IOPS Working Papers on Effective Pensions Supervision, No.34

DESIGN AND SUPERVISION OF PENSION PROJECTIONS IN 26 JURISDICTIONS

Dariusz Stańko
December 2019

IOPS WORKING PAPERS ON EFFECTIVE PENSIONS SUPERVISION

As the proportion of retirement income provided by private pensions becomes increasingly important, the quality and effectiveness of their supervision becomes more and more crucial. The IOPS Working Paper Series, launched in August 2007, highlights a range of challenges to be met in the development of national pension supervisory systems. The papers review the nature and effectiveness of new and established pensions supervisory systems, providing examples, experiences and lessons learnt for the benefit of IOPS members and the broader pensions community.

IOPS Working Papers are not formal publications. They present preliminary results and analysis and are circulated to encourage discussion and comment. Any usage or citation should take into account this provisional character. The findings and conclusions of the papers reflect the views of the authors and may not represent the opinions of the IOPS membership as a whole.

DESIGN AND SUPERVISION OF PENSION PROJECTIONS IN 26 JURISDICTIONS

Dariusz Stańko[*]

ABSTRACT

This report looks at the design and supervision of pension projections based on a survey of 26 jurisdictions. Predominantly, pension projections in the surveyed IOPS jurisdictions are provided by pension funds and supervisors in the form of on-line calculators, developed by supervised entities, supervisory authorities or other governmental institutions, or regular communications by pension entities via pension benefits statements (PBSs). The paper provides also an overview of key variables used while making pension projections.

The paper finds that projections in the surveyed jurisdictions tend to be deterministic, individualised and based on one scenario. In the majority of jurisdictions, projections show both future accumulated pension assets and pension benefits, expressed in today's terms. Most jurisdictions show expected benefits from a single pillar. The methodology used in projections and their underlying assumptions are developed by pension funds and their boards, pension supervisors or governmental institutions.

Pension supervisors are challenged with regard to assuring quality of projections, finding proper methods for presentation of results, standardisation issues as well as ensuring compliance. The report proposes recommendations in the area of design and supervision of pension projections.

Keywords: pension projections, pension supervision, consumer protection, private pensions, pension policy, pension calculators, pension benefit statements

JEL codes: D-18, G-17, G-23, G-28.

---

[*] International Organisation of Pension Supervisors (IOPS).

Contents

Tables

Boxes

Executive summary

Pension projections can be a powerful tool to manage expectations of pension scheme members and influence their retirement decisions. They can educate the members about realistic values of their future retirement income and offer advice on retirement decisions taken. However, pension projections may also pose several risks that relate to improper methodology used, assumptions made, or incorrect, unclear communications.

This report looks at the design and supervision of pension projections based on a survey of 26 jurisdictions. Predominantly, pension projections in the surveyed IOPS jurisdictions are provided by pension funds and supervisors in the form of on-line calculators, developed by supervised entities, supervisory authorities or other governmental institutions, or regular communications by pension entities via pension benefits statements (PBSs).

Projections tend to be deterministic, individualised and based on one scenario. In the majority of jurisdictions, projections show both future accumulated pension assets and pension benefits, expressed in today's terms. Most jurisdictions show expected benefits from a single pillar. The methodology used in projections and their underlying assumptions are developed by pension funds and their boards, pension supervisors or governmental institutions.

Most of the surveyed authorities have a mandate, specific or indirect, to supervise the issues related to pension projections. They tend to focus on verifying that the methodology used and the assumptions made comply with the specific regulatory requirements as delivered by supervised entities, the pension supervisors, law or other bodies.

Pension supervisors are in favour of at least partial standardisation of pension projections in terms of methodology and assumptions. Alternatively, supervisors are willing to offer some guidance on methodology and assumptions.

Pension supervisors indicated the challenges with regard to pension projections and their supervision that can be grouped into four main categories:

- assuring quality of projections (proper data, methodology, assumptions);
- finding proper methods for presentation of results;
- standardisation (methodology, assumptions and presentation);
- ensuring compliance with supervisory regulations or legal acts.

Issues related to forecasting and communicating future retirement benefits span pension policymaking and supervision. The main problems for supervisors are technical in nature and relate to developing an appropriate methodology for estimations aimed at long-term, demographic assumptions (such as longevity) and macroeconomic assumptions (such as asset returns and annuity rates). An important question is how to communicate effectively to pension fund members the results of projections.[1] Therefore, pension fund supervisors need to be able to properly access the technical side of projections (such as methodology used and assumptions made) as well as the conduct of projection providers (the ways they communicate the results).

The report proposes recommendations in the area of design and supervision of pension projections.

---

[1] These issues will be the subject of a joint IOPS/OECD paper that will focus on communication of pension projections.

Design and supervision of pension projections in 26 jurisdictions

Introduction

Pension projections can be a powerful tool to manage the expectations of pension scheme members and to influence their behaviour (with regard to the chosen contribution rate, length of saving time, level of risk etc.). Projections can educate members about the effects of their retirement decisions and provide realistic values of their future retirement income. However, pension projections can also be abused by providers in order to take advantage of their competitors, thus potentially hurting pension members' interests.

Pension projections can be very complex and costly to design and maintain. First, information on methodology and assumptions, and uncertainty of forecasted values are difficult to convey to the savers. Second, making assumptions about various input variables is very difficult. It is difficult to assume some future returns as the forecaster makes bets not only on uncertain parameters but also on the sequence of future returns (the sequencing risk). This is particularly true in the case of deterministic forecasts. The impact of underperformance of a particular magnitude is apparently the greatest for people approaching retirement because their individual savings tend to be at their highest at this point. At the same time, the potential for recovery, due to better returns in the future or delaying retirement, is severely limited. Finally, forecasting future retirement balance or income for a long time period is very difficult due to uncertainty, as the range of possible outcomes widens as the projection period increases. In other words, projecting future retirement benefits is subject to a forecasting error that can be substantial for long forecasting periods.

The goal of this paper is to understand how pension projections are performed in various IOPS jurisdictions and how this activity is supervised. The focus is to learn about the methodology and the assumptions and how they are supervised. We also aim to identify some common supervisory problems encountered by IOPS members. Another paper will discuss how pension projections are communicated and how such communications are supervised in the IOPS member jurisdictions.

Definitions

In this paper, we define 'pension projections' as any tools or documents that help future retirees understand the most probable value of their future accumulated savings or the most probable value of their future retirement income. Therefore, pension projections include pension calculators, pension benefit statements, statutory pension estimates, projections of future pension drawdowns (programmed withdrawals), life annuities, etc.

Method, scope and data

A survey sent to IOPS members in January 2018 was the main tool used for collecting information on pension projections. We received responses from 26 jurisdictions.[2] This gives a relatively representative and evidence-based view on the current supervisory practices and the recommendations with regard to designing, making and presenting pension projections to scheme members. The survey focused on issues pertaining to

---

[2] Albania, Australia, Austria, Armenia, Bulgaria, Canada (CAPSA), Chile, Colombia, the Czech Republic, Egypt, Hong Kong (China), Iceland, Ireland, Italy, Jamaica, Lithuania, Republic of North Macedonia, Mauritius, Mexico, the Netherlands, Poland, Romania, Serbia, Slovakia, Suriname and Turkey (Pension Monitoring Center). Additionally, Malta and Spain mentioned that now there is no legislation that would require (Malta) or regulate (Spain) projections; however, in both countries such activities can be undertaken by private pension schemes. We gratefully acknowledge participation in the survey by a non-IOPS Member, the Australian Securities and Investments Commission (ASIC).

defined contribution (DC) and hybrid plans, but some information received also related to defined benefit (DB) plans. Additionally, India and the UK provided short comments on the subject.

1. Pension projections in surveyed IOPS jurisdictions

1.1. Legal framework

In most (20 of 26) of the jurisdictions surveyed, the legislation framework *directly addresses*, at least partially, the issue of pension projections. Most often, pension laws, or supervisory regulations, mandate on the contents and format of pension projections, the assumptions made and frequency of communications. They can also mandate on pension projections, standardise methodology, assumptions or presentation formats, including requirements for presentation of estimates under certain scenarios (Table 1). More details are presented in the Annex: Legal framework.

Table 1 Legislation relating to pension projections in selected IOPS jurisdictions

Jurisdiction	Type of legislation	Main features of legislation
Albania	pension law	Mandates information prospectus verified by actuary with information about the annual contribution needed to receive the desired level of pension
Austria	supervisory regulation	Pensionskassen: defines information requirements, mandates projections to be made and included in an annual pension benefit statement (PBS), defines when projections are delivered, requires scenarios (3 different interest rates)
Chile	supervisory regulation	Mandates personalised pension projections: defines information requirements, group of recipients, scenarios, and main parameters (mortality table, annuity and pension funds rates) On-line calculators: requires use of supervisor's base assumptions (real rate of return, annuity returns)
Colombia	supervisory regulation	Mandates delivering projections with an advice each time when a member moves between funded and unfunded system; requires presenting scenarios (4 different densities of contribution)
Czech Republic	pension law	Provides only basic principles (data should not be based on historical returns, reasonable assumptions projections net of costs must be used, disclaimer is required)
Iceland	pension law	Mandates presentation of lifelong monthly annuity in PBS sent at least annually
Ireland	pension law	Mandates projections on accumulated assets and predicted retirement income in an annual PBS to be sent to active members, and a generic PBS, containing key personal information to be made available to new members when joining a fund
Italy	supervisory regulation	Mandates projections (projecting standardised macroeconomic scenarios) and the presentation format
Jamaica	supervisory regulation	Mandates projections to be included in PBS, defines delivery dates, requires that assumptions used are described and the effects of potential changes to final outcomes are discussed Provides supervisory guidelines on calculation and presentation of projections
Lithuania	pension law	Requires explanation of methodology and assumptions, interpretation of results and disclaimer

North Macedonia	pension law	Provides general guidance, mandates projections for programmed withdrawals or life annuities when offers to pension fund members are made
	supervisory regulations	Describes general methodology and assumptions for projections of programmed withdrawals or annuities. Produced by pension regulator (programmed withdrawals) and insurance regulator (life annuities)
Mauritius	supervisory regulation	Mandates projections be given in a PBS, which must be sent annually, but does not specify the methodology, assumptions or presentation format
Mexico	supervisory regulation	Mandates personalised pension estimates be sent annually in line with the methodology developed by supervisor
the Netherlands	pension law	Mandates uniform pension overview (UPO) to be provided on an annual basis
Poland	pension law	Mandates projections from mandatory unfunded first pillar
Romania	pension law	Forbids projections made by pension fund administrators for marketing purposes as being potentially misleading
Serbia	supervisory regulation	Requires that projected benefits are individualised and net of fees and costs
Slovakia	pension law	Mandates stochastic, individualised projections in a PBS to be sent annually to members of voluntary pension funds
Suriname	pension law	Mandates projections for DB and hybrid schemes on retirement income to be sent at least annually, requires submitting an annual report to the Central Bank
Turkey	supervisory regulation	Mandates projections of accumulated pension savings and monthly benefits, determines the content and timing

Note: PBS – pension benefit statement
Source: IOPS.

In the context of EU countries, the IORP II Directive required them to create their legislation on projections and enact it on 13 January 2019 for all private voluntary pension plans (so-called third pillar). One of the key requirements of the Directive is that pension fund members receive projections in a single document on an annual basis (see Box 1 and EIOPA, 2018).

The law does not address pension projections in six jurisdictions, i.e. Armenia, Australia, Bulgaria, Egypt, Hong Kong (China), [3] Slovakia (quasi-voluntary second pillar), or in four provinces of Canada that participated in this study (Alberta, Manitoba, Ontario and Québec).

---

[3] However, due to fiduciary duty imposed on MPF trustees, the supervisor (MPFA) has the legislative power to monitor how trustees perform their duties, including pension projections provided by trustees.

Box 1 IORP Directive II on pension projections

> • pension benefit projections on the retirement age as well as disclaimer that those projections may differ from the final value of the benefits received has to be included (art. 39.1(d)) in the Pension Benefit Statement made available to each member free of charge through electronic means or on paper at least annually and – in the form of paper copy – on demand (art. 38.3)
>
> • in case of economic scenarios the information on projected pension benefits should also include two scenarios (i.e. best estimate and an unfavourable scenario), taking into consideration the specific nature of the pension scheme (art. 39.1(d))
>
> • the IORP, on request from a member has to provide any further information about the assumptions used to generate the pension benefit projections (art. 44(c))
>
> • Member States will set out rules for IOPRs to determine the assumptions of the projections to determine, where relevant, the annual rate of nominal investment returns, the annual rate of inflation and the trend of future wages (art. 38.5)
>
> • Members States will ensure that IORPs are subject to prudential supervision including the supervision of information to be provided to members and beneficiaries (art. 46)

Source: Directive (EU) 2016/2341 of the European Parliament and of the Council of 14 December 2016 on the activities and supervision of institutions for occupational retirement provision (IORPs), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L2341

1.2. Who makes projections?

Various entities engage in providing forecasts of future pension benefits. In most cases, these are *pension fund managing companies*,[4] *pension fund administrators*[5] or *trustees*.[6] Projections in the form of on-line pension simulators or calculators are made available by *pension funds*, *supervisors* or *non-commercial or public institutions* (see section 2.1). The responding jurisdictions also mentioned *other parties*,[7] and pension board (Suriname, where projections are made by actuaries on behalf of the board), insurance companies (Republic of North Macedonia), non-commercial entities (Albania, two pension calculators). Egypt reported that projections are a joint process that involves pension funds, actuaries and the supervisor.

---

[4] Albania (projections are verified by an actuary), Austria (Pensionskassen), Bulgaria, Chile (personal pension projections need to follow the guidelines of the supervisor; pension calculators need to follow supervisors' methodology for returns and annuity rates), Colombia, Czech Republic, Italy, Lithuania, Republic of North Macedonia, Mexico (personalised pension estimates must be in line with the methodology developed by the supervisor), Serbia, Slovakia.

[5] Iceland, Ireland, Italy (occupational pension funds), Mauritius, the Netherlands (providers such as pension funds, insurance companies or the Pension Premium Institution in the case of DC pensions only).

[6] Australia, Hong Kong (China) (in case of calculators, the data are inputted by members), Jamaica (projections are made by an actuary or administrator appointed by the trustees).

[7] Non-pension institutions involved in projections in Australia need to meet licensing and disclosure requirements that relate to their role as financial advisers. In Poland, projections on benefits from the unfunded pillar are undertaken by the Social Insurance Institution (ZUS). In Slovakia, there can be other institutions involved in providing information about pension system or financial products, e.g. research institutes.

1.3. What projections are made?

The 26 authorities reported various types of pension projections made in their jurisdictions. Two main types of projections were *pension calculators* (17 jurisdictions[8]) and *regular pension projections* communicated by pension entities in pension benefits statements (PBS) (12 jurisdictions[9]).

In the Netherlands, in addition to regular pension projections, defined benefit funds have an obligation to inform members about their prospective benefits before their retirement to help them choose between a fixed and variable annuity. Pension fund managing companies and insurance companies in the Republic of North Macedonia have to offer projections to members only on the moment of retirement (i.e. when members ask for offers from the Listing Center on retirement or when they want to replace their programmed withdrawals with an annuity). The projections are in the form of standardized tables on the forecasted value of benefits. Pension fund managing companies make projections for programmed withdrawals and insurance companies make projection for annuities.

Various (but unspecified by respondents) types of projections are available in the Czech Republic and Suriname. In Colombia, projections are available from pension regimes when a member decides to transfer between regimes and wants to know the likely pension benefits for the competing regimes.

Finally, in Romania the law currently forbids pension funds from producing pension projections. However, the pension supervisor does its own internal stochastic projections.

Calculators are mostly provided by pension schemes or funds (12 jurisdictions)[10] but can also be offered by pension supervisors (Chile, Hong Kong (China), Mexico, Serbia), governmental institutions (Lithuania, Poland) or non-commercial sites (Armenia, the Netherlands, Turkey). Box 2 offers some examples. In Hong Kong (China) and Mexico, pension calculators are available from both pension funds and pension supervisors. In the case of Poland, a calculator is prepared by a governmental body in charge of social insurance, the Social Insurance Institution. A stochastic simulator is available on the website of the Chilean pension supervisory authority. The simulator is offered independently of projections prepared by pension funds and is provided to members once a year in the benefit statement for the 3rd quarter. The non-commercial website 'My Pension Overview' in the Netherlands currently uses a deterministic simulator. The site collects annual PBSs from different pension providers and adds the first pillar state pension to show a consolidated overview of both pillars.[11] In some cases, official pension calculators were created jointly by governmental institutions and the pension industry (e.g. Lithuania, the Netherlands, Sweden, Turkey).[12] The

---

[8] Albania, Armenia, Austria, Australia, Bulgaria, two Canadian provinces surveyed in the study (Ontario and Québec), Chile, Hong Kong (China), Iceland, Italy, Jamaica, Lithuania, Mexico, Poland, Serbia, Slovakia, Turkey.

[9] Albania, Austria, Australia, two Canadian provinces surveyed in the study (Ontario and Québec), Chile, Iceland, Ireland, Italy, Jamaica, Mauritius, Mexico, the Netherlands.

[10] Albania, Austria (most of the Pensionskassen), Australia, Bulgaria, two provinces of Canada surveyed in the study (Ontario and Québec), Hong Kong (China), Iceland, Italy, Jamaica, Lithuania, Serbia, Slovakia.

[11] The government plans to introduce a stochastic calculator that will be showing forecasts based on three different scenarios (pessimistic, optimistic and median).

[12] In the Netherlands, pension calculator provided by the Stichting Pensioenregister (SPR) being a joint venture between the Social Insurance Bank (SVB), the Pension Federation and the Dutch Association of Insurers. In Lithuania, the calculator tool has been prepared jointly by the Ministry of Social Security and Labour, the Bank of Lithuania, SODRA (State Social Insurance Fund of the Republic of Lithuania), Lithuanian Investment and Pension Funds Association and Association of Pension Funds Participants. In Turkey, the Pension Monitoring Center is the institution set up by pension fund companies and the Treasury to monitor the industry and to develop policy strategies. In Sweden, a non-IOPS

Icelandic Pension Funds Association has a calculator on their website that provides combined information on accrued rights and projected benefits (life annuity) from all occupational pension funds to which a member has been contributing during his/her career. The state pension benefits in Iceland are projected by the Social Insurance Administration website calculator. These benefits are contingent on the value of private pension benefits and all other income during the retirement.

Box 2 Public pension calculators in selected jurisdictions

Armenia (governmental sites)

    https://abcfinance.am/calculators/pensioncalc.html (the Central Bank of Armenia)

    http://www.epension.am/en/calcs (the Ministry of Labour and Social Issues)

Chile (pension supervisor)

    www.spensiones.cl

Hong Kong (China) (pension supervisor)

    http://www.mpfa.org.hk/eng/mpf_education/mpf_calculators/mpf_accrued_benefits/calculator.jsp

Iceland (The Icelandic Pension Funds Association)

    https://www.lifeyrismal.is/is/lifeyrisgattin

Lithuania (The State Social Insurance Fund Board under the Ministry of Social Security and Labour, SODRA)

    https://www.sodra.lt/en/calculators/projected_pension_calculator

Mexico (pension supervisor)

    https://www.gob.mx/consar/acciones-y-programas/calculadoras-de-ahorro-y-retiro

Poland (Social Insurance Institution, ZUS)

    http://www.zus.pl/swiadczenia/emerytury/kalkulatory-emerytalne/emerytura-na-nowych-zasadach/kalkulator-emerytalny-prognozowana-emerytura/wersja-uproszczona

The Netherlands (My Pension Overview)

    www.mijnpensioenoverzicht.nl

Serbia (pension supervisor)

    http://webservices.nbs.rs/FinancialCalculatorOfficeSite/SerCyrl/FinancialCalculator/Penzije.aspx

Sweden (My Pension)

    www.minpension.se

Turkey (Pension Monitoring Center)

    http://emeklilik.egm.org.tr/?sid=53

Source: IOPS.

---

member, the portal 'My pension' is owned by Min Pension i Sverige AB, which is a wholly owned subsidiary of Swedish Insurance. Its operations are run and equally financed by the state and the pension companies.

Regarding the nature of projections in the responding jurisdictions, they are predominantly *deterministic, individualised*[13] and based on *a single scenario*. In most cases, projections show both future accumulated pension assets and pension benefit,[14] expressed in today's money terms.

Pension statements in Albania provide only projections of future accumulated assets whereas only the value of periodic benefits is provided in Armenia and Mauritius (in the latter, some providers also provide the replacement rate, i.e. a percentage of a worker's pre-retirement income). In other jurisdictions, projections include both accumulated assets and forecasted benefits; additionally, Jamaica, Poland and, as already mentioned, some providers in Mauritius show projections using the replacement rate. In Mexico, recipients of personalised PBSs can also see a qualitative indicator on how good their benefits are likely to be (see forthcoming IOPS paper on communication of pension projections).

The *stochastic approach* is used only in Chile, where a pension risk simulator was developed by the Chilean regulator; and in some rare cases by pension funds in Lithuania; in projections delivered by voluntary pension funds in Slovakia; and in Romania by the supervisor in the internal forecasts. The Netherlands had planned to introduce stochastic projections in early 2018; however, from the Dutch perspective, the recently introduced European Directive IORP II represents a step back for their pension providers. Before the Directive, the trend in the Netherlands was to remove projections from the uniform pension overview (UPO) and to guide members to the My Pension Overview (MPO) website for information on projected benefits. The rationale for this was that this online environment is more up to date and gives members an overview of the status of all their UPO pensions, as well as the state pension. However, IORP II legislation obliges pension providers to show projections again in a single document, which leads to more, potentially overwhelming and static information as well as implementation costs.

The *scenario approach* is used in six jurisdictions. Pension providers in Australia can use it in their calculators. , and this approach is also present in Colombia where pension funds apply four scenarios with different density of contributions until the retirement (100%, 75%, 50% and 0%) and take into account allocations of funds (conservative, balanced, aggressive). Some pension funds in Iceland use scenarios with different rates of return on investments. Italian pension fund managing companies may use multiple scenarios in their pension calculators; however, such scenarios must be symmetric with respect to the base case scenario. Scenarios are also applied in the case of projections of some annuities in Republic of North Macedonia (fixed annuity with share in profits in the second pillar and variable annuity and fixed annuity with share in profits in the third pillar). Results of stochastic projections for voluntary pension funds in Slovakia are presented under three scenarios (optimistic 90th percentile, moderate 50th percentile, pessimistic 10th percentile).

1.4. Are projections mandatory?

Pension projections are provided to scheme members *free of charge* in almost all responding jurisdictions. Egypt reported that there might be a small fee paid to the supervisory authority when requesting a projection.

---

[13] Albania, Austria, Australia (some assumptions are individualised and other standardised – see guideline RG229), Bulgaria (some parameters are pre-set: size and frequency of contributions, age, length of saving period, rate of return, technical interest rate, length of retirement), Canada (Alberta, and typically in Ontario and Québec), Chile (personal pension projections), Colombia, Hong Kong (China) (in most cases), Ireland, Iceland, Jamaica, Republic of North Macedonia, Mauritius, Mexico, Netherlands, Poland, Serbia, Slovakia. In Italy, projections are calculated for a representative agent at joining, and are then individualised on an-on-going base.

[14] Both assets and benefits are presented in case of projections in Albania (pension calculator), Australia, Bulgaria, Canada, Iceland, Ireland, Jamaica (benefits only in case of DB plans and assets and benefits in case of DC, also the replacement rate is available for both types of plans), Mexico (calculators and projections), and Poland (unfunded part only).

In Ireland, such a service is almost always free of charge; however, pension funds have the right to charge in the case of numerous requests made by a member. In Australia, projections are also free unless offered by financial advisers who operate outside the legal relief. Projections for voluntary pension funds in Slovakia are delivered as a part of the PBS, electronically and free of charge. Members can also request that their annual statement be sent in paper form. For paper statements requested at more frequent intervals than annually, members need to cover the cost of delivery.

Whether making pension projections is mandatory depends very often on the type of pension scheme (mandatory vs voluntary) and the circumstances of the individual (i.e. whether s/he is about to enter a scheme, change it or retire).

Mandatory projections are present in most (16) of the surveyed jurisdictions. These are: Albania (a pension prospectus must be given to a member before entering the fund); Austria and Chile (where at least once a year pension funds must send to members projections as part of their personal statement);[15] Colombia (when switching between pension regimes or at a member's request); Iceland (at least annually in a PBS); Ireland (delivered at least annually to members, including when leaving the scheme or approaching retirement); Italy (an individualised PBS is sent annually to active members and a generic PBS is made available to new members when joining a fund); Jamaica (a PBS is sent at least annually to active members, and on request for deferred members); Republic of North Macedonia (in case of the mandatory pillar); Mauritius (projections are included as part of an annual PBS); Mexico (a personalized pension estimate is sent in February each year); the Netherlands (annual PBS), Poland (in the case of the unfunded mandatory pillar), Slovakia (annual PBS in case of voluntary pension funds); Suriname (in cases of the DB and hybrid voluntary schemes); and Turkey (before a member enters the system and before retirement, and at any time on request from a participant).

Pension projections are *not mandatory* in 11 jurisdictions: Armenia, Australia, Bulgaria, the four provinces in Canada (Alberta, Manitoba, Ontario and Québec) that participated in the survey, Czech Republic, Hong Kong (China), Lithuania, Republic of North Macedonia (voluntary pillar), Poland (funded pillar), Serbia (however all funds have established their website calculators) and Slovakia (quasi-voluntary second pillar).

As already mentioned, pension projections are forbidden in Romania. Egypt did not provide clear information as to whether projections are mandatory or not.

1.5. Scope of pension projections

In most (19) of the responding jurisdictions, projections show likely benefits only *from a single pillar*. This is the case in Albania, Austria, Armenia, Bulgaria (separate projections are available for benefits from mandatory and voluntary pillars), the Czech Republic, Egypt, Iceland (mandatory occupational pillar or state means tested benefit), Italy (private funded pension schemes), Jamaica (occupational or personal pension plans), Republic of North Macedonia, Mauritius, Mexico, the Netherlands (occupational schemes; however an integrated projection at the My Pension Overview site is available, see below), Poland (only for unfunded pillar), Romania (internal projections by the supervisor that cover both occupational or individual funded pillars), Serbia, Slovakia (both quasi-voluntary or voluntary pension funds), Suriname and Turkey.

Only in a few jurisdictions do entities provide *combined pension projection*. In Australia, projections undertaken by pension funds relate to occupational pensions, but, in the case of some providers, can also include information about the likely value of a state pension (so-called age pension) at retirement. In Canada,

---

[15] In addition, the Austrian regulation requires that Pensionskassen send to their members the pension projections in case of specific events (switching to different investment vehicle, to an occupational group insurance scheme, switching to another Pensionskasse).

projections by some pension plans may focus on a single pension or multiple sources (e.g. occupational, personal and government plans). In Chile, projections combine both mandatory and voluntary funded pillars; however, they do not include information about unfunded state pension, as the latter is means-tested. In Colombia, pension projections provide information about both regimes (unfunded and funded). This is in line with the purpose of projections for members who intend to switch between regimes. In Hong Kong (China), projections relate to mandatory provident fund schemes. However, some online calculators provided by pension funds, as well as the one provided by the pension supervisor (MPFA), also allow users to input additional variables, such as any voluntary contributions, when projecting the amount of their accrued benefits upon retirement. Similarly, in Ireland some providers may offer information not only about likely benefits from voluntary occupational pensions but also about voluntary employee benefits. Some providers of pension calculators in Italy also offer projections on expected benefits from a public unfunded pillar. In Lithuania, projections made by the SODRA show both first and second pillars, the third pillar (voluntary pension) is excluded. Commercial calculators by pension funds usually show all three pillars.

The *most comprehensive projections* in the researched jurisdictions are available on the Netherlands' My Pension Overview (MPO). The website collects pension projections on occupational benefits from different pension providers and adds the first pillar state (unfunded) pension to show the consolidated overview of both pillars. Belgium plans to introduce a similar solution for projections on its government site.[16]

2. Methodology and assumptions of pension projections in IOPS jurisdictions

2.1. Who creates methodology and makes assumptions?

The methodology used and assumptions made for pension projections are developed depending on the surveyed jurisdiction and type of projection. Pension projections are made by pension fund managing companies in Albania, Austria, Bulgaria, Czech Republic, three of the surveyed Canadian provinces (Alberta Ontario, Québec), Egypt, Republic of North Macedonia, Lithuania (in case of third pillar pension funds), Serbia, Slovakia (quasi-voluntary second pillar pension funds) and by insurance companies in the Republic of North Macedonia (in case of annuities); pension supervisor in Chile, Colombia, Hong Kong (China) (in case of MPFA calculator), Italy, Mexico and Romania; pension fund governing body in Mauritius; trustees in Hong Kong (China); pension board in Suriname (after consultations with actuary); governmental institution in Australia, the Netherlands (see the next section), Slovakia (in case of third pillar voluntary pensions),[17] the UK; fund advisers in Ireland; or actuaries/plan administrators in Jamaica. Notwithstanding, the methodology and assumptions may also partly come from legislation (e.g. Austria) or be fully described by legal acts as is the case in Colombia (issued by the pension supervisor), Iceland, Poland and Turkey.

According to responses to the survey, pension fund managing companies generally have freedom in establishing methodology and assumptions. However, as outlined in the Annex, in the Czech Republic, managing companies have to meet certain general principles and in the Republic of North Macedonia, a general methodology is prescribed as well as guidance on assumptions (such as minimal rules and standards for interest rates and for mortality tables).

In some jurisdictions (e.g. Egypt, Ireland, Canadian provinces (Alberta Ontario, Québec)), *actuaries* may have a role in advising pension funds/administrators on pension projections in terms of methodology or

---

[16] https://mypension.onprvp.fgov.be/nl/mypension/Paginas/default.aspx

[17] The methodology of projections and the underlying assumptions for the voluntary pillar are developed by the Ministry of Labour, Social Affairs and Family of the Slovak Republic responsible for pension legislation, in cooperation with the National Bank of Slovakia as the supervisory body. Pension projections are communicated by pension entities (supplementary pension management companies).

assumptions. In the provinces of Ontario and Québec, actuaries of defined benefit (DB) plans would be expected to calculate projections using methods and actuarial assumptions that are consistent with section 3500 of the Canadian Institute of Actuaries Standards of Practices[18]. Advisers in Ireland provide assumptions basis and methodology, subject to legislated maximum investment yield and equivalence of methodology on expression of costs as reduction in yield. Reference is also made to mortality research by the Society of Actuaries.

In Iceland, the Pension Act and the pension fund articles determine the basic rules for projections. Legislation prescribes methodology and assumptions for projections in Poland, as well as in Turkey where assumptions for the exemplary financial table are regulated by the Undersecretariat of the Treasury, which is the regulatory and supervisory authority that distributes the 'Circular on Projected Accumulation and Repayment Tables to be used in Individual Pension System' (2010/10). The Pension Monitoring Center and pension companies determine the methodology of calculations in accordance with this Circular.

In four jurisdictions (Chile, Italy, Republic of North Macedonia, Mexico), the *pension supervisor* decides on the methodology used and assumptions made for pension projections. In Chile, the supervisor establishes a specific norm[19] regulating personal pension projections (PPP). The norm stipulates what information should be included in the statement, different scenarios and groups (according to age) that should be informed, the estimation methodology for projections of the accumulated balance at the age of retirement for each scenario, and the main parameters (mortality table, annuity and pension funds rates, beneficiaries) for the calculation of the pension amount. Moreover, it establishes the specific format in which the information should be presented and when it should be handed to the member. Regarding the Pension Simulator created by the supervisor, there is no legislation that regulates it, although the methodology and main assumptions are documented.[20] The model simulates the evolution of pension funds' returns, mapping the multi-fund scheme on eight asset categories. The returns vary by type of fund and evolve stochastically over time: a random walk + a jump diffusion process to introduce the occurrence of crisis. The investment horizon of the user determines the length of the simulation. Then the probability density function for the final pension is obtained. Pension managing companies can also have their own pension calculators on their webpages, but even though deterministic, for the base scenario, they need to follow the assumptions developed by the pension supervisor (real rate of returns and the discount rate for annuities). Managing companies of pension funds (AFPs) can also provide additional scenarios or allow users to replace some assumptions. Information on such assumptions must be disclosed to the user. Not all the AFPs have their own calculators; some of them insert the link to the SP simulator on their webpages.

Similarly, the Italian supervisor establishes standardised assumptions with regard to retirement age, rates of return (set at different values for the equity and the bond components), inflation rate, wage growth rate and parameters related to conversion of accumulated savings into an annuity (mortality tables, charges, technical rates).

Likewise, the North Macedonian supervisor provides the general methodology, and guidance for assumptions are prescribed by law and in the secondary regulations.

In the development of its MPFA's online calculator in Hong Kong (China), the supervisor made reference to the methodology and assumptions of retirement planning calculators available locally and abroad. In the process, MPFA also consulted relevant stakeholders, including the MPF industry, labour unions and financial practitioners.

---

[18] https://www.cia-ica.ca/publications/standards-of-practice

[19] http://www.spensiones.cl/portal/compendio/596/w3-propertyvalue-3482.html
[20] http://www.spensiones.cl/appsSP/simuladorPensiones/doc/supuestos_simulador.pdf

The Mexican supervisor sets methodologies[21] for the online calculator for retirement savings (see Box 3) and personalised projections.

Box 3 Methodology of the Savings and Retirement Calculator for workers who contribute to the IMSS

Savings' balance upon retirement S_f is calculated as

$$S_f = S_i \left(1 + r^{(m)}\right)^n \left(1 + c^{(m)}\right)^n + \left[d(A_0 + A_v + C_S)\left[\frac{\left(1 + r^{(m)}\right)^n\left(1 + c^{(m)}\right)^n - 1}{(1 + r^{(m)})^n(1 + c^{(m)})^n - 1}\right]\right]$$

Where

S_f – the savings' balance in the individual account projected at the moment of reaching the retirement age.

S_i – the initial savings balance in the individual account as of the moment when the projection is calculated. This is the sum of subaccounts for: i) Retirement (*retiro*), unemployment commencing at 60 years old (*cesantía en edad avanzada*), and old age (*vejez*) (RCV); ii) Social quota (*cuota social*); iii) Voluntary pension savings account minus the value of the sub-accounts: iv) Subaccount SAR92 (retirement savings accumulated during the period 1992 to 1997); and v) Housing account (*vivienda*).

Salary – the latest monthly contribution base; it is assumed to be constant over the projection horizon.

$r^{(m)}$ – the monthly real rate of return net of fees; calculated on the basis of selected annual return of 4% or 5%. For example, the monthly real rate of return in case of choosing 4% annual return would be

$$r^{(m)} = (1 + r_{annual})^{\frac{1}{12}} - 1 = (1.04)^{\frac{1}{12}} - 1 = 0.00327374 = 0.327\%.$$

$c^{(m)}$ – the monthly fee charged over the savings' balance by the pension managing company (AFORE) as of the moment the projection is calculated. It is calculated as 1/12 of the annual fee. For example, if the annual fee is 1.03% per year, the monthly fee would be

$$c^{(m)} = \frac{0.0103}{12} = 0.00085833 = 0.08533\%.$$

d – the density of contribution (i.e. the percentage of months when a saver contributes to the pension system). This value is assumed at 80% and is constant over the projection horizon.

A_0 – the value of mandatory monthly contribution, calculated as the value of salary multiplied by 6.5%, the latter being the contribution rate for mandatory pension savings.

A_v – the monthly voluntary retirement savings.

C_s – the monthly amount of social quota calculated as daily social quota corresponding to salary in force at the moment the projection is calculated, multiplied by 30.

n – the number of months required to reach statutory retirement age by the saver, calculated as

$$n = \frac{\text{no.of days between retirement age and the day pension projection is calculated}}{365} * 12.$$

Once the pension savings balance S_f is calculated, *the estimated monthly benefit* for savers who have the right to pension benefit is calculated in the following way

$$Estimated\ monthly\ benefit = \frac{S_f}{12 * URV}$$

where URV is the annuity rate (*unidad de renta vitalicia*) in force at the moment the pension projection is calculated that takes into account gender of the saver and age at which the saver retired. The methodology of calculating URV is described in the Annex C to 'General provisions applicable to programmed withdrawals'

---

[21] http://www.consar.gob.mx/gobmx/Aplicativo/calculadora/imss/PDF/Metodolog%C3%ADa_Calculadora_de_Retiro .pdf, and https://www.gob.mx/cms/uploads/attachment/file/185713/Metodo_EPP_VF.pdf

(*Las disposiciones de carácter general aplicables a los retiros programados*, https://www.gob.mx/cms/uploads/attachment/file/64257/DISPOSICIONES_aplicables_a_los_Retiros_Programados.pdf.

The replacement rate (*TR*) is calculated by dividing the *estimated monthly benefit* by *salary* and multiplying by 100. It corresponds to the percentage that the estimated monthly benefit represents with regard to the last salary of a saver:

$$TR = \frac{\text{Estimated monthly benefit}}{\text{Salary}}$$

Source: Mexican pension supervisor (CONSAR), Metodología de la calculadora ahorro y retiro para trabajadores que cotizan al IMSS 2017, https://www.consar.gob.mx/gobmx/Aplicativo/calculadora/imss/PDF/Metodolog%C3%ADa_Calculadora_de_Retiro.pdf

In the UK, the methodology and assumptions for DC projections are provided by the Financial Reporting Council (FRC), which sets the standard by which annual statutory money purchase illustrations (SMPIs) should be determined. The pension regulator's role in this respect is to provide guidance to trustees on how they might work with administrators and agree reporting requirements (including reporting on SMPIs). The Financial Conduct Authority in one of the annexes[22] to its FCA Handbook provides instructions on benefit projections for insurance companies and workplace DC pension schemes (stakeholder pension schemes and personal pension schemes).

Box 4 Supervisory guidelines on the method of calculating pension projections in Jamaica

The required assumption is that contributions continue to be made at current rates until the retirement, as well as some long-term real salary growth and long-term real interest rates.

Defined benefit pension schemes

• accrual rate x average salary projected to normal retirement age x length of total expected pensionable service at normal retirement age:

  e.g. 1.5% x $1,066,394 x 35 = $559,857 per annum

• estimated projected annuity / projected pensionable salary at normal retirement age

  $559,857 / $1,148,424 = 48.75%

Defined contribution pension schemes

Assumptions on expected real rate of return net of expenses (e.g. 1% p.a.), expected real pensionable salary escalation (e.g. 0% p.a.), interest rate after projection period (e.g. 9% p.a.), mortality table (e.g. PA(90)-6), annuity factor at normal retirement age (e.g. 10.039). Unisex rates for annuities are not usually used.

• Estimated projected annuity = total estimated accumulated contributions / annuity factor at normal retirement age

  e.g. $2,576,000 / 10.039 = $256,599 p.a.

• Estimated replacement rate = estimated projected annuity / estimated projected pensionable salary

  e.g. $256,599 / $770,000 = 33.24%

Source: Financial Services Commission of Jamaica, Guidance on the presentation and Calculation of Accrued and Projected Pensions of Active Members: http://www.fscjamaica.org/regulated-industries/content-104.html

The Jamaican pension supervisor (FSC) does not develop a methodology, however it does provide guidelines on how to calculate projected pensions for DB or DC pension schemes as well as on the format of assumptions and the frequency with which they are to be presented to members (see Box 4). These guidelines

---

[22] https://www.handbook.fca.org.uk/handbook/COBS/13/Annex2.html

apply to all pensions. The law stipulates that the PBS should contain a description of the assumptions used (e.g. annuity rates, interest rates, increases in salary) as well as a brief discussion of the effects of future variance of actual experience from the assumed values.

2.2. Variables used for pension projections

Table 2 provides a summary of variables used by entities involved in making pension projections, the source of these variables as well as some numerical examples.[23]

Table 2 Variables used for pension projections in surveyed IOPS jurisdictions

Variable	Source	Value/range
current age	Admin records (Austria, Egypt, both Chile supervisor calculator and personal pension projections, Iceland – from ID number, Ireland, Italy, Jamaica, Republic of North Macedonia, Mexico in case of PBS, Poland – Social Insurance Institution, Suriname) User/member (Colombia, Hong Kong (China) MPFA calculator, Lithuania SODRA calculator, Mexico supervisors' calculator, Serbia supervisor's calculator, Slovakia calculators, Turkey Pension Monitoring Center) Pension supervisor (Egypt) Actuary (Egypt)	16–65 (Lithuania), 18–64 (Hong Kong (China), supervisor calculator), 20–65 (Ireland), 22–60 (Egypt), 26 (default, Turkey Pension Monitoring Center)
retirement age	Admin records (Albania, Austria, Jamaica, Lithuania – usually legal age (third pillar pension funds, voluntary system), Republic of North Macedonia, Mauritius, the Netherlands, Slovakia (voluntary pension funds), Suriname Legal age (Australia, both Chile supervisor calculator and personal pension projections Colombia, Iceland plus current years of contributing, Italy, Lithuania, Mexico, Poland, Turkey) User/member (Bulgaria calculators, Chile supervisor calculator, Mexico – supervisor calculators and pension benefit statements, Serbia – supervisor calculator, Slovakia calculators) Supervisor (Australia) Pension supervisor (Egypt)	56 (Turkey plus min. 10 years of contributing), 57/62 (Colombia plus min. 1300 weeks of contributing in DC scheme), 60 (Egypt, Romania voluntary system), 60/65 (Mauritius, Chile, Poland), 61.2/64.2 (Bulgaria), 62.5 (Slovakia, to increase gradually) 63/65 (Lithuania, mandatory system, age to increase gradually to 65), 63/65 (Romania mandatory system, to increase gradually to 65), 65 (Hong Kong (China) supervisor calculator, default and fixed), 65 (Mexico, statutory retirement age) 67 (Australia), max 70 (Serbia)
gender	Admin records (Australia, Austria, both Chile supervisor calculator and personal pension projections, Iceland – from ID number, Ireland, Italy, Jamaica, Republic of North Macedonia, Mauritius, Mexico in case of PBS, Poland – Social Insurance Institution, Suriname, Turkey – Pension Monitoring Center) User/member (Colombia, Lithuania SODRA calculator, Mexico supervisor calculator, Slovakia calculators) Pension supervisor (Romania)	
contribution rate	Admin records (Albania, Austria, Australia, Egypt, Iceland, Ireland, Italy, Jamaica, Republic of North Macedonia, Mauritius, the Netherlands, Serbia, Slovakia – voluntary pension funds)	average value from previous 12 months (Australia), actual amount paid during the previous year (Turkey), 0–30% (Mauritius employer and employee),

---

[23] A related work will be conducted by EIOPA who, upon publication of the PEPP regulation in the Official Journal of the EU, will draft technical standards including on assumptions for PEPP projections.

	Legal (Chile, Colombia, Lithuania, Mexico, Poland, Romania, Turkey – Pension Monitoring Center) User/member (Bulgaria calculators, Chile – voluntary savings in supervisor calculator, Lithuania – voluntary system) Actuary (Suriname) Pension Monitoring Center (Turkey)	1.8% (Lithuania mandatory with the voluntary individual and employer contribution density), 3.75% (Romania mandatory with the actual individual contribution density), 5% (Bulgaria, universal mandatory pension funds), 5% or 10% (Hong Kong (China) supervisor calculator), 6.5% (Mexico private sector), 7% or 12% (Bulgaria, professional mandatory pension funds), 10% (Chile), 11.3% (Mexico public sector), 16% (Colombia), 19.52% (Poland, unfunded pillar)
pension plan costs	Admin records (Albania, Austria, Australia, Bulgaria, Italy, Republic of North Macedonia, Mexico, Romania, Slovakia – voluntary pension funds) Actuary (Suriname – with auditor and pension fund)	average value from previous 12 months (Australia), actual fees charged (Mexico), up to 2.5% on contributions and up to 0.6% p.a. on assets (Romania, mandatory pension funds), up to 4% of contribution and up to 0.8% p.a. of assets (Bulgaria, universal mandatory and professional mandatory pension funds), up to 5% on contributions and up to 2.4% p.a. on assets (Romania, voluntary pension funds), up to 7% of contribution and up to 10% of returns (Bulgaria voluntary pension funds)
rates of return	Legal acts (Colombia, the Netherlands, Turkey, Slovakia – voluntary pension funds) User/member (Hong Kong (China) MPFA calculator, Lithuania SODRA calculator Mexico CONSAR calculators, Serbia calculators, Slovakia calculators) Pension fund managing company/administrator (Albania, Austria, Bulgaria, Iceland, Lithuania, Republic of North Macedonia, Mauritius, Mexico – regular projections, Suriname) Supervisor (Australia) Pension supervisor (Chile, Italy, Romania) Actuary (Egypt, Jamaica, Mauritius) Pension fund advisor (Ireland)	0.5% real (money market), 0.8% (MPF Conservative Fund) 1.1% (guaranteed fund), 2.6% (bond fund), 3.6% (mixed assets fund), 3.9% (equity fund) – reference values as of 2017 subject to yearly update, annualized (after fees), (Hong Kong (China)), 1–2% real (Turkey Pension Monitoring Center), 2% real (bonds, 4% real (equity) (Italy) 3–7% nominal (default variables; 2023 and onward: 3% – bonds, 7% – shares; 2019–2022: gradually increasing rates), but user may choose other rates of return (Lithuania), 3% real, net of tax and investment fees (Australia), 4% real before commission (Mexico regular projections), 4% or 5% real before commission (Mexico CONSAR calculators), 4% real (conservative fund), 6% (moderate fund), 8% (great risk fund) (Colombia), 4–10% real (Bulgaria), 5–10% real (net of investment-related expenses, Mauritius), average of simulated returns over 55 years: 5.22% real (fund A), 4.60% (fund B), 4.04% (fund C), 3,56% (fund D), 3.13% (fund E), 3.23% (life annuity) (Chile), up to 6% real (legal ceiling in Ireland), up to 20% nominal (Serbia, calculators), CPI plus 3.5% (Iceland), depends on the prevailing market real rate of return on long-term debt securities in the last year, pension fund nominal rate of return in average in the last three years, and assessment for Consumer Prices Index (Republic of North Macedonia)

volatility of rates of return	Legal acts (Austria, the Netherlands, Slovakia – voluntary pension funds) Pension fund or actuary (Jamaica, Mauritius – DC funds) Pension fund, auditor or intermediaries (Suriname) Pension supervisor (Chile, Romania)	+/– 1pp (Mauritius), actual volatility of a pension fund (Romania) average of simulated returns over 55 years: 7.83% (fund A), 5.56% (fund B), 3.73% (fund C), 2.64% (fund D), 2.19% (fund E), 0.6% (implicit rate of return of life annuities) (Chile)
correlation between rates of returns	Legal acts (the Netherlands) Pension fund or intermediaries (Austria, Suriname) Pension supervisor (Chile, Colombia)	
discount rate	Legal acts (Colombia, the Netherlands) Pension fund managing company (Austria, Republic of North Macedonia) Pension fund or actuary (Jamaica, Mauritius –DC funds) Pension supervisor (Romania)	3.77% (Colombia), 5–10% (Mauritius), government AAA yield curve (Romania)
risk-free rate	Legal acts (the Netherlands) Adviser (Ireland) Pension supervisor (Romania)	market rates and the ultimate forward rate (UFR) (the Netherlands), government AAA yield curve (Romania)
inflation rate	Legal acts (Colombia, the Netherlands, Slovakia – voluntary pension funds, Suriname) User (Hong Kong (China) MPFA calculator) Adviser (Ireland) Pension fund managing company (Austria, Lithuania if results presented in real terms, Republic of North Macedonia) Pension fund or actuary (Jamaica, Mauritius) Pension supervisor (Italy, Romania)	0–7% (Mauritius, difference between real and nominal yields or the CPI), 2% (Italy, Lithuania, Slovakia – voluntary pension funds), 3.2% (Hong Kong (China) supervisor, calculator, the annualized percentage change in the CPI over the past 10 years), 5.09% (Colombia, 3 years' average), CPI (Suriname), Harmonised CPI (Romania)
wage growth	Legal acts (the Netherlands) User (Bulgaria calculators, HK supervisor calculator, Slovakia calculators) Pension fund managing company (Austria, Colombia) Pension fund or actuary (Jamaica, Mauritius, Suriname) Pension supervisor (Chile supervisor calculator, Italy, Romania) Ministry of Finance (Iceland), Ministry of Finance and the European Commission (Lithuania) Social Insurance Institution (Poland) Pension Monitoring Center (Turkey)	0–3% (average annual increase of the minimum wage, Turkey),0–10% (nominal, Mauritius, specific fund/industry data or CPI+inflation), 1% (real, Italy) 1.29% (real, Colombia, 10 years' average difference between the growth of minimum wage and the inflation rate), 1.75% (real, assumed growth of the ceiling on covered earnings, Chile supervisor calculator), 3.80% (nominal, Hong Kong (China) supervisor calculator as of 2017 subject to yearly update, the annualized percentage change of the nominal indices of payroll per person engaged from Q4 2007 to Q4 2017)
life tables	Legal acts/prescribed tables (Colombia, Republic of North Macedonia, Mauritius – DC funds only, Turkey) Adviser (Ireland) Pension fund managing company (Austria, Bulgaria, Italy) Pension fund or actuary (Jamaica, Suriname – actuary) Pension supervisor (Chile, the Netherlands) Ministry of Finance (Iceland) European Commission (Lithuania)	UK mortality tables A67/70, PA85/90 (Mauritius – DC funds only), ATT – 1983 US unisex (Turkey)
labour market risk	Pension supervisor (Chile, Mexico, Romania)	actual or assumed density of contribution

disability rate	Legal acts (Colombia) Pension supervisor (Romania) Pension fund managing company (Austria) Pension supervisor, pension fund, actuary (Egypt)	
pension benefit accrual rate (DB schemes)	Actuary (Mauritius, Suriname) Pension fund, managing company or provider (Austria, Iceland, Ireland, Jamaica, the Netherlands) Pension supervisor, pension fund, actuary (Egypt)	up to 1.875% p.a. (the Netherlands), up to 2% p.a. (Mauritius National pension Fund)
annuity rate	Legal acts (Mexico) Actuary (Jamaica, Mauritius – DC funds only) Adviser (Ireland) Pension fund managing company or provider (Austria, the Netherlands) Pension supervisor (Chile, Romania) Pension supervisor, pension fund, actuary (Egypt) Pension Monitoring Center (Turkey) SODRA (Lithuania)	3.23% (Chile – the implicit real interest rate of annuities), 4.35% (Mexico as of 27.05.2019*), 8–10% (Mauritius)

* https://www.consar.gob.mx/gobmx/datosabiertos/URV/

Source: IOPS

All variables are inputted by pension fund managing companies in Albania and by pension funds in Mauritius (with the help of an actuary). In Alberta, Canada, all assumptions are provided by a pension plan or third party administrator or are selected by a plan member. The Australian Securities & Investments Commission, on the advice of the Australian Government Actuary, sets all pension projection assumptions except member-specific and scheme-specific admin data in Australia. For calculators offered by pension funds in Australia, the assumptions may differ but they must be reasonable, i.e. parameters such as fees, performance and contributions need to be based on the previous 12 months and actual investment policies. In the case of the Chilean pension simulator, the supervisor uses administration records and own assumptions. Also in Colombia and Romania, it is the pension supervisor that sets up assumptions.

In the Netherlands, it is the Ministry of Social Affairs and Employment (SZW) that decides on the underlying methodology and assumptions. The Ministry is advised by the pension supervisor (Central Bank of the Netherlands, DNB) and The Netherlands Authority for the Financial Markets (AFM), and is given input by the sector through stakeholder organisations such as the Federation of Dutch Pension Funds and the Dutch Association of Insurers. The Commissie Parameters (Parameters Committee), established by the Ministry of Social Affairs, operates independently, but within the limits dictated by the Ministry, and sets the parameters that pension providers should use for projections (Box 5). Based on the parameters set, the DNB has a responsibility to provide frequent updates on the structure of risk free interest rates, the scenario set and updates on wage increases and price growth rates. The parameters are also used in the scenarios that pension providers communicate to members. Current parameters were set on 1 January 2015 and will be updated every five years. The DNB supervises the use of assumptions made by the pension provider.

In Slovakia, users of the pension calculators input all required data, whereas in Poland pension projection is performed based on assumptions made by the Social Insurance Institution. In other cases, some data are provided by a pension fund member (or calculator user) and by other entities such as the pension fund or provider.

Box 5 **Projection parameters used in the Netherlands (as of February 2019)**

> The current assumptions are as follows. Inflation 2%, wage growth 2.5% p.a. (i.e. 0.5% real), risk free rate proxied by the interest rate term structure (RTS) of government bonds AAA 2.5% (i.e. 0.5% real), listed shares returns 7% (i.e. 5% equity premium). Reduction of costs is 15bp for governmental bonds AAA, and 25 bp for listed shares.
>
> Inflation and wage growth parameters are minimum growth rates. The listed shares returns are maximum level (i.e. the implied maximum equity risk premium varies over time with the development of the RTS). The RTS is published by the Central Bank of the Netherlands.

Source: Central Bank of the Netherlands

Regarding *retirement age*, some jurisdictions use the legal retirement age or the ones set up by the pension scheme. Using the same retirement age for projections enables consistency between retirement estimates. For example, in Australia, when estimating an annual income stream, funds must assume that an income will be required every year for 25 years from the age of retirement specified at 67, i.e. until age 92. In Chilean pension simulator offered by the supervisor, the retirement age is set by default at the legal age (60 women, 65 men) but users may change this value to evaluate the impact on pension. The personal pension projections in Chile also assume the legal age, and both the personal pension projections and the supervisor calculator provide an estimated pension in the case of postponing retirement for three years after the legal age.

The *contribution rate* is either scheme-specific or established by law. Only in Bulgaria, Chile (when adding voluntary savings in the supervisor pension calculator) and the voluntary system of Lithuania can members provide their own values. In Suriname, an actuary decides on this variable. In the case of Australia, the regulator requires that the input be calculated as the average value for the previous 12 months. In the case of projections for voluntary pension funds in Slovakia, the rate is calculated as the average monthly contributions based on the period of time preceding the provision of the PBS. The Turkish Pension Monitoring Center uses actual amounts paid by a pension fund member during the previous year. Depending on the nature of the scheme and national regulations, reported contribution rates ranged between 0 and 30%.

Pension plan costs are scheme-specific and are explicitly taken into account in Albania, Austria, Australia, Bulgaria, Italy, Republic of North Macedonia, Mexico, Suriname and Romania. In Hong Kong (China), the MPFA calculator plan costs are not explicitly inputted but they are incorporated into the assumed net returns. In the same vein, an adviser or plan administrator in Ireland addresses these costs via reducing the assumed yield. The pension fund and the actuary in Mauritius consider them if costs of a pension plan are not borne by employer. Pension fund administrators in Lithuania usually take the same approach. In many jurisdictions, pension plan fees, which represent the bulk of plan costs, are subject to legal ceilings.[24]

Costs are not taken into account in projections made in Colombia, Egypt, Iceland, the Netherlands, Jamaica, Poland (Social Insurance Institution, ZUS, projections), Slovakia and Turkey (Pension Monitoring Centre). In the Netherlands, costs are displayed in general information but not in the UPO delivered by pension providers.

Rates of return are most often assumed by the pension fund administrator/managing company (Albania, Austria Bulgaria, Iceland, Republic of North Macedonia, Mauritius, Mexico, Suriname), actuary (Egypt, Jamaica, Mauritius) or users of pension calculators (Hong Kong (China), MPFA calculator, (Mexico)), CONSAR calculators (Serbia, Slovakia). They can also be specified by law (Colombia, External Circular 051/2016, the Netherlands, based on the parameters defined by the Pensions Act), by pension supervisor (Chile, Italy, Romania) or pension fund advisor (Ireland). In Australia, the expected rates of return on assets

---

[24] For detailed information on fee structures, levels and legal ceilings refer to IOPS Working Paper No. 32, *2018-Update on IOPS work on fees and charges.*

are set up by ASIC with the help of a Government Actuary. ASIC assumes a real rate of return of 3% p.a. net of tax and investment fees, uniform for all funds regardless of their asset allocation. Such standardisation is perceived appropriate because the main purpose of projections in Australia is 'to provide members with a simple indication of the likely adequacy of their retirement benefit'.

In Chile, Colombia and Lithuania (SODRA calculator), *returns vary according to the lifecycle portfolio*. A Chilean supervisor assumes the returns follow a random walk process with a jump diffusion process. Current values[25] calculated for an horizon of 40 years are presented in Table 2. Also, in Hong Kong (China), reference values offered to a user of the MPFA calculator vary depending on the category of fund and are calculated on the basis of *the historical performance* (the annualized return of different constituent funds by fund type and annualized internal rate of return of the MPF system since the inception of the system in 2000). In contrast, Italy's COVIP sets different rates of return for equities and for bonds, in order to signal to members that different investment options should be expected to have different returns in the long term.

In Iceland, pension funds aim to deliver returns at the level of inflation (CPI) plus 3.5%. In Ireland, pension scheme advisors decide on the assumed rates of returns; however, the rates are subject to a legal ceiling of 6%.

In Jamaica, rates of return are specified by actuaries and must be net of pension fund or scheme expenses. Also, in Mauritius, the rates of return assumed by fund administrator or actuary for DC projections only reflect the expected asset allocation return *net of investment-related expenses*. In contrast, in Mexico, supervisor's calculators and pension companies assume a fixed annual real rate of return before commission.

In Lithuania, third pillar pension funds provide a range of returns to be chosen by a fund member based on historical returns. Projections made by the SODRA pension calculator, for the next 4 years, are forecasted separately for bonds and shares. It is estimated that for 2019 the nominal return on bonds will be 1.56% and on shares 5.36%; in 2020 1.86% and 5.86%, in 2021 2.16% and 6.16%, in 2022, 2.46% and 6.46%, respectively. From 2023 onwards, a constant rate of return will be applied: 3% for bonds and 7% for shares. In the Republic of North Macedonia, the rate of return applied to projections of first pension benefit depends on the prevailing market real rates of return on long-term debt securities in the previous year, pension fund's nominal average rates of return over last three years and on assessment of the CPI index.

Volatility of expected returns is used in stochastic calculations undertaken in Chile (supervisor's simulator, see current values in Table 2), the Netherlands (the MPO website), Romania (internal calculations made by pension supervisor) and Slovakia (projections for the PBS in the voluntary pension system). Some sort of volatility is also assumed in case of scenario or sensitivity analysis as reported by Austria and Mauritius (both jurisdictions for DC funds only), Jamaica and Suriname. The Information Requirements Regulation for Pensionskassen in Austria specifies that projections should use three different levels of expected returns: zero, the assumed rate of interest and the maximum permissible value. The Netherlands uses values as defined by the Pensions Act; funds in Mauritius assume a deviation from the expected rate of return by +/– 1 percentage point; the Romanian supervisor uses actual volatility of a pension fund. In Slovakia, volatility is calculated from the level of market risk based on the synthetic risk and reward indicator.

Correlation between returns is applied in stochastic calculations in Chile (supervisor's simulator – two correlation matrices are estimated, one for crisis periods and the other for normal or no crisis periods); in the Netherlands they are provided by pension providers, based on the parameters defined by the Pensions Act. Correlation parameters are also used by the pension supervisor in Colombia for deterministic projections and in Austria and Suriname by intermediaries or pension funds.

---

[25] See http://www.spensiones.cl/appsSP/simuladorPensiones/doc/supuestos_simulador.pdf (page 2)

Discount rate can be specified by a legal document as in Colombia where the technical interest rate is established by regulation, or in the Netherlands where a pension provider uses the stochastic approach based on the parameters defined by the Pensions Act. This can also be established by an actuary or plan administrator (Jamaica, Mauritius in case of DC funds only), by pension companies contracts (Austria) or by a pension fund managing company (Republic of North Macedonia). In Mauritius, the discount rate is based on the mean term of pension liabilities and typically derived from 15 to 0 year government bonds that are used to determine the projected annuity rate at retirement. The Romanian supervisor bases its internal pension projection on the AAA government bonds yield euro curve published by the European Central Bank.

Risk-free rate is explicitly used in projections made by pension funds in Ireland where the parameter is determined by an adviser, and in the Netherlands where it is based on the market term structure of the risk-free rate augmented with an ultimate forward rate, as well as in Romania where the pension supervisor assumes the AAA government bonds yield euro curve.

Inflation rate is explicitly used in Austria, Colombia, Hong Kong (China) (for MPFA's calculator), Italy, Jamaica, Lithuania, Republic of North Macedonia, Mauritius, the Netherlands, Romania (for internal projections made by supervisor), Slovakia (voluntary pension funds) and Suriname. In Austria, the inflation rate is determined in the pension company contract. In some cases, the value is calculated based on statistical data indices (Romania, the harmonised index of consumer prices; Jamaica by pension plan administrators or actuary, based on data from the Statistical Institute of Jamaica; Suriname, General Bureau of Statistics). The inflation can also be determined by a formula based on statistical data. For example, in Colombia inflation is calculated as the weighted average of the inflation rate for the past three years whereas in Hong Kong (China) – as the annualized percentage change in the Composite Consumer Price Index for the past 10 years. In Hong Kong (China), the users are offered the default value of inflation; however, they can input their own value. In Ireland, the rate is determined by an advisor. In Lithuania, if the projections are presented in real terms, the rate is determined by the pension fund administrator (third pillar). Also in Republic of North Macedonia the inflation rate is subject to assessment by a pension fund managing company or an actuary. In Mauritius, the variable is used to determine projected pension increases and the wage growth rates and is calculated by a pension fund or an actuary as the difference between the real and nominal yields or the CPI. The Dutch pension providers set up the inflation rate in its stochastic approach based on parameters specified in the Pensions Act. Slovak calculations assume constant inflation rate of 2%.

Approximately half of the countries assume constant wages. However, *wage growth* is assumed in projections made in Austria (by a pension company contract), Chile (supervisor calculator), Colombia, Hong Kong (China) (MPFA online calculator), Iceland, Italy, Jamaica, Lithuania (SODRA calculator), Mauritius, the Netherlands, Poland (for PAYG projections), Romania (for internal supervisor's projections), Suriname and Turkey (by the Pension Monitoring Center). This parameter can be based on the expected annual wage growth (Hong Kong (China), an annualized percentage change of Nominal Index of Payroll Per Person Engaged calculated over the past 10 years subject to yearly updates or minimum wage changes (Turkey, average annual growth, Colombia average growth net of inflation). For example, in Mauritius wage growth used for calculation of projected contributions and the final wage on reaching retirement age is set up based on company or industry specific data or as the growth of CPI index plus inflation. The Romanian supervisor specifies the wage growth as a function of the inflation rate and future GDP growth. It can be assumed that advisers in Ireland and pension funds or actuaries in Suriname and Jamaica are using these macroeconomic data or scheme-specific values when setting up their own assumptions. In some jurisdictions, this parameter is specified by governmental institutions (Iceland – Ministry of Finance after recommendations from the Association of Icelandic Actuaries; Poland – the Social Insurance Institute) or by a pension provider based on the parameters specified by law (the Netherlands). In Hong Kong (China), the users of MPFA calculator can change the default growth wage value, whereas in Slovakia the users of pension calculators are free to choose their own value without being given a default value.

Unisex life tables are explicitly used for pension projections in Austria, Bulgaria, the province of Alberta in Canada, Iceland, Italy, Ireland, Lithuania, the Netherlands, Poland, and Turkey. *Gender-specific life tables* are used in Chile, Colombia, Republic of North Macedonia (the pension fund managing company chooses a mortality table according to minimal standards and rules prescribed in the regulations), and typically in Jamaica and Mauritius. In Mexico, gender-specific life tables with life improvements are taken into account when calculating the variable life annuity unit. Improvements in life expectancy are also explicitly incorporated into the life expectancy assumptions made in Chile, and Colombia (from 2018), Jamaica, Republic of North Macedonia (relating to fund members), Romania (mortality improvements up to 2060), Suriname, and indirectly – via the choice of mortality tables – in Mauritius.

Some countries have legal stipulations on tables used for pension projections. For example, in Colombia the Administrative Decision 1555/2010 sets the life expectancy tables for members of the pension system, and Administrative Decision 0584/1994 in the case of physically disabled members. In Republic of North Macedonia, pension companies are obliged to use tables which fulfil minimal standards and rules as specified by law and by laws, whereas in Mauritius (in the case of DC schemes), these must be the UK mortality tables (A67/70, PA85/90), typically used as gender-related rather than unisex tables.

In Iceland, the Ministry of Finance elaborates life tables for projections after recommendations from the Association of Icelandic Actuaries. In Poland, projections of unfunded pension benefits are based on unisex life tables supplied by the Social Insurance Institution with the assumed life expectancy of 21.25 years for women at the age of 60 and 17.66 years for men at the age of 65. Pension providers in the Netherlands use unisex tables based on the latest expected mortality rate.

It is worth mentioning that a retirement product determines whether gender-specific life expectancy should be used for benefit projections (as in case of programmed withdrawals and gender-specific life annuities) or not (as in case of unisex life annuities).

Labour market risk is approximated by Chile, Mexico and Romania. This risk involves many more areas than the ones related to member´s density of contribution. In the case of the impact of contribution density, in Chile, the personal pension projections provide an option to assume 50% or 100% density for the remaining working period till retirement. The Chilean supervisor pension calculator allows members to modify contribution density for the remaining period of the projection, by inputting the number of contributing months in each year for three age groups (18–35; 36–55; 56 and more in the case of men and 18–35; 36–50; 51 and more in the case of women). Contribution density, determined by the pension supervisor CONSAR, is applied in Mexico in the case of individualized estimations in annual statements that are sent to members by pension funds. This parameter is also used in pension calculators offered by the supervisor and can be used in pension calculators provided by pension managing companies. The Romanian pension supervisor uses the actual contribution density for each participant.

Disability risk is explicitly used in projections done in Colombia (in line with the tables established by the Administrative Decision 0584/1994), Egypt and by the Romanian supervisor (based on the latest data published by the Romanian National Institute of Statistics).

Pension benefit accrual rate is applied in projections of benefits in the case of DB pension schemes in Austria, Egypt, Iceland, Jamaica, Mauritius (National Pension Fund[26]), the Netherlands and Suriname.

Annuity rates, understood as pay-out rates, are used in Austria, Egypt, Ireland, Jamaica, Lithuania, Mauritius (only in the case of DC pension schemes), Mexico, the Netherlands, Romania and Turkey. In Chile, the

---

[26] The National Pension Fund in Mauritius covers private sector employees who contribute to this mandatory pillar. The Fund does not fall under the purview of the Financial Services Commission of Mauritius.

supervisor establishes the implicit interest rate of annuities, in real terms. Costs of annuities are assumed in annuity values in Austria (in line with a pension company contract), Chile, Jamaica, Lithuania, Mauritius, the Netherlands, and Romania. In some jurisdictions, these values are determined based on market variables: by the pension provider in the Netherlands, by actuaries in Jamaica and in Mauritius (based on the buyout rates from insurers, typically for a single life annuity), or by advisors (Ireland). In some other countries, annuity rates are calculated by the pension supervisor (Chile, Romania, Egypt – possibly with the participation of pension funds and actuaries) or a government institution (Lithuania – SODRA, Turkey – Pension Monitoring Center). SODRA's calculator provides a theoretical estimate of the expected annuity with the following assumptions: 1) average annual return of 2%; 2) one-off deduction (to cover management costs), 2.5% of the accumulated assets; (3) length of the expected pay-out period is calculated on the basis of the European Commission's average life expectancy forecast (AWG Budgetary projections, base line scenario). In Mexico, the insurance supervisor (Comisión Nacional de Seguros y Finanzas) periodically publishes annuity rates in line with legal requirements. These rates are used by the pension supervisor (CONSAR) to calculate values of the variable life annuity, i.e. the values of programmed withdrawals.

Several countries mentioned also that they use *other variables* for pension projections. In Australia, pension funds must provide a retirement estimate of the annual income stream that will be available to the member for 25 years after they retire. Such an estimate does not take into account any payable income taxes and is calculated as the member's estimated lump sum on retirement multiplied by *the factor* specified in ASIC Class Order CO 11/1227. Another variable taken into account while projecting pension benefits in Australia is *the insurance premiums* paid by the members. This allows taking account of the impact of insurance premiums on the member's contributions. Pension funds in Australia are not allowed to consider member's other accounts. When estimating a member's age pension benefit (i.e. state pension), funds must use a set of assumptions.[27] Funds must also assume that taxation and other legal factors will remain the same although this is not always the case and can have a significant effect on the pension benefit. However, it is impossible to foresee changes in tax rates and other legal factors that may occur over the course of a member's working life. Therefore, funds in Australia need to make their members aware of this limitation by including a warning that the projected benefit is calculated under the assumption that taxation and other legal conditions remain unchanged. In Hong Kong (China), users of MPFA's online calculator can input additional information on *voluntary contributions* and *existing MPF balance*. Users of on-line calculators in Lithuania input *the number of years* of their participation in the pension pillar, but there is also a possibility to enter other variables for pension projections such as the total amount of contributions to a second pillar pension fund, the total accumulated amounts in a second pillar, the lost units from the first pillar (i.e. the value of the reduction in the state pension because of participation in the funded pillar during 2004–2018). In Mauritius, pension fund or actuary also include in pension projections of benefits from DB schemes information on *the lump sum commutation factors*. These factors are used to compute, as an illustration, the sum of money that could be obtained if up to 25% of the lifetime pension is exchanged for a lump sum at retirement.

---

[27] a) the member qualifies for an age pension under s43 of the Social Security Act 1991; b) the member has a partner; c) the member and their partner jointly own their home; d) the member and their partner each have a single superannuation fund retirement benefit equal to the lump sum and these benefits are applied on the date of the estimate to purchase superannuation pensions (income streams) that provide the member and their partner with income in that year equal to the annual income stream amount, 5) the member and their partner have no other assets or income (including other superannuation accounts) affecting that amount of the age pension payable to the member or their partner.

2.3. Reviewing methodology, assumptions and variables

Review of methodology, assumptions and inputs used for projecting pension benefits is undertaken by the same entity that set them up. The exception is Colombia where each time the regulation changes, the adjustments are made by the Ministry of Finance and not by the pension supervisor.

In some jurisdictions, *there is no legal requirement for supervised entities to review* regularly the methodology and assumptions used for pension projections. Therefore, pension supervisors do not require such revisions in Albania, Bulgaria, Czech Republic, Hong Kong (China) and in the case of online calculators provided by MPF trustees in Ireland, Jamaica, Mauritius, Poland, Romania, Serbia, Slovakia and Suriname. Obviously, such an obligation does not exist in the jurisdictions where supervisors set up the methodology and assumptions. This is the case for Australia, Chile, Hong Kong (China) in the case of the MPFA online calculator, Mexico and the Netherlands. In Australia, the ASIC expects that the providers of projections comply with the relief they were given. If ASIC makes changes to the relief, the pension industry needs to adjust accordingly.

In Colombia, pension fund managing companies need to undertake a review of assumptions and/or methodology each time there are *changes in legislation/regulations* or *when the market rates change*.

The legal requirement for periodic review of methodology and projection assumptions exists in Egypt and Republic of North Macedonia.[28]

The supervisor requires reviews in Ireland and Turkey (the Ministry of Treasure and Finance). In Ireland, pension funds need to update accrual tables and accrued rights annually according to actuarial positions, and in Turkey pension companies have to comply with the current Circular.

Frequency of reviews by pension fund managing companies is *not specified* in Albania, Bulgaria, and the three Canadian provinces (Alberta, Ontario, Québec) surveyed in this study, Lithuania and Slovakia. Likewise, such reviews are conducted by governmental institutions on an as needed basis. This is the case of Australia (reviews by ASIC), Chile (reviews by the pension supervisor), Hong Kong (China) (in the case of online calculators provided by MPF trustees), and Mexico (the pension supervisor periodically performs the updates and makes necessary adjustments to the assumptions, depending on each variable, for example, the Life Annuity Unit is updated weekly). Also, Romanian supervisor reviews the underlying methodology and assumptions linked to variable parameters at each calculation whenever it is needed or when the situation imposes it, and depending on the risks involved. In Suriname, the boards of the pension funds and sponsor/employer undertake relevant reviews depending on the financial position of the pension fund and/or sponsor/employer. In Jamaica, the actuary and the plan administrator review the methodologies and assumptions and determine the frequencies of such reviews. They also make adjustments if necessary.

In Colombia, Iceland, Serbia and Turkey, reviews of methodology and assumptions are undertaken *whenever legal acts change*. In Colombia, each time the regulation changes adjustments are made by the Ministry of Finance (not the pension supervisor). Icelandic pension funds make reviews in line with changes in pension legislation or fund articles. Longevity assumptions in Iceland are reviewed every four years and other assumptions are reviewed according to the existing accrual tables annually. In Serbia, methodology and assumptions of pension projections are reviewed after changes in regulations or in management companies' internal acts that affect the methodologies used and assumptions made, e.g. age at retirement, contribution

---

[28] In the case of Republic of North Macedonia it is the appointed actuary of the pension fund managing company who has to give guidelines for calculations of the programmed withdrawals. The actuary has to present each quarter a written statement to its management board and the pension supervisor on whether the calculations, mortality tables and interest rates have been computed in accordance with the law and the secondary regulations prescribed by the Agency. In addition, the supervisory authority undertakes on-site risk-based supervision once a year.

fee. In Turkey, the Undersecretariat of the Treasury regulates fundamental assumptions via the Circular. Since 2003, when the system started, several Circulars have been published in 2004, 2009 and 2010 within the context of projections. The latest published Circular in 2010 was amended in 2015 and 2016. The projection assumptions change according to legislation and general economic conditions.

Yearly reviews are undertaken in Austria (the pension supervisor reviews the assumptions specified in the Information Requirements Regulation) and Hong Kong (China) for MPFA's online calculator. The pension supervisor in Hong Kong (China) reviews and updates some default variables in the assumptions once a year, such as expected annual wage growth, expected annual MPF investment return (after fees) and inflation rate. As yet, there are very few members who have started to take programmed withdrawals from second pillar pension funds in the Republic of North Macedonia. Pension companies select the methodology and assumptions that, according to the regulation, should be reviewed at least once a year or in a shorter time period if a pension company considers that there have been significant changes. The North Macedonian pension regulator MAPAS reviews the methodology and assumptions through regular controls at least once a year.

Projections in Mauritius are typically reviewed *at least once every three years* in line with actuarial valuations, as decided by the governing body (of the pension fund) allowing for advice from the scheme's actuary.

In Egypt, such a law on pension funds states that the underlying assumptions and methodology of pension projections should be reviewed by a pension fund managing company *at least once every five years*. Same frequency applies to the Netherlands. The Commissie Parameters (Parameters Committee) sets the parameters that pension providers should use for the projections of their financial plans. Pension providers use these parameters, which are also used in the scenarios they communicate to members. Current parameters were set on 1 January 2015 and will be updated every five years. Based on the parameters set, the Dutch central bank (DNB) has responsibility to provide *higher frequency updates* of the risk free term structure of risk free interest rates, as well as scenarios set and updates on wage and price growth rates.

In Ireland, fund advisers review the methodology of projections *very infrequently*. Mortality research is carried out by the Society of Actuaries in Ireland every 5 years approximately.

2.4. Disclosure of methodology and assumptions

In half of the surveyed jurisdictions (Australia, Austria, Chile, Colombia, Hong Kong (China), Ireland, Italy, Lithuania, Mexico, the Netherlands, Republic of North Macedonia, Serbia, and Turkey), the methodology and assumptions for pension projections *are disclosed* to the users. Disclosure is required by law in Lithuania, Republic of North Macedonia and Serbia.

Usually, the disclosed information is available on-line or is included in the documents sent to members (e.g. Chile). In Australia, pension funds wishing to rely on Circular Order [CO 11/1227] must include standard text about the methodology and underlying assumptions used. Projection assumptions, but not methodology, are disclosed in Austria (via yearly information sent by pension companies) and the Republic of North Macedonia (and are presented only to pension fund members who move to the decumulation phase).

Methodology and assumptions are *not disclosed* in five jurisdictions (Albania, Bulgaria, Egypt, Iceland, Romania).

2.5. Conveying uncertainty of pension projections

The uncertainty of projected results is communicated to the members with the use of *disclaimers* (vast majority of countries[29]) or, less common, by showing *a range of possible results*.[30] Chile is the only country where the Pension Simulator shows a range of possible results as well as *the probability* of achieving the desired pension. The Simulator was designed on the basis of recommendations and comments of users obtained from focus groups and usability tests. The design includes the text, how to display the different sections, location of the help icons, graphics, and colours. Users can also see the effect of changing parameters on the range of results and probabilities of achieving them.

Disclaimers usually specify that presented results are not guaranteed by the provider and depend on a set of assumptions which may result in the actual outcomes being different from the projected ones (see an example in Box 6). Standard disclaimers are required in Australia (see Box 7), Republic of North Macedonia, and the Netherlands (in case of UPO). Disclaimers are mandatory in Austria, Czech Republic, Ireland, Jamaica, Lithuania, Mexico, Turkey, Poland and Suriname. In the Republic of North Macedonia, apart from the use of a standardised disclaimer, an agent offering pension products and projections must explain to a client both the nature of the products as well as the assumptions and the uncertainty of projections.

Box 6 Disclaimer displayed before entering the pension simulator offered by supervisor, Hong Kong (China)

> 'This is a calculator for projecting MPF accrued benefits to facilitate user's retirement planning and to demonstrate the impact of different variables on the accrued benefits.
>
> The calculation is based on the standardized assumptions, and other hypothetical data and individual variable(s) input by the user.
>
> The results generated by this calculator are for illustrative purposes only and not intended to be a substitute for professional investment advice. The results may differ from other similar calculators when different assumptions are adopted. The results do not represent, or promise, the actual amount of the MPF accrued benefits the user will receive at retirement. The actual amount of the MPF benefits will depend on, among other things, the amount and duration of contributions, the actual MPF investment returns, fees and charges paid and other personal and external factors. It could be different from the projected results.
>
> The MPFA shall not be liable for any errors or omissions in or any reliance placed upon the projected results. Caution statements or disclaimers are normally in place at the online calculators provided by MPF trustees.'

Source: MPFA, Hong Kong, China

The range of possible results is calculated by applying different values to variables such as the assumed return, retirement age or contribution history. In Austria, members are offered three scenarios for different interest rate levels (zero, assumed value, maximum value) and it is required by law that a caveat on past performance should be highlighted. The pension calculator from the Mexican supervisor offers scenarios for each of the following: the three different retirement ages, with additional voluntary savings and when micro savings activities are applied. This approach conveys uncertainty rather indirectly by showing the members various potential results. The Mexican supervisor tries to nudge recipients of projections to save additionally by providing them with numerical examples of increased benefits as a result of monthly voluntary savings. In the Netherlands, the stochastic approach was introduced with three scenarios: the central, extreme positive and extreme negative (i.e. top and bottom 5% of possible results) ones. Polish projections of benefits from

---

[29] Albania, Armenia (calculators), Australia, Austria, Bulgaria, Chile (Pension Simulator, Colombia, Czech Republic, Hong Kong (China), Ireland, Italy, Jamaica, Lithuania, Republic of North Macedonia, Mauritius, Mexico (supervisory pension calculator and personalised pension projections, the Netherlands (UPO), Poland, Slovakia (usually), and Turkey.

[30] Albania, Australia, Chile (Pension Simulator), Mexico, the Netherlands (to be introduced), Poland, Turkey.

the unfunded system cover a couple of scenarios, whereas in Turkey there are two scenarios based on optimistic and pessimistic returns.

Box 7 Standard disclaimer in Australia, pension projections

'What this estimate means

The projection is just an estimate, not a guarantee. The actual money you get in your retirement may be very different from this estimate.

The superannuation amounts are shown in today's dollars. The age pension estimate is shown based on current pension amounts.

This estimate does not consider any other superannuation accounts that you may hold or other assets that you own.'

Source: ASIC, Australia

In Jamaica, the law requires that the PBS include a brief discussion of the effects of future variance of actual experience from those assumed. The Jamaican pension supervisor (FSC) reinforces this through its guidance, which indicates that appropriate wording should convey that projections are not guaranteed and that they are estimates that will vary if the assumptions used are not realised. The guidelines, developed by the supervisor, stress that the trustees must exercise caution, when presenting projections, to ensure the members are not misled. The guidelines recommend using the term 'estimated', and emphasize that projected benefits are not guaranteed and may change due to assumptions not being realised, as well as referring members to the description of the methodology used as well as the assumptions. They also recommend providing some explanation of how the projected benefits should be interpreted. All assumptions must be clearly disclosed in the statement and they should represent a reasonably long-term view of the economic variables. The guidelines also specify that the projections should present not only the accumulated assets and expected retirement income but also an estimated replacement ratio.

In Turkey, the law requires that the offer tables must include an explanation stating that the presented values are estimates, may actually change due to fund decisions and investment results and are not guaranteed by the Pension Monitoring Centre. A similar caveat applies to the tables used for the decumulation phase.

In Suriname, the caveat about results not being guaranteed must be mentioned in the assumptions. This may, however, be less visible to the potential user compared to the disclaimers placed next to the results.

In the Republic of North Macedonia, the concept of uncertainty is conveyed to pension fund members by the explanations and disclaimers. In addition, sales agents of pension funds are obliged by law to present uncertainty to the members when making an offer of investment services. The standardised offer form includes a short description and the main characteristics of every pension product and a brief statement that projections are predictions made based on particular assumptions. The statement informs that actual outcomes may be different and are therefore not guaranteed so that if the assumptions are not met, the pension amounts may be different from the projected amounts. Sales agents are obliged to explain the products, the assumptions and the uncertain character of projections.

There are *no requirements for applying disclaimers* in pension projection information in the case of Albania (where forecasts are for illustrative purposes only), Bulgaria (however pension fund managing companies use disclaimers), Egypt, Hong Kong (China) (in case of online fund calculators), Iceland (funds rarely communicate uncertainty to their members) and Mauritius. Nevertheless, in Hong Kong (China), even though there is no legislative requirement for MPF trustees to remind users that the pension projections are not guaranteed, it is their fiduciary duty to do so and the supervisor, MPFA, has the power to oversee the actions of trustees in this area. In Romania, where projections are not allowed, the only indicator of

uncertainty conveyed to pension fund members is the statement on past investment performance; the same caveat is applied in Serbia. No information on this subject was available for Suriname.

Apart from graphical presentation (tables, graphs, colours) the surveyed jurisdictions do not use any specific risk indicators to communicate uncertainty to the recipients. One of the potential reasons might be the complexity of such indicators and problems with correct interpretation by pension fund members. According to the Dutch supervisor, projected benefits may be misleading as the ultimate retirement income might be lower (either due to lack of compensation for inflation or due to nominal cuts). This may result in a situation where members might have expectations for the future that are too optimistic. This situation may be alleviated by switching to a stochastic calculation method that would better illustrate the range of potential outcomes.

3. Supervision of pension projections

3.1. Legislative power to supervise issues related to pension projections

Pension supervisors *have a specific mandate* to supervise the issues related to pension projections in 13 surveyed jurisdictions.[31] For instance, such a mandate is stated in the law in Egypt, Romania, Serbia, and Suriname.

The mandate for supervising pension projections may also *arise indirectly*, i.e. from the power to request information from supervised entities and a mandate to monitor their regulatory compliance with regard to information disclosed on websites or delivered to pension scheme members, including marketing materials or financial advice. For example, in Australia, ASIC may monitor pension forecasts as it is responsible for the licencing of financial product advice and financial product disclosures. Mandate may also come from principle-based regulation. For example, the Pension Act in the Netherlands stipulates that information provided to pension fund members should be clear, correct and balanced. The Dutch market conduct authority (AFM) has therefore a mandate to supervise pension providers.

In five surveyed jurisdictions (Bulgaria, Czech Republic, Hong Kong (China), Italy, Jamaica), even though there is *no explicit mandate* for supervising pension projections, the pension authorities have competences to do so based on their general powers, such as power to control services and information provided by financial institutions to pension scheme members or a mandate to control whether the actions of supervised entities are in line with their fiduciary duty. While there is no current legal framework in Bulgaria that outlines specific actions for the provision of pension projections, the supervisor (FSC) overseas the supervision of the services provided by the pension insurance companies to the insured persons. Also, the pension managing companies are obliged to observe the requirements defined by the FSC for advertising, information materials and information given on the website. Since pension projections in the Czech Republic are voluntary and their form depends only on pension management companies, the national law does not provide for an obligation to supervise potential issues related to pension projections. However, the Czech National Bank has legislative power to monitor compliance with the general principles relating to provision of information on expected future income. In Hong Kong (China), there is no legislative requirement in respect of the projections of accrued benefits made by MPF trustees for scheme members. Still, MPF trustees are obligated to exercise their fiduciary duty in operating MPF schemes in the interest of scheme members. The MPFA has legislative power to monitor how MPF trustees perform the duties required by law, and to

---

[31] I.e., Albania, Austria, Chile, Iceland, Ireland, Italy, Lithuania, Republic of North Macedonia – with regard to projections of programmed withdrawals, the Netherlands, Romania, Slovakia (for voluntary pension funds), Suriname, Turkey. The Ministry of Treasury and Finance is the regulatory and supervisory authority in Turkey to estimate the accumulation and reimbursement tables and to inspect the projections. The Ministry is supported by the Pension Monitoring Centre.

take appropriate enforcement action if warranted. Likewise, the supervisor in Jamaica (FSC) does not have an express mandate to supervise pension projections; however, it ensures that the contents of benefit statements meet the minimum requirements of pension legislation. Where a member has an issue with their projected benefits, redress can be sought from the FSC.

Five pension supervisors (Mauritius, Mexico, Poland, Serbia, Slovakia in case of quasi-voluntary pension funds) do *not have a mandate* to monitor pension projections. In Mauritius, the law only requires benefit statements to disclose projected pension benefits to members of private pension schemes, and it can be presumed that the supervisor has some responsibility to intervene ex-post should any complaints occur. In Mexico, its pension supervisor (CONSAR) must provide tools to members to facilitate their decision-making; however, the law does not specify whether any information provided should be supervised or how that supervision should be done. The National Bank of Slovakia does not have a mandate to supervise retirement forecast issues. As the pension projections are only unofficial and made by pension companies, there is no obligation to supervise them.

3.2. Supervisory activities

In 10 jurisdictions (Austria, Chile, Colombia, Egypt, Iceland, Jamaica, Lithuania, Republic of North Macedonia, Mexico, the Netherlands), pension authorities *supervise the methodology* used and *the underlying assumptions* of pension projections made by supervised entities. In some of these jurisdictions, the pension authorities regularly monitor compliance of pension fund managing companies with the methodology and assumptions developed by supervisors (Chile, Colombia, Mexico), by law (Turkey, compliance being monitored by Insurance Auditing Board) or by other bodies (the Netherlands, compliance being monitored by the Commissie Parameters installed by the Ministry of Social Affairs). In Austria, the pension supervisor monitors projections on a case-by-case basis, whereas in Iceland pension fund projections are assessed against their financial statements, actuarial assumptions and actuarial position. In Egypt, pension funds need to send their report, that contains the methodology and assumptions, to the supervisor for approval. In Jamaica, some reliance is placed on the work of the Caribbean Actuarial Association; however, the supervisor routinely checks the methodology and assumptions employed by the actuaries. Projections in the Republic of North Macedonia are supervised at least once a year. Supervisors may use enforcement actions such as demanding changes in methodology and assumptions (e.g. Republic of North Macedonia) or preventing the distribution of the projections or other appropriate enforcement action if warranted (Australia – ASIC, Lithuania, Suriname).

Supervisors also pay attention to *the way projections are presented* to pension fund members, even if no regulations or guidelines have been established (e.g. Mauritius).

In EU countries, supervisors monitor pension projections by relevant entities against the requirements set up in the IOPR II Directive.

In four jurisdictions (Australia, Bulgaria, Hong Kong (China), Serbia), pension projections are not subject of regular supervision. ASIC in Australia inspects projections if a fund approaches the institution, for example to seek further relief, or in case of notification of a breach, or receiving a complaint from a member of the public. The ASIC may also carry out proactive reviews of pension projections from time to time. The Bulgarian pension supervisor (FSC) monitors projections when assessing services provided by the pension companies and their compliance with advertisement and information provision (materials and the website) as defined by FSC. Similarly, the pension supervisor in Hong Kong (China) examines how trustees exercise their fiduciary duty in operating MPF schemes in the interests of scheme members. In Serbia, supervision of projections happens occasionally during off-site inspections when analysing the websites of pension fund managing companies.

In Ireland, powers to supervise pension projections rest with the relevant government department.

The survey also assessed current and planned actions of supervisors with regard to pension projections. Two authorities have been developing new laws relating to projection methodology and assumptions (Egypt) or amending the existing ones (Turkey). The Turkish Pension Monitoring Center intends to introduce a change so that the assumed real rate of return is updated annually as opposed to the current practice where this parameter is set up by the Circular, therefore less frequently. Two other authorities (Bulgaria, Romania) plan to develop regulations related to the pay-out phase, which will have relevant pension projections. In Australia, the ASIC has recently amended relief applying to pension projections to ensure that pension projections of two or more years are adjusted for inflation. The ASIC anticipates other law reforms (e.g. introduction of pension dashboards) that may also impact on the supervisory approach to projections, including the application of different assumptions.

Several jurisdictions mentioned their on-going or planned activities relating to pension projections. These actions aimed at: improving or verification of the methodology and data availability during on-site inspections (Albania), continued engagement with the industry on the use of projections (Australia), regular review of the main assumptions (Chile) or implementation of the stochastic pension projections (uniform calculation method, URM). With regard to recent actions, two respondents mentioned publicising the importance of planning for retirement. This campaign was combined with the launch and promotion of the mobile application version of the supervisor's pension calculator (Hong Kong (China)), or use of behavioural science in the supervisor's pension calculator aimed at efforts to improve recipients understanding of the projections and a promotional campaign aimed at improving voluntary savings (Mexico). The Mexican regulator introduced into its pension calculators a section that visualises the impact of micro-savings on member's pension balance as a result of a reduction in certain expenditures (e.g. on coffee, cigarettes or alcohol). In Suriname, the Central Bank plans to appoint an actuary that will, amongst other functions, contribute to better supervision of issues related to pension projections.

No immediate actions were planned in the five responding jurisdictions (Austria, Hong Kong (China), Iceland, Lithuania, Serbia).

3.3. Supervisory views on standardisation

Pension supervisors were in favour of some standardisation of pension projections in terms of their assumptions and methodology.

A group of jurisdictions (Bulgaria, Colombia, Egypt, Iceland, Italy, Mexico, the Netherlands, Romania, Slovakia, Turkey) argued that *projections should be standardised*. Not surprisingly, such a suggestion was presented by countries where the supervised pension entities are quite similar or where their number is rather small. Supervisors from this group believed that standardisation would improve accuracy of such projections and allow pension funds members to compare projected benefits of different products or pension providers. Standardization should help members to understand the expected outcome when they reached retirement age and the possible risks, therefore allowing for informed decisions about their pensions. The additional argument, raised by the Netherlands, was that standardisation could also make it possible for members to add different projected benefits of different providers or products; however, projected benefits are only additive if the underlying assumptions and methodology are the same. Standardization should take into account the specific characteristics of the pension arrangement. The supervisor from Turkey noted that standardisation of projections should prevent unfair competition.

According to the respondents, standardisation should be undertaken by the supervisor (Bulgaria, Iceland, Italy, Mexico, Turkey) being the institution that protects the best interests of members; the supervisor and pension funds managers (Colombia); the supervisor, pension funds and actuaries (Egypt). In Slovakia, the

new legislation introducing standardised projections will be developed by the Ministry of Labour, Social Affairs and Family, responsible for pension schemes, in cooperation with the National Bank of Slovakia as the supervisory body.

The second group of respondents (Albania, Austria, Australia, Chile, Ireland, Jamaica, Lithuania, Republic of North Macedonia, Mauritius, were in favour of *partial standardisation*. Even though supporting the idea in general, the supervisors indicated that there were some trade-offs for or obstacles to achieving full standardisation. Therefore, they proposed to make uniform only the key elements/assumptions. Some others respondents from this group believed that the supervisors should offer some kind of guidance with regard to assumptions and methodology of pension projections (Mauritius). Not surprisingly, some of these jurisdictions are characterised by a large number of supervised entities (e.g. Australia, Ireland) and/or diverse character of products offered (e.g. Australia, Chile). Only in Lithuania and Republic of North Macedonia, as noted by these authorities, are the pension markets quite similar.

The respondents from the above group agreed that standardisation of assumptions and methodology is desired as it would allow for comparisons and help members to understand their retirement estimate. However, they also pointed out several issues that would prevent full standardisation. Assumptions on investment returns would need to vary according to the different investment policies of each fund (Albania, Lithuania). Moreover, standardised projections are not able to take into account all specificities of different pension providers and products (Austria). The Chilean supervisor believed that some discretion on standardisation would allow pension fund managing companies to apply different approaches; however, there would need to be some basic assumptions that could be applied by the supervisor in its Pension Simulator, i.e. real returns and the implicit real interest rate of an annuity. A similar approach is taken in Australia, where only the methodology and assumptions for pension projections that rely on ASIC relief in CO 11/1227 are standardised. Ireland noted that while minimum requirements, which can be quite extensive, should be complied with, funds should be free to provide other information that they felt would benefit their members. Similarly, the Jamaican supervisor argued that even though pension projections should be as uniform as possible, methodologies and assumptions must be flexible in order to allow for financial and demographic variations in pension plans, as well as in members' contribution rates.

Regarding the question of *who should be responsible for standardisation*, only three jurisdictions in this group provided any comments. The pension supervisor in Lithuania noted that application of PRIIPs (Packaged Retail Investment and Insurance-based Products) regulation for standardised information disclosure was postponed in the case of the pension market. In their view, such standardisation should be made under mutual consent. In Jamaica, actuaries, while performing pension projections are guided by the Caribbean Actuarial Association, which sets the standards in the Caribbean. As such, the task is vested in this organization. The Macedonian supervisor considered that there should be at least a general framework for methodology, and guidelines for assumptions for pension projections prescribed in the regulation, and the supervisors should be responsible for that regulation. The real calculation for pension projections should be done by the pension companies.

3.4. Challenges

Responding pension supervisors indicated a couple of supervisory or policy challenges pertaining to the area of pension projections.

The first group of challenges mentioned by the supervisors relate to *concerns for assuring quality of projections*. Supervisors acknowledged that there is a need for actuarial guidance and discussion on the methodology of projections (Mauritius, Mexico, the Netherlands). Three supervisors mentioned the problems with obtaining appropriate data and developing the methodology (Albania, Bulgaria, Egypt). The Chilean regulator underlined the importance of reviewing the mortality tables that represent an important

input factor for pension projections and have a vital impact on the quality of forecasted results. According to the supervisor from the Republic of North Macedonia, regulations in the area of pension projections (methodology, assumptions) should be changing in line with the maturing market. Another quality challenge mentioned as important (Italy) is how to inform members about the level of uncertainty that surrounds the values provided as pension projections. This involves both theoretical and practical issues. On the one hand, the methods used to estimate the variance in returns in the short run (i.e. value-at-risk estimates based on the variance of annual returns) are not appropriate for a time span that may go thirty or forty years into the future, as they may easily lead to an implausibly large range of possible outcomes. On the other hand, consensus is still lacking on an operationally feasible procedure to produce estimates of the dispersion of returns in the decades-long time horizon that is relevant for pension plans.

The second group of challenges relates to *the ways the results should be presented* so that the recipients are able to make informed decisions (Bulgaria, Colombia, Mauritius, Mexico, the Netherlands). In the view of one supervisor (Republic of North Macedonia), members, general public and sales agents should be provided with more education. However, another supervisory authority (Ireland) pointed to the problem that pension fund members tend to reveal low engagement with, and understanding of, pension information, and that increasing the amount of information provided turned out to be relatively ineffective. Regulators also mentioned the risk that recipients rely too much on presented results (Australia) or will treat them as guaranteed by the supervisor (Chile).

The third category of challenges are *the issues of standardisation*. One authority (Hong Kong, China) mentioned the need to analyse whether the methodology, assumptions and presentation format used by trustees should be standardised. Similarly, another supervisor (Mauritius) mentioned the challenge of harmonisation of guidelines, rules or regulations in this area. One authority (Iceland) indicated as a policy challenge the need to standardise the format of pension projections made by pension funds and to disclose these projections and risk scenarios on fund websites. One respondent (Lithuania) stated that, in the absence of standardisation, the challenge is for supervisors to evaluate the assumptions and prove that they are realistic, especially when the pension company uses in-house estimations of future market trends.

Finally, three other authorities found it challenging *to ensure compliance of providers of pension projections with the methodology* established by the supervisor (Mexico), requirements set up by EU IORP II Directive (Ireland) or to supervise this process due to lack of an in-house actuary in the authority (Suriname). As noticed by the Irish supervisor, the new IOPR II Directive increased the obligations on pension funds, e.g. to provide annual projections to deferred members, which – bearing in mind the number of supervised entities – will make the compliance function more challenging.

Conclusions

Projections of retirement benefits represent an important process in communications with pension scheme members as they are an important tool for informing and influencing retirement decisions by individuals.

The report provides information from 26 IOPS jurisdictions in the area of design and supervision of pension projections. In most jurisdictions surveyed, the legislation framework directly addresses, at least partially, the issue of pension projections. Most often, pension projections are provided as a regular pension communication or in a form of on-line calculators. Projections are usually deterministic, individualised and based on one scenario. Only six jurisdictions used a couple of scenarios assuming different investment strategies or history of contributing. In the majority of jurisdictions, projections show both future accumulated pension assets and pension benefits, expressed in today's terms. Most of the jurisdictions show projected benefits from single pillar. Only in a few jurisdictions are benefits forecasted on the basis of more than one pillar. Almost everywhere projections are free of charge. Whether making pension projections is mandatory depends very often on the type of pension scheme (mandatory vs voluntary) and the situation of

a recipient (i.e. whether such person is about to enter a scheme, change it or retire). Some forms of pension projections are mandatory in 16 jurisdictions and voluntary in 11 jurisdictions.

The methodology of projections and their underlying assumptions are developed by pension funds and their boards, pension supervisors or governmental institutions. In most jurisdictions, pension funds have freedom in establishing methodology and assumptions. Projections usually take into account costs of the pension scheme, approximately half of jurisdictions assume constant wages, but only five consider some sort of labour market risk (e.g. unemployment, disability).

The key variables for pension projections are the assumed rates of return (established most often by pension schemes/funds), wage growth (used in half of the surveyed jurisdictions), and – in case of annuities – life expectancy and annuity rates. Depending on jurisdiction, some macroeconomic inputs used for calculating pension projections are specified in law, set up by supervisors or other governmental bodies, or, most often, left to be decided by pension schemes and administrators. Scheme-related variables (such as age, contribution rate and level of wages, cost of pension plans or density of contributions etc.) are most often drawn from the administration database. In case of on-line pension calculators, input variables are prefilled (as default variables) and can be changed by the users.

Widespread use of on-line pension calculators by supervised entities, supervisory authorities or other governmental institutions was found in the jurisdictions surveyed. The Pension Simulator developed by the Chilean authority is an interesting case as it provides a customised and interactive projection of an expected future pension, calculated on the basis of stochastic simulation. The user is made aware of the expected pension at retirement, and the risk associated with this forecast and receives information regarding measures that can be taken to improve the forecast.

In half of the surveyed jurisdictions, the underlying assumptions and/or methodology for pension projections are disclosed to the users. Disclosure is required by law only in three jurisdictions. In approximately a quarter of jurisdictions, the law does not require supervised entities to review regularly the methodology used and assumptions for pension projections. Frequency of such reviews can be unspecified (5 jurisdictions), occur whenever a legal act changes (4 jurisdictions) or are regular (7 jurisdictions).

The uncertainty of projected results is communicated to the recipients with the use of disclaimers or, much less commonly, by showing a range of possible results.

Most of the surveyed authorities have a specific or indirect mandate to supervise issues related to pension projections. Half of them supervise the methodology and underlying assumptions of pension projections produced by supervised entities by monitoring their compliance with either references set up by pension supervisors, law or other bodies. Supervisors may use enforcement actions, such as demanding changes in methodology/assumptions or prevent the continued distribution of the projection by an appropriate enforcement action if warranted. Pension supervisors from the responding jurisdictions are in favour of at least partial standardisation of pension projections in terms of their methodology and assumptions.

Pension supervisors indicated the following challenges with regard to pension projections and their supervision:

- *Assuring quality of projections*

  There is a need for actuarial guidance and discussion on the methodology of projections. There are problems with obtaining appropriate data (e.g. mortality tables) and developing the methodology.

- *Finding proper methods for presentation of results*

  There is a need to find clear and efficient methods for communicating the results to the recipients.

Moreover, supervisors have to find ways to overcome low engagement with, and understanding of, pension information by pension fund members without increasing the amount of information already being presented. Members need to be properly educated so that they do not rely too much on presented results or treat them as guaranteed.

- *Standardisation*

   There is a need to analyse whether the methodology, assumptions and presentation format should be standardised or harmonised. Lack of standardisation when the pension company uses in-house projection methods may render supervision unrealistic.

- *Assuring compliance*

   Some authorities found it challenging to ensure compliance of pension projections providers with the methodologies established by the supervisor or legal act (e.g. IORP II Directive). This may be particularly difficult with a large number of supervised entities and the increased reporting obligations.

Issues related to forecasting and communicating future retirement benefits span across pension policymaking and supervision. The main challenges for supervisors are technical and relate to developing appropriate methodology for estimations aimed at long-term, demographic assumptions (such as longevity) and macroeconomic assumptions (such as asset returns and annuity rates). There are also important issues related to finding ways of communicating efficiently the results of projections to pension fund members. These topics will be covered in a separate paper that will be developed by IOPS/OECD. Pension fund supervisors therefore need to be able to properly access the technical side of the projections (such as methodology used and assumptions made) and market conduct of projection providers (ways they communicate the results).

Based upon the findings from the survey of supervisors, the following suggestions might be drawn:

- design of pension projections
   - the methodology used and assumptions made should be disclosed to the users to improve communication, transparency and comparability;
   - standardisation should be considered to allow comparability, better communication and supervision;
   - projections should be personalised as much as possible to provide meaningful advice;
   - presented results should be net of costs (investment and retirement products).

- supervision
   - pension supervisors should have a mandate and the capacity for supervising issues related to pension projections or have the power to ask relevant authorities to intervene;
   - pension supervisors or other relevant authorities should consider developing standardised methodology used, and assumptions made, or developing guidelines on information disclosure and presentation of results;
   - if not standardised, methodology and assumptions developed by supervised entities should be in line with prudent person rule; supervisors should be able to demand changes if needed;
   - pension supervisors or other relevant authorities should be able to ban misleading market communication practices or should promote self-organisation of the market in this area.

Annex: Legal framework

Jurisdictions where the legal system addresses pension projections

In Albania, the Law No. 10 197, dated 10.12.2009, 'On voluntary pension funds', article 8, point 6, requires that the prospectus of a pension fund provides information verified by an authorized actuary on the amounts a unit holder needs to invest on an annual basis in a pension fund to receive an adequate pension upon reaching retirement age. The explanation has to be illustrated with examples showing different age scenarios and how the age variable affects the amount that needs to be deposited as a contribution.

The Financial Market Authority (FMA) of Austria, in its Information Requirements Regulation for Pensionskassen on the content and structure of information[32] requires that pension projections be included (art. 2 para. 14) in annual PBSs sent to beneficiaries. The regulation also specifies when such projections have to be delivered and the relevant parameters that should be taken into account when calculating benefit projections. Projections must also be delivered when a member of a pension fund switches to a different investment entity (so-called investment and risk sharing group (IRG), art. 6 para. 1 no. 5) or to an occupational group insurance scheme (art. 7 para. 1 no. 4, and art. 8 para. 1 no. 4). Estimates of benefits must be calculated for the entity that receives and the entity that loses a member. The regulation stipulates (art. 2 para. 3) that such a forecast should provide an estimate as realistic as possible of the pension benefit that can be expected at the calculated pension age in line with the pension company commitment (that is based on the entitlement acquired to date and the assumption that employer and beneficiary contributions will not change). The regulation requires provision of estimates under three different interest rate scenarios.

In Chile, the law does not regulate the pension simulator created by the supervisor. However, all underlying assumptions made by this entity need to be documented.[33] There is a specific norm[34] that regulates the personalised pension projections (PPP) provided by pension fund administrators. It establishes what information should be included in the statement, different scenarios and groups (according to age) that should be informed, the specific estimation methodology for the accumulated balance at the age of retirement for each scenario, and the main parameters (mortality table, annuity and pension funds rates, beneficiaries) for the calculation of the amount of the pension. In addition, it establishes the format of the information as well as on what occasions affiliates should receive the projection. The pension managing companies can have their own pension calculators but they must follow base assumptions for real rates of return and annuity rates as used in the supervisor's simulator.

In Colombia, the legislation[35] imposes that mandatory pension projections and advice be provided by entities from both (unfunded and funded) pension regimes whenever a member changes regimes. Projections, made by pension fund managing companies, should show the future value of the retirement income under four different scenarios for density of contributions.

In the Czech Republic, the law is quite general and it is up to the pension managing companies to decide on the particular features of projections. Act No. 427/2011 Coll. on Supplementary Pension Savings and its implementing rules prescribe a set of basic principles that the pension management companies must meet

---

[32] Regulation of the Financial Market Authority (FMA) on the content and structure of information to be provided by *Pensionskassen* to beneficiaries (entitled and recipients), survivors and insured persons (Informationspflichtenverordnung Pensionskassen – PK-InfoV; Information Requirements Regulation for *Pensionskassen*). https://www.fma.gv.at/download.php?d=2777)

[33] http://www.spensiones.cl/apps/simuladorPensiones/doc/supuestos_simulador.pdf

[34] http://www.spensiones.cl/portal/compendio/596/w3-propertyvalue-3482.html

[35] External Circular No. 51 from 2016, https://www.superfinanciera.gov.co/publicacion/10085860

when providing information about expected future income. Such information must (a) not be based on or make reference to historical simulated returns, (b) be based on reasonable assumptions on the grounds of objective data, (c) be presented after accounting for the remuneration of the pension company, and (d) contain a strong warning that it is only an expected outcome but not a guarantee of future payments. The law prescribes no concrete forms of projections or methods of delivery; nevertheless, there must be a strong disclaimer stating that projections are only expected and do not represent guaranteed future payments.

In Iceland, the Pension Act 129/1997 stipulates that PBSs, showing projected lifelong annuity in monthly payments, be sent to active members and beneficiaries at least annually.

The Irish legislation requires that PBSs, containing likely value of accumulated assets and likely value of retirement income, be provided at certain times automatically to in-service members (and from 2019 for all members) and on request to other members.

In Italy, a comprehensive regulation on pension projections for members of mandatory pension funds was introduced in 2008 by the supervisor.[36] Paper-based pension projections have to be made available to members when joining and on an annual basis, together with the annual PBS. In this latter case, projections have to be personalized. Standardised assumptions of investment returns to be used in the projections were set for equities at 4% and for bonds at 2% (real) in order to reflect different expected returns as a function of the strategic asset allocation of the investment option chosen by the member. Plan-specific costs have to be deducted from gross returns in order to take account of the actual impact of costs on the net returns. A consistent set of rules was defined as well for pension calculators.

The Jamaican pension legislation does not specifically address assumptions and methodology nor does it speak about the requirement for their revision. However, regulation 12(2)[37] stipulates that the PBS must contain the projected benefits at the normal retirement age (between 60 and 65). Active members of a fund should receive a PBS within four months of the end of each plan year, whereas deferred pensioners should receive it on request. A member's benefit statement should contain a description of the assumptions used (e.g. annuity rates, interest rates, increases in salary) as well as a brief discussion of the effects of future variance of actual experience from those assumptions.[38] In addition, the pension supervisor (FSC) provides guidelines[39] to all pension plans (DB and DC) on how the projected pensions should be calculated and presented to members.

The Law on the Supplementary Voluntary Accumulation of Pensions (Article 14 Part 3) in Lithuania sets up certain principles-based requirements when providing pension projections as part of the advertising material. According to these principles, the information provided needs to be clear and not misleading, must explain how calculations are made (in terms of methodology and assumptions), as well as how to interpret the results. It must also contain a warning that projected benefits are not guaranteed by the pension fund managing company.

---

[36] COVIP Decision of 31 January 2008 (amended in 2012 and 2016). For consolidated text, see http://www.covip.it/wp-content/uploads/01_CONSOLIDATO_PULITO_Progetto_esemplicativo_con-revisioni.pdf

[37] Regulation 12(2) a) of the Pensions (Superannuation Funds and Retirement Schemes) (Governance) Regulations.

[38] The Pensions (Superannuation Funds And Retirement schemes) (Governance) Regulations, 2006 ("Governance Regulations"): First Schedule (Regulation 12) – Minimum Standard For Benefit Statement For Active Member: http://moj.gov.jm/sites/default/files/laws/Pensions%20%28Superannuation%20Funds%20and%20Retirement%20Schemes%29%20Act%20p.pdf

[39] Guidance on the Presentation and Calculation of Accrued and Projected Pensions of Active Members: http://www.fscjamaica.org/regulated-industries/content-104.html

The pension and insurance supervisors in the Republic of North Macedonia prescribe the general methodology for projections as well as assumptions used in the case of programmed withdrawals (pension supervisor, MAPAS) or annuities (insurance supervisor).[40] General guidance on pension projections is set up in Article 30 paragraph 3 of the Law on Payment of Pensions and Pension Benefits from Fully Funded Pension Insurance.[41] The listing of pension products is compulsory for mandatory fully funded pensions (second pillar) and optional for voluntary fully funded pensions (third pillar). Pension managing companies are obliged to present their offers on lifelong and/or temporary programmed withdrawals (including pension projection) to a particular pension member in the Listing Centre. The life insurance companies present their offers on pension annuities (including pension projection) to a particular pension member in the Listing Centre voluntarily. Such offers have validity of 30 days from the date of listing.

In Mauritius, the Private Pension Schemes (Disclosure) Rules 2012[42] require disclosing projected benefits in a PBS issued annually to members of DB and DC private pension schemes. However, the Rules do not describe the methodology, the assumptions, the ways to present the results to the members and the frequency of the revisions of the methodology/assumptions.

Projections made in calculators created by the Mexican pension supervisor (CONSAR) are not regulated. Personalised pension estimates made by pension fund administrators must comply with the methodology developed by CONSAR and be sent to fund members through their account statement (PBS).

In the Netherlands, every participant receives the uniform pension overview (UPO) on an annual basis. Originally, as from July 2015, the UPO does not prescribe to show projected benefits. The UPO was intended to serve as a teaser to the My Pensions Overview (MPO) website that contains more detailed information presented in a layered format. Due to the IORP II Directive,[43] the projected benefits will once again be displayed on the UPO. Early in 2018, the Netherlands implemented the Uniforme Rekenmethode (URM, uniform calculation method) which introduced a stochastic approach to projected benefits.

In Poland, the legislation relates only to projections on benefits from the mandatory unfunded pillar. There are no relevant regulations for projections of the funded (occupational or individual) pensions.

In Romania, pension law now forbids any type of pension projections made by fund administrators for marketing purposes. Such projections are viewed as potentially misleading to pension fund members. The Financial Supervisory Authority makes these projections for internal use. The methods of projection calculations are mostly regulated by secondary legislation given that the majority of these projections are needed in the calculations of the technical reserves.

Pension projections in Serbia are regulated by Article 7 of the Decision on the Advertising of Voluntary Pension Funds and Standardized Advertisement Text,[44] which stipulates that projected benefits should be

---

[40] Rulebooks on projection of pensions and the amounts of individual accounts as for programmed withdrawals (text in Macedonian); on rules and minimum standards for determining interest rates (text in Republic of North Macedonian); on rules and minimum standards for mortality tables (text in Macedonian). Rulebook for presentation offers for projected future pensions (text in Macedonian).

[41] http://mapas.mk/wbstorage/files/Zakon%20za%20isplata%20na%20penzii%20%20prevod%20doc_EN_am.pdf

[42] https://www.fscmauritius.org/media/2155/private-pension-schemes-_disclosure_-rules-2012-cc.pdf

[43] Directive (EU) 2016/2341 of the European Parliament and of the Council of 14 December 2016 on the activities and supervision of institutions for occupational retirement provision (IORPs), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L2341

[44] "RS Official Gazette", no. 23/2006, http://www.nbs.rs/internet/english/20/spf/advertising.pdf

individualised, based on the parameters specified by the fund members and take into account fees and costs borne by the members. These fees and costs must be clearly stated.

Pension projections as part of pension benefit statement are mandatory in the third pension pillar (private voluntary pension system) of Slovakia in connection with the implementation of the IORP II Directive. A new legislation regulating pension projections is laid down by act No. 650/2004 Coll on the supplementary pension scheme as amended (a pension law that regulates the third pension pillar) and by the legislative measure issued by the Ministry of Labour, Social Affairs and Family of the Slovak Republic (a secondary legislation) that came into force on 1 January 2019.

In Suriname, pension projections are mandatory by law and apply to the DB and the hybrid schemes. The board of a pension fund must present the results of projections at least once a year in a meeting with members. Boards are obliged to provide members with a statement of the likely value of retirement income. Furthermore, boards must submit an annual report to the Central Bank of Suriname, supplemented by a statement of the external accountant and an actuarial report.

In Turkey, the 'Circular Regarding Possible Savings and Repayment Tables to be used in Pension System' requires preparation of tables on projected accumulated pension savings and monthly benefits. The Pension Monitoring Centre and pension managing companies have to introduce these calculations to the participants in accordance with principles of the 'Circular on Projected Accumulation and Reimbursement Tables'. The Circular determines the content and timing of this mandatory disclosure. The 'Regulations on Individual Pension System' require that pension companies present a pension information form to fund members before their retirement.

<u>Jurisdictions where the legal system does not address pension projections</u>

In Australia, there are no requirements within the legislation to provide pension projections to members. As a result, not all providers offer pension forecasts to their members, and some providers only provide retirement estimates to certain cohorts of members (i.e. those with a certain amount of money in an account), reflecting concerns over interpretation and reaction to projections by members. Some providers are concerned that, for example, members with a low account balance might move their monies to aggressive and (potentially) inappropriate options to try and address the shortfall they have in their retirement savings, or others might completely disengage because they consider they will never have enough money to retire. Some trustees encourage particular members to call and discuss their options instead of providing a projection. However, if a pension projection is performed and presented by a pension provider, it could be construed as personal financial advice and would thus trigger a requirement to hold an Australian Financial Services (AFS) licence, which would necessitate certain disclosure requirements and other obligations for the provider. To facilitate these projections and better consumer engagement, the Australian Securities & Investments Commission (ASIC) offers relief from the licencing and disclosure requirements for retirement estimates in the form of a statement, or a calculator, as long as certain conditions are met. To fall within ASIC relief, a retirement estimate must:

- include certain mandatory content;

- be calculated taking into account all of the required variables, and using the default assumptions; and

- be given at the same time as the periodic statement and be included in, or accompany, the statement.

To be eligible for relief, financial calculators must not advertise or promote any specific financial products, and any default assumptions applied by the calculator in working out the estimate must be reasonable. If a

pension fund trustee already has an AFS licence with an authorisation to give personal financial product advice, it is free to give its members personal advice via whatever medium it chooses.[45]

In Canada, according to CAPSA's (2014) Guideline No. 8, 'Defined contribution pension plans guidelines' from 28 March (page 7),[46] 'Plan administrators should consider providing members, periodically, with an estimate or a general illustration of the accumulated value of the member's account at retirement, as well as an estimate or example of the benefit that may result from the accumulated value. Members should be informed that statements regarding projected account balances and future benefits are estimates only, and the assumptions used in the estimates should be clearly stated.' However, the responses received from Alberta, Manitoba, Ontario and Québec indicate that none of these provinces regulates pension projections. Provincial regulations of Alberta, Ontario and Québec require providing plan members with annual pension statements but they do not have to include projections. According to respondents from Alberta, the current supervisory focus is given to accrued benefits or account balances, as there is a concern about the risks associated with requiring projections.

---

[45] Regulatory Guide 229 (RG 229.18) by Australian Securities & Investments Commission (ASIC), *Superannuation forecasts*, 13 November 2014, http://download.asic.gov.au/media/2257747/rg229-published-13-november-2014.pdf

[46] https://www.capsa-acor.org/Documents/View/63

Related publications

Antolin, P. and Fuentes, O. (2012), *Communicating Pension Risk to DC Plan Members: The Chilean Case of a Pension Risk Simulator*, OECD Working Papers on Finance, Insurance and Private Pensions, No. 28.

EIOPA (2018), *Report on the Pension Benefit Statement: Guidance and Principles Based on Current Practices*, European Insurance and Occupational Pensions Authority, November.

Fuentes, O.; Lafortune, J.; Riutort, J.; Tessada, J.; and Villatoro, F. (2017). *Personalized Information as a Tool to Improve Pension Savings: Results from a Randomized Control Trial in Chile*, Documentos de Trabajo 483, Instituto de Economia. Pontificia Universidad Católica de Chile.

Rinaldi, A. and Ceccarelli, S. (2016), *Pension Projections and Risk Indicators for Pension Plan Members: Recent Experiences and Policy Issues*, unpublished manuscript.

Sane, R. and Price, W. (2018), *Simulating Pension Income Scenarios with penCalc: An Illustration for India's National Pension System*, Policy Research Working Paper 8304, the World Bank.