comprises a flat-rate public pension and quasi-mandatory earnings-related occupational pension schemes linked to industrial agreements.

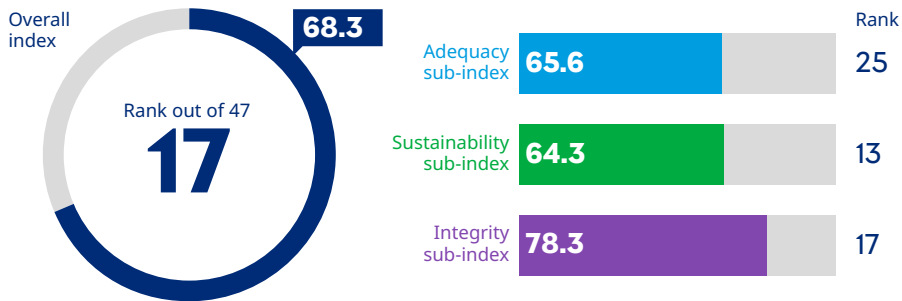
The overall index value for the Dutch system could be increased by:

- Reducing the level of household debt
- Increasing the labor force participation rate at older ages as life expectancies rise
- Introducing a carer’s pension credit for those caring for young children

The Dutch index value increased slightly from 84.6 in 2022 to 85.0 in 2023, primarily due to a strengthening of the early retirement regulations.



## New Zealand



New Zealand’s retirement income system comprises a universal public pension, the KiwiSaver DC retirement scheme or alternative occupational schemes. KiwiSaver is a voluntary scheme with contributions from the government, employers and members. New employees who are not already members of KiwiSaver are automatically enrolled by their employers and can remain in KiwiSaver unless they elect to opt out within a limited time of joining.

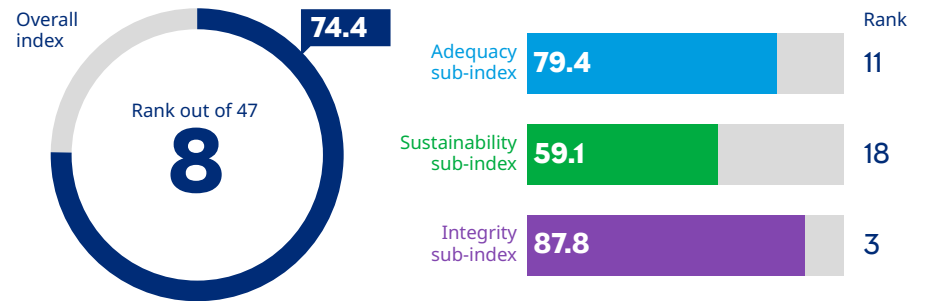
The overall index value for the New Zealand system could be increased by:

- Increasing the level, coverage and tax efficiency of KiwiSaver contributions, thereby increasing the level of assets set aside for future retirement benefits
- Raising the level of household savings and reducing the level of household debt
- Introducing a carer’s savings credit or contribution for those caring for young children that is not contingent on the carer making a contribution
- Introducing a requirement for KiwiSaver schemes to provide options for regular payments during retirement

The New Zealand index value decreased slightly from 68.8 in 2022 to 68.3 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.



## Norway

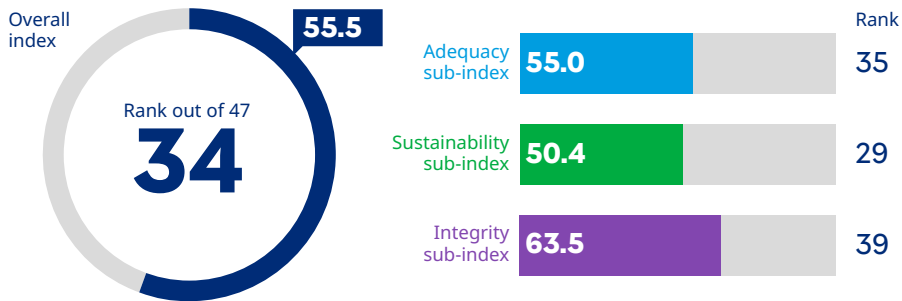


Norway’s retirement income system comprises an earnings-related social security pension with a minimum pension level and mandatory occupational pension plans. Many voluntary arrangements also provide additional benefits.

The overall index value for the Norwegian system could be increased by:

- Raising the level of household savings and reducing the level of household debt
- Increasing the level of mandatory contributions to DC plans, thereby raising the level of pension assets
- Introducing the option for voluntary contributions with tax relief for members of DC plans
- Introducing arrangements to protect all the pension interests of both parties in a divorce

The Norwegian index value decreased from 75.3 in 2022 to 74.4 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

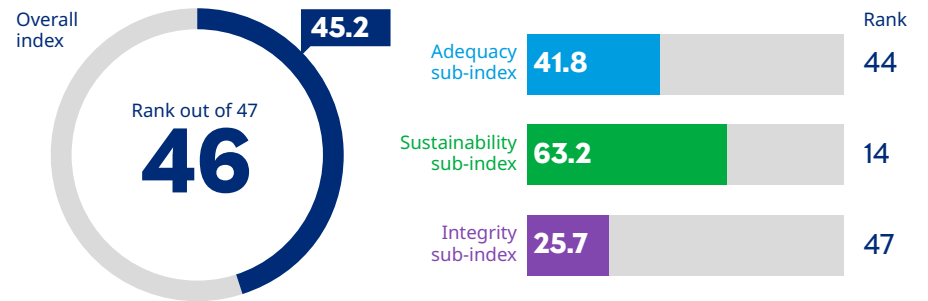


Peru’s retirement income system comprises a means-tested pension paid to the needy and two parallel and mutually exclusive pension systems. At the time of enrollment, people choose between a pay-as-you-go DB public system and a fully funded DC system managed by the private sector. Individuals under the DB scheme can change; otherwise, it is an irreversible decision. Employers don’t contribute to the system — all contributions are made by the employee.

The overall index value for the Peruvian system could be increased by:

- Reducing access to pension assets before retirement
- Increasing the minimum level of support for the poorest aged individuals
- Expanding coverage of employees in occupational pension schemes (for example, by promoting tax benefits or flexible investment rules), thereby increasing the level of contributions and assets
- Introducing a requirement to show benefit projections on members’ annual statements
- Enabling individuals to retire gradually while receiving a part pension

The Peruvian index value decreased slightly from 55.8 in 2022 to 55.5 in 2023, primarily due to a decline in the level of pension assets as reported by the OECD.



The Philippines’ retirement income system comprises a small basic pension and an earnings-related social security pension. Members can receive a lifetime pension if they have contributed for a minimum of 120 months. If this requirement is not met, the retiree will receive a lump sum upon retirement equal to the member and employer contributions plus interest.

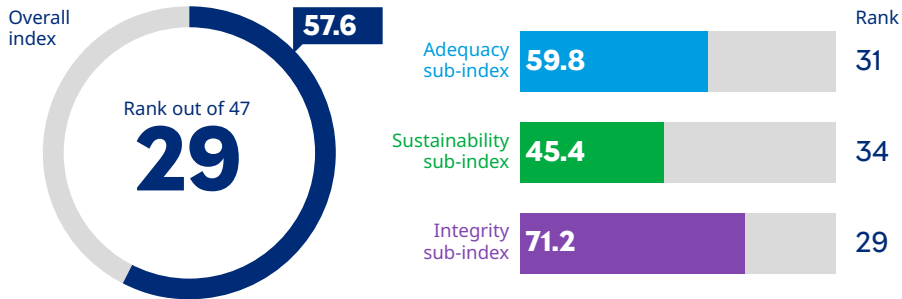
The overall index value for the Philippine system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Setting aside funds in the public system for the future, thereby reducing reliance on the pay-as-you-go system
- Introducing non-cash-out options for retirement plan proceeds so they are preserved for retirement purposes
- Improving the governance requirements for the private pension system

The Philippine index value increased from 42.0 in 2022 to 45.2 in 2023, primarily due to the increased level of pension coverage published by the OECD.



 **Poland**



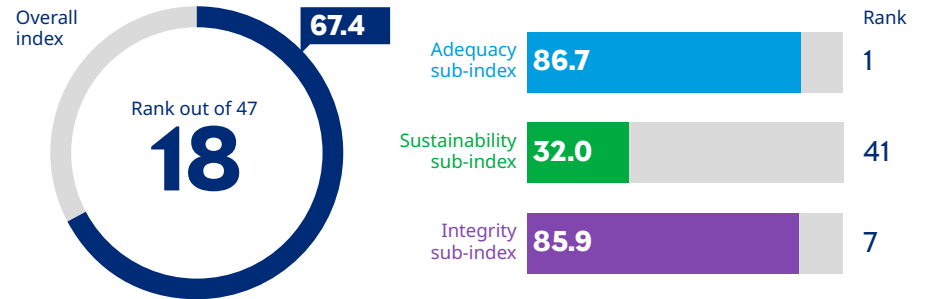
Poland’s retirement income system comprises a minimum public pension with an earnings-related pension based on notional accounts, supplemented by open private DC pension funds. The overall system, excluding the open DC pension funds, is pay-as-you-go. There are also mandatory auto-enrollment employer-sponsored pension plans with mandatory employee contributions, voluntary employer pension plans with voluntary employee contributions and individual pension accounts.

The overall index value for the Polish system could be increased by:

- Increasing the level of funded contributions, thereby increasing the level of assets over time
- Raising the minimum level of support available to the poorest pensioners
- Raising the level of household savings
- Increasing the labor force participation rate at older ages as life expectancies rise

The Polish index value increased slightly from 57.5 in 2022 to 57.6 in 2023 due to several minor changes.

 **Portugal**



Portugal’s retirement income system comprises an earnings-related public pension with an income-tested safety net. There are also voluntary personal and occupational pension schemes, but coverage is low.

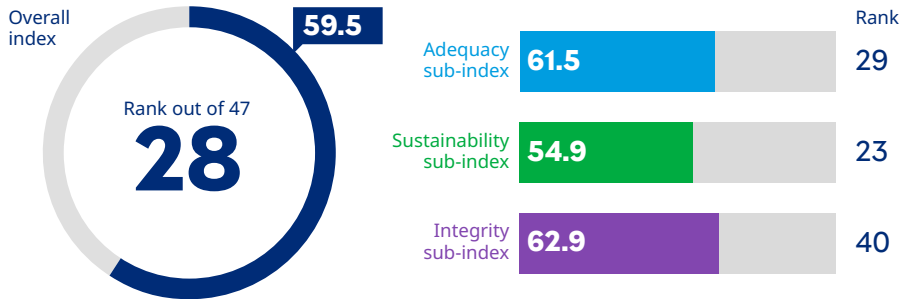
The overall index value for the Portuguese system could be increased by:

- Increasing the coverage of private pension plans, thereby increasing the level of contributions and the level of assets set aside for future retirement benefits
- Reducing the level of government debt
- Increasing the labor force participation rate at older ages as life expectancies rise

The Portuguese index value increased from 62.8 in 2022 to 67.4 in 2023, primarily due to updated information.



## Saudi Arabia



Saudi Arabia’s retirement income system comprises an earnings-related pension or an earnings-related lump-sum retirement benefit for individuals who do not fulfill any of the retirement conditions.

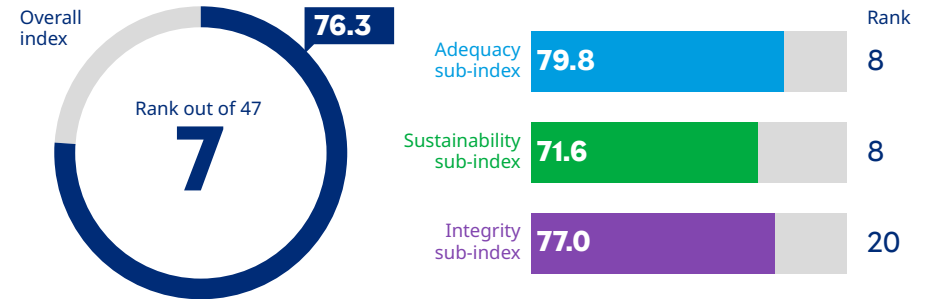
The overall index value for the Saudi Arabian system could be increased by:

- Increasing the minimum level of support provided to the poorest aged individuals
- Further increasing the state pension age over time
- Increasing the labor force participation rate at older ages as life expectancies rise
- Improving the required level of communication to members from private pension arrangements

The Saudi Arabian index value increased slightly from 59.2 in 2022 to 59.5 in 2023 due to several minor improvements.



## Singapore



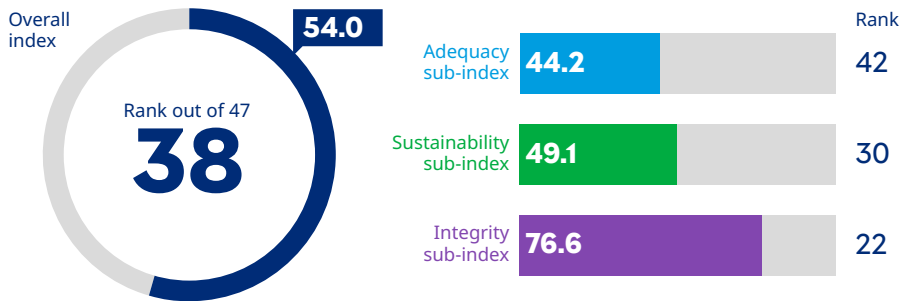
Singapore’s retirement income system is based on the Central Provident Fund (CPF), which covers all employed Singaporean residents. Under the CPF, some benefits are available to be withdrawn at any time for specified housing and medical expenses, with other benefits preserved for retirement. A prescribed minimum amount is required to be drawn down at retirement age in the form of a lifetime income stream through CPF Life.

The overall index value for the Singaporean system could be increased by:

- Reducing the barriers to establishing tax-approved group corporate retirement plans
- Opening the CPF to nonresidents (who make up a significant percentage of the labor force)
- Increasing the age at which CPF members can access their savings that are set aside for retirement as life expectancies rise
- Improving the level of communication provided to CPF members

The Singaporean index value increased from 74.1 in 2022 to 76.3 in 2023, primarily due to the increased level of pension coverage published by the OECD.

 **South Africa**



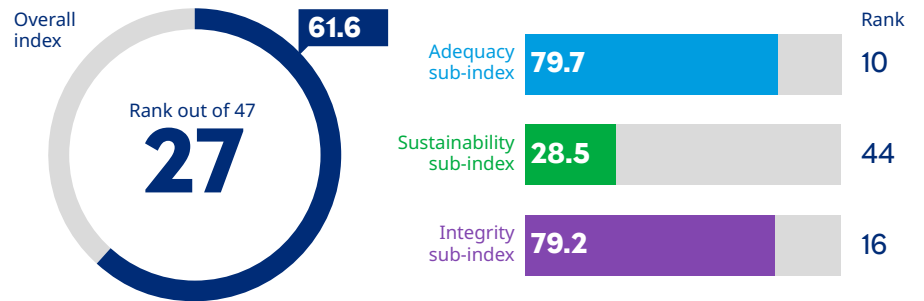
South Africa’s retirement income system comprises a means-tested public pension and tax-supported voluntary occupational schemes.

The overall index value for the South African system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Increasing the coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets
- Introducing a minimum level of mandatory contributions into a retirement savings fund
- Introducing preservation requirements restricting members withdrawing funds from occupational pension funds prior to retirement

The South African index value decreased from 54.7 in 2022 to 54.0 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **Spain**



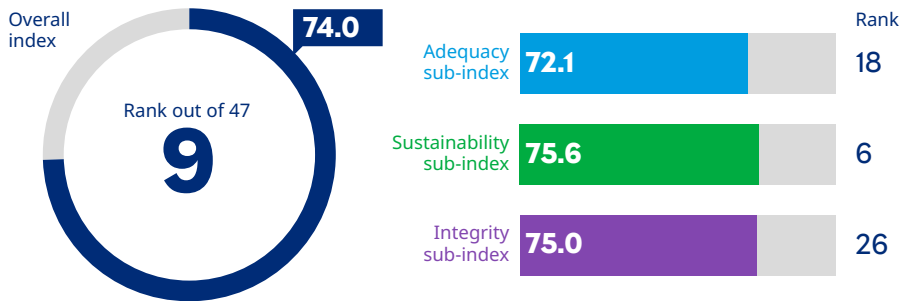
Spain’s retirement income system comprises an earnings-related public pension system and a minimum means-tested social assistance benefit. Voluntary personal and occupational pension schemes exist, but coverage is low. New legislation was passed in 2022 with the aim of promoting occupational pension coverage.

The overall index value for the Spanish system could be increased by:

- Increasing the minimum level of support provided to the poorest aged individuals
- Expanding coverage of employees in occupational pension schemes through automatic membership or enrollment, thereby increasing the level of contributions and assets
- Continuing to increase labor force participation rate at older ages as life expectancies rise

The Spanish index value decreased slightly from 61.8 in 2022 to 61.6 in 2023, primarily due to a decline in the level of growth assets.

 **Sweden**



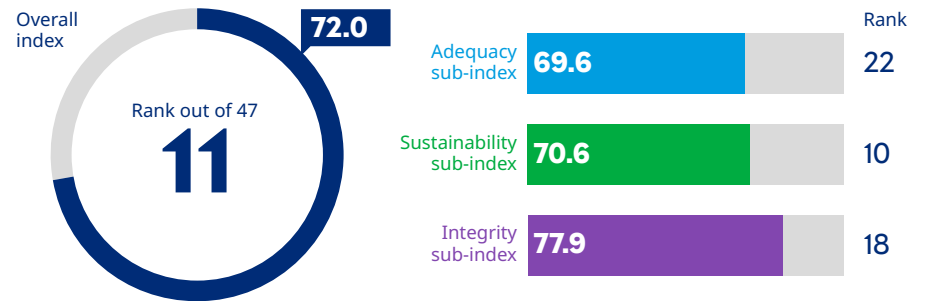
Sweden’s national retirement income system comprises a pay-as-you-go earnings-related system with notional accounts and a mandatory DC pension system. The overall system is in transition from a pay-as-you-go system to a funded approach. There is also an income-tested top-up benefit that provides a minimum guaranteed pension. Occupational pension schemes also have broad coverage.

The overall index value for the Swedish system could be increased by:

- Further increasing the state pension age to reflect increasing life expectancy
- Ensuring that all employees can make contributions into employer-sponsored plans
- Reintroducing tax incentives for individual contributions
- Introducing arrangements to protect all the pension interests of both parties in a divorce

The Swedish index value decreased from 74.6 in 2022 to 74.0 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

 **Switzerland**

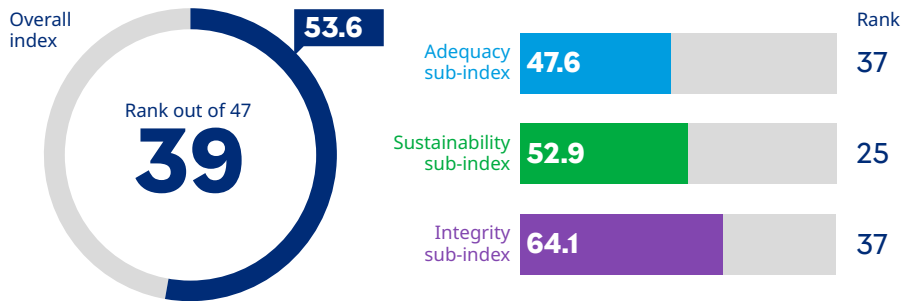


Switzerland’s retirement income system comprises an earnings-related public pension with a minimum pension, a mandatory occupational pension system where the contribution rates increase with age and voluntary pension plans.

The overall index value for the Swiss system could be increased by:

- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Increasing the state pension age over time as life expectancies rise
- Increasing the rate of home ownership

The Swiss index value decreased slightly from 72.3 in 2022 to 72.0 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

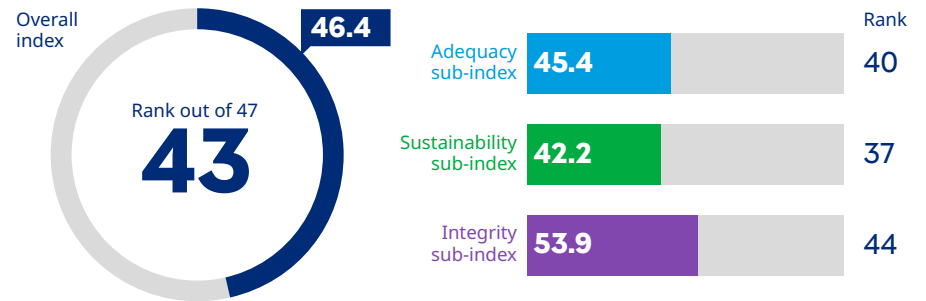


Taiwan’s retirement income system consists of an earnings-related public pension and a national labor pension scheme in which the employer contributes 6% or more of a worker’s monthly wage into an individual pension account overseen by the Bureau of Labor Insurance. Ownership of this pension account belongs to the worker. Upon reaching age 60, a worker may apply directly to the Bureau of Labor Insurance to receive the principal and investment earnings.

The overall index value for Taiwan’s system could be increased by:

- Increasing the minimum level of support for the poorest aged individuals
- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Gradually increasing the state pension age as life expectancies increase
- Increasing labor force participation rate at older ages

The Taiwanese index value increased from 52.9 in 2022 to 53.6 in 2023, primarily due to an increase in the net replacement rates published by the OECD.

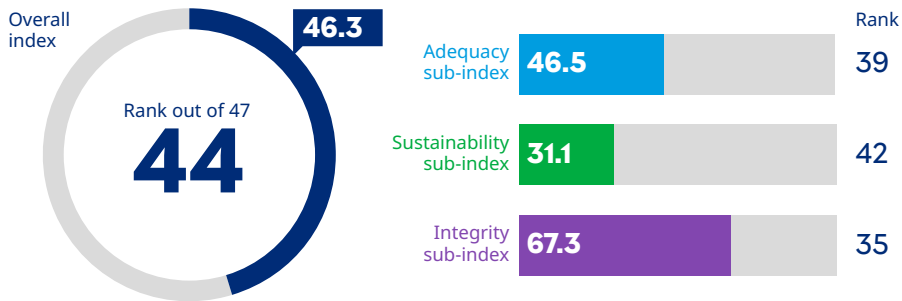


Thailand’s retirement income system comprises an old-age pension, a social security fund for private-sector employees in the formal sectors, voluntary employer-sponsored DC plans and individual savings products.

The overall index value for the Thai system could be increased by:

- Increasing the coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets
- Increasing the minimum level of support for the poorest aged individuals
- Introducing a requirement that part of the retirement benefit from private pension arrangements be taken as an income stream
- Continuing to enhance the governance requirements for the private pension system

The Thai index value increased from 41.7 in 2022 to 46.4 in 2023, primarily due to an increase in the level of pension coverage as published by the OECD.

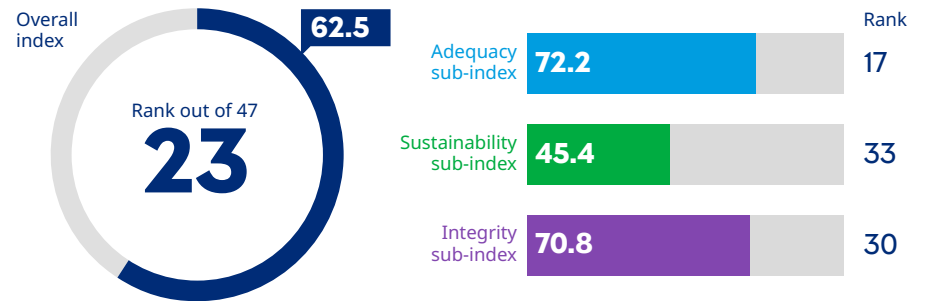


Turkey's retirement income system comprises an income-tested public pension and an earnings-related public scheme. There are voluntary private pension systems that people can join to supplement their income in retirement, but coverage is low. There are also auto-enrollment plans in which employee contribution is mandatory but with the right to opt out at any time.

The overall index value for the Turkish system could be increased by:

- Increasing the minimum public pension provided to the poorest aged individuals
- Expanding the coverage of employees in occupational pension schemes, thereby increasing the level of contributions and assets
- Introducing a requirement that part of the retirement benefit be taken as an income stream
- Reducing preretirement leakage by limiting the access to private pension funds before retirement
- Introducing mandatory employer contribution to auto-enrollment plans

The Turkish index value increased from 45.3 in 2022 to 46.3 in 2023 due to small improvements in each sub-index.



The UAE's retirement income system comprises a minimum means-tested state pension and an earnings-related national employment-based scheme administered by Abu Dhabi Pension Fund for the Emirate of Abu Dhabi, Sharjah Social Security Fund for the Emirate of Sharjah and the General Pensions and Social Security Authority for the rest of the emirates. Employees contribute 5% of salary, and employers contribute 12.5%–15% of salary, with benefits guaranteed by the government.

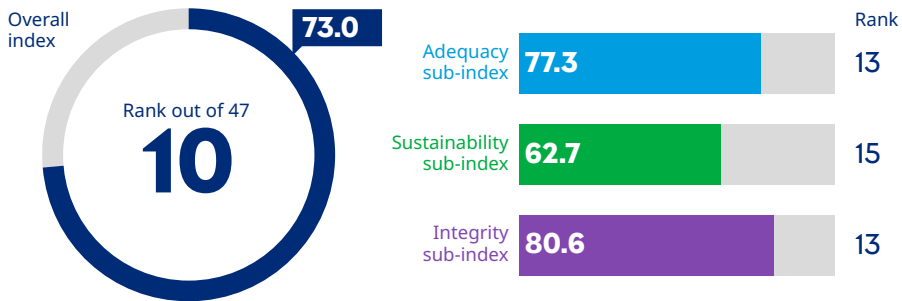
The overall index value for the Emirati system could be increased by:

- Introducing a minimum access age so that the benefits from pension plans are preserved for retirement purposes
- Increasing the level of assets held in private pension arrangements to reduce the reliance on state pensions in the future
- Improving the required level of communication to members from pension arrangements
- Increasing the state pension age as life expectancies rise

The Emirati index value increased from 61.8 in 2022 to 62.5 in 2023, primarily due to a correction relating to last year's data.



## United Kingdom (UK)



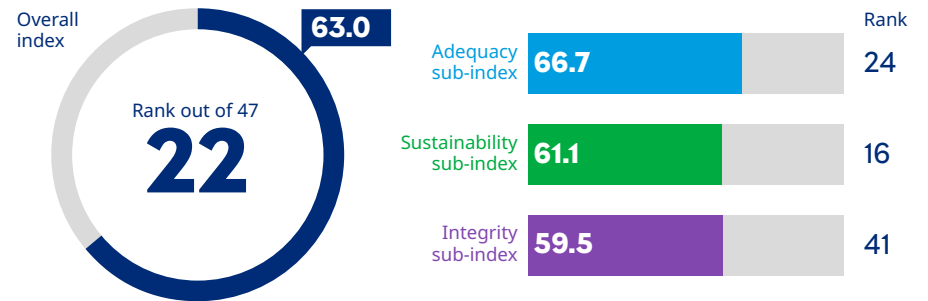
The UK retirement income system comprises a single-tier state pension supported by an income-tested pension credit and supplemented by voluntary occupational and personal pensions. Auto-enrollment now covers all employers, requiring them to enroll eligible employees (who can then choose to opt out) in pension schemes. The minimum contribution rate is currently 8%.

The overall index value for the UK system could be increased by:

- Restoring the requirement to take part of the retirement benefit as an income stream
- Raising the minimum pension for low-income pensioners
- Further increasing the coverage of employees and the self-employed in private pension schemes
- Increasing contribution levels required under auto-enrollment
- Reducing the level of household debt

The UK index value decreased from 73.7 in 2022 to 73.0 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.

## United States of America (US)

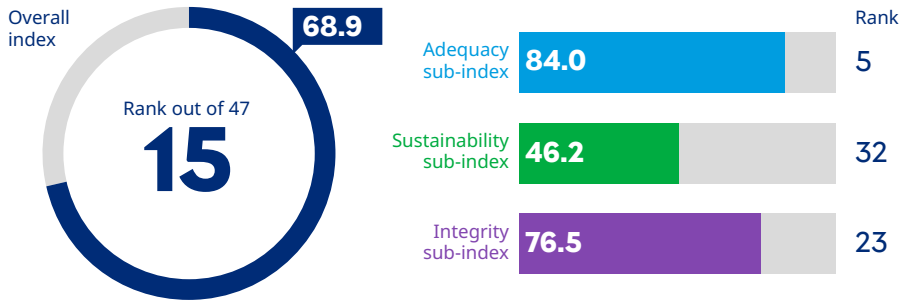


The US retirement income system comprises a social security system with a progressive benefit formula based on lifetime earnings, adjusted to a current-dollar basis, together with a means-tested top-up benefit and voluntary private pensions, which may be occupational or personal.

The overall index value for the US system could be increased by:

- Raising the minimum pension for low-income pensioners
- Improving the vesting of benefits for all plan members and maintaining the real value of retained benefits through to retirement
- Reducing preretirement leakage by further limiting access to funds before retirement
- Introducing a requirement that part of the retirement benefit be taken as an income stream

The American index value decreased from 63.9 in 2022 to 63.0 in 2023, primarily due to the changes in the integrity sub-index outlined in Chapter 3.



Uruguay's retirement income system comprises a means-tested state pension and mandatory private pension arrangements. Compulsory contributions from employers and employees are paid into both the pay-as-you-go social security system and a private pension fund.

The overall index value for the Uruguayan system could be increased by:

- Increasing the level of individual contributions that are invested through the private pension arrangements for future retirement benefits
- Improving the governance requirements for the private pension system
- Increasing the state pension age as life expectancies rise
- Introducing arrangements to protect all the pension interests of both parties in a divorce

The Uruguayan index value decreased from 71.5 in 2022 to 68.9 in 2023, primarily due to updated data relating to pension coverage.



# 07. The adequacy sub-index

The adequacy sub-index considers the benefits provided to the poor and a range of income earners as well as several design features and characteristics that enhance the efficacy of the overall retirement income system. The net household saving rate, the level of household debt and the home ownership rate are also included, representing non-pension factors that contribute to financial security during retirement.

The countries with the highest value for the adequacy sub-index are Portugal (86.7) and the Netherlands (85.6), whereas Korea (39.0) and Botswana (39.8) have the lowest. Although several indicators influence these scores, the level of the basic (or targeted) pension (expressed as a percentage of the average wage) and the net replacement rate for a range of incomes are the most important.

Full details of the values relating to each indicator in the adequacy sub-index are shown in Appendix 1.



### **Question A1: What is the basic (or targeted) state pension, as a percentage of the average wage, that a single aged person will receive?**

**How is the basic (or targeted) state pension increased or adjusted over time (for example, by prices or wages or some other means)?**

**Are these increases or adjustments made on a regular basis? If yes, how often?**

#### **Objective**

An important objective of any retirement income system is to provide a minimum pension to the aged poor. In terms of the World Bank's recommended multipillar system, it represents the noncontributory basic pension or zero pillar, which provides a minimum level of income for all aged citizens. Eligibility for this minimum pension requires no period in the paid workforce but will often require a minimum period of residency. As the World Bank notes: "The elderly in the poorest quintile have benefited the most from old-age social pensions, no matter the program design."<sup>21</sup>

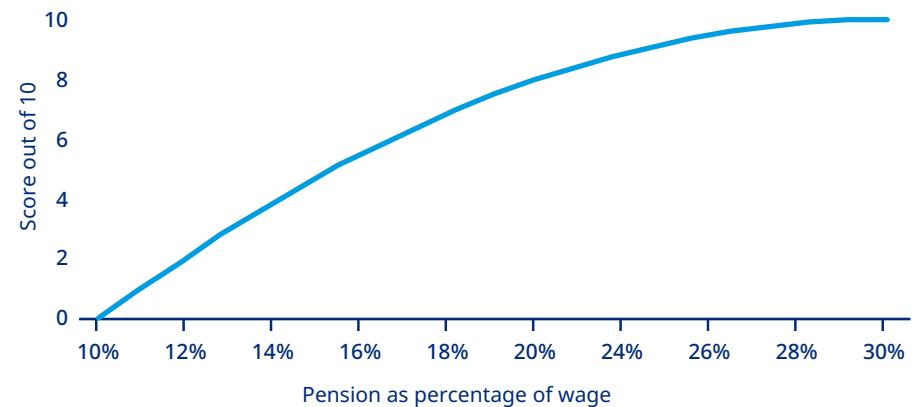
This question also considers how the minimum pension is increased or adjusted over time. The level and frequency of increases or adjustments are critical to ensure that the real value of the basic (or targeted) pension is maintained.

#### **Calculation**

There is no single answer as to the correct level of the basic (or targeted) pension — it depends on a range of socioeconomic factors. However, a minimum pension of about 30%<sup>22</sup> of average earnings is suggested to adequately meet the poverty-alleviation goal. So, for the first part of this question, a basic (or targeted) pension below 30% will score less than the maximum value of 10, with a 0 score if the pension is 10% or less of average earnings, as such a pension offers very limited income provision.

However, we haven't used a linear scoring approach between 10% and 30%. Rather, more credit is given for increases at the lower levels of the pension than at the higher levels as these improvements will provide relatively greater benefits to the poor.

**Figure 9. Calculating A1 — Basic (or targeted) pension**



The second part of this question is assessed on a four-point scale, with the maximum score of 2 for increases granted on a regular basis related to wage growth (where regular is considered to be at least annually); 1.5 for increases granted on a regular basis related to price inflation; 1 for increases that occur but not on a regular basis related to wage growth or price inflation; and 0 in cases where the minimum pension is not increased.

A maximum score is achieved for this question if the minimum pension is 30% or higher of average earnings and it is increased on a regular basis in line with wage growth.

#### **Commentary**

The minimum pension ranges from less than 5% of the average wage in China, the Philippines and Thailand to more than 35% in Brazil, Denmark and New Zealand. India and Indonesia do not provide a basic (or targeted) pension.

#### **Weighting**

The major objective of any nation's retirement income system is to provide income support for its older citizens. The level of actual benefits therefore represents the major measurable outcome from the system. Hence, this measure (which considers the retirement income provided to the poorest in the community) and the next measure (which considers the retirement income for a range of income earners) represent the two most important components within the adequacy sub-index. This indicator is therefore given a weighting of 20% in the adequacy sub-index, with 17.5% for the first question and 2.5% for the remaining questions.



## Question A2: What is the net pension replacement rate for a range of income earners?

### Objective

The most common measure used to assess the adequacy of retirement income is the replacement rate; that is, the income at retirement expressed as a percentage of an individual's preretirement income. Although this concept is simple to understand, several comments are worth noting:

1. Replacement rates should allow for future indexation of the postretirement income so that the purchasing power of the retiree does not reduce during retirement.
2. A net replacement rate recognizes that the taxation of income after retirement may be very different from that before retirement.
3. Low-income earners are likely to need a higher replacement rate than higher-income earners to provide a reasonable standard of living.
4. The replacement rates need to include income from both public and private pensions, which are available to the majority of workers.

The OECD suggested a target replacement rate of 70% of final earnings, or around two-thirds of final salary, while noting that this level may need to be higher for low-income individuals.<sup>22</sup>

The OECD calculates net pension replacement rates for a single person at a range of income levels (revalued with earnings growth) throughout their working career. These calculations assume no promotion of the individual; in other words, the individual earns a particular percentage of average earnings throughout.

To recognize that a range of income levels exists in practice, we have used the net replacement rates at three income levels — namely, 50%, 100% and 150% of average earnings. The net replacement rates at these three income levels are given weightings of 30%, 60% and 10%, respectively, which recognizes that more individuals earn less than the average wage than above it. The use of a range of incomes is more comprehensive than a single point, although the weighted answer will be similar to the net replacement rate for the median income earner in many systems.

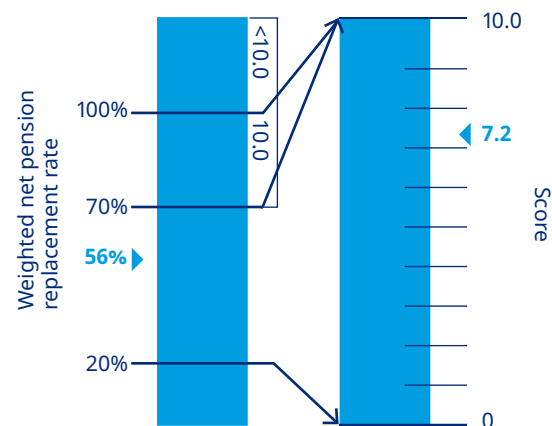
This indicator for the adequacy sub-index includes mandatory components of a retirement income system for private-sector workers as well as an allowance for voluntary plans that cover more than 30% of the working-age population. This allowance takes into account the level of coverage above 30% and the increase in the net replacement rate due to these voluntary schemes.<sup>23</sup>

A net replacement rate below 70% suggests a reliance on some voluntary savings, which many individuals are unable to achieve, whereas a figure above 100% suggests significant overprovision.

### Calculation

The maximum score for this indicator is obtained for any system with a result between 70% and 100%. Sixteen of the 47 pension systems in the Index achieve this outcome. Any outcome outside this range scores less than the maximum, with a 0 score being obtained for a result less than 20%.

Figure 10. Calculating A2 — Weighted net pension replacement rate



**Commentary**

Most systems have a result between 20% and 70%, as shown in Attachment 1, with scores between 0 and 10 for this question. The Chinese, Indian and Indonesian figures have been adjusted to reflect the varying levels of replacement rates that exist in practice.

**Weighting**

The net pension replacement rates for a range of income earners represent a major outcome in the assessment of any retirement income system. As this indicator reflects the benefits provided to a broad group of retirees, this indicator is given the highest weighting in the adequacy sub-index; namely, 25%.





### Question A3: What is the net household saving rate?

#### What is the net household debt to GDP ratio?

##### Objective

The living standards of the aged will depend on the benefits arising from the total pension system (as covered by the previous two questions) as well as the net level of household savings or debt outside the pension system.

##### Calculation

For countries where Economist Intelligence Unit (EIU) data were used, we calculated the saving rate in the following way:

$$\text{Household saving rate} = \frac{\text{PDIN} - \text{PCRD}}{\text{PDIN}}$$

PDIN = Personal disposable income  
PCRD = Private consumption

To remove some volatility that may occur in annual figures, we have averaged the 2022 and 2023 measurements.

OECD measures were used for Canada, Denmark, Germany, Ireland, Italy and Spain due to changes in data sources and estimation methods.

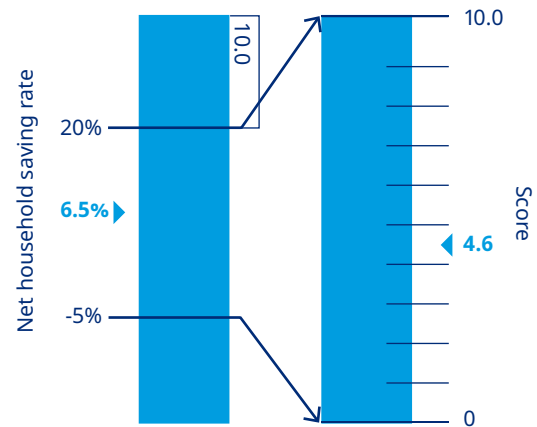
Trading Economics measures were used for Mexico, Sweden, Switzerland and the UK due to changes in data sources and estimation methods.

Mercer colleagues and other contributors provided responses for Botswana, Iceland, Taiwan and Uruguay.

The calculated household saving rates ranged from -7% in Kazakhstan to +33% in Singapore. A maximum score is obtained for any country with a saving rate of 20% or higher and a 0 score for any country with a saving rate of less than -5%.

The EIU's calculation excludes contributions to pension plans, and the OECD measure also excludes contributions to social security and employer contributions. This is consistent with our approach as we allow for both pension plan assets and the level of pension contributions as part of the sustainability sub-index.

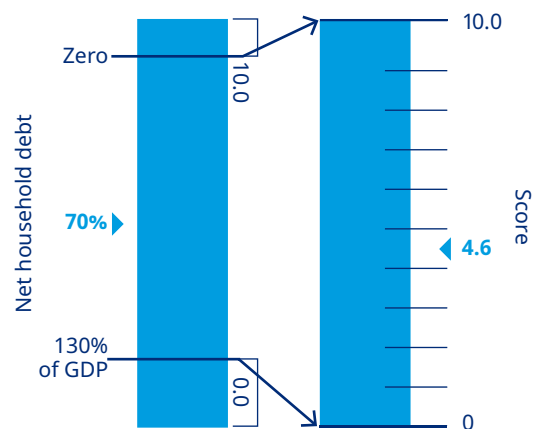
Figure 11. Calculating A3a — Net household saving rate



Although the level of household savings represents the current flow of household savings, the level of household debt represents the financial liabilities that must be paid by households in the future. In many cases, these liabilities will be repaid by accumulated benefits from the pension system, thereby reducing the adequacy of the remaining pension benefits.

The level of household debt ranges from 4% of GDP in Argentina and 10% of GDP in the Philippines to 116% of GDP in Australia and 131% of GDP in Switzerland. A maximum score is obtained for any country with zero household debt and a 0 score for any country with household debt of 130% of GDP or higher.

Figure 12. Calculating A3b — Net household debt

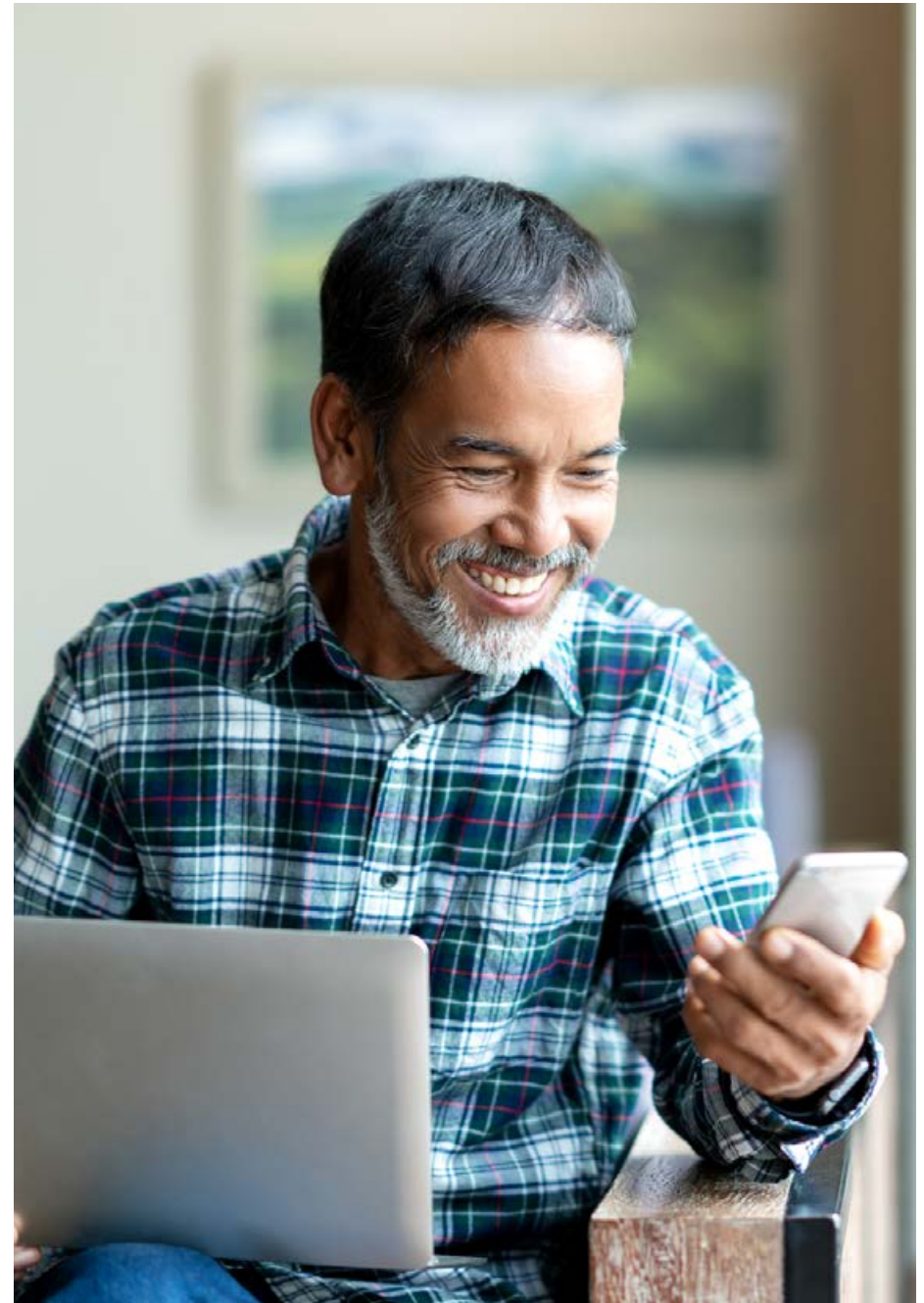


### Commentary

The net household saving rate provides some indication of the level of current income that is voluntarily being set aside from current consumption, excluding pension contributions, whereas net household debt provides an indication of the debt levels that will need to be repaid by households in the future.

### Weighting

The weighting for these two measures has been set at 5% each of the adequacy sub-index. This indicates the importance of both net household savings and debt as individuals plan for their futures.



### **Question A4: Are voluntary member contributions to a funded pension plan made by a full-time earner on the median income treated by the tax system more favorably than similar savings in a bank account?**

#### **Is the investment income earned by the pension plan exempt from tax in the preretirement and/or postretirement periods?**

##### **Objective**

The level of total retirement benefits received by an aged person will depend on both the mandatory level of savings and any voluntary savings, which are likely to be influenced by the presence (or otherwise) of taxation incentives designed to change individual behavior. The investment earnings (and the related compounding effect over decades) are critical with regard to adequacy as the size of an individual's retirement benefits are primarily due to investment earnings and not contributions.

##### **Calculation**

This indicator is concerned with any taxation incentives or tax exemption of investment earnings that make saving through a pension plan more attractive than through a bank account. The benchmark of a bank account was chosen as this saving alternative is readily available in all countries.

Both questions were assessed with a score of 2 for "yes" and 0 for "no." In cases in which the response to the first question was neither a clear "yes" nor a clear "no," a score of 1 was given.

##### **Commentary**

All countries offer some taxation incentive for voluntary contributions except for Austria, the Philippines and Turkey, in addition to Saudi Arabia and the UAE, where there is no income tax. In Norway and Sweden, additional employee contributions are encouraged in certain circumstances. Thirty systems offer a tax exemption on investment earnings of pension plans in both the preretirement and postretirement periods.

##### **Weighting**

Taxation incentives or tax exemption represent important measures that governments can introduce to encourage pension savings and long-term investments. Such incentives provide a desirable design feature of retirement income systems. We have therefore given this measure a total weighting of 5% in the adequacy sub-index, with 2% for the first question and 3% for the second question.

**Question A5: Is there a minimum access age to receive benefits from private pension plans<sup>24</sup> (except in the cases of death, invalidity or significant financial hardship)? If so, what is the current age?**

**Objective**

The primary objective of a private pension plan should be to provide retirement income; therefore, the availability of these funds at an earlier age reduces the efficacy of such plans as it leads to leakage from the system.

**Calculation**

The first question was assessed on a three-point scale, with a score of 2 for “yes,” 1 if it was applied in some cases and 0 for “no.” The second question was scored on a scale for those who said “yes” to the first question, ranging from a score of 0 for age 55 or below to a score of 1 for age 60 or above. A maximum score is achieved if a minimum access age exists and this age is at least 60.

**Commentary**

Many countries have introduced a minimum access age, whereas others have access provisions described in each pension plan’s set of rules. In some cases, early access is not prohibited, although the taxation treatment of the benefit discourages such behavior.

**Weighting**

Ensuring that the accumulated benefits are preserved until the later years of life represents an important design feature of all pension arrangements. Hence, this desirable feature has been given a 10% weighting in the adequacy sub-index.

**Question A6: Is it a requirement to take part or all of the retirement benefit as an annuity or income stream for life?**

- **If it is a requirement to take a lifetime annuity or income stream, are some lump-sum benefits also available?**
- **If it is not a requirement to take a lifetime annuity or income stream, are there any incentives or rules that encourage the provision of income streams?**

**Are the annuities or income streams available priced or designed as unisex annuities (that is, the same benefit for males and females)?**

**Are reverse mortgages (or home equity release schemes) available to your retirees (either from the government or the private sector)?**

**Objective**

The primary objective of a private pension system should be to provide income during retirement. Of course, this does not imply that a lump-sum payment is not a valuable benefit; it often is. Indeed, both Rocha and Vittas<sup>25</sup> and the OECD<sup>26</sup> suggest that policymakers should target an adequate level of annuitization but should be wary of causing excessive annuitization. This indicator therefore focuses on whether the system has any requirement that at least part of the benefit be taken as an income stream or if there are any tax incentives to encourage the take-up of income streams. Further, the availability of some lump-sum benefits can provide additional security and comfort to retirees.

Traditionally, the price of purchased annuities often distinguished between males and females. Yet this distinction does not appear in government pensions or most DB pension schemes. The better systems provide the same income streams for a given price, irrespective of gender.

Another potential source of retirement income is the home. Although the need for this income source will vary considerably between individuals, its availability

provides greater flexibility and income for retirees who may need it.

### Calculation

No single design of retirement income products provides the best outcome for all retirees. The significant heterogeneity between retirees means the situation is more complicated than that. The better systems have some flexibility so that retirees have regular income as well as access to some capital for those unexpected expenses.

The first set of questions, relating to the balance between income and lump sums, accounts for 80% of this indicator, whereas the next two questions are worth 10% each.

### Commentary

Systems vary considerably in the design of their retirement benefits, and variation also exists within systems with two or more pension arrangements. Twenty-seven of the 47 systems require that part or all of the retirement benefit be taken as an income stream, with 16 of these also permitting some level of lump-sum benefits. Of the 20 systems that do not require that part or all of the retirement benefit be taken as an income stream, 10 provide some level of incentive to encourage the provision of income streams.

Twenty-six systems require that annuities be priced on a unisex basis, while reverse mortgages are available to retirees as a potential source of income in 23 systems.

### Weighting

The benefit format of the retirement benefits is a fundamental feature of any private pension system. Therefore, this indicator has a weighting of 10% in the adequacy sub-index.

## **Question A7: On resignation from employment, are plan members normally entitled to the full vesting of their accrued benefit?**

### **After resignation, is the value of the member's accrued benefit normally maintained in real terms (either by inflation-linked indexation or through market investment returns)?**

### **Can a member's benefit entitlements normally be transferred to another private pension plan on the member's resignation from an employer?**

#### Objective

Most individuals have many employers during their careers and do not stay with a single employer throughout their working lives. It is therefore important that individuals receive the full value of any accrued benefit upon leaving an employer's service and that the real value of this benefit is maintained until retirement, either in the original plan or in another plan. Further, the availability of portability between schemes provides greater flexibility for individuals and should lead to a more efficient outcome.

#### Calculation

Each question was assessed with a score of 2 for "yes," 0 for "no" and between 0.5 and 1.5 if it was applied in some cases. The actual score depended on the specific circumstances.

#### Commentary

There is considerable variation in whether the real value of a member's benefit entitlements can be transferred or is retained after changing employment. That is, in only 24 of the 47 systems is full vesting present, with the real value of the benefits maintained after resignation and the accrued benefit transferrable, thereby obtaining the maximum score.

#### Weighting

Maintaining the real value of a member's accrued benefit entitlements during a member's working life represents an important feature of all retirement income systems. Hence, this desirable feature has been given a 5% weighting in the adequacy sub-index.

### Question A8: Upon a couple's divorce or separation, are the individuals' accrued pension assets normally taken into account in the overall division of assets?

#### Objective

The adequacy of an individual's retirement income can be disrupted by a divorce or separation. In many cases involving heterosexual couples, the female partner can be adversely affected as most of the benefits may have accrued in the male's name during the marriage or partnership. We consider it desirable that upon a divorce or separation, the pension benefits that have accrued during the marriage be considered as part of the overall division of assets. This outcome is fair and provides improved adequacy in retirement for both individuals rather than just the main income earner.

#### Calculation

The question was assessed on a three-point scale with a score of 2 for "yes," 1 if it was applied in some cases and 0 for "no."

#### Commentary

In 21 of the 47 systems, it is normal practice for the accrued pension benefits to be taken into account in the overall division of assets upon a divorce or separation.

#### Weighting

With a relatively high level of divorce or separation occurring in many countries, the adequacy of retirement income for the lower-income partner is improved if pension assets are considered in the overall division of assets. This desirable feature has a 3% weighting in the adequacy sub-index.

### Question A9: What is the level of home ownership in the country?

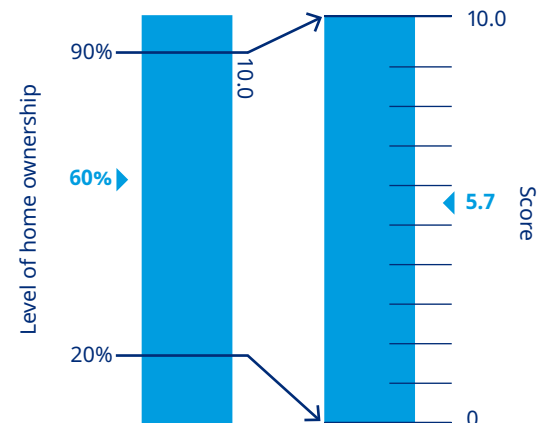
#### Objective

In addition to regular income, home ownership represents an important factor affecting financial security during retirement. In some countries, taxation support encourages home ownership.

#### Calculation

A maximum feasible level is considered to be 90%. Hence, a home-ownership level of 90% or more scores maximum results, whereas a level of 20% or less scores 0.

Figure 13. Calculating A9 — Home ownership



#### Commentary

The level of home ownership ranged from 36% in Switzerland to more than 85% in China, India, Singapore and the UAE.

#### Weighting

Home ownership is a significant contributor to financial security in retirement. This indicator has therefore been given a 5% weighting in the adequacy sub-index.



## Question A10: What is the proportion of total pension assets in the whole industry (that is, including both the public and private sectors) invested in growth assets?

### Objective

The investment performance of funded pension plans over the long term, after allowing for costs and any taxation, represents a key input into the provision of adequate retirement income. Yet international comparisons of investment returns might not be totally meaningful.<sup>27</sup> This report also notes that any benchmarks need to consider a range of factors, including the age of the plan member, the availability of other income (such as social security), the contribution rates, the target replacement rate, the risk tolerance of the member and the types of retirement income products available. There is no ideal asset allocation appropriate for all members at all ages. The development of life-cycle funds suggests that the best approach may be a changing asset allocation during an individual's lifetime.

We must also recognize that the investment performance of a pension plan needs to focus on the longer term and not on short-term returns. With this in mind, we believe it is appropriate for the investments of pension plans to be diversified across a range of asset classes, thereby providing the opportunity for higher returns with reduced volatility.

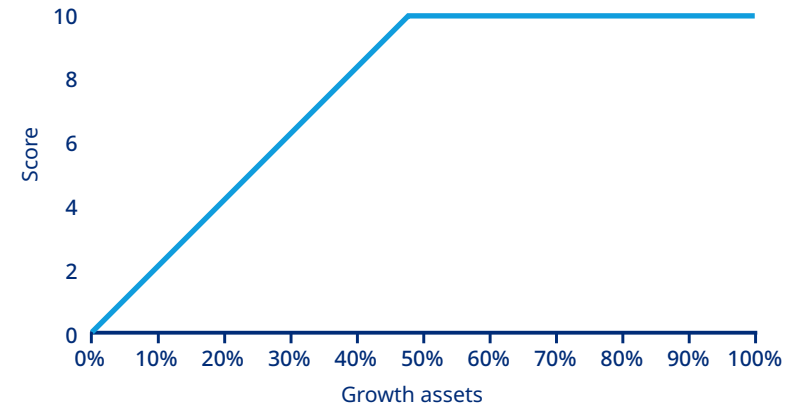
### Calculation

Many countries have pension plan assets invested in a variety of assets, ranging from cash and short-term securities through bonds and equities to alternative assets, such as property, venture capital, private equity and infrastructure. As a proxy for this diversified approach, we have used the percentage of growth assets (including equities and property) in the total pension assets in each system.

Although a zero percentage in growth assets may highlight the benefits of security for members, it does so without the benefits of diversification and the associated reduction in risk. No exposure to growth assets scores 0 out of 10. This score increases to the maximum score of 10 as the proportion in growth assets increases to 45% of all assets.

Notwithstanding this approach, we recognize that capital markets are underdeveloped in some emerging markets. We also note that in some private pension systems, restrictions imposed by the government may limit the investment decisions made by the pension plan's trustees or fiduciaries.

Figure 14. Calculating A10 — Percentage of growth assets



### Commentary

The level of growth assets ranges from 2% in Kazakhstan to approximately 80% in the UAE. Twenty-one of the 47 systems have a percentage above 45%.

### Weighting

Asset allocation represents an important feature of all funded retirement systems. This indicator has therefore been given a 5% weighting in the adequacy sub-index.

**Question A11: Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income due to invalidity or a disability? These income benefits could be from the public pension scheme or a private-sector pension scheme.**

**Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income during paid parental leave? These income payments could be from the government or the employer.**

**Is it a requirement that an individual continue to accrue their retirement benefit in the pension system while out of the paid workforce caring for young children?**

### Objective

The adequacy of an individual's retirement income can be affected if there is no requirement for benefits to accrue in a pension scheme when a worker is temporarily out of the workforce and may be receiving income support; for example, due to parental leave, ill health or disability. Although these benefit accruals or actual contributions may be for a relatively short period, making pension contributions (or increasing the accrued benefit) a compulsory component of income support payments is desirable. In addition, to help reduce the gender pension gap that exists in most retirement income systems, parents caring for young children should receive some additional retirement benefit.

### Calculation

These questions were assessed on a three-point scale, with a score of 2 for "yes," 1 if contributions are paid in some cases and 0 for "no."

### Commentary

In 19 of the 47 systems, it is a requirement for additional retirement benefits to accrue if a worker receives income support due to an invalidity, and this benefit occurs in 29 systems during paid parental leave.

Fourteen systems provide additional pension contributions or benefits from the government for parents who are caring for young children.

### Weighting

The requirement for contributions to be paid while a worker is receiving income support or a parent is caring for young children is a desirable feature and represents an important signal in the design of the best retirement income systems. These two features have each been given a 1% weighting in the adequacy sub-index.

## Sources of data for the adequacy sub-index

### Question A1

The answers for the first question were taken from the following sources:

- The OECD's *Pensions at a Glance Asia/Pacific 2022* for Hong Kong SAR, India, Indonesia, Malaysia, the Philippines and Thailand
- The OECD's *Pensions at a Glance 2021: OECD and G20 Indicators, 2021*, for all other OECD countries
- Mercer calculations for Singapore using government information
- Mercer calculations for Peru using websites
- Mercer calculations for Botswana, Croatia, China, Kazakhstan, Saudi Arabia, Taiwan, the UAE and Uruguay using data sourced from Mercer consultants and other contributors

The answers for the second question were sourced from Mercer consultants and other contributors in each country.

### Question A2

- The OECD's *Pensions at a Glance: Latin America and the Caribbean, 2014*, for Uruguay
- The OECD's *Pensions at a Glance Asia/Pacific 2018*, unpublished data, for Peru
- The OECD's *Pensions at a Glance Asia/Pacific 2022* for China, Hong Kong SAR, India, Indonesia, Malaysia, the Philippines, Singapore and Thailand
- Mercer model for Botswana, Croatia, Kazakhstan, Taiwan and the UAE
- The OECD's *Pensions at a Glance 2021: OECD and G20 Indicators, 2021*, for all other countries

### Question A3

- Data from the Economist Intelligence Unit was used for the first question for all systems except Botswana, Canada, Denmark, Germany, Iceland, Ireland, Italy, Mexico, Spain, Sweden, Switzerland, Taiwan, the UK and Uruguay.
- The OECD's "OECD Economic Outlook No. 112," *OECD Economic Outlook: Statistics and Projections (database)*, November 2022, for Canada, Denmark, Germany, Ireland, Italy, the Netherlands and Spain
- Trading Economics' "Personal Savings," 2023, for Mexico, Sweden, Switzerland and the UK
- Mercer colleagues and other contributors for Botswana, Iceland, Taiwan and Uruguay
- The answers for the second question used an average of data taken from Trading Economics, "Household Debt to GDP," 2023, and CEIC, "Household Debt: % of GDP," 2023.

### Questions A4, A5, A6, A7, A8, A9, A10 and A11

The answers were sourced from relevant Mercer consultants and other contributors.

# 08. The sustainability sub-index

The sustainability sub-index considers a number of indicators that influence the long-term sustainability of current pension systems. These include the economic importance of the private pension system; its level of funding; the length of expected retirement both now and in the future; the labor force participation rate of the older population; the current levels of public pension expenditure and government debt; and the level of real economic growth.

The system with the highest values for the sustainability sub-index are Iceland (83.8) and Israel (82.7), with the lowest values being for Italy (23.7) and Austria (22.6). Although several indicators influence these scores, the coverage of private pension plans, the demographic factors and the level of pension assets as a proportion of GDP are the most important.

Full details of the values relating to each indicator in the sustainability sub-index are shown in Appendix 2.



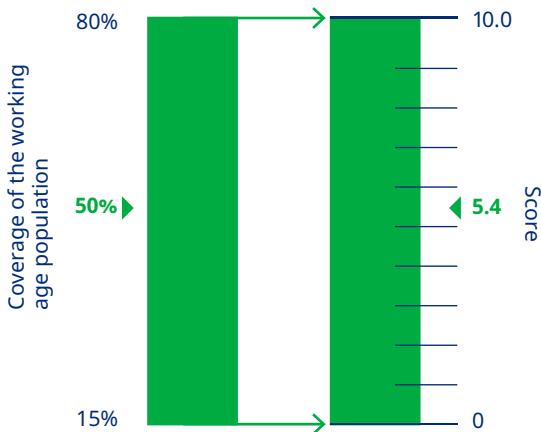
## Question S1: What proportion of the working age population are members of retirement savings plans?

### Objective

Retirement savings plans (including pension plans for public-sector employees and the military) represent an important pillar within all retirement income systems. A higher proportion of coverage among the workforce therefore increases the likelihood that the overall retirement income system will be sustainable in the future as funding continues and the level of pension assets increases over time.

Individuals may participate in an occupational-based pension plan or voluntarily contribute to a pension plan, possibly encouraged by government policies. However, it is also important that this pension coverage go beyond full-time workers and those in standard or traditional employment arrangements. As the OECD notes: "The sustainability and adequacy of pension systems includes making sure that workers in non-standard forms of work have the opportunity to save for retirement."<sup>28</sup> This development has become even more important given the changes to work patterns following the COVID-19 pandemic.

Figure 15. Calculating S1 — Coverage



### Calculation

The rates of coverage ranged from less than 15% in Brazil and Portugal to more than 80% of the working-age population in Chile, Denmark, Finland, Hong Kong SAR, Iceland, Israel, the Netherlands, Sweden and Taiwan. Each system's score is related to its level of coverage, with a maximum score for 80% or above and a 0 score relating to coverage of 15% or less, as such coverage represents a minimal contribution to the future provision of retirement income.

The coverage figure also allows for public pension arrangements in which the public pension reserve exceeds 10% of GDP and these arrangements are available to most of the workforce.

### Commentary

Only 19 of the 47 systems have coverage rates over 64% of the working-age population (that is, a score of 7.5 or more), indicating a heavy reliance on social security benefits in the future for many systems.

### Weighting

Retirement savings plans play a critical role in a multipillar retirement income system, particularly with the financial pressures associated with aging populations. Therefore, this indicator was given a weighting of 20% in the sustainability sub-index.

## Question S2: What is the level of pension assets, expressed as a percentage of GDP, held in private pension arrangements, public pension reserve funds, protected book reserves and pension insurance contracts?

### Objective

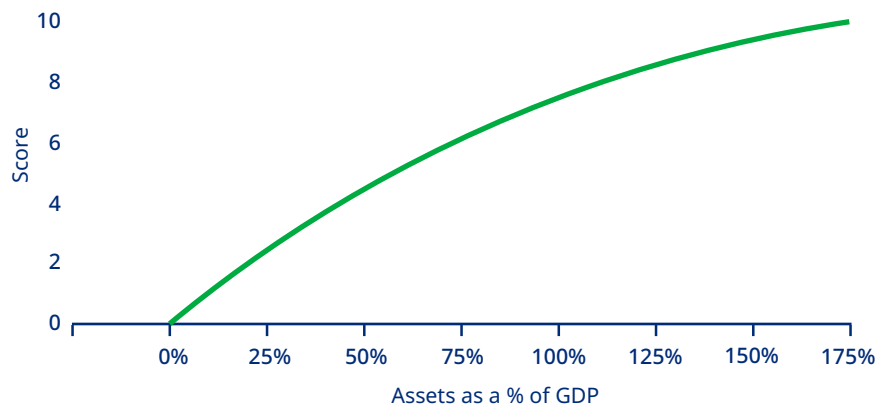
The level of current assets set aside for future pensions, when expressed as a percentage of GDP, represents a good indicator of an economy's ability to meet these payments in the future.

### Calculation

We have included assets from many types of funds to calculate the total level of assets held within each system to pay future pensions, irrespective of whether the pensions are paid through public pension provision or from private pension plans. The types of funds that have been included are:

- Assets held in autonomous private pension plans
- Assets held by insured or protected book reserves that are being accounted for to pay future pensions
- Social security reserve funds
- Sovereign reserve funds that have been set aside for future pension payments
- Assets held to support pension insurance contracts

Figure 16. Scoring S2 — Level of assets



The level of assets ranged from less than 10% of GDP for Austria, China, Indonesia, the Philippines, Thailand and Turkey to more than 175% for Canada, Denmark, Iceland, the Netherlands, Switzerland and the US. The maximum score was achieved for 175% of GDP and the minimum score for 0%.

A linear scoring approach between 0% and 175% is not used. Rather, more credit is given for increases at the lower levels of assets than at the higher levels as these gains will provide relatively greater improvements in sustainability.

### Commentary

The size of assets set aside for future pensions around the world varies considerably, reflecting the relative importance of funded pension arrangements. In addition, many countries are partway through a reform process that is expected to increase the level of assets over many decades. In these cases, we expect the score for this indicator to gradually increase in the future.

The level of private pension assets goes beyond pension funds and includes book reserves, pension insurance contracts and funds managed by financial institutions, such as individual retirement accounts. These assets have been included as they represent assets set aside to provide future retirement benefits.

### Weighting

This indicator shows the level of assets already set aside to fund retirement benefits and represents a key indicator in the ability of each system to pay future benefits. This indicator was therefore given a weighting of 15% in the sustainability sub-index.



### Question S3:

- What is the life expectancy at the current state pension age?**
- What is the projected life expectancy at the expected state pension age in 2053 (that is, in 30 years' time)? This calculation allows for mortality improvement.**
- What is the projected old-age dependency ratio in 2053?**
- What is the estimated total fertility rate (TFR) for 2021–2025?**

#### Objective

A retirement income system is designed to provide benefits to an individual after the person leaves the workforce and prior to their death. The longer the period, the larger the total value of benefits that will be needed and the greater the financial strain placed on the overall system. Although individuals retire for many reasons, the state pension age represents a useful proxy that guides many retirement decisions. As life expectancy increases, one way of reducing the strain is to encourage later retirement by increasing this age.

In the second question, we project this life expectancy indicator to 2053 to highlight the fact that many governments have already taken action and increased the state pension age, thereby reducing the forthcoming pension burden. However, it is also clear that some governments have not yet tackled this difficult issue.

The projected old-age dependency ratio question highlights the impact of the aging population between now and 2053 and therefore the likely effects on the funding requirements for pensions, healthcare and aged care.

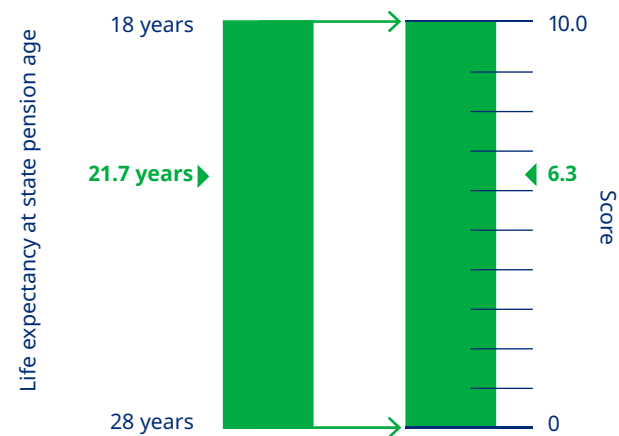
Consideration of the TFR provides an even longer-term perspective as it provides an indication of the likely balance between workers and retirees in future decades.

#### Calculation

- A maximum score is achieved with a life expectancy at state pension age of 18 years or less and a 0 score with a life expectancy of 28 years or more.
- The same scoring is used as for the previous question.

The life expectancies for these two questions are averaged for males and females.

Figure 17. Calculating S3a — Life expectancy at state pension age



- The old-age dependency ratio is the population age 65 and over divided by the population between ages 15 and 64. The projected dependency ratios for 2053 vary from 14% in Botswana to 78% in Korea and 84% in Hong Kong SAR. A maximum score is achieved with a projected dependency ratio of 20% or lower and a 0 score for a ratio of 70% or higher.
- The TFR ranges from 0.77 in Hong Kong SAR to 3.02 in Kazakhstan. In view of these scores and the likely range in the future, a minimum score of 0 is achieved for a TFR of 1.0 or lower and a maximum score for a TFR of 2.5 or higher.

### Commentary

All systems have current life expectancies at the state pension age of less than 26 years, although China, Colombia, France, Hong Kong SAR, Malaysia, Saudi Arabia, Taiwan and Thailand are expected to exceed this figure by 2053.

A TFR of less than 1.5 is currently present in 17 of the 47 systems covered by the Index. This raises serious issues about the future age structures in these countries or regions. Although immigration can assist in the short term, it is unlikely to provide sound long-term solutions.

### Weighting

These demographic-related indicators have a total weighting of 20% in the sustainability sub-index, with a 5% weighting for each question.

### **Question S4: What is the level of mandatory contributions that are set aside for future retirement benefits (that is, funded), expressed as a percentage of the annual wage for a full-time median-income earner? This may include mandatory employer and/or employee contributions paid into funded public benefits (that is, social security) and/or retirement benefits from the private sector.<sup>29</sup>**

#### Objective

Mandatory contributions from employers and/or employees represent a feature of every retirement income system. In some cases, these contributions are used to fund current social security benefits, whereas, in other cases, the contributions are invested, either through a central fund (such as Singapore's Central Provident Fund or a social security reserve fund) or through a range of providers in the private sector. With regard to longer-term sustainability, the important issue is whether the contributions are set aside to pay for the future benefits of the contributors, irrespective of the vehicle used for the saving. Regulations set a minimum contribution rate in systems with mandatory contribution or an auto-enrollment arrangement.

#### Calculation

We see considerable variety in the extent to which the contributions paid are invested into a fully funded investment vehicle. This calculation multiplies the level of mandatory contributions by the percentage of these funds that are invested to provide for future retirement benefits; for example, in Australia, Chile, Denmark, Hong Kong SAR, Iceland, Israel, Kazakhstan, New Zealand and Norway, the mandatory contributions are fully invested for the individuals concerned. On the other hand, Argentina, Austria, Belgium, Brazil, France, Germany, Ireland, Japan, Portugal, South Africa and Spain adopt a pay-as-you-go basis.

In some cases, neither extreme is adopted. For instance, the Canada Pension Plan adopts a "steady state" funding basis so that contributions will remain constant for 75 years. In this case, we have assumed that 75% of the contributions are invested.

For India and Indonesia, we have used 50% of the required level of contributions due to the limited coverage in these countries. For Sweden, which is transitioning from a pay-as-you-go approach to a fully funded one, we have used the contributions to the DC funded system plus the contributions to the quasi-mandatory occupational schemes.

Although Italy's mandatory scheme is funded on a pay-as-you-go basis, we have assumed that 25% of the mandatory contributions required to fund termination indemnity benefits are invested.

In line with OECD data, we have assumed that 35% of all contributions to Singapore's Central Provident Fund are invested. For Malaysia, we have assumed that 70% of all contributions to the Employee Provident Fund are invested for retirement. In both these cases, the maximum score is achieved.

Colombia has two systems: a funded system and a pay-as-you-go system, both with contributions of 16%. Assuming that about 70% of the contributions are in the funded system, we have used 11.3%.

In other cases, social security reserve funds are funded by the difference between contributions and current benefit payments or through top-up contributions from the government. Korea and the US are examples of this approach. In these cases, we have assumed that 50% and 20% of the contributions are invested, respectively.

The results of the above calculations mean that the net funded level of mandatory contributions (expressed as a percentage of earnings) ranges from 0% in several systems to 12% or more in Denmark, Iceland, Israel, Malaysia, the Netherlands, the Philippines and Singapore.

In view of this range and likely developments in some systems, a maximum score is achieved with a contribution level of 12% invested into a fund for future benefits, with a 0 score being obtained in cases where there are no funded mandatory contributions.

**Commentary**

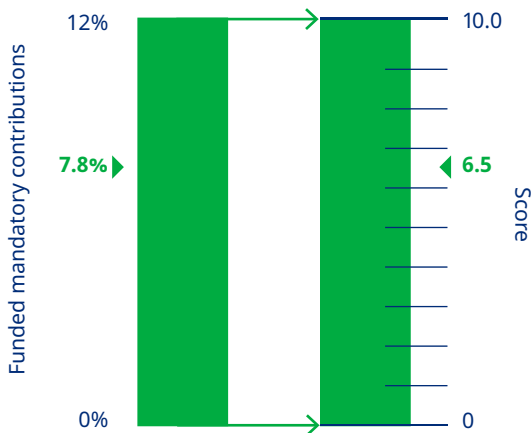
The level of mandatory contributions to a funded arrangement paid by employers and employees around the world varies considerably.

In some cases, they represent taxation for social security purposes and are not used to fund future benefits. On the other hand, funded retirement savings with the associated investment funds provide improved sustainability for the system and greater security for future retirees.

**Weighting**

This question represents one of several key indicators representing desirable features of a sustainable retirement income system. A weighting of 10% in the sustainability sub-index is used for this indicator.

**Figure 18. Calculating S4 — Funded mandatory contributions**



**Question S5: What is the labor force participation rate for those aged 55–64?**

**What is the labor force participation rate for those aged 65 or over?**

**Objective**

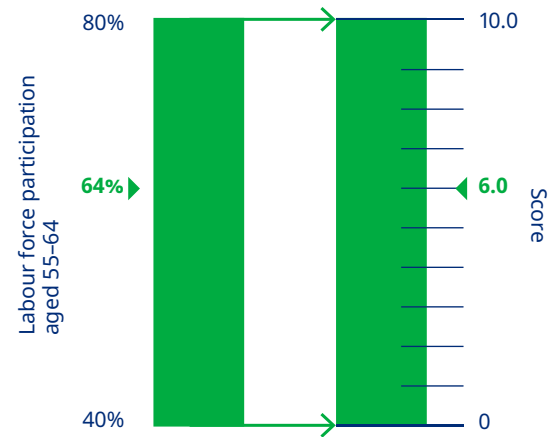
Higher labor force participation at older ages means individuals are retiring later, thereby reducing both the number of years in retirement and the level of retirement benefits needed, as well as accumulating greater savings for retirement during the working years. As noted in an International Monetary Fund staff discussion note, “Financial sector and labor market policies should be considered as part of a pension reform package ... Labor market policies should be geared towards encouraging participation by older workers.”<sup>30</sup>

**Calculation**

For ages 55 to 64, the percentages range from 36.1% in Turkey to 84.5% in Iceland. A maximum feasible score is considered to be 80% in most situations. Hence, a participation rate of 80% or more scores the maximum, whereas a participation rate of 40% or less scores 0.

For ages 65 and over, the percentages range from 3.2% in Belgium to 48.5% in Peru. A maximum feasible score is considered to be 30% or more in most situations. Hence, a participation rate of 30% or more scores the maximum, whereas a participation rate of nil at these ages scores 0.

**Figure 19. Calculating S5 — Labor force participation, ages 55 to 64**



**Commentary**

With the increasing awareness of longer life expectancies and the pressures associated with an aging population, governments should continue to encourage higher labor force participation at older ages.

**Weighting**

This indicator has a weighting of 10% in the sustainability sub-index, split into 8% for the first question and 2% for the second question.

**Question S6: What is the level of adjusted government debt (being the gross public debt reduced by the size of any sovereign wealth funds that are not set aside for future pension liabilities<sup>31</sup>), expressed as a percentage of GDP?**

**What is the level of public expenditure on pensions expressed as a percentage of GDP, averaged over the latest available figure and the projected figure for 2050?**

**Objective**

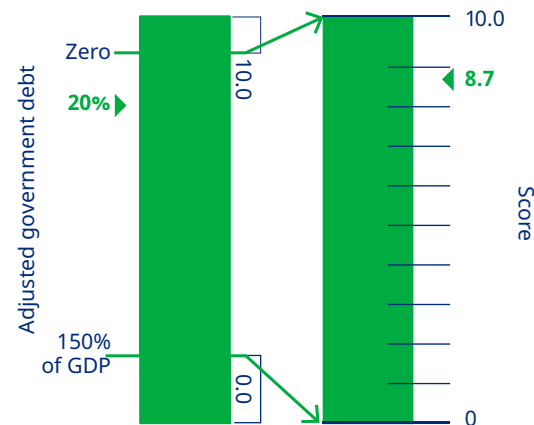
As social security payments represent an important source of income in most retirement income systems, the ability of future governments to pay these pensions and other benefits represents a critical factor in the sustainability of current systems. Due to the fiscal support and health measures adopted during the COVID-19 pandemic, the levels of debt have increased significantly for some governments. The OECD notes “the newly accumulated debt will add pressure on pension finances, already strained by demographic changes.”<sup>32</sup>

Similarly, higher pension payments lead to increased financial strains on government budgets.

**Calculation**

The level of the adjusted government debt ranges from less than zero for Norway and Singapore to 261% of GDP in Japan. A maximum score was achieved for countries with a zero or negative level of adjusted government debt (that is, a surplus), with a 0 score for countries with an adjusted government debt of 150% of GDP or higher.

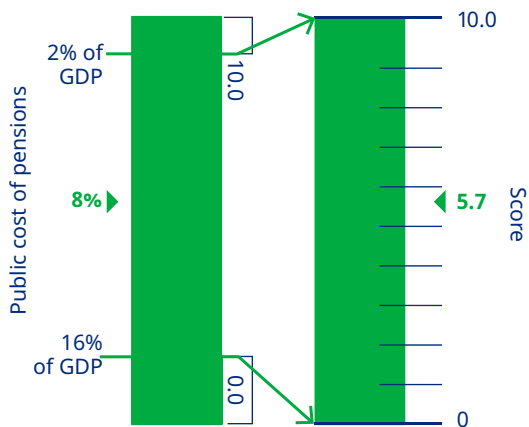
**Figure 20. Calculating S6a — Adjusted government debt**



The size of government pension payments varies considerably between different systems. For example, the public expenditure on pensions within the OECD in 2018–2020 varied from 1.3% in Korea to 15.4% in Italy. The projected 2050 figures range from 2.3% in Australia to 16.2% in Italy.<sup>33</sup>

A maximum score was achieved for systems with public pension costs of 2% of GDP or less (recognizing that some costs are desirable to alleviate poverty among the aged), with a 0 score for systems with costs of 16% of GDP or higher.

Figure 21. Calculating S6b — Public cost of pensions



### Commentary

Government debt is likely to restrict the ability of future governments to support their older populations, either through pensions or through the provision of other services, such as healthcare and aged care. Increasing interest rates are adding to this pressure. Hence, governments with lower levels of debt are in a stronger financial position to be able to sustain their current levels of pension and other payments into the future. In addition, public pension payments represent actual cash flows, which have a direct impact on a government's fiscal position.

### Weighting

These two indicators have a total weighting of 10% in the sustainability sub-index, with a 5% weighting for each question.

**Question S7: In respect of private pension arrangements, are older employees able to access part of their retirement savings or pension and continue working (for example, part time)?**

**If yes, can employees continue to contribute and accrue benefits at an appropriate rate?**

### Objective

A desirable feature of any retirement income system, particularly with aging populations, is to permit individuals to phase into retirement gradually by reducing their reliance on earned income while at the same time enabling them to access part of their accrued retirement benefits. Such individuals should also be able to continue to contribute or accrue pension benefits while working.

### Calculation

The first question was assessed with a score of 2 for “yes” and 0 for “no.” However, in many cases, it may depend on the particular pension fund's rules. In these cases, a score between 0 and 2 was given depending on the circumstances and practice. A maximum score was achieved where the answer was “yes” for the majority of older employees.

If the answer to the first question was “yes,” an additional score between 0 and 2 was given to the second question depending on the ability of employees to continue to contribute and accrue benefits during this transition period to retirement.

### Commentary

In most systems, employees are able — at least to some extent — to continue working at older ages while also accessing an income stream from their accumulated benefits and continuing to contribute and accrue benefits.

### Weighting

This indicator has a weighting of 5% in the sustainability sub-index because we do not consider it to be as critical as the previous indicators. The total weighting was split into 4% for the first question and 1% for the second question.



**Question S8: What is the real economic growth rate averaged over seven years (namely, the past four years and projected for the next three years)?**

**Objective**

Adequate pension provision is a long-term issue, and significant real growth of the economy will make the system more sustainable through an improvement in the government’s financial position, thereby improving the likelihood of social security payments continuing and permitting higher levels of savings in the private sector.

**Calculation**

The real economic growth rate, averaged over the past four years and the projected rates for the next three years, ranges from less than 0.2% in Japan to 7.2% in Ireland. A maximum feasible score over the long term is considered to be 5% per annum. Therefore, real growth of 5% or more scores the maximum, whereas a rate of minus 1% or lower scores 0.

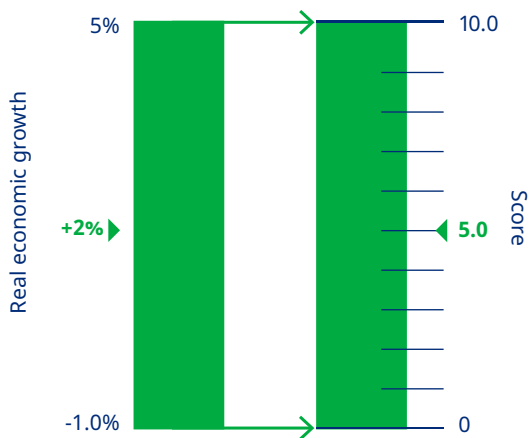
**Commentary**

Long-term real economic growth means the country’s GDP is growing faster than inflation. This result can have several benefits, including higher average incomes, lower unemployment, reduced government borrowing, higher levels of savings and, often, improved investment returns. Most of these outcomes lead to a stronger and more robust retirement income system, which, in turn, provides more sustainable pension benefits.

**Weighting**

This indicator has a weighting of 8% in the sustainability sub-index.

**Figure 22. Calculating S8 — Real economic growth**



**Question S9: Is it a requirement for the pension plan's trustees/fiduciaries to consider environmental, social and governance (ESG) issues in developing their investment policies or strategies?**

**If not a requirement, is it encouraged by the relevant pension regulator?**

**Objective**

It is critical that private pension plans provide sustainable investment returns over many decades. We have seen a growing awareness in many countries of the importance of ESG-related issues, so it is appropriate for plan trustees and fiduciaries to consider ESG factors when framing their investment strategy.

**Calculation**

This question was assessed on a three-point scale, with a score of 2 for "yes" to the first question, 1 if it is to some extent (including encouragement from the regulator) and 0 for "no," which includes no action from the regulator.

**Commentary**

In 11 of the 47 systems, it is a requirement for trustees or fiduciaries to consider ESG factors when developing their investment strategies.

In a further 25 systems, there is no requirement, but the regulator has encouraged this direction through public announcements or direct communication.

**Weighting**

This indicator has a 2% weighting in the sustainability sub-index because it represents an important signal in the development of long-term sustainable investment strategies.



## Sources of data for the sustainability sub-index

### Question S1

- Mercer and other contributor calculations for Botswana, Croatia, France, Kazakhstan, Saudi Arabia, Taiwan, the UAE and Uruguay
- The OECD's *Pensions at a Glance 2011: Retirement Income Systems in OECD and G20 Countries* for South Africa
- The OECD's *Pensions at a Glance: Latin America and the Caribbean 2014* for Argentina and Peru
- The OECD's *Pensions at a Glance Asia/Pacific 2022* for China, Hong Kong SAR, India, Indonesia, Malaysia, the Philippines, Singapore and Thailand
- The OECD's *Pensions at a Glance 2021: OECD and G20 Indicator, 2021*, for all other systems, although adjustments were needed when data were not available or comprehensive

### Question S2

- Mercer and other contributor calculations for Malaysia, the Philippines, Saudi Arabia, Singapore, Taiwan and the UAE
- The OECD's *Pensions at a Glance 2011: Retirement Income Systems in OECD and G20 Countries* in relation to pension insurance contracts for Germany
- The OECD's *Pensions at a Glance 2017: OECD and G20 Indicators, 2017*, in relation to public pension reserves for India
- The OECD's *Pensions at a Glance 2021: OECD and G20 Indicators, 2021*, in relation to public pension reserves as a percentage of GDP
- The OECD's *StatExtract Database* (Dataset: Funded Pensions Indicators; Book reserve (non-autonomous), Pension funds (autonomous), Pension insurance contracts, Other), 2021, in relation to all retirement vehicles as a percentage of the relevant GDP
- Sovereign Wealth Fund Institute in relation to pension insurance contracts for Norway

### Question S3

- Life expectancy (2024 and 2053), aged dependency (2053) and total fertility rate (2021–2025) data were from the United Nations' "World Population Prospects 2022, Online Edition."

- State pension ages were sourced from relevant Mercer consultants and other contributors.

### Questions S5

- Mercer consultants and other contributors for China, Kazakhstan and the 65+ age group for Malaysia
- International Labour Organization 2023 for all other systems

### Question S6

#### Government debt as percentage of GDP

- The International Monetary Fund's *World Economic Outlook — Database*, April 2023
- Sovereign Wealth Fund Institute

#### Public expenditure on pensions

- Mercer and other contributor calculations for Botswana, Kazakhstan, Taiwan and the UAE
- Standard & Poor's *Global Aging 2016: 58 Shades of Gray* for Colombia, Hong Kong SAR, Malaysia, Peru, the Philippines, Singapore, Thailand and Uruguay
- The OECD's *Pensions at a Glance 2021: OECD and G20 Indicators, 2021*, for all other systems

### Questions S8

- The International Monetary Fund's *World Economic Outlook — Database*, April 2023

### Questions S4, S7 and S9

- Answers were sourced from relevant Mercer consultants and other contributors.

# 09. The integrity sub-index

The integrity sub-index considers three broad areas of the pension system:

- Regulation and governance
- Protection and communication for members
- Operating costs

This sub-index asks a range of questions about the requirements that apply to funded pension plans that normally exist in the private sector. Well-operated and successful private-sector plans are critical because, without them, the government becomes the only provider, which is not a desirable or sustainable long-term outcome. Hence, such plans represent a crucial component of a well-governed and trusted pension system that has the long-term confidence of the community.

The systems with the highest values for the integrity sub-index are Finland (90.9) and Belgium (88.2), with the lowest values for Mexico (37.0) and the Philippines (25.7). Better scores were achieved by the retirement income systems with well-developed private pension industries.

Full details of the values relating to each indicator in the integrity sub-index are shown in Appendix 3.





## Regulation and governance

### Question R1: Do private-sector pension plans need regulatory approval or supervision to operate?

#### Is a private pension plan required to be a separate legal entity from the employer?

##### Objective

These questions are designed to assess the extent to which a private-sector pension plan is required to be a separate entity from any sponsoring employer (which usually entails holding assets separate from the employer) and is subject to some form of regulatory oversight.

Thirty-six of the 47 systems obtained the maximum score, indicating the presence of the basic groundwork needed for a sound governance framework.

##### Calculation

We assessed each question in this section with a score of 2 for “yes” and 0 for “no.” In cases in which the response was neither a clear “yes” nor a clear “no,” the score is between 0 and 2 depending on the actual circumstances.

##### Weighting

The first question has a 2.5% weighting, and the second question has a 5% weighting, giving a total weighting of 7.5% in the integrity sub-index for these two questions.

### Question R2: Are private-sector pension plans required to submit a report in a prescribed format to a pension regulator each year?

#### Does the pension regulator make industry data available from the submitted forms on a regular basis?

#### How actively does the pension regulator discharge its supervisory responsibilities, on a scale from 1 to 5?

The table in Figure 23 below was provided to assist in answering this question.

**Figure 23. Supervisory responsibilities scaling system**

Scale	Description	Examples of activity by the regulator
1	Inactive	Receives reports from plans but does not follow up
2	Occasionally active	Receives annual reports, follows up with questions but has limited communication with plans on a regular basis
3	Moderately active	Receives annual reports, follows up with questions and has regular communication with plans, including on-site visits
4	Consistently active	Obtains information on a regular basis from plans and has a focus on risk-based regulation; that is, there is a focus on plans with higher risks
5	Very active	Obtains information on a regular basis from plans and has a focus on risk-based regulation; in addition, the regulator often leads the industry with ideas and discussion papers and reacts to immediate issues

### Objective

These questions are designed to assess the level of supervision and the involvement of the pension regulator within the industry.

### Calculation

The first two questions in this section were assessed with a score of 2 for “yes” and 0 for “no.” In cases in which the response was neither a clear “yes” nor a clear “no,” the score is between 0 and 2 depending on the actual circumstances.

The last question was assessed on a five-point scale as shown in Figure 23. It is important to note that this question did not assess the quality of the supervision — rather, it considered the activity of the regulator.

The results highlight that the role of the pension regulator varies greatly around the world. Generally speaking, the pension regulator plays a stronger role in places where the pension industry has developed over many decades.

### Weighting

The first and third questions are each given a 4% weighting, with the second question being given a 2% weighting, resulting in a total weighting of 10% in the integrity sub-index for these three questions.

## **Question R3: Where assets exist, are the private pension plan’s trustees/fiduciaries required to prepare an investment policy?**

**Are the private pension plan’s trustees/fiduciaries required to prepare a risk management policy?**

**Are the private pension plan’s trustees/fiduciaries required to prepare a conflicts of interest policy?**

**Is the private pension plan’s governing body required to have at least one member who is independent from the employer and the employees?**

**Is it a requirement for the pension plan to have an anti-bribery and corruption policy?**

**Is it a requirement for the pension plan to have a code of personal conduct (or equivalent) for its trustees/fiduciaries, senior executives and employees?**

### Objective

These questions are designed to assess the regulatory requirements regarding the operations that may be required of private pension plans.

The first two questions relate to essential policies that should be developed by all those who oversee private pension plans.

The third question takes into account fiduciaries who may have a number of roles in various entities, including the pension plan, the sponsoring employer, a provider (such as an investment house) or, indeed, another pension plan. Good governance practice means pension plans should have a clear policy to handle such situations.



The fourth question reflects the fact that it is no longer appropriate for the governance structure of pension schemes to be restricted or controlled by a particular entity. Good governance practice includes independent trustees or fiduciaries.

The final two questions relate to the behavior of fiduciaries, executives and employees of pension plans. To encourage the long-term confidence of society in pension plans, the behavior of these individuals must be beyond reproach.

### Calculation

The questions in this section were assessed with a score of 2 for “yes” and 0 for “no.” In cases in which the response was neither a clear “yes” nor a clear “no,” the score is between 0 and 2 depending on the actual circumstances.

Chile, Finland, Peru, Saudi Arabia, Singapore, the UAE and Uruguay received the maximum score of 10 for these questions, whereas 12 systems scored less than 6. This indicates that there is still scope to improve governance requirements in many systems.

### Weighting

Each question was given a weighting between 2% and 3%, resulting in a total of 15% in the integrity sub-index for these six questions.

## Question R4: Do the private pension plan’s trustees/ fiduciaries have to satisfy any personal requirements set by the pension regulator?

### Objective

This question is designed to assess the regulatory requirements regarding the experience and behavior of those responsible for the governance of private-sector pension plans.

### Calculation

The question was assessed with a score of 2 for “yes” and 0 for “no.” In cases in which the response was neither a clear “yes” nor a clear “no,” the score is between 0 and 2 depending on the actual circumstances.

Thirty-two of the 47 systems received the maximum score, indicating that several systems could improve their requirements with regard to this question.

### Weighting

This question was given a 2.5% weighting in the integrity sub-index.

## **Question R5: What is the capacity of the government to effectively formulate and implement sound policies and to promote private-sector development?**

### **What respect do citizens and the state have for the institutions that govern economic and social interactions among them?**

### **How free are the country's citizens to express their views? What is the likelihood of political instability or politically motivated violence?**

#### **Objective**

These questions are designed to assess the integrity of the government that plays a critical role in the ongoing governance, legal framework, regulation, policy development and stability of the retirement income system.

#### **Calculation**

The World Bank publishes results from the Worldwide Governance Indicators project for more than 200 countries and territories for the following six dimensions of governance:

- Government effectiveness
- Regulatory quality
- Rule of law
- Control of corruption
- Voice and accountability
- Political stability and absence of violence/terrorism

From this publicly available source, each indicator provided a score for each country in the standard normal units, ranging from approximately -2.5 to +2.5. These six scores were summed and then increased by three to avoid any negative scores. The scores ranged from 0.0 for Mexico to 13.8 for Finland out of a maximum score of 15.

#### **Weighting**

Each question was given a 5% weighting in the integrity sub-index, resulting in a total of 15% for these three questions.

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### **Commentary on the total regulation and governance results**

The scores ranged from 11.7 for the Philippines to 48.0 for Finland out of a maximum of 50. Low scores for some systems are indicative of the fact that the relevant regulators have minimal requirements when compared to the more developed private pension systems.

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## Protection and communication for members

With the exception of Question P1, which deals with DB funding, each question in this section is assessed with a score of 2 for “yes” and 0 for “no.” In cases in which the response was neither a clear “yes” nor a clear “no,” the score is between 0 and 2 depending on the actual circumstances.

### Question P1:

#### For DB schemes:

- **Are there minimum funding requirements?**
- **What is the period over which any deficit or shortfall is normally funded?**
- **Describe the major features of the funding requirements.**

#### Objective

These questions are designed to assess the level of funding required for DB plans. Funding levels are critical in securing DB members’ future retirement benefits.

#### Calculation

For DB funding assessment, we considered both the extent of the funding requirement and the period over which any deficit must be rectified. The maximum score for DB was given in cases where funding requirements included regular actuarial involvement and the funding of any deficit or shortfall over a maximum period of four years.

#### Commentary

The requirements for funding DB plans vary considerably. There are, in effect, no requirements in some systems, whereas, in other cases, any deficit requires rectification within a specified period. Twenty systems received the maximum score.

#### Weighting

The funding of a member’s retirement benefit in a private-sector pension plan represents a basic protection of the member’s accrued benefits, and this indicator is therefore given a 5% weighting in the integrity sub-index.

## **Question P2: Are there any limits on the level of in-house assets held by a private-sector pension plan? If yes, what are they?**

### **Objective**

An essential characteristic of a sound retirement income system is that a member's accrued retirement benefit is not subject to the financial position of the member's employer.

### **Commentary**

Most systems have a restriction on the level of in-house assets held by a pension plan. These restrictions are often set at 5%–10% of the plan's assets. A maximum score was given in cases where in-house assets are restricted to 5%. There are no restrictions in Argentina, Indonesia, Italy, Japan, the Philippines, Taiwan and Thailand.

### **Weighting**

This requirement represents an important way of protecting the member's accrued benefits and is given a 5% weighting in the integrity sub-index.

## **Question P3: Are the members' accrued benefits provided with any protection or reimbursement from an act of fraud or mismanagement within the pension plan?**

### **In the case of employer insolvency (or bankruptcy), do any unpaid employer contributions receive priority over payments to other creditors? In the case of employer insolvency (or bankruptcy), are members' accrued benefits protected against claims of creditors?**

### **Objective**

Members of pension plans face many risks over the long term. These questions consider what protection, if any, the members receive in the case of fraud, mismanagement or employer insolvency. In the latter case, the employer may not be able to pay any outstanding contributions.

### **Commentary**

The answers to these questions vary considerably. In some cases, there are some restricted arrangements in place to support the member, whereas, in the UK (for example), a fraud compensation scheme exists. Twelve of the 47 systems received full marks for these questions.

### **Weighting**

Although these issues are very important when such incidents occur, experience in most systems suggests it is not a common event or that its financial effect is relatively minor. Hence, each question is given the weighting of 2.5% in the integrity sub-index, resulting in a total of 5% for these two questions.

### **Question P4: When joining the pension plan, are new members required to receive information about the pension plan?**

#### **Objective**

It's important that members receive information when joining a pension plan, including a description of the benefits and the risks they may face, particularly with the global growth of DC plans.

#### **Commentary**

All systems except India (for some DB plans), the Philippines and Thailand require that information be provided directly to members when they join the plan.

#### **Weighting**

The weighting for this question is 5% in the integrity sub-index.



**Question P5: Are plan members required to have access to an annual report about the plan, for example, on the plan's website? Is the plan's annual report required to be publicly available?**

**Is the annual report or other public document required to show:**

- **The allocation of the plan's assets to major asset classes?**
- **The major investments of the plan?**
- **All investments of the plan?**

**Are pension plans required to grant members access to information about their plan's investment strategy, for example, on the plan's website?**

**Are plans required to provide information to members on the plan's investment performance?**

**Objective**

Regular disclosure to pension plan members about the progress and investments of their accrued retirement benefits represents a fundamental obligation of all pension plans.

Annual reports present the opportunity for pension plans to communicate with their members, highlighting plan information and contemporary issues that may need to be considered by members.

As DC arrangements become more prevalent, it is becoming more important for members to receive regular information about the investments of the plan.

**Commentary**

There is considerable variety in the responses, with only five systems (Brazil, Ireland, Israel, Malaysia and New Zealand) scoring full marks for these four questions. Furthermore, 10 systems scored half marks or less, suggesting there is room for improvement in the level of member disclosure in many systems.

**Weighting**

Each of the four questions was given a 2.5% weighting in the integrity sub-index, resulting in a total of 10%.



### **Question P6: Are plan members required to receive an annual statement of their accrued benefits in the plan?**

**Is this annual statement to individual members required to show any projection of the member's possible retirement benefit?**

**Is this annual statement provided to members of defined contribution or accumulation plans required to show any costs or fees debited from their individual accounts?**

#### **Objective**

Although an annual report and investment information about the pension plan is valuable, most members are more interested in their personal entitlements. The first question therefore ascertains whether the provision of such information is a requirement, while the second question considers whether this requirement includes any projections about the member's future retirement benefit. The third question relates to any requirement concerning the disclosure of costs.

#### **Commentary**

The majority of systems have a requirement concerning annual personal statements, with 21 systems requiring some form of benefit projection. As account balances increase and individuals take on greater responsibility for their retirement benefits, the provision of this type of information will become increasingly important to members.

Full disclosure of fees charged is required to be shown in annual personal statements in 26 systems.

#### **Weighting**

The first question was given a 4% weighting in the integrity sub-index, whereas the second and third questions were given a 2% and 1.5% weighting, respectively. This resulted in a total of 7.5% for these three questions.

### **Question P7: Do plan members have access to a complaints tribunal that is independent from the pension plan?**

#### **Objective**

A common way to provide some protection to individuals who receive benefits from a contract with a financial services organization (such as a bank or insurance company) is to provide them with access to an independent complaints tribunal or ombudsman.

As the provision of retirement benefits can represent an individual's most important financial asset, there is good reason for such a provision to exist with regard to pension plans.

#### **Commentary**

Thirty-one systems have a complaints arrangement that is independent from both the provider and the regulator, whereas nine other systems have a range of processes that can be used for this purpose.

#### **Weighting**

Although this indicator is not as important as funding or communication to members, it represents a desirable feature as it provides all members with access to an independent body should any disputes arise. It was given a 2.5% weighting in the integrity sub-index.

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### **Commentary on the total protection and communication results**

The scores ranged from 5.0 for the Philippines to 37.5 for Israel and 39.0 for Belgium out of a maximum of 40. The very low score for the Philippines is primarily caused by its system having virtually no requirements in terms of communicating with plan members.

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## Costs

### Question C1: Approximately what percentage of total private pension assets in your system is held in various types of pension plans?

### Approximately what percentage of total pension assets in your system is held by the largest pension funds/providers?

#### Objective

Economist Luis Viceira notes that costs are one of the most important determinants of the long-run efficiency of a pension system, commenting that:

“Unfortunately, there is very little transparency about the overall costs of running most pension systems or the total direct and indirect fees that they charge to participants and sponsors.”<sup>34</sup>

This is generally correct. The huge variety of pension systems around the world — with a great diversity of retail, wholesale and employer-sponsored arrangements — means some administrative or investment costs are clearly identified, whereas others are borne indirectly or directly by providers, employer sponsors or third parties. Comparisons are therefore very difficult.

Yet, in the final analysis, many costs will be borne by members and thereby affect the provision of their retirement income. We have therefore used two proxies for this indicator.

The first question represents an attempt to ascertain the proportions in each pension industry that are employer-sponsored plans, not-for-profit plans or retail funds, which may be employer based or individual contracts. Each type of plan is likely to have a different cost structure, which, in turn, influences the overall cost structure of the industry.

The second question highlights the fact that economies of scale matter. That is, as funds increase in size, their costs are likely to reduce, and some (or all) of these benefits will be passed on to members. The number of pension plans or providers considered for this question ranged from three to 30 depending on the country’s population.

#### Calculation

For the first question, each type of plan was given a weight ranging from 1 for individual retail or insurance contracts to 10 for a centralized fund. These scores were then weighted by the actual characteristics of each pension system.

For the second question, we considered the size of the assets held by the largest providers or pension plans. A score of 1 was given when these assets were less than 10% of all pension assets, rising to a maximum score of 5 when these assets represented more than 75% of all pension assets.

#### Weighting

Each question was given a 5% weighting in the integrity sub-index, resulting in a total of 10% for these two questions.

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### Commentary on the costs results

The scores for these two indicators ranged from 4.5 for the US and 5.0 for Canada to 10 for Kazakhstan, Malaysia, Saudi Arabia and the UAE. The high scores for these four systems are not surprising as each system has a central fund that should provide administrative savings. In addition, larger funds have the opportunity to add value through a broader range of investment opportunities.

We recognize that there is a tension between a system with a single fund (or relatively few funds) that should be able to keep costs down and a competitive system in which individuals have greater choice and freedom. The ideal system should encourage competition and flexibility to suit members’ needs while at the same time encouraging economies of scale to minimize costs and improve benefits.

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## Sources of data for the integrity sub-index

As the integrity sub-index is primarily based on the operations of the private-sector pension industry, answers to all but one of the questions were sourced from relevant Mercer consultants and other contributors in each country. The exception was Question R5, which used Worldwide Governance Indicators from The World Bank.

# Notes, references and appendices

## Notes

<sup>1</sup> World Economic Forum. *Platform Advisory Process 2022–23*, 2022.

<sup>2</sup> OECD. *OECD Pensions Outlook 2022*, 2022.

<sup>3</sup> OECD. *Pensions at a Glance 2021: OECD and G20 Indicators*, 2021.

<sup>4</sup> Van Popta B, Steenbeek O. "Transition to a New Pension Contract in the Netherlands: Lessons From Abroad," *Netspar Occasional Paper 3/21*, 2021.

<sup>5</sup> Australian Government the Treasury. *Retirement Income Review — Final Report*, 2020.

<sup>6</sup> World Economic Forum. *We'll Live to 100 — How Can We Afford It?*, May 2017.

<sup>7</sup> Several countries have moved in this direction in recent years. Nevertheless, very few are linking the future pension age to the likely ongoing increases in life expectancy.

<sup>8</sup> *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth (English)*, Washington, DC: World Bank Group, 1994.

<sup>9</sup> The World Bank. *The World Bank Pension Conceptual Framework*, 2008.

<sup>10</sup> Kim S. "Role of the Private Pension Programs" in Lee H et al. *International Comparison of Pension Systems* (New York: Springer, 2022), pp. 415–428.

<sup>11</sup> International Labour Organization. *The ILO Multi-Pillar Pension Model: Building Equitable and Sustainable Pension Systems*, 2018.

<sup>12</sup> OECD. *Pensions at a Glance 2017: OECD and G20 Indicators*, 2017.

<sup>13</sup> Centre of Excellence in Population Ageing Research, *Retirement Income in Australia: Part I — Overview*, CEPAR Research Brief, November 2018.

<sup>14</sup> The World Bank. "Pensions," available at <https://www.worldbank.org/en/topic/pensions#2>, updated April 3, 2023.

<sup>15</sup> The appendices provide the scores for all indicators in each sub-index so that readers may calculate the effects of changing the weights used for each sub-index or the sensitivity of changing the weights within each sub-index.

<sup>16</sup> Kissell R. *Algorithmic Trading Methods Applications Using Advanced Statistics, Optimization, and Machine Learning Techniques*, 2nd Edition, Cambridge, Massachusetts: Academic Press, 2020.

<sup>17</sup> Smigel L. "79+ Amazing Algorithmic Trading Statistics (2023)," June 30, 2022, available at <https://analyzingalpha.com/algorithmic-trading-statistics>.

<sup>18</sup> This table is a summary of Exhibit 1 in CFA Institute, *Ethics and Artificial Intelligence in Investment Management — A Framework for Professionals*, 2022.

<sup>19</sup> CFA Institute. *Future State of the Investment Industry*, September 2023.

<sup>20</sup> CFA Institute. *Ethics and Artificial Intelligence in Investment Management — A Framework for Professionals*, 2022.

<sup>21</sup> World Bank. *Pensions Overview*, 2019.

<sup>22</sup> OECD. *Pensions Outlook 2012*, 2012.

<sup>23</sup> OECD. *Pensions at a Glance 2017: OECD and G20 Indicators*, 2017.

<sup>24</sup> Private pension plans include both DB and DC plans and may pay lump-sum or pension benefits. They also include plans for public-sector and military employees.

<sup>25</sup> Rocha R and Vittas D. "Designing the Payout Phase of Pension Systems," *Policy Research Working Paper No. 5289*, Washington, DC: The World Bank, 2010.

<sup>26</sup> OECD. "The OECD Roadmap for the Good Design of Defined Contribution Pension Plans," *OECD Working Party on Private Pensions*, June 2012.

<sup>27</sup> Hinz R et al. *Evaluating the Financial Performance of Pension Funds*, Washington, DC: The World Bank, 2010.

<sup>28</sup> OECD. *Pension Markets in Focus 2020*, 2020.

<sup>29</sup> This question does not include contributions arising from statutory minimum levels of funding for DB plans because these plans do not represent mandatory arrangements.

<sup>30</sup> Amaglobeli D et al. *The Future of Saving: The Role of Pension System Design in an Aging World*, Washington, DC: The International Monetary Fund, 2019.

<sup>31</sup> This reduction does not include sovereign wealth funds that have been set aside for future pension payments because these have been included in Question S2.

<sup>32</sup> OECD. *Pension Markets in Focus 2020*, 2020.

<sup>33</sup> OECD. *Pensions at a Glance 2021: OECD and G20 Indicators*, 2021.

<sup>34</sup> Hinz R et al. *Evaluating the Financial Performance of Pension Funds*, Washington, DC: The World Bank, 2010.

## References

- Amaglobeli D et al. *The Future of Saving: The Role of Pension System Design in an Aging World*, Washington, DC: The International Monetary Fund, 2019.
- Australian Government the Treasury. *Retirement Income Review — Final Report*, 2020.
- *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth (English)*, Washington, DC: World Bank Group, 1994.
- CEIC. "Household Debt: % of GDP," 2023, available at <https://www.ceicdata.com/en/indicator/household-debt--of-nominal-gdp>.
- Centre of Excellence in Population Ageing Research. "Retirement Income in Australia: Part I — Overview," *CEPAR Research Brief*, November 2018.
- CFA Institute. *Ethics and Artificial Intelligence in Investment Management — A Framework for Professionals*, 2022.
- CFA Institute. *Future State of the Investment Industry*, September 2023.
- Hinz R et al. *Evaluating the Financial Performance of Pension Funds*, Washington, DC: The World Bank, 2010.
- International Labour Organization. *The ILO Multi-Pillar Pension Model: Building Equitable and Sustainable Pension Systems*, 2018.
- International Labour Organization, 2023, [www.ilo.org](http://www.ilo.org).
- International Monetary Fund. *World Economic Outlook — Database*, April 2023, [www.imf.org](http://www.imf.org).
- Kim S. "Role of the Private Pension Programs" in Lee H et al: *International Comparison of Pension Systems* (New York: Springer, 2022), pp. 415–428.
- Kissell R. *Algorithmic Trading Methods Applications Using Advanced Statistics, Optimization, and Machine Learning Techniques*, 2nd Edition, Cambridge, Massachusetts: Academic Press, 2020.
- OECD. *Pensions at a Glance 2009: Retirement Income Systems in OECD Countries*, 2009.
- OECD. *Pensions at a Glance 2011: Retirement Income Systems in OECD and G20 Countries*, 2011.
- OECD. *Pensions Outlook 2012*, 2012.
- OECD. "The OECD Roadmap for the Good Design of Defined Contribution Pension Plans," *OECD Working Party on Private Pensions*, June 2012.
- OECD. *Pensions at a Glance: Latin America and the Caribbean*, 2014.
- OECD. *Pensions at a Glance 2017: OECD and G20 Indicators*, 2017.
- OECD. *Pensions at a Glance Asia/Pacific 2018*, 2018.
- OECD. *Pension Markets in Focus 2020*, 2020.
- OECD. *Pensions at a Glance 2021: OECD and G20 Indicators*, 2021.
- OECD. *StatExtract Database* (Dataset: Funded Pensions Indicators; Book reserve (non-autonomous), Pension funds (autonomous), Pension insurance contracts, Other), 2021.
- OECD. "OECD Economic Outlook No 112," *OECD Economic Outlook: Statistics and Projections (database)*, November 2022.
- OECD. *Pensions at a Glance Asia/Pacific 2022*, 2022.
- OECD. *OECD Pensions Outlook 2022*, 2022.
- Rocha R and Vittas D. "Designing the Payout Phase of Pension Systems," *Policy Research Working Paper No. 5289*, Washington, DC: The World Bank, 2010.
- Smigel L. "79+ Amazing Algorithmic Trading Statistics (2023)," June 30, 2022, available at <https://analyzingalpha.com/algorithmic-trading-statistics>.
- Sovereign Wealth Fund Institute, available at [www.swfinstitute.org](http://www.swfinstitute.org).
- Standard & Poor's. *Global Aging 2016: 58 Shades of Gray*.



- The World Bank. "The World Bank Pension Conceptual Framework," *World Bank Pension Reform Primer Series*, Washington, DC: World Bank Group, 2008.
- The World Bank. "Pensions," available at <https://www.worldbank.org/en/topic/pensions#2>, updated April 3, 2023.
- Trading Economics. "Personal Savings," 2023, available at <https://tradingeconomics.com/country-list/personal-savings>.
- Trading Economics. "Households Debt to GDP," 2023, available at <https://tradingeconomics.com/country-list/households-debt-to-gdp>.
- United Nations. "World Population Prospects - Population Division - United Nations," available at <https://population.un.org/wpp/>.
- Van Popta B and Steenbeek O. "Transition to a New Pension Contract in the Netherlands: Lessons From Abroad," *Netspar Occasional Paper 3/21*, 2021.
- The World Bank. *Pensions Overview*, 2019.
- The World Bank. "Worldwide Governance Indicator 2022 Update," available at <https://www.govindicators.org>.
- World Economic Forum. *We'll Live to 100 — How Can We Afford It?*, May 2017.
- World Economic Forum. "Platform Advisory Process 2022–23," 2022.



## Appendix 1. Score for each system for each indicator in the adequacy sub-index

Question		Score for each system																
		Question weight	Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>A1</b>	What is the basic (or targeted) state pension, as a percentage of the average wage, that a single aged person will receive?  How is the basic (or targeted) state pension increased or adjusted over time (e.g., prices or wages or by some other means)?  Are these increases or adjustments made on a regular basis? If yes, how often?	20.0%	7.6	9.8	8.2	9.7	0.6	9.7	9.7	5.7	0.9	0.0	1.3	10.0	8.3	9.3	7.2	3.6
<b>A2</b>	What is the net pension replacement rate for a range of income earners?	25.0%	10.0	5.5	10.0	10.0	0.0	10.0	6.4	4.2	10.0	10.0	5.2	10.0	8.7	10.0	8.0	4.1
<b>A3</b>	What is the net household saving rate?  What is the net household debt to GDP ratio?	10.0%	7.4	3.1	5.3	6.0	5.2	6.5	3.0	6.6	6.6	4.9	6.5	3.1	3.3	6.4	5.7	3.8
<b>A4</b>	Are voluntary member contributions to a funded pension plan made by a full-time earner on the median income treated by the tax system more favorably than similar savings in a bank account?  Is the investment income earned by the pension plan exempt from tax in the preretirement and/or postretirement periods?	5.0%	4.0	7.8	6.0	8.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.5	7.8	10.0	10.0	10.0
<b>A5</b>	Is there a minimum access age to receive benefits from private pension plans (except in the cases of death, invalidity or significant financial hardship)? If so, what is the current age?	10.0%	0.0	10.0	0.0	10.0	5.0	0.0	3.3	5.0	8.3	9.7	6.7	10.0	10.0	10.0	10.0	10.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>A1</b>	What is the basic (or targeted) state pension, as a percentage of the average wage, that a single aged person will receive?  How is the basic (or targeted) state pension increased or adjusted over time (e.g., prices or wages or by some other means)?  Are these increases or adjustments made on a regular basis? If yes, how often?	20.0%	10.0	0.0	0.0	9.1	9.1	7.4	6.2	0.6	1.3	0.0	2.5	10.0	9.7	9.7	0.9	0.0
<b>A2</b>	What is the net pension replacement rate for a range of income earners?	25.0%	9.2	4.1	1.8	7.8	6.0	10.0	5.6	7.1	3.6	3.9	10.0	10.0	6.4	8.2	7.4	10.0
<b>A3</b>	What is the net household saving rate?  What is the net household debt to GDP ratio?	10.0%	4.8	6.8	8.2	8.0	7.7	4.8	4.4	4.5	3.9	4.1	9.3	2.7	2.6	3.6	7.6	6.5
<b>A4</b>	Are voluntary member contributions to a funded pension plan made by a full-time earner on the median income treated by the tax system more favorably than similar savings in a bank account?  Is the investment income earned by the pension plan exempt from tax in the preretirement and/or postretirement periods?	5.0%	10.0	10.0	7.0	10.0	10.0	5.5	10.0	10.0	10.0	10.0	7.8	10.0	4.0	8.0	10.0	3.0
<b>A5</b>	Is there a minimum access age to receive benefits from private pension plans (except in the cases of death, invalidity or significant financial hardship)? If so, what is the current age?	10.0%	10.0	0.0	6.7	6.7	6.7	0.0	5.0	3.3	0.0	6.7	6.7	6.7	8.3	10.0	1.7	0.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system														
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US
<p><b>A1</b> What is the basic (or targeted) state pension, as a percentage of the average wage, that a single aged person will receive?</p> <p>How is the basic (or targeted) state pension increased or adjusted over time (e.g., prices or wages or by some other means)?</p> <p>Are these increases or adjustments made on a regular basis? If yes, how often?</p>	20.0%	4.0	9.5	0.0	7.6	4.4	7.7	8.3	8.4	0.0	0.0	1.9	6.5	8.5	10.0	5.2
<p><b>A2</b> What is the net pension replacement rate for a range of income earners?</p>	25.0%	2.9	10.0	9.2	7.5	0.0	10.0	8.0	6.2	2.6	6.0	10.0	10.0	8.8	9.3	9.2
<p><b>A3</b> What is the net household saving rate?</p> <p>What is the net household debt to GDP ratio?</p>	10.0%	5.1	4.7	9.5	8.0	4.6	4.7	4.7	4.8	6.5	3.7	6.7	3.5	4.5	8.6	4.7
<p><b>A4</b> Are voluntary member contributions to a funded pension plan made by a full-time earner on the median income treated by the tax system more favorably than similar savings in a bank account?</p> <p>Is the investment income earned by the pension plan exempt from tax in the preretirement and/or postretirement periods?</p>	5.0%	10.0	7.8	8.0	10.0	10.0	10.0	3.5	10.0	7.0	10.0	4.5	8.0	10.0	7.0	10.0
<p><b>A5</b> Is there a minimum access age to receive benefits from private pension plans (except in the cases of death, invalidity or significant financial hardship)? If so, what is the current age?</p>	10.0%	10.0	10.0	7.0	6.7	0.0	10.0	6.7	9.3	10.0	6.7	0.0	3.3	6.7	10.0	6.3

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system															
		Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<p><b>A6</b> Is it a requirement to take part or all of the retirement benefit as an annuity or income stream for life?</p> <p>If it is a requirement to take a lifetime annuity or income stream, are some lump-sum benefits also available? If yes, please describe.</p> <p>If it is not a requirement to take a lifetime annuity or income stream, are there any incentives or rules that encourage the provision of income streams? Please describe.</p> <p>Are the annuities or income streams available priced or designed as unisex annuities (that is, the same benefit for males and females)?</p> <p>Are reverse mortgages (or home equity release schemes) available to your retirees (either from the government or the private sector)?</p>	10.0%	1.0	4.0	6.0	2.0	8.0	4.5	8.0	6.0	2.0	7.0	9.0	8.0	8.0	7.0	10.0	3.0
<p><b>A7</b> On resignation from employment, are plan members normally entitled to the full vesting of their accrued benefit?</p> <p>After resignation, is the value of the member's accrued benefit normally maintained in real terms (either by inflation-linked indexation or through market investment returns)?</p> <p>Can a member's benefit entitlements normally be transferred to another private pension plan on the member's resignation from an employer?</p>	5.0%	2.0	10.0	7.0	10.0	9.0	9.0	8.0	10.0	8.0	8.0	10.0	10.0	10.0	10.0	9.0	10.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system															
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines
<p><b>A6</b> Is it a requirement to take part or all of the retirement benefit as an annuity or income stream for life?</p> <p>If it is a requirement to take a lifetime annuity or income stream, are some lump-sum benefits also available? If yes, please describe.</p> <p>If it is not a requirement to take a lifetime annuity or income stream, are there any incentives or rules that encourage the provision of income streams? Please describe.</p> <p>Are the annuities or income streams available priced or designed as unisex annuities (that is, the same benefit for males and females)?</p> <p>Are reverse mortgages (or home equity release schemes) available to your retirees (either from the government or the private sector)?</p>	10.0%	7.5	6.5	8.0	5.0	7.5	8.0	3.0	4.0	4.5	3.0	2.5	9.0	2.0	6.0	3.0	1.0
<p><b>A7</b> On resignation from employment, are plan members normally entitled to the full vesting of their accrued benefit?</p> <p>After resignation, is the value of the member's accrued benefit normally maintained in real terms (either by inflation-linked indexation or through market investment returns)?</p> <p>Can a member's benefit entitlements normally be transferred to another private pension plan on the member's resignation from an employer?</p>	5.0%	8.0	10.0	9.0	9.0	10.0	10.0	7.0	10.0	8.0	10.0	5.0	10.0	10.0	10.0	9.0	0.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.



## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system														
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US
<p><b>A6</b> Is it a requirement to take part or all of the retirement benefit as an annuity or income stream for life?</p> <p>If it is a requirement to take a lifetime annuity or income stream, are some lump-sum benefits also available? If yes, please describe.</p> <p>If it is not a requirement to take a lifetime annuity or income stream, are there any incentives or rules that encourage the provision of income streams? Please describe.</p> <p>Are the annuities or income streams available priced or designed as unisex annuities (that is, the same benefit for males and females)?</p> <p>Are reverse mortgages (or home equity release schemes) available to your retirees (either from the government or the private sector)?</p>	10.0%	6.5	8.5	7.0	9.0	9.0	3.0	8.0	2.5	3.0	2.0	2.5	7.0	4.0	7.0	3.5
<p><b>A7</b> On resignation from employment, are plan members normally entitled to the full vesting of their accrued benefit?</p> <p>After resignation, is the value of the member's accrued benefit normally maintained in real terms (either by inflation-linked indexation or through market investment returns)?</p> <p>Can a member's benefit entitlements normally be transferred to another private pension plan on the member's resignation from an employer?</p>	5.0%	10.0	9.0	4.0	10.0	10.0	9.0	10.0	10.0	10.0	6.0	2.0	9.0	10.0	10.0	5.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system															
		Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>A8</b> Upon a couple's divorce or separation, are the individuals' accrued pension assets normally taken into account in the overall division of assets?	3.0%	0.0	10.0	0.0	10.0	10.0	0.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	5.0	10.0	0.0
<b>A9</b> What is the level of home ownership in the country?	5.0%	6.5	6.6	4.5	7.6	2.6	7.6	6.7	6.4	10.0	2.7	10.0	5.2	6.0	5.4	3.1	4.4
<b>A10</b> What is the proportion of total pension assets in the whole industry (i.e., including both the public and private sectors) invested in growth assets?	5.0%	2.8	10.0	7.9	6.7	10.0	3.6	10.0	7.6	3.8	10.0	6.7	9.6	10.0	4.4	9.3	10.0
<b>A11</b> Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income due to invalidity or a disability? These income benefits could be from the public pension scheme or a private-sector pension scheme.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income during paid parental leave? These income payments could be from the government or the employer.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system while out of the paid workforce caring for young children?	2.0%	0.0	0.0	7.5	1.3	7.5	0.0	5.0	2.5	7.5	5.0	5.0	6.3	5.0	5.0	5.0	2.5
<b>Adequacy sub-index</b>	<b>40%</b>	<b>56.3</b>	<b>70.7</b>	<b>66.8</b>	<b>82.0</b>	<b>39.8</b>	<b>70.4</b>	<b>71.1</b>	<b>60.0</b>	<b>64.2</b>	<b>62.9</b>	<b>57.1</b>	<b>82.5</b>	<b>77.4</b>	<b>84.5</b>	<b>79.8</b>	<b>51.9</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system															
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines
<b>A8</b> Upon a couple's divorce or separation, are the individuals' accrued pension assets normally taken into account in the overall division of assets?	3.0%	5.0	5.0	0.0	7.5	10.0	10.0	10.0	0.0	5.0	4.0	5.0	10.0	10.0	0.0	10.0	0.0
<b>A9</b> What is the level of home ownership in the country?	5.0%	7.6	9.5	8.6	7.1	6.7	7.4	5.9	8.8	5.8	8.1	6.0	7.1	4.5	8.1	7.9	6.3
<b>A10</b> What is the proportion of total pension assets in the whole industry (i.e., including both the public and private sectors) invested in growth assets?	5.0%	10.0	2.2	2.9	9.0	9.1	7.1	10.0	0.3	9.6	10.0	7.2	10.0	10.0	10.0	10.0	8.2
<b>A11</b> Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income due to invalidity or a disability? These income benefits could be from the public pension scheme or a private-sector pension scheme.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income during paid parental leave? These income payments could be from the government or the employer.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system while out of the paid workforce caring for young children?	2.0%	3.8	5.0	2.5	0.0	5.0	10.0	5.0	7.5	5.0	2.5	2.5	3.8	0.0	10.0	5.0	2.5
<b>Adequacy sub-index</b>	<b>40.0%</b>	<b>85.5</b>	<b>41.9</b>	<b>41.6</b>	<b>77.1</b>	<b>77.0</b>	<b>72.7</b>	<b>59.2</b>	<b>46.9</b>	<b>39.0</b>	<b>44.3</b>	<b>63.5</b>	<b>85.6</b>	<b>65.6</b>	<b>79.4</b>	<b>55.0</b>	<b>41.8</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 1. Score for each system for each indicator in the adequacy sub-index (cont'd)

Question	Question weight	Score for each system														
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US
<b>A8</b> Upon a couple's divorce or separation, are the individuals' accrued pension assets normally taken into account in the overall division of assets?	3.0%	10.0	5.0	0.0	10.0	10.0	5.0	2.5	10.0	10.0	10.0	0.0	0.0	10.0	0.0	10.0
<b>A9</b> What is the level of home ownership in the country?	5.0%	9.1	8.3	5.7	9.9	7.1	8.1	6.3	2.3	9.3	7.5	5.2	9.5	6.4	4.8	6.6
<b>A10</b> What is the proportion of total pension assets in the whole industry (i.e., including both the public and private sectors) invested in growth assets?	5.0%	10.0	10.0	10.0	6.7	10.0	9.1	10.0	10.0	10.0	5.9	5.4	10.0	10.0	4.7	10.0
<b>A11</b> Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income due to invalidity or a disability? These income benefits could be from the public pension scheme or a private-sector pension scheme.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system when they receive income during paid parental leave? These income payments could be from the government or the employer.  Is it a requirement that an individual continue to accrue their retirement benefit in the pension system while out of the paid workforce caring for young children?	2.0%	2.5	2.5	5.0	5.0	1.3	10.0	2.5	7.5	2.5	2.5	0.0	10.0	10.0	10.0	0.0
<b>Adequacy sub-index</b>	<b>40.0%</b>	<b>59.8</b>	<b>86.7</b>	<b>61.5</b>	<b>79.8</b>	<b>44.2</b>	<b>79.7</b>	<b>72.1</b>	<b>69.6</b>	<b>47.6</b>	<b>45.4</b>	<b>46.5</b>	<b>72.2</b>	<b>77.3</b>	<b>84.0</b>	<b>66.7</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 2. Score for each system for each indicator in the sustainability sub-index

Question		Question weight	Score for each system															
			Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>S1</b>	What proportion of the working age population are members of retirement savings plans?	20.0%	0.8	9.3	1.4	6.0	4.0	0.0	6.8	10.0	5.2	5.8	8.3	10.0	10.0	8.2	5.7	10.0
<b>S2</b>	What is the level of pension assets, expressed as a percentage of GDP, held in private pension arrangements, public pension reserve funds, protected book reserves and pension insurance contracts?	15.0%	1.2	9.6	0.7	3.5	5.2	2.3	10.0	6.7	0.5	2.9	3.0	10.0	7.6	1.8	2.1	4.6
<b>S3</b>	What is the life expectancy at the current state pension age? What is the projected life expectancy at the expected state pension age in 2053 (that is, in 30 years' time)? What is the projected old-age dependency ratio in 2053? What is the estimated total fertility rate (TFR) for 2021–2025?	20.0%	6.4	5.7	3.9	5.4	10.0	6.6	4.6	5.0	1.6	4.6	5.4	7.1	5.0	3.6	5.2	1.6
<b>S4</b>	What is the level of mandatory contributions that are set aside for future retirement benefits (that is, funded), expressed as a percentage of the annual wage for a full-time median-income earner? This may include mandatory employer and/or employee contributions paid into funded public benefits (that is, social security) and/or retirement benefits from the private sector.	10.0%	0.0	9.2	0.0	0.0	0.0	0.0	7.4	9.6	4.0	9.4	4.2	10.0	3.9	0.0	0.0	8.3
<b>S5</b>	What is the labor force participation rate for those aged 55–64? What is the labor force participation rate for those aged 65+?	10.0%	5.8	6.8	4.1	4.0	6.2	3.3	6.2	6.1	2.5	5.4	2.8	7.8	8.0	4.3	7.6	4.6

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 2. Score for each system for each indicator in the sustainability sub-index (cont'd)

Question		Question weight	Score for each system															
			Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines
<b>S1</b>	What proportion of the working age population are members of retirement savings plans?	20.0%	10.0	1.9	0.2	5.1	10.0	1.3	8.2	9.7	7.0	2.7	8.8	10.0	9.8	7.1	0.3	6.2
<b>S2</b>	What is the level of pension assets, expressed as a percentage of GDP, held in private pension arrangements, public pension reserve funds, protected book reserves and pension insurance contracts?	15.0%	10.0	1.3	0.7	3.3	6.9	1.7	5.8	1.6	6.2	6.0	2.0	10.0	4.4	5.5	1.5	0.7
<b>S3</b>	What is the life expectancy at the current state pension age? What is the projected life expectancy at the expected state pension age in 2053 (that is, in 30 years' time)? What is the projected old-age dependency ratio in 2053? What is the estimated total fertility rate (TFR) for 2021–2025?	20.0%	6.5	6.6	8.8	6.2	7.3	4.3	2.5	10.0	2.1	4.2	7.7	6.4	5.1	5.8	8.4	9.3
<b>S4</b>	What is the level of mandatory contributions that are set aside for future retirement benefits (that is, funded), expressed as a percentage of the annual wage for a full-time median-income earner? This may include mandatory employer and/or employee contributions paid into funded public benefits (that is, social security) and/or retirement benefits from the private sector.	10.0%	10.0	2.6	3.6	0.0	10.0	1.5	0.0	8.3	3.8	10.0	6.1	10.0	4.2	1.7	8.3	10.0
<b>S5</b>	What is the labor force participation rate for those aged 55–64? What is the labor force participation rate for those aged 65+?	10.0%	9.4	4.3	8.2	6.7	7.6	3.9	9.7	5.1	8.3	3.9	5.0	7.8	9.6	8.0	9.5	6.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.



## Appendix 2. Score for each system for each indicator in the sustainability sub-index (cont'd)

Question		Question weight	Score for each system														
			Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US
<b>S1</b>	What proportion of the working age population are members of retirement savings plans?	20.0%	9.1	0.0	7.4	8.4	1.3	1.8	10.0	9.6	10.0	5.0	0.8	5.8	5.6	6.1	6.9
<b>S2</b>	What is the level of pension assets, expressed as a percentage of GDP, held in private pension arrangements, public pension reserve funds, protected book reserves and pension insurance contracts?	15.0%	1.1	2.8	2.7	6.5	7.1	1.4	9.4	10.0	2.2	0.8	0.3	1.2	8.5	2.8	10.0
<b>S3</b>	What is the life expectancy at the current state pension age? What is the projected life expectancy at the expected state pension age in 2053 (that is, in 30 years' time)? What is the projected old-age dependency ratio in 2053? What is the estimated total fertility rate (TFR) for 2021–2025?	20.0%	4.4	4.8	5.3	2.8	9.2	3.7	5.7	4.0	1.1	1.8	7.0	3.2	5.9	5.3	6.3
<b>S4</b>	What is the level of mandatory contributions that are set aside for future retirement benefits (that is, funded), expressed as a percentage of the annual wage for a full-time median-income earner? This may include mandatory employer and/or employee contributions paid into funded public benefits (that is, social security) and/or retirement benefits from the private sector.	10.0%	2.4	0.0	9.0	10.0	0.0	0.0	5.7	8.3	5.0	5.8	0.0	5.0	6.7	4.2	2.1
<b>S5</b>	What is the labor force participation rate for those aged 55–64? What is the labor force participation rate for those aged 65+?	10.0%	3.9	6.5	3.9	8.2	2.0	5.3	8.9	7.8	2.2	7.4	0.8	6.5	6.4	5.4	6.3

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 2. Score for each system for each indicator in the sustainability sub-index (cont'd)

Question		Score for each system																
		Question weight	Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>S6</b>	<p>What is the level of adjusted government debt (being the gross public debt reduced by the size of any sovereign wealth funds that are not set aside for future pension liabilities), expressed as a percentage of GDP?</p> <p>What is the level of public expenditure on pensions expressed as a percentage of GDP, averaged over the latest available figure and the projected figure for 2050?</p>	10.0%	4.6	8.0	3.1	2.3	4.3	4.1	5.1	7.9	6.0	7.4	4.9	6.7	3.6	1.9	4.5	8.8
<b>S7</b>	<p>In respect of private pension arrangements, are older employees able to access part of their retirement savings or pension and continue working (e.g., part time)?</p> <p>If yes, can employees continue to contribute and accrue benefits at an appropriate rate?</p>	5.0%	0.0	10.0	0.0	0.0	0.0	0.0	8.0	6.0	8.0	4.0	10.0	10.0	10.0	9.0	10.0	10.0
<b>S8</b>	<p>What is the real economic growth rate averaged over seven years (namely, the past four years and projected for the next three years)?</p>	8.0%	3.5	5.1	3.5	3.8	7.5	4.1	4.1	4.5	9.6	6.5	6.7	4.1	3.2	3.4	2.8	2.7
<b>S9</b>	<p>Is it a requirement for the pension plan's trustees/fiduciaries to consider environmental, social and governance (ESG) issues in developing their investment policies or strategies?</p> <p>If not a requirement, is it encouraged by the relevant pension regulator?</p>	2.0%	0.0	5.0	5.0	10.0	2.5	5.0	2.5	5.0	2.5	5.0	10.0	2.5	5.0	10.0	5.0	10.0
<b>Sustainability sub-index</b>		<b>35.0%</b>	<b>29.5</b>	<b>78.4</b>	<b>22.6</b>	<b>39.4</b>	<b>52.8</b>	<b>28.5</b>	<b>64.5</b>	<b>71.3</b>	<b>39.0</b>	<b>55.4</b>	<b>56.0</b>	<b>82.5</b>	<b>65.6</b>	<b>41.8</b>	<b>45.3</b>	<b>61.1</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 2. Score for each system for each indicator in the sustainability sub-index (cont'd)

Question	Question weight	Score for each system															
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines
<p><b>S6</b> What is the level of adjusted government debt (being the gross public debt reduced by the size of any sovereign wealth funds that are not set aside for future pension liabilities), expressed as a percentage of GDP?</p> <p>What is the level of public expenditure on pensions expressed as a percentage of GDP, averaged over the latest available figure and the projected figure for 2050?</p>	10.0%	7.2	7.2	8.7	7.1	6.6	0.3	2.2	9.2	8.0	7.4	8.0	6.3	6.9	6.5	8.6	8.0
<p><b>S7</b> In respect of private pension arrangements, are older employees able to access part of their retirement savings or pension and continue working (e.g., part time)?</p> <p>If yes, can employees continue to contribute and accrue benefits at an appropriate rate?</p>	5.0%	10.0	5.0	9.0	6.0	10.0	0.0	4.0	8.0	0.0	10.0	0.0	10.0	5.0	9.0	0.0	0.0
<p><b>S8</b> What is the real economic growth rate averaged over seven years (namely, the past four years and projected for the next three years)?</p>	8.0%	4.5	9.4	8.1	10.0	8.0	2.8	2.0	6.9	5.1	7.4	2.8	4.3	5.1	4.9	5.4	8.3
<p><b>S9</b> Is it a requirement for the pension plan's trustees/fiduciaries to consider environmental, social and governance (ESG) issues in developing their investment policies or strategies?</p> <p>If not a requirement, is it encouraged by the relevant pension regulator?</p>	2.0%	2.5	0.0	0.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	10.0	2.5	2.5	0.0	2.5
<b>Sustainability sub-index</b>	<b>35.0%</b>	<b>83.8</b>	<b>43.0</b>	<b>50.6</b>	<b>54.4</b>	<b>82.7</b>	<b>23.7</b>	<b>46.5</b>	<b>74.8</b>	<b>52.7</b>	<b>56.1</b>	<b>58.4</b>	<b>82.4</b>	<b>64.3</b>	<b>59.1</b>	<b>50.4</b>	<b>63.2</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 2. Score for each system for each indicator in the sustainability sub-index (cont'd)

Question	Question weight	Score for each system														
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US
<p><b>S6</b> What is the level of adjusted government debt (being the gross public debt reduced by the size of any sovereign wealth funds that are not set aside for future pension liabilities), expressed as a percentage of GDP?</p> <p>What is the level of public expenditure on pensions expressed as a percentage of GDP, averaged over the latest available figure and the projected figure for 2050?</p>	10.0%	5.3	2.3	7.8	10.0	7.4	2.5	7.0	6.3	9.1	6.3	7.4	9.0	4.4	5.3	4.7
<p><b>S7</b> In respect of private pension arrangements, are older employees able to access part of their retirement savings or pension and continue working (e.g., part time)?</p> <p>If yes, can employees continue to contribute and accrue benefits at an appropriate rate?</p>	5.0%	0.0	10.0	0.0	10.0	8.0	8.0	10.0	6.0	10.0	8.0	0.0	0.0	10.0	0.0	6.0
<p><b>S8</b> What is the real economic growth rate averaged over seven years (namely, the past four years and projected for the next three years)?</p>	8.0%	6.6	4.4	6.0	5.5	2.7	3.4	4.3	3.8	7.0	4.1	8.6	6.2	2.9	4.3	4.5
<p><b>S9</b> Is it a requirement for the pension plan's trustees/fiduciaries to consider environmental, social and governance (ESG) issues in developing their investment policies or strategies?</p> <p>If not a requirement, is it encouraged by the relevant pension regulator?</p>	2.0%	0.0	5.0	0.0	10.0	10.0	5.0	0.0	0.0	2.5	2.5	0.0	0.0	10.0	5.0	0.0
<b>Sustainability sub-index</b>	<b>35.0%</b>	<b>45.4</b>	<b>32.0</b>	<b>54.9</b>	<b>71.6</b>	<b>49.1</b>	<b>28.5</b>	<b>75.6</b>	<b>70.6</b>	<b>52.9</b>	<b>42.2</b>	<b>31.1</b>	<b>45.4</b>	<b>62.7</b>	<b>46.2</b>	<b>61.1</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index

Question		Score for each system																
		Question weight	Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>R1</b>	Do private-sector pension plans need regulatory approval or supervision to operate?  Is a private pension plan required to be a separate legal entity from the employer?	7.5%	0.0	10.0	8.3	10.0	10.0	10.0	10.0	10.0	3.3	10.0	10.0	10.0	10.0	6.7	10.0	10.0
<b>R2</b>	Are private-sector pension plans required to submit a written report in a prescribed format to a pension regulator each year?  Does the pension regulator make industry data available from the submitted forms on a regular basis?  How actively does the pension regulator (or protector) discharge its supervisory responsibilities?	10.0%	0.8	10.0	4.2	9.2	9.2	9.2	9.5	10.0	9.2	8.2	9.2	10.0	9.2	8.2	9.0	10.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>R1</b>	Do private-sector pension plans need regulatory approval or supervision to operate?  Is a private pension plan required to be a separate legal entity from the employer?	7.5%	10.0	10.0	10.0	10.0	10.0	10.0	6.7	10.0	8.3	10.0	1.7	10.0	10.0	10.0	8.3	0.0
<b>R2</b>	Are private-sector pension plans required to submit a written report in a prescribed format to a pension regulator each year?  Does the pension regulator make industry data available from the submitted forms on a regular basis?  How actively does the pension regulator (or protector) discharge its supervisory responsibilities?	10.0%	10.0	8.2	9.2	9.0	10.0	9.2	8.4	9.2	4.4	7.2	7.6	9.2	9.2	9.2	3.2	0.8

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system															
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	USA	
<b>R1</b>	Do private-sector pension plans need regulatory approval or supervision to operate?  Is a private pension plan required to be a separate legal entity from the employer?	7.5%	10.0	10.0	10.0	10.0	10.0	10.0	8.3	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
<b>R2</b>	Are private-sector pension plans required to submit a written report in a prescribed format to a pension regulator each year?  Does the pension regulator make industry data available from the submitted forms on a regular basis?  How actively does the pension regulator (or protector) discharge its supervisory responsibilities?	10.0	9.2	10.0	6.2	8.2	9.2	10.0	9.2	8.4	3.2	8.4	10.0	9.2	10.0	10.0	7.6

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.



## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question	Question weight	Score for each system															
		Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<p><b>R3</b> Where assets exist, are the private pension plan's trustees/fiduciaries required to prepare an investment policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a risk management policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a conflict of interest policy?</p> <p>Is the private pension plan's governing body required to have at least one member who is independent from the employer and the employees?</p> <p>Is it a requirement for the pension plan to have an anti-bribery and corruption policy?</p> <p>Is it a requirement for the pension plan to have a code of personal conduct (or equivalent) for its trustees/fiduciaries, senior executives and employees?</p>	15.0%	5.7	7.3	6.3	8.7	8.7	7.7	7.2	10.0	8.2	9.2	7.8	4.8	10.0	3.7	7.2	9.0
<p><b>R4</b> Do the private pension plan's trustees/fiduciaries have to satisfy any personal requirements set by the pension regulator?</p>	2.5%	10.0	10.0	0.0	10.0	10.0	10.0	5.0	5.0	10.0	5.0	10.0	10.0	10.0	10.0	5.0	10.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>R3</b>	<p>Where assets exist, are the private pension plan's trustees/fiduciaries required to prepare an investment policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a risk management policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a conflict of interest policy?</p> <p>Is the private pension plan's governing body required to have at least one member who is independent from the employer and the employees?</p> <p>Is it a requirement for the pension plan to have an anti-bribery and corruption policy?</p> <p>Is it a requirement for the pension plan to have a code of personal conduct (or equivalent) for its trustees/fiduciaries, senior executives and employees?</p>	15.0%	5.7	5.0	6.5	6.8	8.7	9.3	5.8	9.7	7.2	8.7	2.8	9.3	3.3	8.5	10.0	5.0
<b>R4</b>	Do the private pension plan's trustees/fiduciaries have to satisfy any personal requirements set by the pension regulator?	2.5%	10.0	0.0	10.0	10.0	10.0	10.0	5.0	10.0	0.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system															
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	USA	
<b>R3</b>	<p>Where assets exist, are the private pension plan's trustees/fiduciaries required to prepare an investment policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a risk management policy?</p> <p>Are the private pension plan's trustees/fiduciaries required to prepare a conflict of interest policy?</p> <p>Is the private pension plan's governing body required to have at least one member who is independent from the employer and the employees?</p> <p>Is it a requirement for the pension plan to have an anti-bribery and corruption policy?</p> <p>Is it a requirement for the pension plan to have a code of personal conduct (or equivalent) for its trustees/fiduciaries, senior executives and employees?</p>	15.0%	3.5	9.3	10.0	10.0	8.7	8.7	4.7	7.3	7.0	6.2	7.0	10.0	7.8	10.0	0.8
<b>R4</b>	Do the private pension plan's trustees/fiduciaries have to satisfy any personal requirements set by the pension regulator?	2.5%	5.0	10.0	10.0	5.0	10.0	10.0	5.0	5.0	10.0	10.0	10.0	10.0	5.0	10.0	0.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Question weight	Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>R5</b>	<p>What is the government's capacity to effectively formulate and implement sound policies and to promote private-sector development?</p> <p>What respect do citizens and the state have for the institutions that govern economic and social interactions among them?</p> <p>How free are the country's citizens to express their views? What is the likelihood of political instability or politically motivated violence?</p>	15.0%	1.1	8.0	7.5	6.8	4.4	1.0	7.9	5.0	1.0	1.1	3.8	9.1	9.2	6.4	7.7	6.2
<b>P1</b>	<p>For defined benefit schemes, are there minimum funding requirements? What is the period over which any deficit or shortfall is normally funded? Describe the major features of the funding requirements.</p>	5.0%	0.0	10.0	5.0	10.0	2.0	8.0	8.0	10.0	5.0	0.0	10.0	10.0	10.0	4.0	6.0	10.0
<b>P2</b>	<p>Are there any limits on the level of inhouse assets held by a private-sector pension plan? If yes, what are they?</p>	5.0%	0.0	10.0	5.0	10.0	10.0	7.5	8.8	10.0	7.5	7.5	5.0	10.0	10.0	5.0	8.8	7.5

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>R5</b>	<p>What is the government's capacity to effectively formulate and implement sound policies and to promote private-sector development?</p> <p>What respect do citizens and the state have for the institutions that govern economic and social interactions among them?</p> <p>How free are the country's citizens to express their views? What is the likelihood of political instability or politically motivated violence?</p>	15.0%	8.3	1.6	1.8	7.7	4.6	4.3	7.4	0.7	6.0	3.6	0.0	8.5	8.8	8.9	1.0	0.6
<b>P1</b>	<p>For defined benefit schemes, are there minimum funding requirements? What is the period over which any deficit or shortfall is normally funded? Describe the major features of the funding requirements.</p>	5.0%	10.0	0.0	8.0	10.0	10.0	8.0	8.0	10.0	10.0	0.0	2.0	10.0	6.0	10.0	0.0	0.0
<b>P2</b>	<p>Are there any limits on the level of inhouse assets held by a private-sector pension plan? If yes, what are they?</p>	5.0%	7.5	8.8	0.0	10.0	10.0	0.0	0.0	10.0	10.0	10.0	7.5	10.0	10.0	10.0	8.8	0.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system															
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	USA	
<b>R5</b>	<p>What is the government's capacity to effectively formulate and implement sound policies and to promote private-sector development?</p> <p>What respect do citizens and the state have for the institutions that govern economic and social interactions among them?</p> <p>How free are the country's citizens to express their views? What is the likelihood of political instability or politically motivated violence?</p>	15.0%	4.2	5.9	1.5	8.6	2.1	5.3	8.5	8.8	6.9	1.1	0.0	4.6	7.1	6.2	6.1
<b>P1</b>	<p>For defined benefit schemes, are there minimum funding requirements? What is the period over which any deficit or shortfall is normally funded? Describe the major features of the funding requirements.</p>	5.0%	10.0	10.0	2.0	0.0	10.0	10.0	6.0	8.0	10.0	0.0	0.0	2.0	8.0	10.0	6.0
<b>P2</b>	<p>Are there any limits on the level of inhouse assets held by a private-sector pension plan? If yes, what are they?</p>	5.0%	10.0	10.0	10.0	7.5	8.8	10.0	10.0	10.0	0.0	0.0	10.0	10.0	10.0	7.5	5.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question	Question weight	Score for each system															
		Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<p><b>P3</b> Are the members' accrued benefits provided with any protection or reimbursement from an act of fraud or mismanagement within the pension plan?</p> <p>In the case of employer insolvency (or bankruptcy), do any unpaid employer contributions receive priority over payments to other creditors?</p> <p>In the case of employer insolvency (or bankruptcy), are members' accrued benefits protected against claims of creditors?</p>	5.0%	0.0	7.5	5.0	10.0	10.0	2.5	3.8	7.5	5.0	10.0	7.5	2.5	10.0	2.5	7.5	10.0
<p><b>P4</b> When joining the pension plan, are new members required to receive information about the plan?</p>	5.0%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
<p><b>P5</b> Are plan members required to have access to an annual report about the plan; for example, on the plan's website? Is the plan's annual report required to be publicly available?</p> <p>Is the annual report or other public document required to show:</p> <p>i. The allocation of the plan's assets to major asset classes?</p> <p>ii. The major investments of the plan?</p> <p>iii. All investments of the plan?</p> <p>Are pension plans required to grant members access to information about their plan's investment strategy; for example, on the plan's website?</p> <p>Are pension plans required to provide information to members on the plan's investment performance?</p>	10.0%	6.3	9.5	9.0	9.0	6.3	10.0	8.3	8.5	9.0	9.4	9.5	5.0	7.0	2.5	6.0	9.5

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.



## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>P3</b>	<p>Are the members' accrued benefits provided with any protection or reimbursement from an act of fraud or mismanagement within the pension plan?</p> <p>In the case of employer insolvency (or bankruptcy), do any unpaid employer contributions receive priority over payments to other creditors?</p> <p>In the case of employer insolvency (or bankruptcy), are members' accrued benefits protected against claims of creditors?</p>	5.0%	10.0	10.0	5.0	0.0	5.0	5.0	6.3	10.0	5.0	10.0	0.0	2.5	5.0	5.0	7.5	5.0
<b>P4</b>	When joining the pension plan, are new members required to receive information about the plan?	5.0%	10.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0
<b>P5</b>	<p>Are plan members required to have access to an annual report about the plan; for example, on the plan's website? Is the plan's annual report required to be publicly available?</p> <p>Is the annual report or other public document required to show:</p> <p>i. The allocation of the plan's assets to major asset classes?</p> <p>ii. The major investments of the plan?</p> <p>iii. All investments of the plan?</p> <p>Are pension plans required to grant members access to information about their plan's investment strategy; for example, on the plan's website?</p> <p>Are pension plans required to provide information to members on the plan's investment performance?</p>	10.0%	9.5	3.5	9.0	10.0	10.0	9.0	8.8	8.5	2.8	10.0	0.0	9.0	10.0	7.6	9.4	0.0

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system															
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	USA	
<b>P3</b>	<p>Are the members' accrued benefits provided with any protection or reimbursement from an act of fraud or mismanagement within the pension plan?</p> <p>In the case of employer insolvency (or bankruptcy), do any unpaid employer contributions receive priority over payments to other creditors?</p> <p>In the case of employer insolvency (or bankruptcy), are members' accrued benefits protected against claims of creditors?</p>	5.0%	7.5	2.5	5.0	10.0	5.0	0.0	5.0	7.5	2.5	2.5	7.5	10.0	10.0	0.0	5.0
<b>P4</b>	When joining the pension plan, are new members required to receive information about the plan?	5.0%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	2.5	10.0	10.0	10.0	10.0	10.0
<b>P5</b>	<p>Are plan members required to have access to an annual report about the plan; for example, on the plan's website? Is the plan's annual report required to be publicly available?</p> <p>Is the annual report or other public document required to show:</p> <p>i. The allocation of the plan's assets to major asset classes?</p> <p>ii. The major investments of the plan?</p> <p>iii. All investments of the plan?</p> <p>Are pension plans required to grant members access to information about their plan's investment strategy; for example, on the plan's website?</p> <p>Are pension plans required to provide information to members on the plan's investment performance?</p>	10.0%	9.5	8.5	6.0	3.5	9.0	8.5	6.9	4.8	9.0	6.3	9.0	1.3	7.3	5.0	7.8

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Question weight	Argentina	Australia	Austria	Belgium	Botswana	Brazil	Canada	Chile	China	Colombia	Croatia	Denmark	Finland	France	Germany	Hong Kong SAR
<b>P6</b>	Are plan members required to receive an annual statement of their accrued benefits from the plan?  Is this annual statement to individual members required to show any projection of the member's possible retirement benefits?  Is this annual statement provided to members of DC plans required to show any costs or fees debited from their individual account?	7.5%	2.7	7.3	10.0	10.0	10.0	6.7	7.3	10.0	5.3	7.3	7.3	7.3	8.0	2.7	10.0	7.3
<b>P7</b>	Do plan members have access to a complaints tribunal that is independent from the pension plan?	2.5%	10.0	10.0	10.0	10.0	10.0	10.0	7.5	10.0	0.0	10.0	10.0	10.0	10.0	5.0	5.0	10.0
<b>C1</b>	What percentage of total pension assets is held in various types of pension plans?  What percentage of total pension assets is held by the largest N pension funds/providers? (Where N is based on the population of the country/system.)	10.0%	8.5	6.9	8.9	6.8	9.6	6.4	5.0	5.5	9.0	5.9	8.8	7.6	7.4	7.1	5.4	8.5
<b>Adequacy sub-index</b>		<b>25.0%</b>	<b>37.8</b>	<b>86.1</b>	<b>71.6</b>	<b>88.2</b>	<b>80.6</b>	<b>70.1</b>	<b>76.7</b>	<b>84.0</b>	<b>63.7</b>	<b>69.3</b>	<b>79.3</b>	<b>77.8</b>	<b>90.9</b>	<b>54.4</b>	<b>76.3</b>	<b>87.6</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system																
		Iceland	India	Indonesia	Ireland	Israel	Italy	Japan	Kazakhstan	Korea (South)	Malaysia	Mexico	Netherlands	New Zealand	Norway	Peru	Philippines	
<b>P6</b>	Are plan members required to receive an annual statement of their accrued benefits from the plan?  Is this annual statement to individual members required to show any projection of the member's possible retirement benefits?  Is this annual statement provided to members of DC plans required to show any costs or fees debited from their individual account?	7.5%	8.0	6.0	7.3	10.0	10.0	10.0	2.7	7.3	9.0	5.3	5.3	9.0	10.0	10.0	5.3	0.0
<b>P7</b>	Do plan members have access to a complaints tribunal that is independent from the pension plan?	2.5%	10.0	5.0	10.0	10.0	10.0	5.0	0.0	5.0	10.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0
<b>C1</b>	What percentage of total pension assets is held in various types of pension plans?  What percentage of total pension assets is held by the largest N pension funds/providers? (Where N is based on the population of the country/system.)	10.0%	7.3	9.8	9.7	5.3	7.0	7.1	8.3	10.0	8.6	10.0	9.0	7.3	5.3	7.3	6.1	9.0
<b>Adequacy sub-index</b>		<b>25.0%</b>	<b>85.0</b>	<b>56.5</b>	<b>69.8</b>	<b>81.1</b>	<b>84.4</b>	<b>75.9</b>	<b>65.6</b>	<b>80.0</b>	<b>68.5</b>	<b>74.6</b>	<b>37.0</b>	<b>87.7</b>	<b>78.3</b>	<b>87.8</b>	<b>63.5</b>	<b>25.7</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Appendix 3. Score for each system for each indicator in the integrity sub-index (cont'd)

Question		Score for each system															
		Poland	Portugal	Saudi Arabia	Singapore	South Africa	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	UAE	UK	Uruguay	US	
<b>P6</b>	Are plan members required to receive an annual statement of their accrued benefits from the plan?  Is this annual statement to individual members required to show any projection of the member's possible retirement benefits?  Is this annual statement provided to members of DC plans required to show any costs or fees debited from their individual account?	7.5%	6.3	10.0	0.0	5.3	7.3	7.3	10.0	8.0	0.0	6.3	7.3	0.0	7.3	7.3	10.0
<b>P7</b>	Do plan members have access to a complaints tribunal that is independent from the pension plan?	2.5%	5.0	10.0	0.0	5.0	10.0	10.0	0.0	10.0	0.0	10.0	10.0	10.0	10.0	10.0	5.0
<b>C1</b>	What percentage of total pension assets is held in various types of pension plans?  What percentage of total pension assets is held by the largest N pension funds/providers? (Where N is based on the population of the country/system.)	10.0%	7.5	8.3	10.0	9.7	7.4	6.7	8.6	5.5	9.9	8.6	5.9	10.0	5.2	5.5	4.5
<b>Adequacy sub-index</b>		<b>25.0%</b>	<b>71.2</b>	<b>85.9</b>	<b>62.9</b>	<b>77.0</b>	<b>76.6</b>	<b>79.2</b>	<b>75.0</b>	<b>77.9</b>	<b>64.1</b>	<b>53.9</b>	<b>67.3</b>	<b>70.8</b>	<b>80.6</b>	<b>76.5</b>	<b>59.5</b>

Each question is scored for each system with a minimum score of 0 and a maximum score of 10.

## Historical performance

System	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Argentina	na	na	na	na	na	na	na	37.7	38.8	39.2	39.5	42.5	41.5	43.3	42.3
Australia	74.0	72.9	75.0	75.7	77.8	79.9	79.6	77.9	77.1	72.6	75.3	74.2	75.0	76.8	77.3
Austria	na	na	na	na	na	52.8	52.2	51.7	53.1	54.0	53.9	52.1	53.0	55.0	52.5
Belgium	na	na	na	na	na	na	na	na	na	na	na	63.4	64.5	67.9	68.6
Botswana	na	na	na	na	na	na	na	na	na	na	na	na	na	na	54.5
Brazil	na	59.8	58.4	56.7	52.8	52.4	53.2	55.1	54.8	56.5	55.9	54.5	54.7	55.8	55.7
Canada	73.2	69.9	69.1	69.2	67.9	69.1	70.0	66.4	66.8	68.0	69.2	69.3	69.8	70.6	70.2
Chile	59.6	59.9	64.9	63.3	66.4	68.2	69.1	66.4	67.3	69.3	68.7	67.0	67.0	68.3	69.9
China	48.0	40.3	42.5	45.4	47.1	49.0	48.0	45.2	46.5	46.2	48.7	47.3	55.1	54.5	55.3
Colombia	na	na	na	na	na	na	na	na	61.7	62.6	58.4	58.5	58.4	63.2	61.9
Croatia	na	na	na	na	na	na	na	na	na	na	na	na	na	na	62.3
Denmark	na	na	na	82.9	80.2	82.4	81.7	80.5	78.9	80.2	80.3	81.4	82.0	82.0	81.3
Finland	na	na	na	na	na	74.3	73.0	72.9	72.3	74.5	73.6	72.9	73.3	77.2	76.6
France	na	54.6	54.4	54.7	53.5	57.7	57.4	56.4	59.6	60.7	60.2	60.0	60.5	63.2	62.0
Germany	48.2	54.0	54.2	55.3	58.5	62.2	62.0	59.0	63.5	66.8	66.1	67.3	67.9	67.9	66.8
Hong Kong SAR	na	na	na	na	na	na	na	na	na	56.0	61.9	61.1	61.8	64.7	64.0
Iceland	na	na	na	na	na	na	na	na	na	na	na	na	84.2	84.7	84.8
India	na	na	43.4	42.4	43.3	43.5	40.3	43.4	44.9	44.6	45.8	45.7	43.3	44.4	45.9
Indonesia	na	na	na	na	42.0	45.3	48.2	48.3	49.9	53.1	52.2	51.4	50.4	49.2	51.8

## Historical performance

System	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ireland	na	na	na	na	na	62.2	63.1	62.0	65.8	66.8	67.3	65.0	68.3	70.0	70.2
Israel	na	na	na	na	na	na	na	na	na	na	na	74.7	77.1	79.8	80.8
Italy	na	na	na	na	na	49.6	50.9	49.5	50.8	52.8	52.2	51.9	53.4	55.7	56.3
Japan	41.5	42.9	43.9	44.4	44.4	44.4	44.1	43.2	43.5	48.2	48.3	48.5	49.8	54.5	56.3
Kazakhstan	na	na	na	na	na	na	na	na	na	na	na	na	na	na	64.9
Korea (South)	na	na	na	44.7	43.8	43.6	43.8	46.0	47.1	47.3	49.8	50.5	48.3	51.1	51.2
Malaysia	na	na	na	na	na	na	na	55.7	57.7	58.5	60.6	60.1	59.6	63.1	56.0
Mexico	na	na	na	na	50.1	49.4	52.1	44.3	45.1	45.3	45.3	44.7	49.0	56.1	55.1
Netherlands	76.1	78.3	77.9	78.9	78.3	79.2	80.5	80.1	78.8	80.3	81.0	82.6	83.5	84.6	85.0
New Zealand	na	na	na	na	na	na	na	na	67.9	68.5	70.1	68.3	67.4	68.8	68.3
Norway	na	na	na	na	na	na	na	na	74.7	71.5	71.2	71.2	75.2	75.3	74.4
Peru	na	na	na	na	na	na	na	na	na	62.4	58.5	57.2	55.0	55.8	55.5
Philippines	na	na	na	na	na	na	na	na	na	na	43.7	43.0	42.7	42.0	45.2
Poland	na	na	58.6	58.2	57.9	56.4	56.2	54.4	55.1	54.3	57.4	54.7	55.2	57.5	57.6
Portugal	na	na	na	na	na	na	na	na	na	na	na	na	na	62.8	67.4
Saudi Arabia	na	na	na	na	na	na	na	na	na	58.9	57.1	57.5	58.1	59.2	59.5
Singapore	57.0	59.6	56.7	54.8	66.5	65.9	64.7	67.0	69.4	70.4	70.8	71.2	70.7	74.1	76.3
South Africa	na	na	na	na	na	54.0	53.4	48.6	48.9	52.7	52.6	53.2	53.6	54.7	54.0
Spain	na	na	na	na	na	na	na	na	na	54.4	54.7	57.7	58.6	61.8	61.6



## Historical performance

System	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sweden	73.5	74.5	73.4	73.4	72.6	73.4	74.2	71.4	72.0	72.5	72.3	71.2	72.9	74.6	74.0
Switzerland	na	75.3	72.7	73.3	73.9	73.9	74.2	68.6	67.6	67.6	66.7	67.0	70.0	72.3	72.0
Taiwan	na	na	na	na	na	na	na	na	na	na	na	na	51.8	52.9	53.6
Thailand	na	na	na	na	na	na	na	na	na	na	39.4	40.8	40.6	41.7	46.4
Turkey	na	na	na	na	na	na	na	na	na	na	42.2	42.7	45.8	45.3	46.3
UAE	na	na	na	na	na	na	na	na	na	na	na	na	59.6	61.8	62.5
UK	63.9	63.7	66.0	64.8	65.4	67.6	65.0	60.1	61.4	62.5	64.4	64.9	71.6	73.7	73.0
Uruguay	na	na	na	na	na	na	na	na	na	na	na	na	60.7	71.5	68.9
US	59.8	57.3	58.1	59.0	58.2	57.9	56.3	56.4	57.8	58.8	60.6	60.3	61.4	63.9	63.0
<b>Number of systems</b>	<b>11</b>	<b>14</b>	<b>16</b>	<b>18</b>	<b>20</b>	<b>25</b>	<b>25</b>	<b>27</b>	<b>30</b>	<b>34</b>	<b>37</b>	<b>39</b>	<b>43</b>	<b>44</b>	<b>47</b>

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