



INTERNATIONAL ACTUARIAL ASSOCIATION  
ASSOCIATION ACTUARIELLE INTERNATIONALE

**Measuring and Reporting  
Actuarial Obligations of Social  
Security Systems**

**Social Security  
Committee**

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# Measuring and Reporting Actuarial Obligations of Social Security Systems

**This paper has been developed and approved  
by the Social Security Committee of the IAA**



INTERNATIONAL ACTUARIAL ASSOCIATION  
ASSOCIATION ACTUARIELLE INTERNATIONALE

**Tel:** +1-613-236-0886 **Fax:** +1-613-236-1386  
**Email:** [secretariat@actuaries.org](mailto:secretariat@actuaries.org)  
1203-99 Metcalfe, Ottawa ON K1P 6L7 Canada  
[www.actuaries.org](http://www.actuaries.org)

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## Table of Contents

1. Executive Overview .....	4
2. Introduction .....	5
3. Nature of SSRs .....	6
4. Definitions of Obligations and Assets for Contributory SSRs .....	7
5. SSRs and their Long-Term Financial Sustainability .....	9
6. The Closed Group Approach for SSRs – Limitations.....	11
7. SSC Perspectives .....	12
8. Summary .....	14

## **1. Executive Overview**

Social security arrangements, particularly social security retirement systems (SSRSs), are founded through legislation and generally very important, both in sheer size and to their many stakeholders. Actuarial measurement of and reporting on their current and expected future financial status are crucial inputs to a proper understanding of their sustainability (their ability to fulfil current promises to pay benefits to people over the long term) and how they affect the finances of the government as a whole and the entire economy as measured in national accounts.

Many accounting and statistical agencies and institutions have already issued or are considering issuing guidelines on measuring and reporting actuarial obligations of social security systems. This principles-based paper presents the SSC's perspectives on measurement and reporting of actuarial obligations of SSRSs and emphasizes the importance of relevant disclosures.

In particular, this paper:

- a. Discusses the nature of SSRSs and how they differ from, say, occupational pensions,
- b. Discusses the importance of assessing long-term sustainability of SSRSs,
- c. Describes the attributes of open group and closed group actuarial valuation approaches,
- d. Emphasizes the value and importance of using open group approaches in valuing SSRSs and in assessing a SSRS's long-term sustainability,
- e. Explains why comprehensive disclosures are critical to supporting informed decision-making about SSRSs, and
- f. Encourages the involvement of qualified actuaries in performing actuarial calculations.

The SSC hopes that this paper will serve as useful reference to national and international organizations dealing with financial and statistical reporting in respect to social security systems.

## **2. Introduction**

A number of requirements related to the reporting of the actuarial obligations of SSRs in national accounts and financial statements of governments and SSRs have been promulgated or proposed by organizations such as the United Nations (UN), the International Public Sector Accounting Standards Board (IPSASB), the International Monetary Fund (IMF) and Eurostat. Currently, no reporting standards require the inclusion of SSR actuarial obligations in the core national accounts or main balance sheet in national financial statements. Thus, these obligations are not considered part of government debt. However, in several instances (e.g., under the requirements of European Statistical Accounts and for the Statement of Social Insurance (U.S.)), such obligations are expected to be disclosed as supplementary information.

This paper focuses on national SSRs and does not address government-financed national health services, long-term care, unemployment programs, pension plans for government employees and workers' compensation systems. As many SSRs provide ancillary benefits such as death benefits, survivor benefits and disability benefits, these benefits are usually included in the projections of future expenditures and in the calculations of actuarial obligations of such SSRs.

It is important to establish a clear distinction between social security on the one hand and "government-sponsored benefits" on the other – the latter referring to benefit programs where the government is acting as the employer for public sector workers. The accounting and reporting treatment of these latter programs is outside the scope of this paper.

The term "social security" would then be confined to public benefit systems that apply to the whole population of a country or at least to significant subsections. Within the universe of social security retirement systems, a further distinction between SSRs that are financed primarily by contributions from participants and their employers and/or earmarked taxes (contributory SSRs) and those that are financed by general tax revenues is made. The latter programs frequently provide some kind of minimum benefit, or a universal, residence-based or means-tested benefit. Finally, several SSRs include both contributory and non-contributory benefits. While we discuss programs primarily financed by general revenues in the paper, discussions regarding concepts of the obligations are restricted in this paper to contributory SSRs.

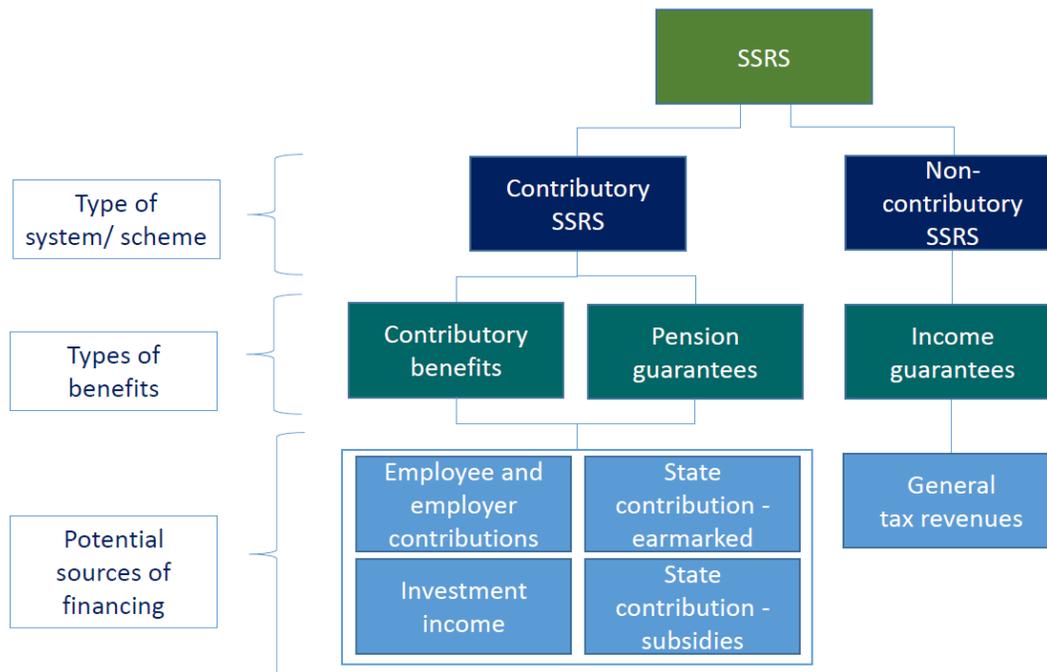
The paper discusses different definitions of the obligations and assets of SSRs and their usefulness when applied to various public pension financing strategies (i.e., pay-as-you-go and partially funded) other than fully-funded approaches (e.g., fully invested defined contribution plans, such as provident funds). Further, the paper discusses how the financial and statistical reporting of the obligations of SSRs can be structured to provide useful information regarding the long-term sustainability of such systems and gives an overview of the main limitations of using a closed group approach.

This paper endorses aligning reporting approaches with the financing approach used by the SSR. In particular, it emphasizes the importance of using the open group approach, which includes the effect of future new entrants, when measuring and reporting obligations for pay-as-you-go and partially funded SSRs. It also emphasizes the value of comprehensive disclosures that are critical to providing key stakeholders with relevant information that enables informed decision-making.

The SSC recognizes that there are several important methodological considerations (discount rate, length of projection period and valuation of redistributive features) that remain to be addressed. However, an in-depth analysis of these important topics is outside the scope of the paper. The SSC will consider preparing separate documents addressing these issues.

### 3. Nature of SSRs

Chart 1 provides a typology of SSRs utilized in this paper.



*Chart 1 SSRs Typology*

SSRSs around the world are quite diverse – no single methodology or approach to financial and statistical reporting could provide a full financial understanding of every single arrangement. The SSRs differ in respect to the benefits provided, the financing approach, and the sources of revenues. In general, such arrangements either pay benefits directly from general government revenues, or have contributions from employers, employees and/or earmarked government revenues. Some arrangements hold a dedicated fund established to receive contributions and support future benefit expenditures. Such funds are often separated from other government accounts.

Depending on its financing approach, its benefit eligibility provisions, inclusion of automatic adjustment mechanism in the design and the ultimate guarantor of benefits, future payments may be considered as liabilities, contingent liabilities or non-guaranteed obligations of government, depending partly on the standards for governmental accounting in the country. In this regard, we view an obligation to be a promise based on current law or regulations, or on a social contract; a commitment to pay a particular

sum of money; a duty; a responsibility. An obligation is also a liability when there is a legal responsibility for the obligation, as in a legal debt. Since SSRs are social contracts, the benefit promises constitute an obligation rather than a liability, the criteria of which are given in applicable financial reports. Thus, this paper will normally assign to the word “obligation” the meaning described above.

Many SSRs are subject to full actuarial review on a regular basis. Reports covering such reviews generally provide the most comprehensive information about the sustainability of these arrangements – that is, their cost and ability to continue to pay the promised benefits in the long term. This paper recognizes that other financial reports seek to cover SSRs at a more summarized level.

SSRs may appear very similar to occupational pension plans offered to employees by many employers, including those provided by governments to their employees. However, the key differences between SSRs and occupational pension plans make the direct application of financial reporting standards relevant to occupational pension plans to social security arrangements problematic.

Occupational pension plans need to be able to show that if the plan were to “end” tomorrow that there would be adequate assets set aside to pay all of the benefits accrued to date. We know of many examples of occupational plans where the plan sponsor declared bankruptcy at a time when the plan was underfunded leaving the plan participants with only a fraction of the value they legitimately expected. Alternatively, this type of financing may be interpreted as each generation of employees paying for its own benefits (together with an employer). Thus, measures used in the financial reporting of occupational pension often indicate the level of sufficiency of the accumulated (investable) assets to pay for the accrued benefits.

SSRs are different. SSRs are usually based on an explicit or implicit “social contract” under which the working age population pays contributions or taxes which benefit those in receipt of retirement benefits. In turn, today’s working age population can expect that when they themselves reach advanced ages, the next working generation will pay contributions or taxes to support the benefits they will receive. The social contract nature of SSRs may make accumulation of investable assets neither imperative, nor practical or desirable.

#### **4. Definitions of Obligations and Assets for Contributory SSRs**

In this section, we provide three possible approaches to defining and measuring the obligations and assets for contributory social security systems (contributory social security systems are those systems financed at least partly by employer and employee contributions and/or earmarked taxes). The difference between obligations and assets will be called the *net pension obligation*. Chart 2 illustrates these concepts.

The three approaches are:

i. *Closed group approach without future accruals.*

Under this approach, the obligations are equal to the present value of all expected future benefits to existing pensioners and all accrued rights<sup>1</sup> of current contributors/taxpayers. Assets include the amount of the existing reserve of the SSRS (i.e., any investable assets).

The net pension obligation under this closed group approach without future accruals represents the additional resources that would be required to fully fund the accrued-to-date obligations. It can also be thought of as the additional resources needed if the SSRS were to be closed down (e.g., in order to start a new one) while honouring all past accruals. In concept, this is similar to a termination reserve in a private sector or occupational pension plan.

The obligations determined under this closed group approach, called the accrued-to-date pension liability, are required to be disclosed from the end of 2017 in supplementary Table 29 under the Eurostat pension exercise in accordance with the European System of National and Regional Accounts 2010 (the ESA 2010).

ii. *Closed group approach with future accruals.*

Under this approach, the obligations are equal to the present value of all expected future benefits to existing pensioners and all accrued and future rights of current contributors/taxpayers. Assets include the amount of the existing reserve of the pension system (i.e., any investable assets) and the present value of future contributions with respect to future benefits of current contributors/taxpayers.

This definition corresponds to the situation where the system becomes closed to new entrants but honours accrued and future rights for existing participants.

This approach is sometimes referred to as the insurance approach and was presented as one of the options in IPSASB Consultation paper "Recognition and Measurement of Social Benefits"<sup>2</sup>.

iii. *Open group approach.*

This approach takes into consideration (1) all current beneficiaries and contributors to the SSRS, as well as (2) future beneficiaries and contributors to the SSRS. Consideration of *future* beneficiaries and contributors is why this approach is referred to as *open group*, and it is what distinguishes this approach from the two *closed group* approaches described above. SSRS measurements under an open group approach take into account future contributions from, and associated benefits to, both groups (1) and (2).

This approach can be used to determine whether an SSRS's current reserve in combination with future contributions (which together comprise the system's assets) is expected to be sufficient to pay for all future benefit expenditures (the system's obligations). Thus, unlike closed group approaches that are often used to develop single point in time measures like the net pension obligation, the open group

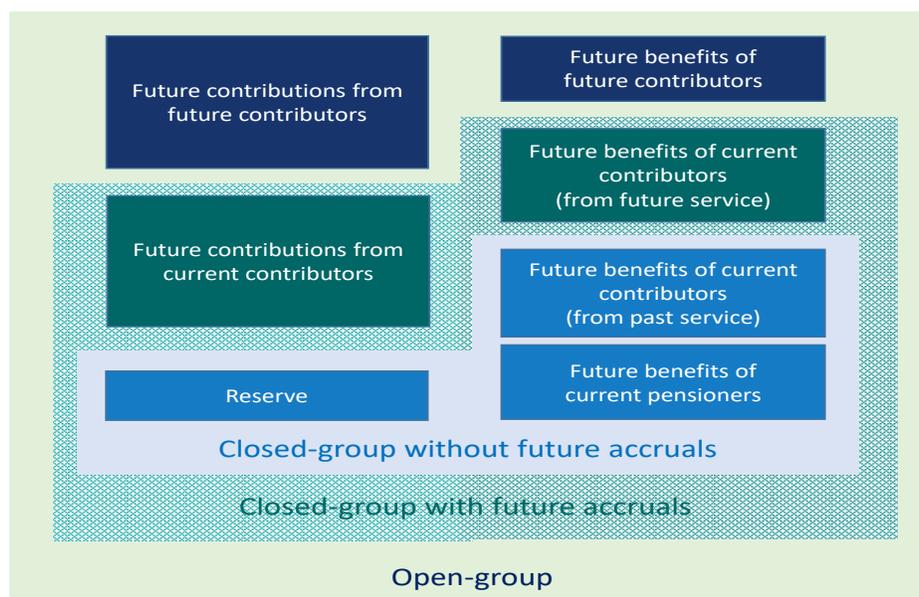
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<sup>1</sup> Such calculations usually take into account future legislated increases in benefits (such as indexation of benefits in pay). Whether future salary increases are considered would depend on the provisions of a SSRS.

<sup>2</sup> <https://www.ifac.org/publications-resources/recognition-and-measurement-social-benefits>

approach enables relevant measurements that support long-term sustainability assessments of ongoing SSRs.

The open group approach explicitly accounts for the intergenerational social contract nature of SSRs, as will be explained further in Part 5 of this paper.



*Chart 2 SSR Obligations and Assets under Closed and Open Group Approaches*

## **5. SSRs and their Long-Term Financial Sustainability**

The majority of SSRs are based on societal commitments (social contracts) within and between generations. Thus, SSRs are conceptually different from occupational pension systems, which are most often based on commitments that remain wholly within a generation. In other words, unlike SSRs, occupational pensions are nearly always premised on each generation of beneficiaries funding its own benefits.

While both social contract and occupational pension system paradigms can accommodate defined benefit retirement commitments, the similarities stop there. The financing of pension commitments within a generation is very different from the financing of such commitments across generations. Thus, it follows that the relevance of different types of reporting and accounting will differ as well.

Full funding, or the focus on measurements that look at funding status, are relevant to assessing occupational pensions and their ability to deliver on their particular promise, given available resources. Funded status measurements are normally accomplished by closed group valuations.

However, since SSRs are cross-generational social contracts based on extensive risk pooling and solidarity within and between generations, full funding is not called for and may not even be possible.

The size of pension obligations on the closed group basis is likely to be very large for the majority of countries. For example, in the Euro area, as suggested by a study undertaken by the European

Commission (Eurostat)/ECB Task Force on Pensions<sup>3</sup>, it is estimated that the closed group pension obligations of social security in the Euro area is about 280 percent of GDP. For example, the closed group social security pension obligations for Germany is estimated to be 275 percent of GDP, while for France and Italy it is 292 and 322 percent of GDP, respectively. Given the magnitude of these closed group obligations, it is unrealistic to expect that countries will have sufficient financial market capacities to fully fund their SSSRs on a closed group basis.

As a result, the majority of defined benefit SSRs are financed using pay-as-you-go or, at most, partially funded approaches. By definition, this means that by design, the majority of defined benefit SSRs around the world will never have a level of reserves equivalent to full funding under the closed group approach.

One of the goals of reporting on a closed group basis is to assess the protection of benefits. A private company can go bankrupt at any moment or be unable to finance accruing benefits in an occupational pension plan. As a result, plan participants are best protected by the existence of investable assets consistent with its liabilities accrued to date. However, usually it is unrealistic to assume that an SSRs would suddenly cease operations (without any replacement program put in place), resulting in a cessation of contributions, other than in extreme circumstances such as war or invasion (and even then, only a temporary suspension of contributions may be involved). The social contract nature of SSRs, the ability to change program provisions and future contributions and/or taxes either through political decisions or by applying automatic adjustment mechanisms ensure that a SSRs continues “indefinitely”.

The design and financing of SSRs are usually driven by country-wide demographic variables such as fertility, migration and mortality and are related to overall economic growth. Therefore, the projections related to future evolution of demographic and economic environments of a country are necessary for the assessment of the financial state of SSRs. These often dynamic factors have a significant impact on an SSRs’s long-term sustainability.

Under pay-as-you-go and partial funding financing approaches, it is understood that current contributors allow the use of their contributions or taxes to pay current pensioners’ benefits. This implicit social contract between and among different generations creates implicit claims for current and past contributors to the contributions of future contributors. Therefore, social security financing is considered adequate if projections indicate that, in each period, revenues (contributions plus investment income) are sufficient to meet benefit payments. The most explicit way to assess such adequacy is to consider projected cash flows<sup>4</sup>. In essence, these are projections under the open group where both future contributors and beneficiaries are considered.

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<sup>3</sup> R. Mink, Household pension entitlements under government schemes in the euro area, 2010  
[http://www.ecb.europa.eu/events/pdf/conferences/fip/Presentation\\_Reimund\\_Mink.pdf?228f5f6df905607229f768e8a4ea7634](http://www.ecb.europa.eu/events/pdf/conferences/fip/Presentation_Reimund_Mink.pdf?228f5f6df905607229f768e8a4ea7634)

<sup>4</sup> Methodologies employed in the actuarial valuation of SSRs involve projections of future cash flows of revenues and expenditures for both current and future program participants. Examples of such methodologies include the steady-state method used in Canada for the Canada Pension Plan, the actuarial balance method used in the United States for its Old-Age, Survivor and Disability Insurance and the general average premium method used in many countries where the International Labour Organization has helped to establish SSRs. Comparison of open group obligations and assets is a relevant alternative measure of long-term sustainability of an SSRs.

Therefore, when there is a need to measure actuarial obligations and assets of pay-as-you-go and partially funded pension systems the most appropriate methodology is the open group approach, which takes into account to the multigenerational nature of SSRs.

In the end, actuarial measurement and management of the long-term financial sustainability of any SSR is crucial so that it may continue to fulfill its role in providing retirement benefits to large segments of the population. Open group valuation approaches are foundational to such actuarial measurements. Closed group valuation approaches, which are useful for funded status assessments of occupational and other similar pension programs, lack the essential capacity to assess an SSR's cash flows over time. The limitations of closed group approaches in valuing SSRs are further explored in Section 6 of this paper.

The SSC endorses the open group valuation approach as an important basis for sustainability measurements for SSRs that are either partially funded or pay-as-you-go. In fact, the IAA, which develops and makes available model standards of actuarial practice for use by authorized actuarial standard-setters world-wide in setting their own practice standards, has issued a model standard for actuarial work related to SSRs (International Standard of Actuarial Practice 2, Financial Analysis of Social Security Programs<sup>5</sup>) which similarly endorses the appropriateness of the open group valuation approach.

## **6. The Closed Group Approach for SSRs – Limitations**

The closed group methodology may provide relevant information in support of SSRs that are financed using fully-funded approaches (e.g., fully invested defined contribution plans, such as provident funds).

However, for pay-as-you-go or partially funded SSRs, stakeholders should be aware of the significant limitations associated with reporting solely on the net pension obligation as a single number under the closed group approach.

Here are several examples of the limitations of using only a net pension obligation determined under a closed group approach to assess the long-term sustainability of SSRs:

- a. It will not indicate that two national SSRs with the same accrued-to-date obligations on a closed-group basis may have very different sustainability statuses. For example, they might be subject to a different expected future evolution of demographics and economics (which are not considered by the closed group) or they might be at different levels of financing<sup>6</sup>.
- b. It does not provide an adequate basis to assess the full impact of pension reforms. Any change in the value of the accrued-to-date pension obligations resulting from pension reform would only incorporate the impact on current pensions in payment and future pension payments that correspond to the accrued-to-date benefit entitlements of current contributors. This is important

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<sup>5</sup> [http://www.actuaries.org/CTTEES\\_ASC/isaps/Final\\_ISAPs\\_posted/Conformance\\_Changes\\_Final\\_ISAPs\\_posted/ISAP2\\_Conformance\\_April2017.pdf](http://www.actuaries.org/CTTEES_ASC/isaps/Final_ISAPs_posted/Conformance_Changes_Final_ISAPs_posted/ISAP2_Conformance_April2017.pdf)

<sup>6</sup> For example, see slide 9 of <http://www.osfi-bsif.gc.ca/Eng/Docs/OCA-Assia-Billig-03092016-Slides.pdf> and associated speaking notes <http://www.osfi-bsif.gc.ca/Eng/Docs/OCA-Assia-Billig-03092016-notes.pdf>

because, typically, the largest financial impact of pension reforms is on future pension payments that correspond to the future service benefit entitlements of current contributors and the pension benefits of new workers. This means that, under the closed group methodology, the financial impact of pension reforms could be significantly underestimated or missed altogether.

- c. It may introduce comparability issues in relation to pension scheme maturity. When the accrued-to-date pension obligations of various countries are compared, it is important to note that the size of accrued-to-date pension obligations depends on the stage of maturity of the national SSRS. Countries with mature pension systems may have large accrued pension obligations, but they might be financially sustainable when considering the net pension obligations under the open group method. In contrast, for countries which operate a relatively new SSRS with relatively low accrued-to-date pension obligations, this does not mean that the system is necessarily in a sound financial position when considering the net pension obligations under the open group method.
- d. It may introduce a bias for or against a particular financing approach. A system which is fully funded on a closed group basis without future accruals may be unsustainable, while a pay-as-you-go scheme on an open group basis might be sustainable. However, if the accrued-to-date net obligations are used, the opposite perception would be created since the future demographic and economic developments of a country are not taken into account under the closed group approach.

The above examples relate to the closed group without future accruals methodology. However, unless a SSRS is closed to new entrants, similar issues may arise when the closed group with future accruals methodology is used.

Finally, reporting a single number such as a net pension obligation developed using a closed group approach may inadvertently communicate a serious financial problem that simply may not exist. A sustainably funded SSRS may very likely report a large net pension obligation on a closed group basis. However, without an appropriate statement of that number's limitations, or an accompanying clear communication about appropriate sustainability measures using an open group approach, the potential for misunderstanding is significant.

## **7. SSC Perspectives**

The SSC is concerned that required disclosures that focus primarily on the accrued-to-date, closed group SSRS obligations (gross or net) provide an incomplete picture of the financial status and sustainability of such systems. The SSC supports more comprehensive disclosures that provide meaningful information and perspective that the SSC believes to be critically important and relevant to decision-makers.

Therefore, the SSC proposes that organizations developing or advising on financial and statistical reporting standards in respect to SSRSs consider the following:

- a. In general, appropriate methodologies for accounting and/or statistical reporting should enable the accurate assessment of the long-term financial sustainability of any SSRS and/or the cost of benefits without a bias for or against a particular financing approach. It would be more useful for decision-makers if the accounting and national reporting treatment were aligned with the

financing methodology. This is particularly so for SSRSs that are financed using pay-as-you-go or partial funding, where information regarding sustainability is provided by an open group approach that includes the expected benefit payments to and contribution income and/or earmarked taxes from future participants based on the expected future demographic and economic environments.

- b. All disclosed information with respect to SSRS obligations should be accompanied by information about the corresponding assets, both investable assets (reserves) and future contributions/earmarked taxes.
- c. Suggested disclosures with regard to contributory SSRSs<sup>7</sup>:
  - i. A description of the financing approach and actuarial measures used to assess the financial sustainability of the SSRS, as well as the main results of the latest actuarial report assessing the financial sustainability of the SSRS. Such results may include projections of future expenditures and revenues expressed either as absolute values or as a percentage of a projected relevant base (e.g., GDP or total contributory earnings);
  - ii. Illustration of uncertainty of results and sensitivity of actuarial measures to different economic and demographic environments;
  - iii. Obligations and assets on a basis that is aligned with the financing methodology; and
  - iv. Where there is a requirement for a pay-as-you-go and partially funded system to disclose obligations and assets on a closed group basis, a supplemental disclosure of numbers prepared on an open group basis – with a reconciliation between the two sets of numbers and an explanation of how to interpret the figures properly.
- d. Suggested disclosures with regard to purely non-contributory SSRSs that are financed from general tax revenues<sup>8</sup>:
  - i. Actuarial projections of future cash flows, prepared on a regular basis;
  - ii. For cross-country comparability purposes, costs expressed as a percentage of future GDP;
  - iii. Illustration of uncertainty of results and sensitivity of future cash flows to different economic and demographic environments.
- e. For contributory SSRSs that provide minimum pension guarantees and other non-contributory benefits which are financed by either earmarked tax revenues (state contributions) or general tax revenues (state subsidies) the SSC suggests:
  - i. Separate presentations of the information for contribution-financed, earmarked tax-financed and general tax-financed benefits, combining the approaches described above<sup>9</sup>;

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<sup>7</sup> An example of such disclosures can be found in Public Accounts of Canada for the Canada Pension Plan.

<sup>8</sup> Disclosure of a single actuarial obligation figure may not be appropriate for such SSRSs given the often-conditional nature of the benefits and the general ability of the government to change future benefits and/or the entitlement to those benefits.

<sup>9</sup> The SSC understands that this may not be always easy to achieve due to interrelated nature of the benefits under such types of programs.

- ii. Such separate presentations will facilitate proper country comparisons and avoid a bias against hybrid systems that have both contributory and non-contributory elements.

The SSC believes that a proper assessment of the financial sustainability of SSRSs requires measurement of obligations and projections of cash flows performed by qualified actuaries applying sound actuarial principles. The SSC further encourages the involvement of qualified actuaries in relevant discussions of national and/or international accounting and statistical reporting for SSRS.

## **8. Summary**

The perspectives presented in this paper are based on the fact that Social Security Retirement Systems (SSRSs) rely on extensive multigenerational risk pooling, considerable income redistribution and solidarity – even in the systems that have some degree of linkage of benefits to contributions. SSRSs constitute social contracts that bind together large population groups and several generations. Each country chooses the mix of financing approaches, pay-as-you-go and pre-funding, which best suits its economic, demographic, social and political environment. It is therefore of paramount concern that SSRS's are financially and intergenerationally sustainable in the long term, and that reported information concerning them reflects their long-term social nature and facilitates well-informed policy decisions and relevant comparisons.

With these perspectives in mind, the Social Security Committee (SSC) of the International Actuarial Association endorses aligning the reporting approach with the financing approach used by an SSRS. In particular, the SSC emphasizes the importance of using an open group approach, which includes the effect of future new entrants, when measuring and reporting obligations for pay-as-you-go and partially funded SSRSs.

Where reporting under closed group valuation approaches are mandated for such SSRSs, the SSC believes that additional comprehensive disclosures of open group measures are essential in providing stakeholders with decision-useful information regarding long-term system sustainability.

The SSC believes that a proper assessment of the financial sustainability of any SSRS requires measurements performed by a qualified actuary applying sound actuarial principles.

Finally, the SSC further encourages the involvement of qualified actuaries in relevant discussions of national and/or international accounting and statistical reporting for SSRS.