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Background Paper: The role of actuarial calculations and reviews in pension supervision

Sherika L.L. Ellis, Esko Kivisaari, Dariusz Stańko

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IOPS WORKING PAPERS ON EFFECTIVE PENSIONS SUPERVISION

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BACKGROUND PAPER: THE ROLE OF ACTUARIAL CALCULATIONS AND REVIEWS IN PENSION SUPERVISION

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ABSTRACT

Actuarial calculations and reviews provide information that is often viewed as very crucial for risk management and governance of pension funds. As such, among other things, pension fund managers and/or trustees customarily use actuarial calculations and reviews in making funding and investment decisions and in assessing risk exposure. Therefore, calculations and reviews play a significant role in the operation and, ordinarily, in the supervision of pension funds.

This Background Paper examines in details the role of actuarial calculations and reviews for pension supervision from the perspective of surveyed actuarial professionals (IAA) and pension supervisors (IOPS). It provides a comprehensive analysis of responses received from both institutions in the areas of: requirements placed on actuarial professionals, expectations of supervisors towards actuarial calculations and reviews, responsibilities and liabilities of actuarial professionals, fit and proper requirements by pension supervisors and the importance of actuarial calculations and reviews in pension schemes and their risk management. The synthesis of this paper is published as IOPS Working Paper No. 23.

The main finding of the paper is that actuarial calculations and reviews have a crucial role in the oversight function, especially when considering the supervision of defined benefit (DB) and hybrid pension funds. Their primary function in the pension supervision process of such funds is to ensure that the entities are complying with legal provisions on how the fund is operating, as well as in complying with requirements for funding.

The paper identifies several potential challenges that might be faced by supervisors with regard to the conduct or role of actuarial professionals. These relate to: quality of actuarial assumptions, use of technical language, inaccurate information, responsiveness by actuarial professionals, their independence, adequacy of resources, availability of timely information and observance of statutory requirements or legal changes.

Keywords: actuaries, supervision, private pensions, actuarial calculations

JEL codes: G-22, G-23, G-28

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BACKGROUND PAPER: THE ROLE OF ACTUARIAL CALCULATIONS AND REVIEWS IN PENSION SUPERVISION

1. The International Organisation of Pension Supervisors (IOPS) in collaboration with the International Actuarial Association (IAA) conducted a survey among IOPS and IAA members pertaining to the "role of actuarial calculations and reviews in pension supervision". In this regard, both organisations distributed a questionnaire covering the supervision of defined benefit (DB), defined contribution (DC) and hybrid pension schemes. The objective of the survey was to determine the importance of actuaries or other professionals preparing the actuarial calculations and reviews in the supervision of these plans as well as to determine their main functions. Additionally, the survey aimed at ascertaining the interactions between the supervisor and these professionals.

2. The main conclusions of this survey are presented in a short synthesis report published as IOPS Working Paper No. 23.

3. "Actuarial calculations and reviews" refer to calculations using actuarial mathematics or actuarial methodologies as opposed to calculations solely undertaken by (qualified) actuaries. We employ this definition because not all jurisdictions engage the services of (qualified actuaries in pension governance and supervision.

4. "Actuarial methodology" or "Actuarial mathematics" denotes the application of mathematical and statistical methods to assess risk, in this case in pensions. In the case of DB pensions, the aim is to ascertain if a pension fund will be able to meet its promised benefit payments and that the members of the fund are treated equitably.

5. This background paper serves as extension to the short synthesis paper referenced above.[1] It presents a detailed analysis of the responses[2] received from 28 respondents from the IAA and 41 respondents representing the pension supervisory authorities in IOPS member countries (see Appendix I for the list of countries). Part I presents an analysis of the IAA responses, while Part II presents an analysis of the IOPS responses.

[1] The paper benefited from valuable input from, as well as comments by, the IOPS Members.

[2] Please note that responses for the UK represent the views of its actuarial association and should not be attributed to the UK supervisory authority, i.e. The Pension Regulator (TPR).

PART I. ANALYSIS OF IAA RESPONSES TO THE IOPS/IAA QUESTIONNAIRE[3]

Introduction

6. Actuarial calculations and reviews (calculations and reviews) provide information that is often viewed as very crucial in the governance of pension schemes, but especially so in the case of defined benefit (DB) arrangements. For this reason, actuarial calculations and reviews usually play a significant role in the operation and, ordinarily, in the supervision of pension schemes.

7. The survey was sent to the members of the IAA Pensions and Employee Benefits Committee. There were 28 responses. A couple of these were practically empty, only stating that there was nothing to report.

8. As regards the types of plans that were considered, most answers (20) indicated that they were dealing with occupational plans (it is to be noted that answers are not “exclusive”, which means that the numbers never add to the total number of answers received). Only one answer was in the area of private cover.

9. Answers fell fairly evenly to voluntary and mandatory plans. Thirteen of the answers indicated voluntary pensions, while eight were in the area of mandatory ones.

10. It was clear that the emphasis was on DB plans, as 18 answers related to these systems. This can be strengthened by the fact that 12 answers were in the area of hybrids, which also probably contained quite strong DB elements. Hybrids can, however, also be thought to increase the importance of DC plans. The number of pure DC plans was ten.

I. Legislative and or prudential requirements placed on actuarial professionals

11. Usually, the actuary is appointed by the trustees or by the board of the plan. There are requirements placed on the actuary. The supervisor is informed of the choice, but the possibility of directly influencing this choice will usually be limited. In some countries (e.g. Sweden) in crisis situations, the supervisor can appoint an external actuary.

12. Fit and proper requirements are imposed on actuaries in some jurisdictions, e.g. Germany. This is not a general rule, as in many jurisdictions there are no requirements.

13. Actuaries were asked to specify what legislative or prudential requirements were placed on them in the course of undertaking actuarial calculations and reviews for the supervisor.

14. A number of respondents indicated that there was a significant degree of control of the actuary's work through legislation or regulation, e.g. Australia, Ireland, Japan, The Netherlands, South Africa, the UK and the US, with some other countries having more limited restrictions, e.g. Mexico, St Lucia, St Vincent. In a number of countries, legislation requires that the actuary be a certified member of a local

[3] This Part has been prepared by Mr Esko Kivisaari (the IAA co-ordinator of the project): Esko.Kivisaari@fkl.fi.

association, and hence meets fit and proper requirements and follows professional guidance where this applies, e.g. Germany, Pakistan, Barbados, Guyana, Trinidad & Tobago, Sweden and Switzerland.

15. Some of the examples quoted were general, e.g. "the activities of the certifying actuary are specified in Articles 126 to 140 of the Pensions Act (The Netherlands)", and "very significant requirements imposed by prudential standards, including some matters on which the actuary must report directly to the supervisor APRA (Australia)". In other cases, more detail was given, e.g. "a single funding method (unit credit) is permitted and actuarial assumptions as to discount rate and mortality are greatly limited (the US)" and "in certain cases, mortality tables and scope for interest rates are mandated by the supervisor (Mexico)".

16. Some respondents (Austria, Canada) indicated that there were no (explicit) restrictions on the actuary's work.

17. The survey also sought information on the requirements, if any, to be met by the individual who undertakes the actuarial calculations and reviews for the report to be submitted to the supervisor. In essence, the questions were:

- Does the individual have to be a qualified actuary?
- If so, does he/she have to be a member of a professional association?
- What education and continuing professional development (CPD) requirements does he/she have to fulfil?
- Are there any other special requirements?

18. In many countries, it is a requirement of national law that the individual who undertakes the actuarial calculations and reviews for the report submitted to the supervisor is an actuary, e.g. Australia, Canada, The Netherlands, Spain, Ireland, Finland, Japan, Mexico, South Africa, Switzerland and the UK; other respondents reported that it is usually the case, e.g. Germany. In most of these countries, it is also a requirement that he/she be a member of the professional association, although this is not the case in Japan, Sweden, Switzerland or the US (for the latter, depending on the type of work).

19. Most actuaries who fulfil the role do not have to have specialist pension education, although this would normally form part of the syllabus for the actuarial qualifications. However, a number of respondents referred to codes of conduct, which would not permit an actuary to undertake work for which he/she did not have sufficient experience or knowledge. Continuing professional development is mandatory in many countries for actuaries fulfilling this role, e.g. Australia, Canada, Finland, Germany, Ireland, Mexico, The Netherlands, South Africa, Switzerland, the UK and the US. In other countries, it is voluntary, e.g. Sweden, Spain and Japan. There are additional special requirements in a number of countries, usually relating to registration or approval by the supervisor, e.g. Switzerland, Sweden, Mexico and Japan, or certification by the professional association, e.g. the UK and Ireland.

20. Two countries (Austria and Pakistan) reported that the person undertaking actuarial calculations and reviews for the report to be submitted to the supervisor does not have to be an actuary.

II. Actuarial problems that supervisors want answered by actuarial calculations and reviews

21. Generally, the respondents gave the view that actuarial calculations and reviews play a fairly central role in the supervision process. Their importance seemed to have some correlation with the

maturity of the market, i.e. more mature markets had more requirements. This might, however, be due to the fact that markets that are more mature place greater emphasis on DB plans, where the role of actuaries is generally higher.

22. Actuaries reported a small number of problems being encountered by supervisors. It was mentioned that sometimes reports are delayed and sometimes different actuaries have, for example, different interpretations of methodology. In addition, sometimes the plans have quite small populations, and therefore credible assumptions are difficult to establish.

23. Supervisors want actuaries to address funding issues and generally evaluate the economic conditions of the plans. In some cases, actuaries are also expected to evaluate the governance and operational soundness of the plan.

24. Frequency of actuarial calculations and reviews varies considerably from country to country. In some countries, they are needed four times a year, in others annual or even triennial analyses are sufficient. In contrast, in some countries such valuations are not required. Probably more frequent valuations are required if the market is more mature and/or has a greater DB emphasis.

25. When asked what actuarial problems supervisors want to have answered by actuarial calculations and reviews, the responses received can be categorised into six main areas: none, funding and contributions, adequacy/funded position, calculation of benefits, data and IT and compliance. While some of these categories overlap, a summary of answers includes only those obvious combinations as reported by each country.

26. Six countries either left this question blank (Canada), answered not applicable (n/a) (Guyana, India, Mexico, Pakistan) or said this was a question for the supervisors (Cambodia).

27. Of the remaining countries, seven answered that their response covered only one category. Finland had a unique answer, stating that in their view the supervisors want actuaries to answer problems "especially related to IT and data issues". Japan and Sweden answered that their supervisors want actuarial calculations and reviews to deal with the financial position of the funds. Sweden seemed to dig a bit deeper into adequacy of assumptions and investments. Korea answered "indecency from the plan sponsor", which led us to believe they meant compliance. The Netherlands also seemed to focus on compliance. Finally, the US actuaries felt that the supervisors rely on actuaries primarily to ensure adequate minimum funding requirements.

28. Of the answers that covered more than one category, the combinations of funding and contributions and adequacy/funded position (Australia, Barbados, Trinidad & Tobago and the UK) and adequacy/funded policy and calculation of benefits (Austria, St Lucia and St Vincent) were the most common. Switzerland answered funding and contributions, adequacy/funded position and compliance, South Africa answered adequacy and compliance and Germany and Spain seemed to cover all the categories except for the IT/data category.

29. It seems that for the majority of the countries outside the seven with no answer, supervisors rely to some extent on actuarial calculations and reviews with regard to plan adequacy, funding requirements and compliance. The level of cross over between categories seemed to vary.

30. For plan design, two countries felt the actuarial calculations and reviews are the least important (1 on a scale of 5). Three countries selected 3 (somewhat important), eight countries selected 4 (important) and 13 countries felt that for plan design the actuarial calculations and reviews are very important (selected 5).

31. For valuation and funding, all countries but two felt that actuarial calculations and reviews are very important. Pakistan answered that they are the least important and South Africa answered that they are somewhat important.

32. Finally, a large majority of countries also felt that actuarial calculations and reviews are very important in funding (funding method). However, Pakistan, the US and Bangladesh thought these to be the least important. Recent law changes in the US mandate the unit credit funding method for funding and valuation calculation for non-governmental plans and non-union multi-employer plans. South Africa and Austria also felt actuarial calculations and reviews are not important in this area. Switzerland considered them somewhat important and Croatia, Sweden and The Netherlands considered them important.

33. To summarise, the majority of actuarial organisations felt that actuarial calculations and reviews are important for plan design, valuation and funding. Some important points are as follows:

- Pakistan has no pension supervision process, so none of the above points applies.
- South Africa does not work with the regulator, so their answers ranged from least important to somewhat important.
- Germany described the role of the regulator as evolutionary.
- The UK felt that the independence of supervisors and influence of politicians can be problematic.
- The US deals with three main supervisory groups: the Internal Revenue Service, the Department of Labor and the Pension Benefit Guaranty Corporation.

III. Responsibilities and liabilities of the actuarial professional

34. Usually, the actuary is responsible to the plan and its board/trustees. In some cases, actuaries also have responsibilities within the auditing process. Only in rare cases does the actuary have direct responsibility towards the supervisor.

35. Respondents were asked to describe the responsibilities and liabilities of the professional undertaking actuarial calculations and reviews towards the plan. This was interpreted in two different ways:

- For what issues does the actuary have responsibility, e.g. setting reserves, determining contributions?
- To whom is the actuary responsible, and where does liability lie if the actuary makes an error? What are the sanctions or repercussions?

36. Those interpreting the questions as relating to the areas in which the actuary had responsibility to advise, or to the issues he/she had to consider in giving this advice, included Canada (who identified reasonableness of assumption and methods, sufficiency of data testing and calculation of contributions), Switzerland (correct provisions, funding measures etc.), The Netherlands, Korea and Finland.

37. The second interpretation was favoured by Germany, Mexico, South Africa, Spain, Sweden, the US and the UK. In the UK, the actuary owes a professional duty to the trustees of the pension scheme, and the respondents referred to the code of conduct. In other countries, the responsibility may be to the plan, although in some cases the actuary may also be responsible to the sponsoring employer. In general, the

actuary is personally liable for the advice given (e.g. Spain, South Africa) and can therefore be sued in a personal capacity if the advice is alleged to fall short of the required standard. Many actuaries are employed by consulting firms who would support the actuary, or he/she would have professional indemnity insurance. If an actuary is found to have acted unprofessionally, he/she could be removed from the register of certified actuaries and/or disciplined by his/her association, e.g. Mexico.

IV. Actuarial professionals: approval and fit and proper requirements by pension supervisors

38. The starting point of the project and the questionnaire was that it dealt with the actuarial calculations and reviews undertaken not necessarily only by the qualified actuaries. It was however thought necessary to ask what possible requirements are placed on the professionals undertaking actuarial calculations and reviews. It seems that when an actuary is required, approval is based on the qualifications needed to be a full member of an actuarial body. Only in a few cases are especial pension-related requirements imposed on actuaries. Probably in half of the cases, the actuary must be formally a member of an actuarial association. In a majority of cases, actuaries must also obey continuing professional development requirements.

39. Requirements regarding the independence of the actuary differ from country to country. In some cases, it is sufficient to follow the professional code of conduct, but the content of the code was not clear from the responses to the survey. As regards, for example, ethical standards, reference is usually made to the professional code. Responsibility is mostly borne by individuals, but in some countries a consultancy can bear responsibility.

40. The data clearly indicate that in most cases supervisory authorities do not directly approve actuarial professionals. In answers indicating approval, it is sometimes slightly unclear whether possible approval is specific to a particular fund or supervised institution, or whether it is a question of general approval to act as a responsible actuary in any supervised pension institution. Of the 25 answers in this area, 21 clearly indicated that the actuary is not directly approved by the supervisor: Australia, Austria, Barbados, Bhutan, Cambodia, Canada, Croatia, Finland, Germany, Guyana, India, Japan, The Netherlands, Pakistan, Spain, St Lucia, St Vincent, Sweden, Trinidad & Tobago, the UK and the US.

41. In Korea and Mexico, the supervisor approves the appointment of the actuary. In South Africa, valuators must be approved and registered as a DB, DC or hybrid valuator. In Switzerland, approval is by the Federal Regulatory Commission.

42. In many countries, the supervisor relies on the actuarial association to guarantee the qualification of the actuary. This is the case at least in Australia, Spain, St Lucia, St Vincent, Trinidad & Tobago and the UK. In addition to this, in many countries it is stated that the actuary must fulfil legislative requirements. In some cases, this means relying on an actuarial association. In others (such as Finland), the qualification process is managed by the regulator or supervisor. Usually, in these cases, the pension fund nominates the actuary, and the supervisor does not need to explicitly act if the actuary is a qualified actuary and fulfils fit and proper requirements.

43. In some cases, the pension supervisor has the power to remove the actuary. In The Netherlands, the supervisor can make objections, which can result in the professional being barred. In Germany, the supervisor has the right to veto if the actuary is not fit and proper. It seems, however, that usually the process is indirect: if a person is subject to a disciplinary process in the actuarial association, then he/she can lose the right to continue work for a pension fund. In Canada, additionally, the supervisor can directly ask the professional association to investigate whether an actuary has followed professional standards.

44. While direct approval is an exception, there are cases where the pension fund must notify the supervisor of the appointment (or removal) of an actuary. This is the case in Croatia, Finland, Japan and South Africa.

45. In some cases, the supervisor can appoint an actuary for the pension fund. This is the case at least in Sweden, where in crisis situations the supervisor can appoint an external actuary.

46. Additionally, it is noted that at least in the US there is a different approach to governmental plans or plans not intended to be tax-qualified.

47. Fit and proper requirements might be classified into two areas, i.e. general requirements and requirements referring to professional qualifications. General requirements include issues such as a criminal record check and any conflict of interest. Professional qualifications refer, for example, to fulfilling a certain educational standard and to obeying certain rules for continuing professional development.

48. As regards the general requirements, the questionnaire had a question on independence of the actuary. There seem to be both explicit and implicit requirements, but also cases where there are no requirements. Independence is explicitly required in Bangladesh, Canada, Finland, The Netherlands, Spain, Switzerland and the UK. Implicitly, independence is required (included in the professional code of conduct) in Australia, Barbados, Guyana, St Lucia and St Vincent. Independence is not required in Austria, Cambodia, Croatia, Germany, Japan, Korea, Mexico (it should, however, be disclosed in the report), Pakistan, South Africa, Sweden, Trinidad & Tobago and the US (it is only required if the actuary is a member of a professional association subject to a code of conduct).

49. For most countries, it is important to follow ethical standards. Only Austria, Bangladesh and Korea report that there is no requirement to do so. In the US, depending on the type of work, actuaries are either required by legislation to obey standards or they have to comply with the code of conduct by being members of an actuarial professional organisation.

50. In Australia, it is stated that the Australian Prudential Regulation Authority (APRA) imposes significant prudential obligations on trustees of funds, including a requirement that the trustees satisfy themselves that the actuary meets fit and proper requirements. Without explicit requirements, the supervisor in Austria has the right to prohibit someone’s nomination if the nominated person is not capable of undertaking the actuarial calculations and reviews.

V. Importance of actuarial calculations and reviews in pension schemes

51. It seems that all countries – even those that do not have a fully developed pension market – rely heavily on actuarial valuations in pension supervision. This is especially true with respect to DB and hybrid plans. Actuarial valuations usually deal with technical provisions and the funding of the plan.

52. Generally problems between the supervisor and the person undertaking the actuarial valuations are in the areas of appropriateness of assumptions, changes in calculation techniques, timeliness of responses, judgments on accounting policies and whether they are prudent enough, judgments on investment policies and effective implementation of investments obeying the prudent person rule and adequateness of plan funding (and whether employer/sponsor is able to manage pension scheme risks). Sweden reports that assumptions regarding mortality are difficult – what assumptions should be used for relatively small populations – as are assumptions in the current low yield environment.

53. There is noticeable variance with respect to the frequency of valuations. Also any correlation between frequency and situation cannot be found. It might be that countries with relatively larger pension funds, operating in a way closely resembling insurance companies, have to report more frequently. Generally, full actuarial valuations must be performed every one to three years. It might of course be that a question was not specific enough: some respondents might have thought that a question referred only to a full actuarial valuation, whereas others might have thought it referred to smaller, more frequent, valuations.

54. Most of the value to the supervisor from actuarial valuations and reviews seems to come in the form of reassuring the supervisor that a fund is financially sound and properly run. Of the more developed pension markets, only South Africa and Austria failed to place these at the top of the list. Also, reliability of assumptions ranked high, although having a slightly lower rank than financial soundness. Reliance on actuarial expertise when checking compliance with legislation was again understood to be important, but it was again slightly less important than the previous two issues. In relation to the solvency assessment, the attitudes were fairly mixed – many countries saw this as of no importance for actuarial valuations, while others thought this is an important area. This might result from the fact that the solvency regimes are very different from country to country.

55. Within supervisors, actuaries are thought to play a role in three areas: actually performing supervision and checking results, collecting overall information from the sector and participating in drafting new regulation. In some cases, actuaries have fairly senior positions within the supervisory authorities whereas in others there are no actuaries employed by the supervisor.

56. In actual supervision, actuaries review assumptions and methods and review conformity of contributions recommended by the valuation actuary. They review actuarial reports of the fund actuary and check general compliance with the law.

57. In the collection of information, actuaries perform valuations and report to the supervisor and the government. Actuaries also contribute in setting strategy and policy on pension oversight, and draft regulations on plan design and funding.

58. In reporting, some countries state that actuaries do not report directly to the supervisor but instead actuaries report to the fund and the fund is responsible for the reporting. When reporting is expected, from either the actuary or the fund, there are requirements for reports on valuation, technical provisions, capital adequacy and solvency margins. In some cases, there are requirements for intermediate reporting upon special request concerning, for example, stress tests, forecasts. In the UK, there are requirements for detailed reporting of regular actuarial valuations, including detailed actuarial assumptions, statement of funding principles and statement of investment principles and actuarial certification of adequacy of the funding plan.

59. In many but not all countries, there are specific tasks in cases of underfunding. While in Mexico there are no specific tasks (as there are no mandatory minimum funding levels), in many countries actuarial valuations are required in order to plan for the recovery of the fund. At least in Switzerland there are additional requirements in the case of underfunding, and the measures decided by the pension fund must comply with legal requirements and the supervisor must be informed if the fund has not taken sufficient measures to restore financial equilibrium. In Bhutan, an underfunded plan is advised to transform into a DC plan.

60. There seems to be some specific tasks for special situations such as mergers and liquidation of plans. In Germany and the UK, reporting is needed if an event is considered significant. In The Netherlands, the actuary checks the balanced interests of all members of the fund. Multi-employer plans, in countries where they exist, have some special provisions. There seem to be very limited actuarial models

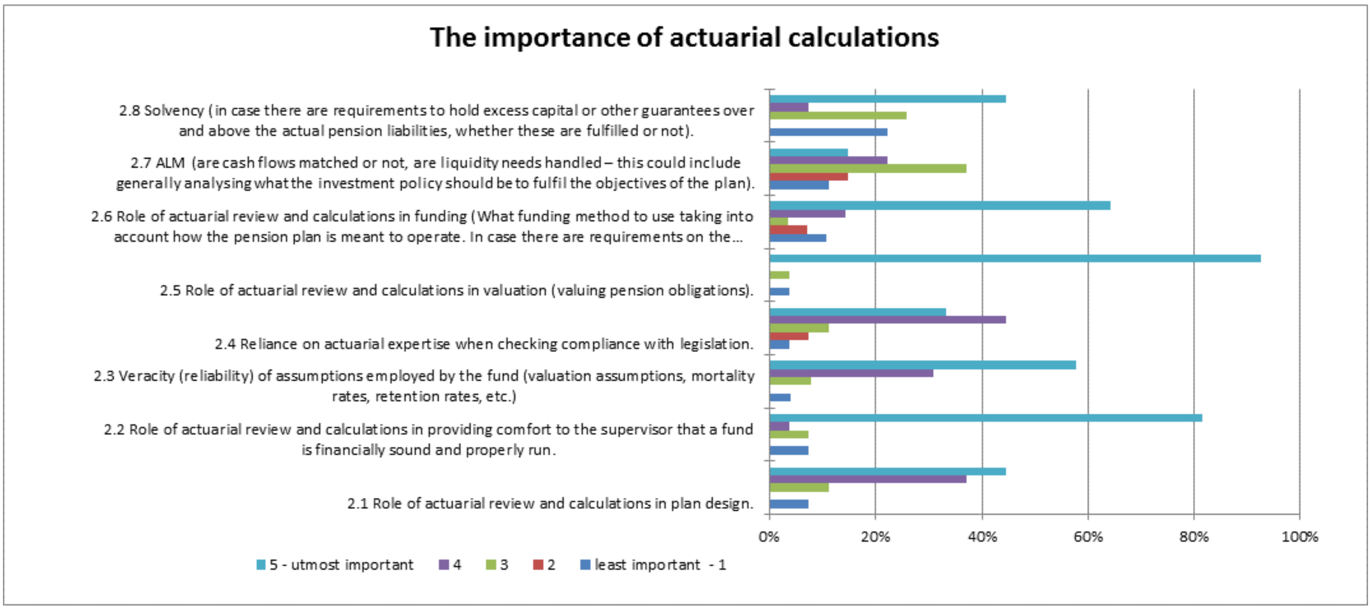
used specifically for supervision purposes. Sweden reports that the introduction of European Solvency 2 might change many aspects of the process.

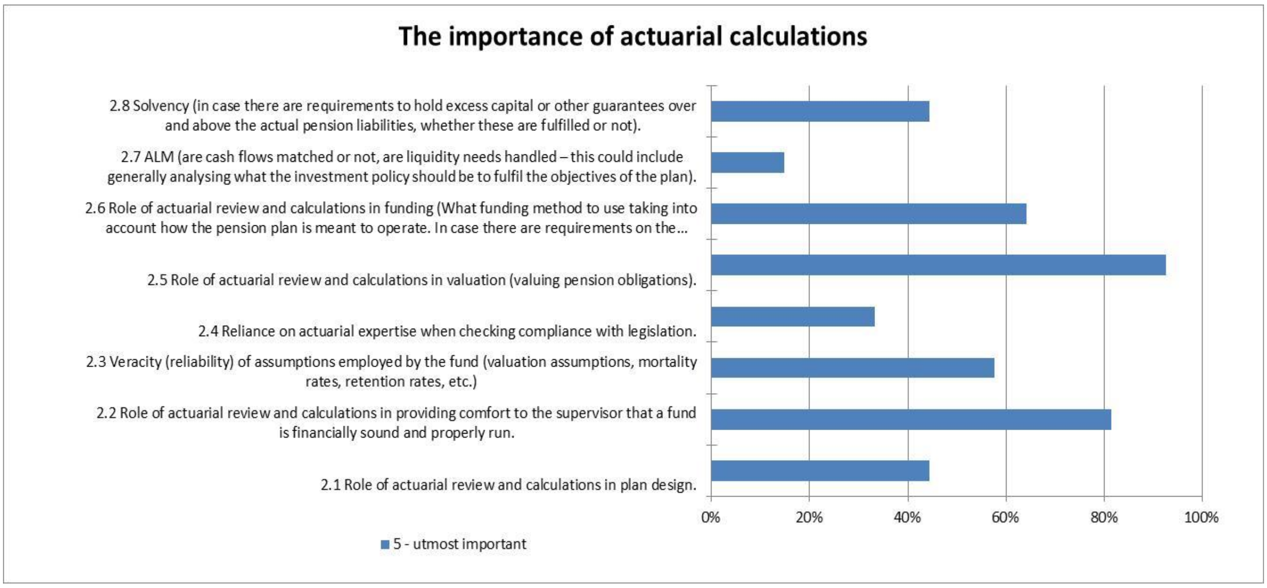
61. There seems to be a limited role for actuarial valuations in the auditing process. Mexico, however, states that the actuarial role is important, especially for larger entities. The Netherlands says actuaries are needed to certify the financial position of the fund.

62. Only in few cases is the actuary directly responsible to the supervisor. Usually the actuary is only responsible to the fund. In the UK, the actuary is responsible, for example, for statutory reporting and compliance with regulations.

63. Attitudes on the importance of actuarial calculations and reviews for different areas are shown in the following two graphs. It certainly needs to be understood that there is no possibility of a scientific basis for the numerical values of each possible answer, so the results are in no way exact, but only indicate the general feelings.

Figure 1. The importance of actuarial calculations and reviews





64. Actuarial calculations and reviews seem to play a central role in plan design and in providing reassurance to the supervisor of the financial soundness of a fund and the plausibility of assumptions employed. In some countries, there is less need for reassurance, which might be the case in less developed markets and/or markets where the emphasis is more on DC funds. In the area of checking compliance with legislation, the role of actuaries has greater significance.

65. As regards additional tasks, there are only limited requirements. Additional requirements seem to be linked to situations where occupational benefits substitute for a public pension, or in cases where multi-employer plans exist.

66. Concerning actuarial models, there is huge variation, from exactly specified models to no requirements at all. More analysis would be required to see what shared characteristics are behind certain requirements.

VI. Importance of actuarial calculations and reviews in risk management

67. Risk management is a discipline that has already become of significance in financial institutions. The IAA has stressed its importance in its document[4] addressing the issue with respect to pension funds. It is noted (Australia) that risk management is an area in which many actuaries are working, but the market (and the regulator) does not perceive this to be essentially actuarial. Spain also notes that actuarial review is important for verifying that the plan has no problems and is being run in accordance with plan rules.

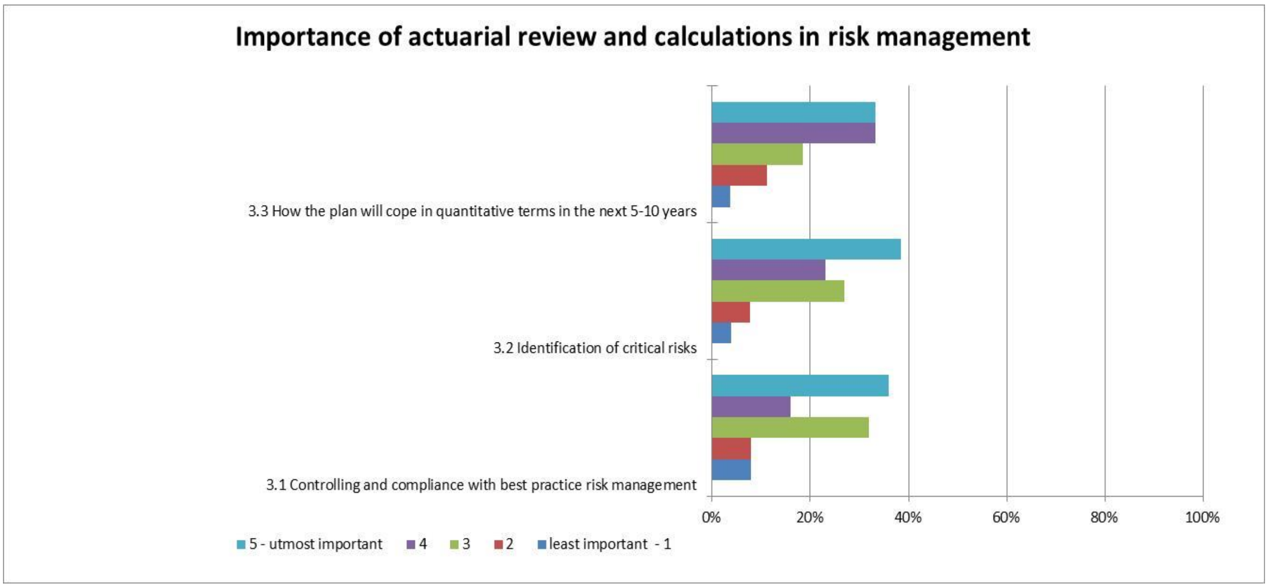
68. Responses to the role of actuarial valuations in risk management gave a somewhat mixed view of the situation. While the answers were concentrated to some extent on the significance of risk management, it was still clear that many think the area to be not that important. When talking of controlling and managing compliance with best practice risk management, 13 respondents gave importance to actuarial valuations (4 or 5), six answers were fairly indifferent (3) and four answers saw only a limited role for risk management. In the identification of critical risks, again 14 respondents gave quite strong importance (South Africa only for DB, for DC/hybrid indifferent), six were indifferent and three saw only limited

[4] Note on Enterprise Risk Management for Pensions, IAA February 2011, http://www.actuaries.org/LIBRARY/Papers/Note_ERM_Pensions_EN.pdf

importance. For coping with requirements over the next five to ten years, 15 respondents saw stronger importance (South Africa in DB and hybrid), four were indifferent and four saw limited importance.

69. In the area of risk management for pension plans, the few comments received indicated that neither the regulators nor the market recognise the value actuaries can provide in the area of risk management. That being said, for the three questions asked regarding the importance of actuarial calculations and reviews in risk management (in controlling and managing compliance, identifying critical risks and the ability of the plan to cope in qualitative terms over the next five to ten years), over 80% of the countries felt actuarial calculations and reviews are at least somewhat important. Over one-third felt them to be very important. Pakistan, Japan, Trinidad & Tobago are the four countries that felt actuarial valuation and calculations are not important for risk management in all three areas.

Figure 2. Importance of actuarial calculations and reviews in risk management



VII. Conclusions

70. Most of the value to the supervisor from actuarial valuations and reviews seems to come in the form of reassuring the supervisor that a fund is financially sound and properly run. Reliance on actuarial expertise when checking compliance with legislation was also understood to be important. In relation to solvency assessments, the attitudes were fairly mixed – many countries saw no importance for actuarial valuations in the area, while some thought this is an important area.

71. Problems in the relationship between supervisors and the professionals undertaking actuarial valuations and reviews seem to be more practical than fundamental. Generally problems between the supervisor and the professional undertaking actuarial valuations are in the areas of appropriateness of assumptions, changes in calculation techniques, timeliness of responses, judgments on accounting policies and whether they are prudent enough, judgments on investment policies and effective implementation of investments obeying the prudent person rule and adequateness of plan funding, and whether employer/sponsor is able to manage pension scheme risks.

72. It seems also that the role of actuaries in risk management is generally understood to be less important for pension funds than is the case for enterprises generally. It is then natural that actuarial valuations and reviews play only a limited role in this area.

PART II. ANALYSIS OF IOPS RESPONSES TO THE IOPS/IAA QUESTIONNAIRE

Introduction

73. The general message coming from IOPS respondents[5] suggests that actuarial calculations and reviews are widely used in members' supervision process, but more extensively in the supervision of DB and hybrid pension schemes. In DC schemes, either current industry practice provides little need for the services of actuarial professionals[6] or, when their services are engaged, supervisors specifically do not utilise actuarial calculations or reviews in the supervision process. This was the view shared by supervisors from six countries – Albania, Kosovo, Maldives, Poland, Slovakia and Thailand, where the pension industry is mainly comprised of DC arrangements. Moreover, the pension industry is at a nascent stage in a few of these countries, so the actuarial field is still developing. This is not to say that calculations and reviews are not useful in the supervision of DC schemes. In fact, two countries – Armenia and Chile – reported using actuarial calculations and reviews for different reasons (discussed in the next paragraph) in the supervision process for DC schemes. Notwithstanding, the data largely suggest that within the countries that primarily operate DC schemes, actuarial professionals are not heavily utilised.

74. The countries that use the calculations and reviews in DC schemes are also countries which do not mandate supervised funds to appoint actuarial professionals. Rather, the supervisors employ them. As gleaned from the two cases of Armenia and Chile, neither the supervisory actuarial professional nor the calculations and reviews in the supervised DC pension funds has a common function. For example, in Armenia, management companies that operate DC funds do not utilise actuarial professionals. However, the actuarial professional employed by the supervisory authority examines the management companies' calculations methodology on an *ad hoc* basis and uses the calculations and reviews to determine the adequacy of the fund for expected future pay-outs. In the Chilean case, the supervisor constructs its own mortality tables for calculating pension benefits and to ensure the suitability of annuity products. In contrast with the application in Armenia, actuarial calculations undertaken by the pension funds in Chile have no specific reference to, and are not necessarily used in, the supervisory process.

75. The benefits that actuarial calculations and reviews provide to pension supervisors that make full use of the calculations and reviews – supervisors of DB and hybrid funds – are serving as a valuable tool in monitoring pension funds' compliance with applicable legislation, as well as in determining and managing risks to beneficiaries of the supervised pension funds. To the extent that the pension supervisory process relies on these calculations and reviews, pension supervisors expect actuarial professionals to produce sound calculations and reviews supported by relevant assumptions and reasonable projections. Another common thread in the pension supervision process across jurisdictions is the value of the calculations and reviews in determining the adequacy of a fund in meeting its current and forthcoming obligations. Consequently, the calculations and reviews play a critical role in the supervisory decision-making process

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[5] A total of 41 jurisdictions responded to the IOPS. However, the summary relates to 39 completed questionnaires. One jurisdiction noted that information gathered was not sufficient to complete the questionnaire. Another provided normative responses, and since we are interested in finding out current practice, unfortunately, we could not include the information provided in this questionnaire. While a third provided an explanatory note and did not complete a questionnaire, we used the information provided in the note within our summary as it provides insight into industry practices.

[6] The term "actuarial professional" as opposed to "actuary" is utilised throughout this part of the document to ensure the use of neutral terminology since some countries do not specifically require actuaries to perform the calculations and reviews.

and in putting the supervisor in an informed position to make targeted, well-reasoned decisions in their assessment of pension funds.

Actuarial calculations and reviews in the pension supervision process

76. For pension supervisors, the overriding function of the actuarial calculations and reviews in DB and hybrid funds is in establishing the funds' financial position (to ensure that member and beneficiaries' interests are protected). The key takeaway from the supervisors' responses is that actuarial calculations and reviews are used as a yardstick for determining the financial health of a pension fund.

77. South Africa, Switzerland and Zambia are bound by statute to rely on actuarial calculations and reviews when verifying the financial soundness of a pension fund, as well as when ascertaining the level and or adequacy of fund assets in meeting [minimum] current and future obligations. Australia, Colombia, Hong Kong (China), Indonesia, Ireland, Kenya and Malawi – although not bound by statute – have a similar basis for their reliance on actuarial reports. To the Swiss supervisor, the type of information provided by the actuarial calculations and reviews gives some indication of the long-term financial stability of the pension fund. The expectations of the pension supervisors in Ireland and in Malawi are congruent with that of the Swiss supervisor. That is, they expect to have information on aspects such as the statutory solvency ratio and recovery plan details, which give an idea of the financial health of the pension plan. In Malawi, the focus of the actuarial professional's role included assessing whether or not the pension funds meet solvency requirements, assessing the conditions that would have an adverse impact on the asset/liability match and evaluating the appropriateness of investments to meet the objectives of the pension fund.

78. Further to the above, Switzerland, Malawi and Hong Kong (China) all expect actuarial professionals to provide recommendations that ensure sustainability and to provide recommendations about employers' contribution requirements. In Switzerland, there is an additional role for the actuarial professional where plans are in deficit; in Hong Kong (China), in the event that the actuarial professional issues a qualified certificate, he/she will also have to offer reasons for any shortfalls to the supervisor.

79. The second most popular purpose of the actuarial calculations and reviews as deduced from the survey is a related, if not contingent, function: the provisions to be made for long-term liabilities. This function was emphasised by four countries: Romania, Egypt, Ireland and Papua New Guinea (PNG). With respect to hybrid funds, the Romanian supervisory authority uses the actuarial calculations and reviews to determine an adequate value for the technical provisions of the pension fund during the accumulation phase. The key role of the professional in Egypt, Hong Kong (China), Ireland and PNG was more or less to produce estimates, make recommendations and report on information regarding the future costs of providing benefits (alternatively, contribution requirements) in accordance with scheme rules and regulations and to provide advice on the various ways in which these liabilities may be financed. An additional requirement in Ireland was for the actuarial professional to provide information on the liabilities of the fund.

80. Brazil depends heavily on the results of the actuarial calculations and reviews for risk assessment. In Brazil, annual reports are submitted to the supervisor showing key assumptions, technical provisions and the financial condition of a pension fund up to the report date. However, the Brazilian supervisor treats DB plans as slightly distinct from hybrid plans. The supervisor relies on the actuarial report in assessing plan riskiness through predefined criteria based on the probability and impact of actuarial risks, with the worst cases having specific actions. For hybrid plans, they look only for data consistency. Like Brazil, Portugal undertakes risk-based supervision and uses the actuarial calculations and reviews to complement their processes. The outputs from an actuarial professional are inputs into internal tools developed by the supervisor to analyse different characteristics of the portfolio of assets and liabilities

held by a fund. Hence, information from actuarial calculations and reviews is used as a base for supervision.

81. The Costa Rican supervisor reviews valuations and calculations of current monthly benefits produced by actuarial professionals. With some similarity, in The Netherlands the reports produced by actuarial professionals are used for plausibility checks and sensitivity analyses as they relate to valuation/reserving basis and benchmarking. In Zambia, the supervisor employs the use of the actuarial calculations and reviews to ascertain transfer values, termination values and viability of the scheme parametric. However, in Malawi, there is a greater burden on the actuarial professionals as they are responsible for: (i) assessing the integrity of data used for valuations and in the preparation of financial statements and (ii) determining compliance with fund rules and legislation. Similar to Malawi, the professionals in Switzerland are also involved in the latter role.

I. Legislative and prudential requirements placed on actuarial professionals

I.1. General requirements

82. Eleven supervisors were non-specific about the type of pension scheme their answers related to, despite acknowledging, in some instances, the existence of all three categories. It seems that in these cases legislative requirements are not discriminatory about the fund type. As such, the legal provisions held, irrespective of whether the fund was DB, DC or hybrid. The most popular legislative requirement noted among a subset of these respondents – Austria, Belgium, Colombia, Jamaica, Portugal, South Africa and Spain – stipulates that the actuarial professional[7] should have the academic background and professional experience (to varying degrees) to undertake the role. All of these countries, except Colombia, require educational qualifications that are within the actuarial field. In addition to the academic and professional experience requirement, Belgium has language and nationality requirements.

83. The second most common feature in this group existed in four countries: Brazil, Jamaica, Kenya and Trinidad & Tobago. In these countries, statute requires that actuarial professionals are members of a professional body and/or that they abide by the standards issued by these bodies. In Brazil, the actuarial professional that will certify a valuation report to be submitted to the supervisor must be a member of his/her national actuarial association. In the case of the Jamaican legislation, the actuarial professional is required to be in good standing with the national association as well as the international governing body. He/she must also apply generally accepted actuarial principles when undertaking his/her work. Kenya also has the latter provision in their legislation, but the referenced principles are those issued by the international actuarial association. In Trinidad & Tobago, the actuarial professional has to meet the regional standard for actuarial practice, and is subject to the requirements of three pieces of national legislation.

84. Another key statutory provision identified which is common in three of the countries – Belgium, Jamaica, Portugal – is that the actuarial professional is precluded from assuming certain (specified) positions that are determined to be a potential compromise to his/her independence or, put another way, that may conflict with his/her duties to the pension fund. However, there are legislative provisions in Jamaica that make exceptions to this rule – the supervisor possesses the flexibility to grant permission to an actuarial professional to hold any of these (specified) positions. Spain also has a requirement regarding independence of the actuarial professional. However, in this particular case, both the pension fund Managing Entity and its Commission of Control engage the services of actuarial professionals, with each having distinct responsibilities. For the Managing Entity, the actuarial professional is required to conduct routine actuarial functions, while the Commission of Control engages the services of the actuarial

[7] In South Africa, this person is termed a valuator.

professional to conduct actuarial reviews (audits) on its behalf. As such, the supervisor requires complete independence between the individual appointed by the Commission of Control and the one employed by the Managing Entity.

85. Less common answers surround the generic duties of the actuarial professional and the reporting requirements. For example, the law in Zambia provides guidance on the functions that the actuarial professional [should] engage(s) in, including the responsibility to make recommendations on the actions required of the scheme. It also places the requirement on the actuary to report issues to the supervisor. The Jamaican legislation also places reporting requirements on the actuarial professional. Specifically, there are provisions which mandate the actuarial professional to report material errors, omissions and inconsistencies; to generally notify (the supervisor) of adverse situations that could impact on the fund; and to whistle-blow in cases of legislative breach. The Tanzanian supervisor issues guidance on what is expected of the professionals in the performance of their functions.

86. There were also requirements pertaining to technical rules enumerated in law. Both the Brazilian and Egyptian legislation prescribe a maximum discount rate to be used in calculations and reviews. Brazil, however, has a further requirement with a legislative provision regarding the minimum mortality tables that may be used in the calculations. Kenya's legislative framework stipulates that assumptions should be based on long-term trends and requires the actuarial professional to value *all* benefits provided for in the scheme rules.

87. Still, there are countries, whose supervisory framework has neither legislative nor prudential requirements for these professionals. These include Iceland and Namibia. However, the Namibian authority approves the appointments of valuators, which is also a measure of control over the actuarial professionals employed by pension funds.

I.2. Requirements for DB and hybrid plans

88. There is convergence as well as divergence among countries with respect to requirements, statutory or otherwise, placed on actuarial professionals engaged by DB and hybrid schemes. Eleven supervisors specifically indicated their answers were in relation to the supervision of such schemes. Although some of these responses relate solely to DB schemes (seven jurisdictions), the responses in this section were integrated because the survey results demonstrate that most supervisors that had both of these schemes operating in their industry treat them in relatively the same way, that is the supervisory approaches were not dissimilar.

89. Responses from three supervisors – Australia, Egypt and Hong Kong (China) – signified that with respect to DB and/or hybrid pension funds, legislation prescribes the minimum information that should be contained in actuarial reports and/or the format completed reports should take. As to the minimum information, this primarily should include financial details that give an indication of the health and long-term sustainability of the pension fund. Specifically, some examples of details that the actuarial professionals were mandated to incorporate into their reports relate to the liquidity and/or solvency of the pension fund, which sometimes take the form of a statement, the results of a sensitivity analysis and the actuarial balances before and after amendments.

90. Legislation in various countries provides guidance on the preparation of the actuarial reports for DB and hybrid schemes in terms of the technical rules for calculations and reviews and the status of the professional executing the document. Egyptian laws include provisions on maximum rates of return on investment, as well as the administrative expenses used in the calculations and reviews. Regulations existing in Costa Rica enumerate rules for (the preparation of) valuations and the use of official mortality tables. Although legislation in Italy and Ireland is similar with respect to the status of the professionals

carrying out actuarial functions, the duties enumerated were different in some respects. In Italy, a "certified actuary" is required to calculate technical reserves in accordance with principles relating to the evaluation method as well as to the demographic, economic and financial assumptions, while in Ireland, only "recognised individuals" may certify the report of prescribed statutory calculations. The Portuguese legislative framework mandates funds and fund management entities to appoint an actuary for each plan, and, similar to Ireland, the framework requires that this person must certify the actuarial report. This report contains calculations, methods, assumptions, funding levels and an opinion on compliance with rules and asset liability adequacy. In addition to the duties to the fund, the actuarial professionals in this jurisdiction are also expected to report to the supervisor on non-compliance with laws as well as on situations that may adversely affect the pension fund. In less egregious cases (example, identifying material errors and inconsistencies), the actuary should report to the fund management company, with recommendations for the resolution of any issues that have arisen.

91. In addition to the aforementioned requirements, other legal frameworks require the actuarial professional to match pension fund assets against current and future obligations, as well as to be prescriptive, such as recommending contribution rates if, for example, the fund is not in a satisfactory financial position. In more particular cases, requirements are imposed on actuarial professionals engaged in auditing to offer an opinion on the financial condition as well as on the adequacy of the fund in meeting its current and future obligations. While The Netherlands impose a duty on the actuarial auditor to provide an opinion, the role is not limited to this function, as legislation also imposes an obligation on the auditor to provide statutory information and to notify the supervisory authority. These requirements are further complemented by the expectation that actuarial professionals adhere to the code and standards issued by their professional bodies.

92. With respect to the supervision of DB and hybrid schemes, Australia shares attributes with the countries for which the three pension fund arrangements are supervised in much the same way. Education and experience play a role in the expected standards for actuarial professionals. Legal standards in Australia require that an actuary possesses formal qualifications and at least five years' professional experience in providing actuarial services to pension funds. Actuarial professionals must also be a fellow or accredited member of the national professional body. Another key feature that Australia shares with those countries is the prohibition on actuarial professionals from holding certain positions; that is, the professional should not accept or hold the position of CEO or Director of a pension fund and related corporate body, and must not be the auditor, or a partner of the auditor, of the fund.

93. Currently, in countries such as Indonesia, Papua New Guinea (PNG) and Malawi,[8] there are no legislative or prudential requirements placed on the actuarial professional employed to DB schemes, hybrid schemes or both, as the case may be. The professional body in Indonesia sets the standards of professional practice that the actuarial professionals should adhere to.[9].The only legislative requirement in Switzerland relates to the approval of actuarial professionals.

I.3. Requirements for DC plans

94. For DC schemes, the most common legislative and/or prudential requirement surrounded technical provisions. In Hong Kong (China), legislation stipulates the framework to be used for making provisions (reserves) for investment guarantees. In the Dominican Republic, professionals are required to

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[8] Malawi intends to develop requirements to include screening actuarial professionals prior to their appointment by a pension fund.

[9] The Indonesian supervisor noted that actuarial professionals rarely comply with the standards issued by the professional body. As such, the authority is in the process of assigning this function to a unit within the supervisory authority.

abide by legislative provisions relating to mortality tables, technical interest rates and formulas. Italy's statute specifies that a certified actuary should calculate technical reserves, which must be in accordance with methodological principles relating to evaluation and to demographic, economic and financial assumptions. This requirement was restricted to DC plans paying out annuities directly. Although regulations issued in Israel do not relate specifically to technical methods of calculation, some legislative provisions exist.

95. The legislation in FYR Macedonia is comparable to Italy in the sense that it requires that professionals be certified (with an active license). However, this jurisdiction's legislation also stipulates that the professional must not be a related party to the pension company, must have previous experience and must provide recommendations from a minimum of two persons (who meet certain criteria) regarding the quality of his/her professional engagement in the actuarial profession.

96. In the Czech Republic, there are no legislative or prudential requirements in relation to DC schemes.

II. What problems do supervisors want answered by actuarial calculations and reviews?

97. In a general sense, the type of information that the pension supervisor required was often a reflection of legislative requirements (already discussed) or the type(s) of pension fund(s) supervised by the authority.

II.1. General issues

98. This section summarises the responses of supervisors who do not have different standards for different fund types. The supervisors gave diverse responses regarding their expectations of the type of information that actuarial calculations and reviews should provide. This was often unique to a particular jurisdiction. However, a common thread among supervisors is the expectation that the calculations and reviews would provide answers regarding the longevity of the fund and how the interests of members and beneficiaries were, or could be further, protected. These expectations were a function of the statute within the jurisdictions. However, there were some jurisdictions that did not rely on any element of calculations and reviews.

99. With respect to technical details, the Austrian pension supervisor expected to obtain balanced technical results across all beneficiaries over time, while the Belgian supervisor expected that the actuary would provide an explanation where there were deviations from the technical bases. In addition, the Belgian authority showed interest in whether or not these deviations would necessitate a change in the financing plan. Experts are expected to provide an opinion on the compatibility of a financing plan with the evolution of the technical provisions of a fund. This is believed to be more useful than a mere description of the financing plan. Further, this supervisory authority is of the view that actuarial calculations and reviews should provide an opinion on the fund's ability to meet its long-term obligations, considering its financing plan and technical provisions as well as the relevant risks, with recommendations. The requirement in Tanzania is not significantly dissimilar to the requirements from Belgium as the pension authority in Tanzania is interested in information linked to the sustainability of the fund. However, for the Brazilian pension supervisor, plan costs, solvency and any trade-offs to be made between contribution and future plan benefits were important factors. The Trinidad & Tobago supervisor is also interested in seeing more detailed sensitivity and solvency analyses, and justification from the actuarial expert regarding the assumptions used in the calculations and reviews.

100. Further, the Trinidad & Tobago supervisory authority would like the actuarial professional to provide a long-term recovery plan for amortisation where a funding deficit exists as well as to indicate the

appropriateness of the Statement of Investment Policy (including asset allocation) based on a plan's liability, as appropriate. The South African authority had similar expectations, as they would like to receive recovery plans for restoring pension funds that are not financially sound. Zambia expected the actuarial professional to provide information that would indicate the suitability of the investments made. In addition, in Zambia, the supervisor sees a need for the actuarial professional to include projections that could assist in ascertaining contribution rates prior to scheme registration as well as information regarding the financial viability of the fund, including necessary (recommended) adjustments to pension fund parametrics to ensure its sustainability. In South Africa, the interest is in obtaining information that would reveal or confirm that the fund and any amendments are financially sound. Tanzania's interest also lies in information relating to the options for benefit increases as well as the impact of demographic dynamics on the pension system.

101. The main answers that Spain required from the review concerned when plans are in deficit. They are interested in knowing the origin of the deficit, if the assumptions are correct and are relevant to the market, and if corrective measures for deficit financing are appropriate.

102. Namibia is interested in obtaining calculations for conversion of funds from DB to DC, confirmation as to whether or not member transfers are reasonable between funds and a comment on targeted replacement ratios in both DB and DC funds. For South Africa, other expectations are for the actuarial professional to provide confirmation that transfers of members from pension schemes meet the statutory requirements.

103. Iceland does not review the results of the calculations done by the actuarial professional.

II.2. DB and hybrid plans

104. With respect to the DB and hybrid plans, pension supervisors generally rely on the actuarial report for the type of information illustrated in Table 1. The most principal expectation shared among six countries (Australia, Costa Rica, Iceland, Jamaica, Kenya and Papua New Guinea) is that actuarial reports would include the contributions required for funding benefits that accrued in the pension fund. The table illustrates the range of answers in order of popularity. Sometimes, the supervisors' expectation was in in accord with the legislative requirements of the particular jurisdiction. For example, in Iceland, the fund is expected to maintain a statutorily prescribed solvency ratio, and, as a result, the supervisor expected that the actuarial report would provide this calculation. The detailed responses are outlined in the table.

Table 1. Main problems to be answered by actuarial reviews and the countries that want the answers

Expectations	Jurisdictions
A calculation of the cost of funding benefits, the long-term funding target or the contributions necessary and that it is properly determined and is at the level needed to meet future benefits [ex. as PNG noted, using a representative sample of benefit payments] given the liabilities and profile of the fund	Australia, Costa Rica, Iceland, Jamaica, Kenya, PNG
Advice on investments necessary to meet future liabilities.	Australia, Costa Rica, Kenya, Malawi
The provision of reasonable and appropriate information regarding the value of [accrued] liabilities (using appropriate methods and assumptions) and noting the impact of any change in the underlying assumptions on the expected present value of liabilities and the funding level	Australia, Iceland, Jamaica, Malawi, Portugal
[Recommendations for] the future sustainability of the fund	Australia, Costa Rica, Kenya
Calculation of the value of accrued liabilities/transfer values in case of mergers	Iceland, Jamaica
An impact assessment of exogenous factors (risks) that could potentially affect fund performance	Egypt, Jamaica

105. Other problems include: (i) advice and opinions on longevity risk and corrective action strategies for funds with increasing DB liabilities; (ii) adequacy and appropriateness of a shortfall limit; (iii) analysis of the effects of a retrenchment program on the financial position of a pension fund; (iv) the use of [lower] interest rates that correspond to a greater degree with the market so as to provide a better reflection on the financial position of the fund, especially if other key variables (rate of death/disability) deviate from expectations; (v) an assessment of the annual change in salary scales due to legislative/government decisions, and the impact they have on the actuarial balance of the fund; (vi) details of a recovery plan; (vii) an indication as to whether or not there are sufficient surplus assets to buffer against adverse circumstances, and, if not, a statement as to whether trustees are aware of these risks and whether or not mitigating strategies are in place; (viii) details of any benefits payable to exiting members; (ix) data checks to ensure data integrity; (x) the use of reasonable and consistent valuation methodology(ies); (xi) calculations to ensure liabilities correspond with the benefits structure; (xii) ensuring that adequate allowances are made for guarantees; (xiii) legal requirements; (xiv) appropriateness of financing and funding; and (xv) appropriateness of measures against deficits.[10]

II.3. DC plans

106. With respect to DC funds, seven countries reported on the issues they wanted actuarial professionals to address. There were a few similarities identified among the responses. However, responses were, for the most part, particular to the countries that provided responses. For instance, both the Dominican Republic and Malawi desire completeness, quality and reliability from the information provided by actuarial professionals. The former expressed an interest in receiving correctly completed information regarding the granting of pensions in a timely manner and needed the assurance that assumptions used in the actuarial valuation of a specific pension plan is well founded and supported. Similarly, Malawi's primary concern is data quality. They expect the actuary to make checks and ensure that reasonable rates are applied when calculating bonuses for members.

107. Another similarity is found in Israel, Italy and FYR Macedonia. In these countries, the supervisors expressed their expectation that actuarial calculations and reviews must be done in compliance with the laws and regulations. FYR Macedonia cited such examples as mortality tables and the interest rates used. Additionally, FYR Macedonia went a step further by stating that they were interested in obtaining directions for the calculation of programmed withdrawals, as well as opinions on specific actions that should be taken regarding these calculations, and for the actuarial professional to perform liquidity checks of the pension fund.

108. No further trends were identified and Hong Kong (China)'s response remained unique to them. With specific reference to investment guarantees, the Hong Kong (China) pension supervisor is interested in receiving information that suggests whether reserves and provisions held by banks and insurers are sufficient to support investment guarantees.

109. As regards the Czech Republic, there are no legislative requirements placed by the supervisor on the professionals undertaking actuarial calculations and reviews. However, the supervisor can request any information for the purposes of supervision, including actuarial calculations and reviews.

III. Responsibilities and liabilities of the actuarial professional

110. Similar to supervisory expectations, the responses generated regarding the responsibilities and liabilities of the actuarial professionals often corresponded with the legislative and prudential requirements

[10] Australia reported problems (i)–(iii); Egypt (iv) and (v); Ireland (vi); Jamaica (vii); Kenya (viii); Malawi (ix)–(xii); The Netherlands (xiii); and Switzerland (xiv)–(xv).

that are imposed on the professionals. Consequently, in this section, we will only elaborate the responsibilities and liabilities that are an extension to those already discussed, making cross references where necessary. In sequence, the paper discusses the responsibilities and liabilities of the professionals, first towards the plan, in the auditing process and, finally, towards the supervisor.

III.1. Towards the plan[11]

111. In several jurisdictions, it is customary for pension funds to appoint actuarial professionals. Because of this, the professionals are duty-bound to provide fund trustees with appropriate advice to facilitate the financial management of the pension plan. Some responsibilities and liabilities are distinct to particular jurisdictions, while others cut across several. Some liability relates to conduct and others to prudential factors. To a greater extent, most jurisdictions outlined the responsibilities of the actuarial professional with no specific reference to their liabilities.

112. In Australia, Austria, Colombia, Costa Rica, Ireland, Italy, Jamaica, Kenya, Namibia and Papua New Guinea, pension funds/trustees usually appoint the actuarial professionals. The specific responsibilities and liabilities of these professionals are established and defined by the provisions of a contract with the pension fund. As such, professional responsibility is owed to the clients, the pension fund managers and the trustees. As the respondent from Namibia indicated, the actuarial professional needs to certify to the trustees and to the managers that the fund is in a financially sound position. Both the Costa Rican and Kenyan supervisory authorities do not have explicit liabilities or punitive sanctions that the supervisor administers in respect to professionals. However, the actuarial professionals may be subject to litigation if they violate their professional responsibility to the pension fund/trustee.[12] In Kenya, in addition to the previously referenced responsibilities to the trustees, the actuarial professionals are also expected to: (i) provide advice to sponsors regarding the appropriate contribution rates needed to fund future benefits or to eliminate any deficit, and (ii) prepare a cost analysis to determine the increases to pensions being paid in order to advise trustees on the most suitable rate to apply during the inter-valuation period. In Mauritius, to be licensed as an actuarial service provider, a company has to obtain professional indemnity insurance, which covers actuarial professionals against financial loss but also protects a pension fund from negligence. Further, in order to determine the funding method for accrued benefits, the actuarial professional must consider the characteristics of the scheme as well as the sponsoring employer. They must also calculate technical provisions of a DB scheme in accordance with the statement of funding policy for the scheme. In Austria, the actuarial professionals must also ensure that they fulfil certain duties and obligations in keeping with supervisory standards and legal provisions so as to ensure that the pension fund is in compliance with these standards and requirements and in good standing with the supervisory authority. In this case, the actuarial professional must ensure that the fund adheres to a business plan submitted to the supervisor.

113. Egypt articulated several responsibilities and liabilities of the professional towards the plan, some of which overlap with responsibilities and liabilities noted by the jurisdictions discussed above. The only distinctive responsibilities are: (i) demonstrating how different designs can meet different objectives when considering scheme design; (ii) assisting employers and trustees in communicating and explaining the funding level and its implications for members; (iii) illustrating the impact on future cash flow of different tiered contribution structures for the employer, and explaining how levels of recruitment, staff turnover and salary progression will affect it; and (iv) advising on appropriate investment selection and methods for minimising various risks.

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[11] Since trustees represent the plan on behalf of members or sponsors as the case may be, responsibilities to trustees are regarded as responsibilities to the plan.

[12] As noted by the Irish and Jamaican supervisory authorities.

114. FYR Macedonia also outlined a number of responsibilities. The appointed actuary is accountable to the Board of Directors of the pension company and must: (i) prepare a quarterly report with formal opinions to be submitted to the Board of Directors; (ii) give immediate notification to the Board if programmed withdrawals are not calculated in accordance with the laws and regulations prescribed by the supervisor; (iii) prepare a report on the operations of the fund for the preceding year, which is submitted to the Board for approval; (iv) give directions for the calculation of programmed withdrawals and check calculations made and mortality tables and interest rates used; and (v) check the liquidity of the fund. If the appointed actuary, in performing his/her work, determines that programmed withdrawals are not calculated in accordance with prescribed laws and regulations, he/she is required to immediately notify the Board of the pension company.

115. Actuarial professionals in the Czech Republic, Portugal and Switzerland share fairly similar responsibilities and liabilities towards the plan. These specifically relate to members and/or beneficiaries. In the Czech Republic, the professionals must ensure that they undertake calculations in the interest of beneficiaries. A failure to do so makes them the subject of 'conduct of business' violations. In Portugal, the responsibilities are as articulated under the legislative and prudential requirements section, and appointed actuarial professionals may be subject to sanctions imposed by the supervisory authority if, in carrying out these duties, they neglect to safeguard the interests of members and beneficiaries. On the face of it, the actuarial professionals in Switzerland are also personally liable for their business conduct. However, in practice, there is very limited liability, as damage or loss has to be proven in each situation. To some extent, Namibia shares these characteristics. The difference is that individual responsibility is limited to specified situations. In addition to certifying that the plan is in a financially sound condition, the actuarial professional has to confirm that members' interests are protected in a transfer, merger or partial or full liquidation. In Spain, there are more extensive liabilities for the actuarial professional who is accountable to the various stakeholders of the pension fund. Where an actuarial professional fails to fulfil his/her obligations, he/she has unlimited liability towards, and is directly accountable to, the sponsor, the commission of control, the managing entity, the fund, the members and the beneficiaries.

116. In other jurisdictions, such as Hong Kong (China), Indonesia, Italy, Jamaica and Malawi, the responsibilities and liabilities of the professionals have a direct relationship to the principles and standards promulgated by national professional bodies to which the individual enlists. For example, the society of actuaries in Hong Kong (China) has adopted certain professional standards, which the supervisory authority expects the actuarial professionals to abide by in the preparation of actuarial certificates. Another example is Indonesia, where professional responsibilities and liabilities reside in the results of calculations and these are regulated by the professional body. In some countries (e.g. Malawi, Jamaica), a failure to abide by these standards may result in the professional association disciplining the actuarial professional and/or the pension fund bringing litigation against him/her. In Malawi, if the actuarial professional fails to carry out his work in line with professional actuarial standards, which amounts to professional negligence, he/she may be subject to litigation. In Jamaica, if the professionals do not adhere to the code of conduct and standards of practice issued by their professional bodies, a report may be made against the person to the professional body, and if he/she is in violation of the code or standard, then he/she would be disciplined.

117. The responsibilities and liabilities of actuarial professionals in Brazil are also within the remit of the national professional body. However, the professional association that governs their conduct and practice has only issued a few professional standards and does not have the capacity to fully discipline its members. Although the actuarial profession is nascent in Brazil, legislation empowers actuarial professionals with the autonomy to make assumptions that are used in calculations. But because the professional body is merely a nominal organisation, it is unable to challenge or examine decisions regarding the choice of assumptions. This ultimately lessens the liability that the actuarial professional has towards the plan. Liability of the actuarial professional in this case is, therefore, minimal.

118. In Austria, the responsibilities are as described in the section on the role of actuarial calculations and reviews in the pension supervision process, while the liabilities are as described in the section on the reporting obligations of the actuarial professionals. An important observation is that the actuarial professional's responsibility to the plan is a bit more extensive in Austria. Before a pension fund receives the supervisor's approval, its business plan has to be prepared in accordance with generally accepted actuarial principles and must be sufficiently detailed with, among other things, numerical information representing assumptions, calculations, contributions, benefits and target technical surpluses. An actuarial professional is responsible for all these tasks. The requisite responsibilities with regard to Belgium are also outlined in the section above detailing the role of actuarial calculations and reviews in the pension supervision process. In this case, the actuarial professional is required by law to provide professional advice on various financial and technical matters as well as to prepare notices on specified information to the Board of Directors of IORPs. In the case of Zambia, the specific requirements are also detailed in statute.

119. With respect to responsibilities and liabilities towards the plan, some jurisdictions have only marginal requirements in place. In Colombia, the only requirement is for the individual to maintain the highest professional standards in carrying out his/her responsibilities. In Trinidad & Tobago, the responsibilities are for disclosure to be made regarding professional and legal standards. Not dissimilar to Trinidad & Tobago, the professional's responsibility to the plan in Iceland as well as in the Dominican Republic just entails ensuring that the actuarial position/calculations are in keeping with legal requirements.

III.2. In the auditing process

120. The usage of actuarial calculations and reviews in the auditing process appears to be minimal, as only a few countries indicated that they served any purpose in their auditing processes. In general terms, auditors rely on the calculations and reviews to inform their opinion about the completeness, reasonableness and fairness (or a subset of these factors) of reported financial information for a pension fund. In Australia, the reviews are fully utilised to form opinions on the three factors mentioned. This suggests that a measure of reliance is placed on the work done by the actuarial professional in advancing the audit process. In Papua New Guinea and South Africa, much reliance is placed on the actuarial professional's work during the audit process. The auditor in the PNG will use the calculations, and advice on liabilities as assessed by the actuarial professional. With specific reference to South Africa, auditors customarily perform audits based on sampling and depend on actuarial calculations, which are done using the complete data set of the pension scheme. This is also what occurs in Jamaica, where auditors rely on the value of the liabilities determined by the actuarial professional. In Trinidad & Tobago, the data are only checked for reasonableness.

121. While the calculations and reviews are not used in the audit process for DC schemes in Malawi, auditors rely on the calculations to determine pension fund liabilities in financial reporting for the DB and hybrid schemes operating in that jurisdiction, which is quite similar to the role that actuarial reviews play in the audit process in Australia and Trinidad &Tobago. In Namibia, calculations usually include, but are not limited to, members' fund credits, pensioner liability and reserve levels, which are incorporated into the financial statements. In Iceland, the actuarial position is an aspect of the annual accounts. In Kenya, the pension funds' as well as the sponsors' audited accounts must both contain the summarised results of actuarial calculations and reviews in relation to pension schemes. Further, with respect to Mauritius, the actuarial professional calculates employee benefit expenses. In the same vein, auditors in The Netherlands use the actuarial calculations and reviews to conduct checks and balances. Therefore, in these jurisdictions, reviews are useful for auditors in making data checks.

122. The countries discussed previously predominantly relied on the actuarial professional's work in undertaking audits. However, in Costa Rica, Czech Republic, Switzerland and Hong Kong (China), auditors test the work and processes of the actuarial professionals. In Costa Rica, auditors use the calculations to verify the results obtained by an actuary, which includes checking members and pensioners' data, assumptions and basic calculations against internal information shared in the audit process. In the Czech Republic, actuarial calculations and reviews are carried out during an audit, whereas in Switzerland, the work of the actuarial professional is assessed during an audit, and although the audit is done regularly for accounting purposes, it rarely occurs for funding reports. In Hong Kong (China), auditors are required to review the work of actuarial professionals by examining source data, assumptions, methods used and the results of the actuary's work, taking into consideration the auditor's knowledge. On this basis, the auditor is then expected to give an opinion as to whether or not the employer has complied with the undertaking to contribute to the scheme's funds in accordance with the recommendations as stated in the actuarial certificate. This requirement is mandated by a guidance note, issued by Hong Kong's (China) professional body for accountants, which specifies that collecting audit evidence from actuarial work undertaken for retirement schemes' should comprise of those review and assessment activities. A similar procedure is currently being contemplated in the FYR Macedonia, where if proposed legal reforms are adopted, the auditor would be required to analyse all actuarial calculations and reviews.

123. The system in Egypt may be classified as equivalent to the practice in Hong Kong (China). The involvement of an actuarial professional in Egypt in the audit process is extensive and assists the external auditor in gathering audit evidence. Some aspects of the audit process that the actuarial professional helps to advance are: (a) obtaining an understanding of the insurer and its environment, including internal controls, relevant to auditing technical provisions or other accounting estimates; (b) identifying and assessing the risks of material misstatements of technical provisions, including determining whether any of the assessed risks require special audit consideration or represent risks for which substantive procedures alone do not provide sufficient appropriate audit evidence; (c) determining an overall assessment of risks of material misstatement at the financial statement level, including in the context of the audit of technical provisions or related amounts; (d) designing and performing audit procedures with respect to technical provisions, including tests of the operating effectiveness of controls, and substantive procedures whose nature, extent and timing are responsive to the assessed risks of material misstatement; (e) assessing whether the methodology used in the development of technical provisions is consistent with acceptable standards and guidelines; (f) testing the assumptions used in, and the robustness of, internal models if these are used to set technical provisions or capital requirements.

124. Given the bifurcated responsibilities of the actuarial professionals in Austria, there is an independent auditing actuary, who examines the fund against the business plan approved by the supervisor to determine the fund's compliance with the calculations contained in the business plan. If the auditor determines that there are risks based on his/her assessment, then he/she is obliged to report the issue to the supervisor. That is to say, the actuarial calculations and reviews facilitate risk assessment in the auditing process. In part, the function of actuarial calculations and reviews in the auditing process is similar in Belgium, where an accredited auditor has the responsibility of certifying the technical provisions calculated by the actuarial professional, as well as collaborating with the supervisor in the supervision of a pension fund.

125. A more restricted use across the respondent countries is where calculations are used in the auditing process to match assets and liabilities. In Colombia, calculations are used as a means of assessing whether or not reserves are sufficient to meet the expected future obligations of the fund. For yet another more limited and precise purpose, in the Dominican Republic, the actuarial calculations are used in the audit process to validate that pensions are properly granted. Likewise, actuarial calculations are very important in the auditing process in Indonesia, as they assist in ensuring the financial health of pension

funds in keeping with the obligations to members. Distinctively, in Brazil, the actuarial auditor has the same responsibilities as the actuarial professional undertaking the calculations and reviews.

126. In Spain, although the auditing process is independent of the actuarial review process, they are two very important mechanisms in the Spanish supervision system.

III.3. Towards the supervisor

127. The evidence shows that the responsibilities of actuarial professionals toward the supervisor are significantly skewed towards reporting requirements. However, the type of information to be reported by the actuarial professionals differs in each of the jurisdictions surveyed. Although they have some level of responsibility towards the supervisor, the analysis in the section discussing responsibilities towards the plan shows that, in most cases, the actuarial professionals' responsibilities are either toward professional associations or plan trustees.

128. According to Egyptian law, actuarial professionals must prepare and submit actuarial reports to the supervisory authority at least once every five years. In the same way, in Trinidad & Tobago, actuarial professionals must submit valuation reports to the supervisor within specified times. Although actuarial professionals employed by pension plans in Austria are also required to prepare certain information and make submissions to the supervisor, this is done in the format of a business plan. Likewise, while the Dominican Republic has reporting requirements, they require specific reporting on information regarding calculations of pensions awarded. The Belgian supervisory authority requires that actuarial professionals submit an annual report regarding the "technical provisions" of the plan, as well as providing, upon request, information regarding actuarial methods, technical provisions or any other information requested. The actuarial professionals in Malawi are responsible for reporting on the solvency of the pension fund, as well as compliance with the rules and legislative requirements.[13] As with regards to Iceland, actuarial professionals report directly to the supervisor.

129. Responsibilities toward the supervisor also involve significant elements of risk analysis and management. For example, actuarial professionals in Colombia and Trinidad & Tobago, respectively, are expected to fulfil all legal requirements in performing calculations and reviews and in the preparation of valuation reports for submission to the supervisor. However, these professionals do not have direct responsibility to the supervisor per se. For instance, in Colombia, if the supervisor has any requirements in relation to the actuarial calculations and reviews, they will require these actions of the pension fund manager as opposed to the actuarial professional engaged by the pension fund. This suggests an indirect responsibility, since requirements imposed on the pension fund manager implies that the pension fund would logically impose these requirements on the actuarial professional engaged by the pension fund.

130. In Austria, the actuarial professionals must ensure adherence of the fund to the approved business plan. South Africa is very similar, where the actuarial professionals are required from time to time to comply with all standards determined by the supervisor, and to receive renewed approval from the supervisor. The requirements for the professionals in Zambia and in respect to DC schemes in Hong Kong (China) are that they must fulfil duties specified in law. In Switzerland, the professionals must comply with fund rules. The Egyptian and Kenyan supervisors place specific responsibilities on the actuary to ensure that actuarial calculations and reviews are done in accordance with scheme rules, technical requirements, life tables and legislative requirements. Actuarial professionals must adhere to the generally accepted rules prescribed for the preparation of actuarial reports. In Egypt, they must also certify the solvency of the fund and its ability to meet its obligations towards the members. With the passage of new legislation, Jamaica will have very similar requirements as Egypt.

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[13] This is only done for DB and hybrid schemes.

131. Actuarial professionals who function as auditors for funds in Austria are required to submit their audit reports, which assess fund compliance with the business plan, to the pension supervisor. Similarly, the supervisory authority in Papua New Guinea uses the actuarial professional's advice on liabilities contained in the actuarial review as a reference point in undertaking its monitoring activities. As such, the actuarial professionals have a responsibility to ensure that the work is done in a professional manner and be ready to engage in discussions with the supervisory authority if and when required.

132. In the FYR Macedonia and in Mauritius, the responsibility of the actuarial professional is a cross between reporting requirements and risk management. Each quarter, the appointed actuary in the FYR Macedonia prepares and submits a report with their formal opinion on actions regarding the calculation of programmed withdrawals, mortality tables and the interest rate used in the calculations, as well as the liquidity of the pension fund. In Mauritius, the actuary takes measures to ensure the completeness and accuracy of the data, and reports any data discrepancies.

133. The supervisory authority in Spain is empowered to conduct either on-site or off-site inspections. If any of these activities result in a determination that the actuarial professional(s) has failed to fulfil his/her responsibilities, the authority may sanction the professional for his/her failure. As such, Spain makes actuarial non-compliance with legislative and supervisory requirements sanctionable conduct. The sanction depends on the severity of the violation, which may be regarded by the pension supervisory authority as a *light offense*, *serious offense* or *very serious offense.* Hong Kong (China) regards the reporting of false or misleading information as warranting sanctions. This is only with respect to the DB and hybrid schemes. In contrast to the above cases, in Costa Rica the supervisor is not empowered to discipline actuarial professionals. Although Jamaica's legislation has not yet been passed, it will follow the same direction as that of Hong Kong (China) as well as of Portugal and Egypt, where the actuarial professional is expected to certify the accuracy of information as well as the fund's compliance with the plan's investment policies and legal obligations.

134. Whistleblowing was another common trend observed within the responses. For instance, pension supervisory authorities in Trinidad & Tobago and Switzerland expect that actuarial professionals will report any issue that places a pension fund at risk, or any other material events, to the supervisory authority. A similar requirement exists in Austria. In this case, if an auditing actuarial professional determines that there may be risks – compliance, regulatory, financial, legal or of any nature – to the pension fund, or there is non-compliance with the law, they are required to immediately report the issue to the supervisor. Mauritius is in the process of developing comprehensive rules for actuarial professionals which will require that a professional engaged by a private pension scheme inform and, as soon as practicable, submit a report to the pension supervisory authority if in the performance of his/her functions, he/she becomes aware, or has reason to believe that: (a) the financial soundness of the scheme is prejudiced, or the ability of the scheme to comply with the Act, regulations and supervisory/regulatory rules made under the Act is otherwise impaired; (b) there is any material change in the operations of the scheme which may jeopardise its ability to continue as a going concern; (c) there has been or there is a breach of any of the provisions of the Act, regulations and supervisory/regulatory rules made under the Act, or any other enactment relating to the keeping of records; (d) other relevant Acts or supervisory/regulatory rules, codes and guidelines made by the Commission have not been or are not being complied with; and (e) financial crime or any irregularity is being, has been committed, or is likely to be committed.

135. Another responsibility of the supervisor which stood out is that the actuarial professional must maintain the highest level of professional conduct in undertaking the work with respect to a pension fund. To provide reassurance to the Belgian, Indonesian and Italian supervisors, the appointed actuarial professionals operating in those jurisdictions must abide by the code of conduct and ethics as well as the standards of practice issued by professional bodies. In Hong Kong (China), as it relates to DB and hybrid

schemes, the authority requires that the preparation of actuarial certificates comply with certain specified rules of professional standards.

136. The previous section presented results illustrating that it is the plan trustees in Australia, Brazil, Costa Rica, Italy and Namibia that engage actuarial professionals and that their responsibilities are established by a contract with the fund. In these jurisdictions – except Australia – the actuarial professionals have no responsibility towards the supervisory authority. Australia and the Czech Republic are similar in the respect that there is no *direct* responsibility towards the supervisor. However, while there are specific prudential and conduct requirements issued by the Australian supervisory authority for actuarial professionals in Australia, in the Czech Republic the supervisory authority monitors actuarial professionals under the umbrella of the pension fund company that engages their services. In Tanzania, the responsibilities of the actuarial professional are not clearly articulated.

IV. Actuarial professionals: approval and fit and proper requirements by pension supervisors

IV.1. Approval by the supervisor

137. The data suggest that pension supervisory authorities in 16 of the respondent countries *do not directly approve* actuarial professionals. These countries include: Australia, Austria, Brazil, Costa Rica, Czech Republic, Dominican Republic, Italy, Ireland, Jamaica, Kenya, Malawi,[14] The Netherlands, Papua New Guinea, Spain, Trinidad & Tobago and Zambia. In Ireland, the professional organisation has responsibility for approval. Although Jamaica does not specifically approve actuarial professionals, the authority must deem the person suitable to perform the requisite functions. In other countries (e.g. Zambia), there are stipulations in the law regarding what qualifications and experience the professional should possess in order to undertake the duties related to a pension fund.

138. Without prejudice to the foregoing, the pension supervisor in Australia is empowered to require the removal of an actuarial professional by a pension fund despite not directly approving the individual. The Austrian pension supervisor is also empowered to require the removal of an appointed actuarial professional. In this case, when a pension fund appoints an actuarial professional, the pension fund is obliged to notify and submit documentation to the supervisor demonstrating that there are no reasons for precluding the actuarial professional's appointment. If the supervisor identifies reasons for disqualifying the appointment, then they are empowered to require the removal of the appointee under threat of a sanction. Two other circumstances under which the Austrian pension supervisor has this empowerment is if the pension fund fails to submit the requisite documents as well as if the supervisor obtains information suggesting that the appointed person is not performing his/her duties subsequent to an appointment.

139. On the other hand, pension authorities in Belgium, Colombia, FYR Macedonia, Hungary, Iceland, Indonesia, Israel, Mauritius, Namibia, Portugal, South Africa, Switzerland and Zambia have to *approve, certify*, *register*, *admit* or *accredit,* as the case may be, any actuarial professional engaged by a pension fund. To be certified, registered or admitted, the actuarial professional must fulfil certain criteria as stipulated in legislation, and may even be interviewed by the pension supervisor, as in FYR Macedonia. Sometimes the criteria are in accord 'with the fit and proper requirements stipulated in the countries' laws. The Portuguese authority requires notification of an actuarial professional *upon* the person taking up his/her duties with a pension fund. However, the pension fund has 15 days within which to notify the supervisor of this appointment. In contrast, in Belgium, *before* an appointment is made, the pension fund is required to seek prior consent from the pension supervisor. To obtain this consent, the pension fund must submit certain specified documents to the supervisor for their review. In Switzerland, for actuarial

[14] The Malawian supervisor indicated that their authority has plans to implement approval of actuarial professionals by the supervisor.

professionals must engage in continuing professional development of at least 20 hours per year in order to maintain “accredited” status, and will lose accreditation if they do not continue to meet this as well as the other criteria.

140. In one of the jurisdictions – Hong Kong (China) – normally, approval is not required except when appointing an actuarial professional to perform certain types of functions. Approval in South Africa is undertaken through collaboration between the pension supervisor and the local professional body. The actuarial professional must be a member of the local professional body, and apply to the supervisor for approval to engage in the duties as required by a fund. A distinction in the South African case is that the supervisor must also “recognise” the type of funds for which the individual is authorised to conduct “valuations”. In addition, the individual has to renew his/her approval periodically.

IV.2. Fit and proper requirements by the supervisor

141. To some degree, whether or not actuaries are subject to fit and proper requirements overseen by the supervisor is a function of legislation. As there were no significant differences in the responses as to whether the supervised funds were DB, DC or hybrid, this section provides a comprehensive overview of the prevailing practices with respect to fit and proper requirements.

142. Of all the countries that completed the questionnaire, Hungary gave the most comprehensive responses regarding fit and proper requirements for actuarial professionals that are overseen by a supervisor. Among other things, a criminal record check, proof of education and experience, as well as a statement from the actuarial professional that he/she is not exposed to any conflict of interest are required for the actuarial professional to be a fit and proper person in Hungary. The Australian, Belgian, Jamaican and Portuguese supervisors, to a large degree, have similar standards. In Belgium, positions that actuarial professionals are not allowed to hold, because of the potential for conflict of interest, are specified, and the possible circumstances that could lead to such a conflict of interest are out in Portugal. In relation to conflict of interest in Australia, the professional is required not to be in a position that could lead to any conflict of interest, but is not required to provide a statement confirming this is so. Though no specific reference is made to a criminal record check by the supervisors from the latter three countries, the Australian standard mentions the character and integrity of the applicant as factors to be considered in assessing fitness and propriety. Belgium also has additional requirements for nationality and language. In contrast to most other countries, actuarial professionals in Belgium are not required to be members of any professional organisation. At the other end of the spectrum is Austria, where the requirement is placed on the pension fund to ensure that there are no reasons to exclude actuarial professionals from being appointed by the fund.

143. While Colombia, Iceland, Indonesia, Israel, Czech Republic, FYR Macedonia and South Africa did not explicitly state requirements, actuarial professionals are subject to fit and proper requirements overseen by the supervisor.

144. Other countries, based on the responses provided, do not necessarily have explicit fit and proper standards that govern actuarial professionals or, at least, requirements that are overseen by the supervisor. However, there is still some measure of oversight with respect to the rules that the professionals are expected to adhere to in a few of the countries. The oversight is less rigorous but nonetheless, in some jurisdictions, it is articulated in law. For instance, the criteria may only cover qualifications, experience, membership of a professional body and observance to the standards of that professional body. To provide an illustration: Spain and Zambia currently do not have any fit and proper requirements overseen by supervisor, but both these countries impose requirements for the professionals to have the requisite qualifications, knowledge and experience to undertake the functions for which they are engaged. In

addition, the Zambian authority requires that the professional maintain membership of a professional organisation.

145. Exceptions to the above category are Costa Rica, Hong Kong (China), Ireland, Italy, Kenya, Namibia, The Netherlands and Trinidad & Tobago, which also do not have fit and proper criteria for actuarial professionals. The requirement in these jurisdictions is compliance with the standards of practice, and or professional conduct, issued by the professional bodies with which they maintain membership. In these cases, when there are breaches, the actuarial professional would be subject to disciplinary action by their respective professional bodies. In Trinidad & Tobago, the professionals are also bound to follow provisions within other aspects of national legislation, and in Hong Kong (China) actuarial professionals are also required to be independent from sponsors in occupational schemes that engage their services. In Switzerland, the only fit and proper criteria overseen by the supervisor relates to continuous professional development of the actuarial professional. The Dominican Republic notes that professionals should obey the provisions of the pension scheme rules.

146. Malawi[15] and Papua New Guinea have no prudential, legislative or fit and proper requirements overseen by the supervisor.

V. Importance of actuarial calculations and reviews in pension schemes

147. The survey also assessed respondents' views on the importance of actuarial calculations and reviews in certain aspects of a pension scheme. The questionnaire listed eight characteristics of a pension scheme and its supervision, which covered the areas where actuarial calculations and reviews could potentially play an important role. These were:

1. plan design;
2. providing reassurance to the supervisor that a fund is financially sound and properly run;
3. assessing the veracity (reliability) of assumptions regarding valuation, mortality rates, retention rates and other applicable tools employed by the fund;
4. supervisory reliance on actuarial expertise when checking compliance with legislation;
5. valuation (valuing pension obligations);
6. funding (what funding method to use, taking into account how the pension plan is meant to operate – in case there are requirements on the level of funding, checking whether these are fulfilled);
7. ALM (the investment policy that should be used to fulfil the objectives of the plan);
8. solvency (in case of requirements in force to hold excess capital or other guarantees over and above the actual pension liabilities).

148. Respondents indicated the level of importance ascribed to the factors identified by their selection of an appropriate option on a 5-point scale, with 1 representing "not at all important" and 5 representing "very important". While there were mixed responses, especially with respect to authorities which oversaw the operation of DC funds, there were a few areas in which congruence existed among the respondents. For

[15] There are plans in Malawi to implement fit and proper requirements (overseen by the supervisor).

those countries that had either DB, or hybrid, or both, operating alongside DC arrangements in their jurisdictions, but which never distinguished their responses regarding the importance of actuarial review in the different aspects tested for each fund type, the results are shared under the heading *mixed*. Table 2 shows the results of the factors tested, indicating the number of respondents that selected a particular ranking on the scale for each factor.

149. A number of conclusions may be drawn from the results. First, as shown in the table, supervisory authorities perceived that actuarial calculations and reviews play a more important role in the different aspects of supervision of DB/hybrid schemes when compared to DC schemes. This is demonstrated by the top heavy rankings assigned by a number of authorities to almost all categories tested in relation to DB/hybrid schemes. In some ways, these results have congruence with the expectations that the supervisor had of the actuarial professionals, as outlined in section II of this paper. Further, dissecting the data reveals that, above all, based on the number of authorities and their rankings, the shared perception is that, of all factors assessed, the most important function that actuarial calculations and reviews play in relation to DB/hybrid schemes is providing reassurance to the supervisor that the fund is properly run and financially sound. Among the other more important roles were veracity of assumptions, plan design and valuation of pension obligations, which all ranked higher in importance in respect of the DB/hybrid schemes than the other aspects of the pension scheme tested.

Table 2. Importance of actuarial calculations and reviews in eight different aspects of a pension scheme (number of respondents)

Attribute measured	Either DB or hybrid OR both						DC						Mixed (Either DB or hybrid OR both along with DC)					
	No. of countries						No. of countries						No. of countries					
	V	IV	III	II	I	NR	V	IV	III	II	I	NR	V	IV	III	II	I	NR
Plan design	12	2	0	1	0	0	1	0	6	1	4	4	6	3	2	0	1	0
Providing reassurance to the supervisor that a fund is properly run and financially sound	14	1	0	0	0	0	4	1	1	2	4	4	9	2	0	0	1	0
Veracity of assumptions	11	3	1	0	0	0	3	2	3	1	3	4	6	5	1	0	0	0
Checking compliance with legislation	7	4	2	2	0	0	0	2	0	3	5	6	1	5	3	1	1	1
Valuation of pension obligations	11	3	1	0	0	0	2	0	3	1	4	6	11	0	1	0	0	0
Funding level and method	9	0	5	0	1	0	1	1	1	0	6	7	10	1	1	0	0	0
Asset-Liability Management (ALM)	5	7	1	0	2	0	3	0	3	1	4	5	1	3	6	2	0	0

Solvency	9	2	1	0	2	1	3	0	1	2	3	7	7	3	1	0	1	0

Scale key: V – Very important; IV – Moderately important; III – Neither important nor important; II – Somewhat important; I – Not at all important; NR – No reply/Not applicable. Although the questionnaire did not classify the points on the scale, for the purposes of analysis, this was the chosen classification.

150. The results in relation to DC funds were distinct from those reported for the DB/hybrid funds. While a number of authorities that supervised DC funds failed to provide a ranking for all of the eight aspects tested, enough responses were input to allow certain extrapolations to be made. Primarily, when considering DC schemes, calculations and reviews were of less importance in funding and in a supervisory authority's reliance on them when checking a funds compliance with applicable legislation than any of the other aspects. These factors received the highest number of responses for the lower categories – somewhat important and not at all important. In contrast, similar to the DB/hybrid schemes, providing reassurance to the supervisor that a fund is properly run and financially sound came out on top in terms of its importance in the supervision of DC schemes, but still less so than the results for the DB/hybrid schemes. Veracity of assumptions ranked the second highest with respect to DC schemes.

151. The results for the "mixed" category (representing authorities supervising either DB or hybrid OR both *along with* DC) bears a resemblance to the results of those authorities supervising solely DB, solely hybrid OR both fund types. The higher categories of importance received several affirmative responses in almost all categories of the pension schemes tested. Also, actuarial calculations and reviews played more important roles in the valuation of pension obligations and in providing reassurance to the supervisor that a fund is financially sound and properly run. In addition, funding level and method also ranked higher than the other aspects in this case.

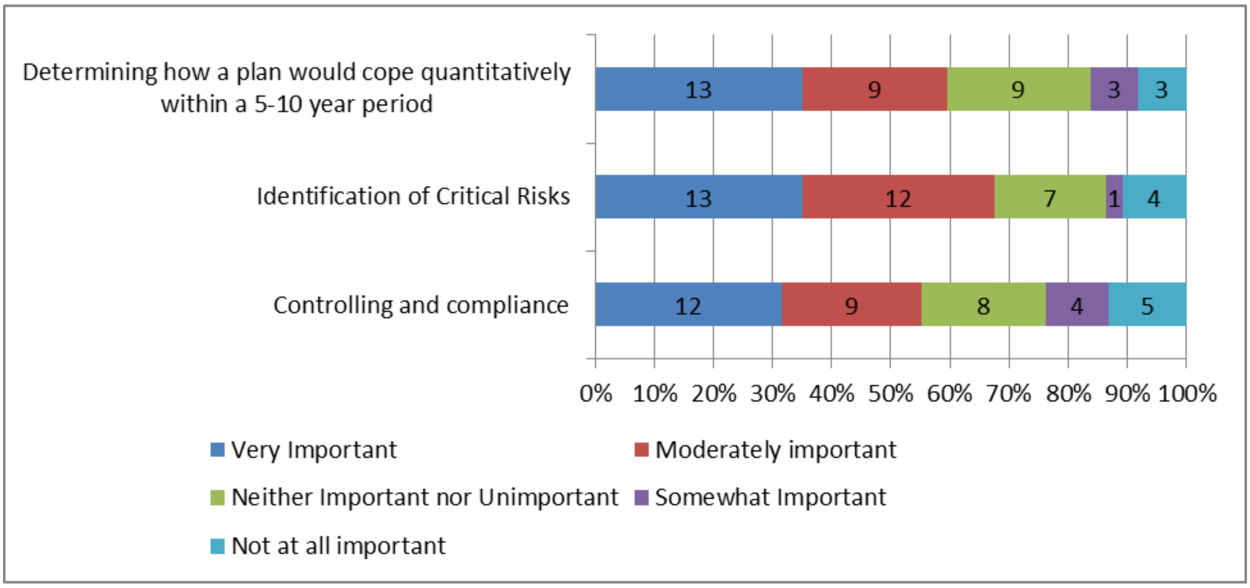
VI. Importance of actuarial calculations and reviews in risk management

152. In this section of the questionnaire, respondents were also asked to indicate on the same scale as was used in the previous section, the importance of actuarial calculations and reviews in risk management. The scale assessed the importance of actuarial calculations and reviews in three areas of risk management: (i) controlling and managing compliance with best practice risk management; (ii) identification of critical risks; and (iii) how a plan would cope quantitatively over a five to ten year period.

153. Figure 3 presents the overall results as a comparative summary of the differences in supervisory authorities' perceptions of the importance of actuarial calculations and reviews across the different risk categories.[16] There are no significant variations in the perceptions of the importance of actuarial calculations and reviews for the three different aspects of risk management that the survey investigated. As the figure shows, the identification of critical risks ranked higher – a total of 25 supervisory authorities either selected 4 or 5 on the scale of importance – than the other two categories, but the differences in perceived importance are negligible: 22 and 21 respondents, respectively, indicated that actuarial calculations and reviews were very important in determining how a plan would cope quantitatively over a five to ten year period and in controlling and compliance with best practice risk management. Despite the marginal differences, in relative terms actuarial calculations and reviews are perceived as more important to pension supervisors in the identification of critical risks.

[16] In "Identification of critical risks", a country selected two responses (1 – Not at all important, 4 – Moderately important) which was not used since it is unclear what the response is conveying.

Figure 3. Perceptions by supervisory authorities of the importance of actuarial calculations and reviews in risk management (all types of funds)



154. At the lower spectrum of the importance scale – somewhat important and not at all important – a similar number of respondents believed that actuarial calculations and reviews were not important in the other two categories: controlling and managing compliance with best practice risk management and determining how a plan would cope quantitatively over a five to ten year period. A much closer analysis reveals that, with a few exceptions, the respondent jurisdictions which believed that actuarial calculations and reviews were not at all important in these categories of risk management primarily had DC plans in existence. Only one of these authorities supervised the operation of all three types of funds, although, in this country, there were no more DB plans being established.

155. A few conclusions may be drawn from the analysis of the supervisory authorities' perception of the importance of actuarial calculations and reviews in risk management. The results suggest that those countries which solely have DC plans in operation placed less emphasis on the importance of actuarial calculations and reviews in the risk management process, and, more specifically, on the three aspects of risk management examined in the survey. To further expose the results from the survey, we sub-divided the data to show the fund types for which actuarial calculations and reviews play a very important role when contemplating risk management. As before, respondents are classified based on the plan types over which their supervisory authority has a mandate. This clarifies the different attitudes of respondents based on the types of plans in existence in their particular jurisdictions.

VI.1. Controlling and managing compliance with best practice risk management

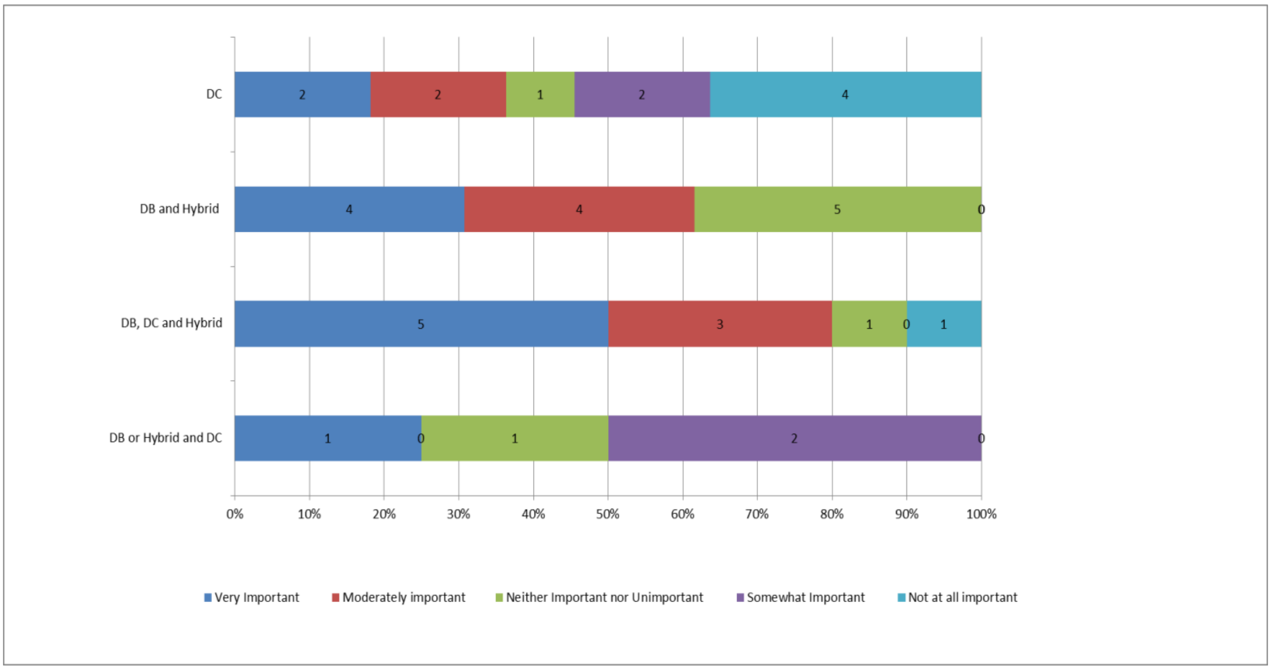
156. As Figure 4 illustrates, actuarial reviews are seen as more crucial in controlling and managing compliance with best practice risk management in those countries that have oversight responsibilities for all three plan types. Approximately 80% of these supervisors thought the actuarial calculations and reviews are either very important or moderately important – the two highest categories on the scale – while only 10% believed they were not at all important for this category of risk. In contrast, for those countries that had oversight responsibility solely for DC plans,[17] over 50% did not view the actuarial calculations and

[17] There are 15 respondents in total with oversight responsibilities for solely DC plans. However, only 11 provided a response to this question.

reviews as crucial in the risk management process – these respondents selected one or the other lower categories on the scale of importance. For this category of respondents, there were four supervisors who did not provide a response. This is also perhaps an indication of the lesser importance the actuarial calculations and reviews have in controlling and managing compliance with best practice in risk management. If we include this figure in the perceived low importance of actuarial calculations and reviews in controlling and managing compliance, the total amounts to approximately 67% of respondents.

157. A more striking result can be seen in the perceptions of the supervisors with oversight responsibility for DB and/or hybrid plans. In this case, no respondents selected either of the latter two categories of importance on the scale. Approximately 61% of these respondents either thought actuarial calculations and reviews were very important or moderately important. The other approximately 39% opted for the neutral category, which may suggest that actuarial calculations and reviews may or may not play a crucial role in the controlling and managing of compliance with best practice risk management.

Figure 4. Supervisory authorities' views on the importance of actuarial calculations and reviews in controlling and managing compliance with best practice



158. Lastly, for those supervisors that oversee DB or hybrid arrangements, there were more diverse results. There were four respondents in this category, and only one respondent perceived that actuarial calculations and reviews were very important in controlling and managing compliance with best practice risk management. Another perceived it to be neither important nor unimportant, while the remaining two believed it to be somewhat important, the second lowest category on the scale of importance.

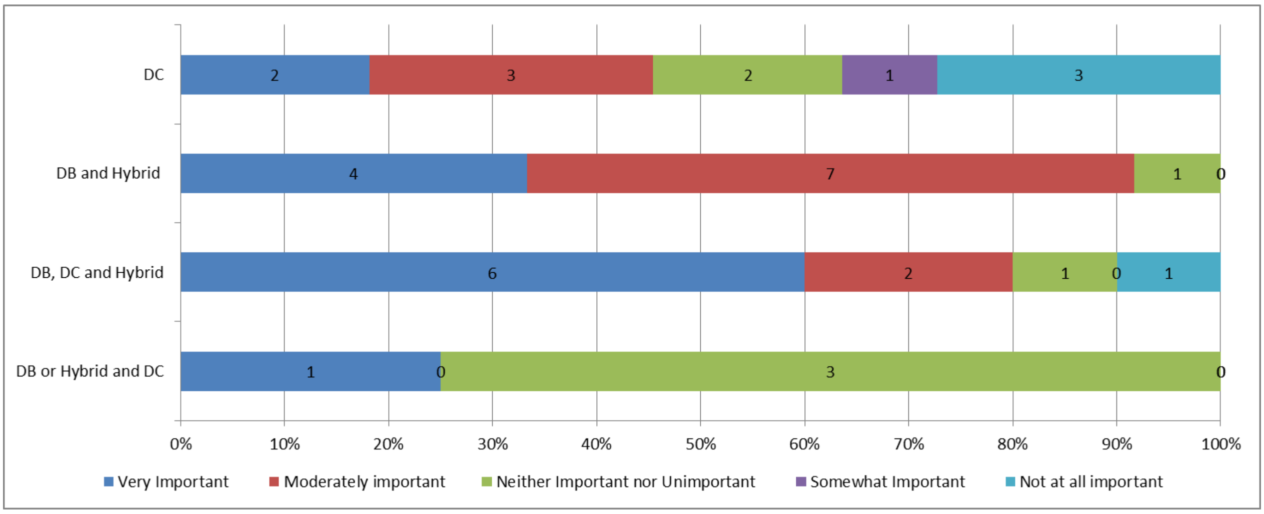
VI.2. Identification of critical risks

159. In this second category of risk tested, unpacking the data reveals that across the categories of supervisors (based on the types of funds they oversee), we have somewhat similar results (Figure 5) to those found in the area of controlling and managing compliance with best practice risk management. For example, of all the categories, calculations and reviews were of greater importance to those supervisors who had oversight for all three fund types or for DB and hybrid funds. However, in this case,

approximately 92% of the supervisors in the latter category[18] indicated that actuarial calculations and reviews were of great significance in the identification of critical risks. This is demonstrated by their selection of one of the two higher points on the scale. The remaining 8% (one respondent) opted for the neutral response.

160. Supervisors who oversaw the three fund types also indicated strong importance for the value of actuarial calculations and reviews in the identification of critical risks. Specifically, 80% of these respondents also selected one of the two higher categories on the scale of importance.

Figure 5. Supervisory authorities' views on the importance of actuarial calculations and reviews in the identification of critical risk



161. For supervisors of DC plans, approximately 45% saw actuarial calculations and reviews as significant in the identification of critical risks, selecting one of the two higher points on the scale. Eighteen percent expressed the view that the reviews were neither important nor unimportant for this risk element, while 9% and 28%, respectively, believed that they were either somewhat important or not at all important. Again, four respondents (27% of the total) failed to provide any answers.

162. In the final group – supervisors of DB or hybrid along with DC funds – the majority (75%) of these respondents held the view that actuarial calculations and reviews were neither important nor unimportant to the identification of critical risks. Only one respondent (25%) believed that actuarial calculations and reviews were very important in that process.

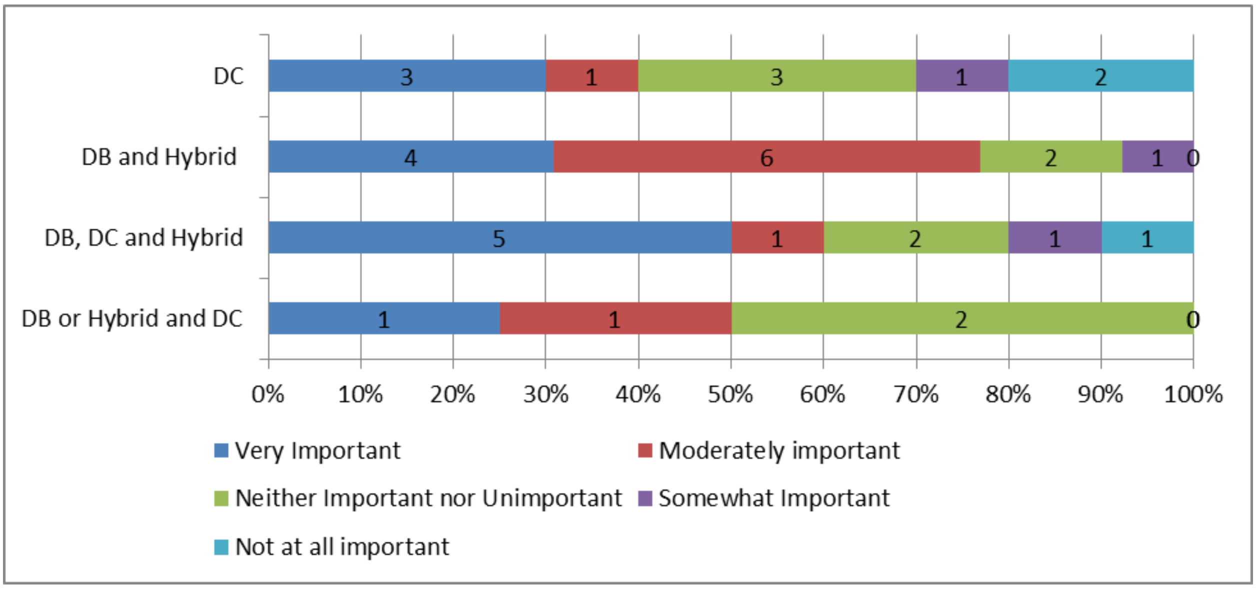
VI.3. Determining how a plan would cope quantitatively over a five to ten year period

163. The final perception assessed by the questionnaire is the use of actuarial calculations and reviews in determining how a plan would cope, in quantitative terms, over a five to ten year period. Here, we find that with approximately 77% of respondents selecting the option of very important or moderately important, supervisors of DB/hybrid schemes place significant importance on using the actuarial calculations and reviews for measuring this element of risk with respect to DB/hybrid funds. There were no respondents who believed that actuarial calculations and reviews were "not at all important" for making this determination. Approximately 15% believed that actuarial calculations and reviews are neither important nor unimportant, while 8% thought they were only somewhat important.

[18] The results from one respondent which selected two responses (1 – Not at all important; 4 – Moderately important) was not used since it is unclear what the response is conveying.

164. Further, as seen in Figure 6, 60% of the supervisors of all three plan types held the view that the reviews were either very important or moderately important to determining how the plan would cope quantitatively over a five to ten year period. The neutral category received 20% of affirmative responses, while the latter two categories received only 10% each. Bearing in mind that there are only four supervisors of DB or hybrid along with DC plans, 50% thought that the actuarial calculations and reviews were either "very important" or "moderately important". The other 50% of respondents expressed the view that actuarial calculations and reviews were neither important nor unimportant in this regard.

Figure 6. Supervisory authorities' views on the importance of actuarial calculations and reviews in determining how a plan would cope quantitatively over the next 5-10 years



165. The results from supervisors of DC plans proved to be the most disparate. Of the total, 30% of the respondents believed that actuarial calculations and reviews were very important in determining whether the plan would cope quantitatively over the next five to ten years. The same percentage also considered them neither important nor unimportant. Ten percent of respondents thought the calculations and reviews to be moderately important, the second highest category, and somewhat important, the second lowest category. Twenty percent expressed the view that actuarial calculations and reviews were not at all important in determining how a DC plan would cope quantitatively over the next five to ten year period.

VII. Potential supervisory challenges with regards to the conduct or role of actuarial professionals

166. The questionnaire also sought to gather information on the potential difficulties that supervisors could have with actuarial professionals. It asked respondents about the main problems that supervisors encounter in relation to the conduct or role of the professional who does the actuarial calculations and reviews. While several supervisors did not encounter any issues, 23 jurisdictions (approximately 59% of all respondents) pointed to potential challenges and/or cited examples of issues faced while interacting with the actuarial professionals. These challenges did not vary widely across the respondents who provided a reply, and are discussed below. As a general note, it is useful to point out that several of these problems are addressed by the IAA in the International Standard of Actuarial Practice 1 (ISAP 1).[19]

[19] The International Standard of Actuarial Practice (ISAP) is a model standard which member associations of the IAA are expected to make binding on their members. An individual may also declare that he/she obeys the ISAP generally or in the provision of certain services.

VII.1. Quality of actuarial assumptions

167. Ten of the supervisors who reported possible problems were concerned about the quality of assumptions being used by the actuarial professionals undertaking the calculations and reviews. This subset from the main issues appear to be the most significant problems from the perspective of supervisors, and contain several central sub-issues.

168. A secondary concern for three of the ten respondents concerned the quality of assumptions, particularly with regard to flexibility of choice when making assumptions due to the forward-looking nature of calculations, loyalties of the actuarial professional and/or the subjectivity of the process, which they believe makes it a potentially problematic area. In one of these the jurisdictions, these are exacerbated by the lack of guidelines or regulations (on, for example, minimum benefits payable in a DB scheme or in computing the value of benefits), resulting in different actuarial professionals deriving varying benefit values depending on the assumptions used. Another of the three noted that although the supervisor may provide guidelines, unless there is proof of unprofessional conduct, this may still not be sufficient. The supervisor may hold a view that a particular assumption is either too optimistic or too conservative, but can do little to validate or invalidate the appropriateness of the assumption once it falls within the guidelines promulgated by the authority. In addition, the last of these three respondents indicated that the choice of bases leaves room for errors in the final calculations.

169. Additionally, one respondent specifically pointed to the fact that if an actuarial professional uses overly conservative rates in the calculation of bonuses in DC plans – while this is understandably an exercise in caution — a problem that can arise is one in which members that exit a fund/scheme early have a higher probability of receiving lower returns.

170. With specific reference to the supervision of DB funds, two supervisors cited the problem of poor assumptions with respect to real rate of return on investments. One of these supervisors referred to the possible decisional dilemma between minimum rate of return, maximum administrative expenses and death and disability rates. The key interest of this supervisor was in determining how to align, or reconcile, the assumptions in the actuarial report with the actual results. In other words, the objective is to prevent extreme deviations between the assumptions so that what actually occurs in the fund is either identical or somewhat similar to the assumptions made. The other supervisor also cited possible problems with making assumptions about inflation. However, this supervisor was specifically concerned with two things – the undervaluation of benefits and the overvaluation of contributions especially in occupational funds.

171. If actuaries make unreliable assumptions, this can have a significant impact on a pension fund and the resulting calculations of values for contributions, benefits, reserves and so on. As two of the supervisors pointed out, such assumptions might sometimes be made without any appropriate or sufficient justification behind the decision to use a particular conjecture/supposition, which, as one of these noted, would normally be included in the technical notes. If assumptions made by the actuarial professional deviate widely from the reality of the fund's economic circumstances, then the actual results produced by the actuarial professional can potentially be unreliable and may place a fund at unwarranted risk. One authority indicated that sometimes exogenous data used to derive reliable assumptions are inadequate. While it is understood that assumptions made are subjective in nature, and assumptions are a prerequisite of performing calculations and reviews, it seems plausible that actuarial professionals should pay close attention and exercise diligence in monitoring market rates, choosing data sources and in using these in their calculations.

172. Further, as one supervisor pointed out, actuarial professionals sometimes fail to discuss (a range of) fund-specific best estimates in their valuations or for the technical reserves. Therefore, it is also logical

to expect that, as much as possible, actuarial professionals should follow the guidelines prescribed, if any, by the supervisors in making assumptions and choosing bases for calculations.

VII.2. Technical language

173. Five respondents believed that another significant problem related to actuarial professionals' use of technical language and jargon, which may not be easily understood by various stakeholders (such as members, trustees or supervisors who do not have an actuarial professional on staff). As stated by one of these authorities, miscommunication (between trustees and sponsors) or lack of understanding of the results of calculations and reviews as well as the measures proposed may result in delays in addressing issues affecting a fund. One of the five respondents in this area attributed the actuarial professionals' unclear way of communicating recommendations to the fact that there was no standard way of reporting in that jurisdiction.

174. In the view of two of these respondents, the actuarial professional may not provide support or additional feedback, or have difficulty in explaining the contents of actuarial calculations and reviews to trustees after completion. As a consequence, the important and very intricate details of the actuarial calculations and reviews may be lost. If the trustees or sponsors do not understand what an actuarial report, including its recommendations, is conveying and what the implications are for the fund, or for its members and beneficiaries, this negates the objective of the actuarial calculations and reviews. Such misunderstandings can then delay appropriate corrective action, or may even lead to failure in taking the necessary measures that will ensure the beneficiaries' and members' interests are protected. An explanation by the actuarial professional to the trustees about the implications of not abiding by the recommendations made could be useful in these cases. A solution proposed by the respondent citing the example is for trustees to develop knowledge in the area so as to be able to understand the basics of an actuarial report. While this may help, supervisors may have to take the lead in providing basic information on pension understanding and the trustee's role in their jurisdiction. One respondent felt that the only issue relating to the role of the actuarial professional is in the fact that there is no quality assurance between reviews since the board of control/governance bodies are not obligated to provide a response to an actuarial report as is the case with an audit report.

VII.3. Inaccurate information

175. Actuarial professionals must also take care to perform calculations on the basis of correct information. If not, this creates obvious problems – calculations will be imprecise or otherwise misleading due to discrepancies in the information on which the calculations are based. In addition, not paying particular attention to statutory requirements, as well as using incorrect bases (in cases where guidance is provided) for calculations, may result in violations of the law in the preparation of the calculations and reviews.

176. While five supervisors felt that the use of either incorrect/unreliable information or poor quality data is a problem area, three of these authorities alluded to the fact that this may relate to the quality of the information the actuarial professional receives from the pension fund, while a fourth referenced the availability of quality data. As the fifth authority put it, it is believed by some governing bodies of (particularly smaller) pension funds that the calculation and review process is time consuming and costly. Therefore, sufficient effort is not put into the activity, resulting in low quality work. This will ultimately achieve unreliable results, and/or insufficient disclosure of information deemed relevant to the supervisory authority.

VII.4. Lacking responsiveness

177. In the view of one supervisory authority, a problem arises when, for instance, actuarial professionals lack responsiveness in certain circumstances. One area cited is when there is an adverse external event, such as a market shock (e.g. salary increase/decrease, falls in equity markets), which substantially changes the circumstances of the pension fund. As this is an area which impacts the interests of the pension fund members and beneficiaries, as well as threatening the objectives of the supervisor in protecting the pension entity at the individual level or the industry at the systemic level, actuarial professionals should be cautious and keep abreast of changes in market circumstances.

VII.5. Independence of the actuarial professional

178. The need to secure the independence of the actuarial professional is another significant issue referenced by supervisors. Lack of independence of an actuarial professional may place him/her in a compromised position if he/she ends up having to make a decision on which there is a conflict of interest. Actuarial professionals have to be mindful of this fact before agreeing to be engaged by a pension fund or by a sponsor/retailer/provider of a pension fund. There is a risk that in some situations, actuarial professionals might be swayed towards performing calculations in the interests of the sponsor/retailer/provider rather than the members or beneficiaries of a pension fund. Five jurisdictions agreed that independence of the actuarial professional is a risk. Two authorities cited examples in this area.

179. One recounted encountering situations in which the actuarial calculations and reviews were done using assumptions that were more favourable to the sponsor (specifically, in the selection of assumptions used in the valuation of liabilities). The other stated in a more general sense that actuarial professionals may perform valuations in the interests of the sponsor without regard for professional ethics. Another jurisdiction noted a similar problem with benefits/contributions calculations, but believed it was more related to selection assumptions. Undervaluation of benefits/overvaluation of contributions can be either a deliberate act or an unintentional one depending on where the loyalties of the actuarial professional lie, specifically with respect to a DB occupational fund. Separately, but on a similar note, although one jurisdiction pointed to the understatement of reserves/buffer values in a pension fund, this may also be an unintentional consequence of the assumptions chosen.

180. Additionally, another element of independence reported by one respondent in the survey is the fact that actuarial professionals may recognise but fail to report serious problems to the supervisor (in other words, whistle-blow) or hesitate to make clear recommendations, especially since in most cases they are engaged by the pension funds. This results in inadequate reporting which can be exacerbated by an occasional unwillingness to cooperate, which is a problem in another jurisdiction.

181. With regard to independence, the local professional associations may play a role in disciplining professionals who are not abiding by the code of conduct and standards of professional conduct. If the local association is active, this may prove to be very effective in deterring negligent as well as unprofessional conduct. Supervisors may also prescribe legislation and/or issue guidance with regard to independence, conduct and conflict of interest.

VII.6.Adequacy of actuarial resources

182. A problem experienced in three jurisdictions was the lack of a sufficient number of actuarial professionals to undertake actuarial calculations and reviews or a general lack of actuarial resources. In and of itself, this can become a problem in terms of pension funds' access to services. In addition, the lack of competition can also result in the delivery of poor quality services to pension funds, lack of timely information, a lack of independence, conflict of interest and many more of the problems discussed in this

paper. Consequently, supervisors who observe this as a problem in their jurisdiction (irrespective of whether or not they approve actuarial professions) may have to be more attentive to the work of the actuarial professionals, and, where they have oversight, discipline the professionals for negligence or other problems encountered. Where these supervisors do not have oversight, then the alternative may be to report issues to the international bodies governing the operation of actuarial professionals.

VII.7. Lack of timely information

183. Two supervisory authorities described a situation where the actuarial professional fails to provide timely information on the results of their calculations and reviews. This may undermine the work of the supervisor, as information that is not timely may potentially be costly for a pension fund, in the sense that it inhibits timely regulatory or supervisory action where necessary. If information provided is out of date, then it also inhibits the supervisory authority from taking corrective action early, especially in the event of an adverse report. This could place beneficiaries and members at risk, and may even rise to the systemic level, depending on the particular issues in a jurisdiction.

VII.8. Neglecting statutory requirements and legal changes

184. Lastly, one respondent had a particular problem where there were changes to pension legislation but where the actuarial professionals continued practices in accord with industry norms and practices, which were in clear violation of the law, as opposed to the new legislative requirements. Two other problems, reported respectively by one supervisor in each case, are when actuarial professionals do not consider the interests of all beneficiaries to a fund or where the supervisory authority finds it difficult to assess reserve levels across different DC funds, given that the framework employed is principle based. In other words, application of the principles by each fund may be quite unique. This problem could possibly be overcome if actuarial professionals engaged in continuing professional development.

VIII. Conclusions

185. While some supervisors in the survey seemed to have similar rules, and a supervision framework in place for all three pension fund types (DB, DC or hybrid), a reasonable conclusion that could be drawn from the findings is that actuarial calculations and reviews have a crucial role in the oversight function, especially when considering the supervision of DB and hybrid pension funds. In reflecting on the more obvious aspects of the evidence, it seems that supervisors generally place a lot of value on the information provided in the actuarial calculations and reviews to gather information on the financial health of DB/hybrid funds. As a result, most jurisdictions, where the supervisors oversee the operations of DB/hybrid funds, have provisions related to how the actuarial calculations and reviews should be performed, the format they should take and the type of information required to be included in an actuarial report.

186. The study found that the primary function of the actuarial calculations and reviews in the pension supervision process of DB/hybrid funds is in ensuring that the entities are complying with the legal provisions on how the fund is operating as well as in complying with requirements for funding. In addition, more often than not, pension funds are required by law to engage the services of an actuarial professional to perform calculations of the risks to a fund. This includes, for example, the calculation of solvency ratios, asset/liability matching calculations, calculating provisions for long-term liabilities and undertaking evaluations of probable conditions that would impact on the fund using various assumptions. In situations where there is non-compliance or other adverse circumstances, the actuarial professionals are, in some cases, required to report these issues to the supervisor so that corrective action can be taken. Presumably, this ensures that the pension fund beneficiaries are shielded from unwarranted risks. These professionals were also often expected to have a particular academic background, some level of experience and be active

members of national professional associations and comply with the code of conduct and standards of professional conduct.

187. In contrast and rather intuitively, in the supervision of DC schemes, actuarial calculations and reviews have a very limited role.[20] Where actuarial calculations and reviews are used in the supervision of DC funds, the supervisory authorities (and not the supervised funds) mostly employ the actuarial professionals. In cases where there were requirements in place for DC funds, these encompassed requirements on provisions for fund liabilities and requirements for investment limits. Limits on investments were specifically in relation to funds which had guarantee provisions in place. Other obligations included specificities relating to mortality tables, interest rates and formulas. In other cases, the requirements were dissimilar among countries. Actuaries can play an important role in DC schemes by informing stakeholders about the expected value of future pension benefits, and by helping them understand the uncertain character of such projections.

188. Despite the requirements, functions and expectations, in most jurisdictions the actuarial professionalshave greater responsibility towards the fund which engages their services. A contractual relationship is established between the fund and the actuarial professional. This professional is then required by the fund manager, trustee or other governance arm to abide by the requirements in place and to ensure that the fund is in compliance with regulatory and supervisory requirements. Only a few countries included the actuarial professional as a supervised person who could be sanctioned within the scope of supervisory rules. However, it seems as if there is a trend towards the inclusion of these individuals as other countries are considering legislation to include them in the remit of supervisory action where there is non-compliance with legislative requirements.

189. Normally, the supervisor does not approve actuarial professionals or have oversight over their conduct. Therefore, the supervisor does not administer sanctions in the event of inappropriate conduct or professional negligence although the supervisor can sometimes have the power to instruct the pension fund, as its supervised institution, to remove the actuarial professional from his/her position. As such, the supervisory authority may only have an indirect control over the actuarial professional. In addition, there were criteria in place that the actuarial professional must meet in order to be engaged by a pension fund. The evidence suggests that if there is professional negligence or if the fund is sanctioned or placed at risk because of the actions or inactions of the actuarial professional, then they may be exposed to litigation from the fund and/or may be sanctioned by the local actuarial association of which they have membership. As a mitigating measure, in a few jurisdictions the actuarial professional is required to obtain professional indemnity insurance.

190. Finally, the supervisor's expectations from the actuarial professionals were often in accord with those provisions included in the jurisdictions' legislation. In all fund types, the most important function of actuarial professionals for supervisors is to provide assurance that a fund is financially healthy and properly run. On the other hand, supervisors were of the view that actuarial calculations and reviews were crucial in all areas of risk with respect to DB and hybrid funds, but not so much for DC funds. At the same time, there were some problems mentioned by a few jurisdictions regarding the role and conduct of the actuarial professional. If the problems are grouped, we identify three problem sets: (i) problems with diligence – paragraphs VII.1. to VII.4. and by some means, paragraph VII.7; (ii) problems with personal requirements – paragraphs VII.5 to VII.6; and (iii) problems with professional requirements – paragraphs VII.7. to VII.8. The first mentioned grouping (i) appears to be the most significant problem set, with quality of actuarial assumptions (VII.1.) being the most prominent.

[20] This could change should the DC framework become more focused on the retirement target (such as replacement rate or pension benefit) – cf. IOPS Working Paper No. 25 *The concept of target retirement income: supervisory challenges.*

191. It is probably fair to say that the actuarial associations are aware of the existence of these types of problems and do have standards of practice and professional ethics in place. However, supervisors still have to make sure that these rules are consistently and effectively applied. Therefore, supervisory authorities need to have clear regulations regarding deadlines, transparency of their recommendations and disclosure of sources and actuarial assumptions in order to effectively address and report issues to actuarial associations with the expectation of disciplinary measures

APPENDIX: COUNTRIES THAT PARTICIPATED IN THE SURVEY

IOPS Members	IAA Members
Albania	Australia
Armenia	Austria
Australia	Bangladesh[21]
Austria	Barbados
Belgium	Bhutan
Brazil	Cambodia
Chile	Canada
Colombia	Croatia
Costa Rica	Finland
Czech Republic	Germany
Dominican Republic	Guyana
Egypt	India
FYR Macedonia	Japan
Hong Kong (China)	Korea
Hungary	Mexico
Iceland	Myanmar
Indonesia	The Netherlands
Ireland	Pakistan
Israel	South Africa
Italy	Spain
Jamaica	St Lucia
Kenya	St Vincent & the Grenadines
Kosovo	Sweden
Malawi	Switzerland
Maldives[22]	Trinidad & Tobago
Mauritius	United Kingdom
Namibia	United States of America
The Netherlands	Vietnam
Papua New Guinea	
Poland	
Portugal	
Romania	
Slovak Republic	
South Africa	
Spain	
Switzerland	
Tanzania	
Thailand	
Trinidad & Tobago	
Turkey[23]	
Zambia	

[21] The questionnaire was found to be hardly relevant to the jurisdiction's circumstances.

[22] Answers provided had normative character. As the survey sought to ascertain current practices, this information was not included in the analysis.

[23] The questionnaire was found to be beyond the domain of the authority, which resulted in its inability to provide the necessary information.