

New data collection on accrued-to-date social insurance pension entitlements in a national accounts context: Main findings**SDD WORKING PAPER No. 107**

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Abstract / Résumé

This paper analyses results on social insurance pension liabilities and entitlements across OECD countries, on the basis of a new data collection. In addition to information on employment-related schemes (covered in the central framework of the national accounts), this new data collection also includes information related to social security pension schemes. As the latter make up a large part of pension liabilities and entitlements, this new data collection provides important new insights into the role of social insurance pensions across OECD countries and on how countries may be affected by ageing populations. The results show that pension liabilities and entitlements are, on average, more significant in European countries than in non-European OECD countries. Furthermore, the results show an increasing preference for defined contribution schemes over defined benefit schemes for private pension schemes, possibly in order to address some of the challenges brought about by an ageing society.

Keywords: Pensions, social insurance, ageing, national accounts, central framework.
JEL classification: E01, H55, H75, J32.

Cet article présente les résultats d'une nouvelle collecte de données sur les engagements et les droits relatifs aux pensions d'assurance sociale dans les pays de l'OCDE. Outre les informations sur les régimes liés à l'emploi (couverts dans le cadre central des comptes nationaux), des informations relatives aux régimes de retraite de la sécurité sociale complètent ces données. Ces derniers représentant une part importante des engagements et des droits à pension, leur prise en compte fournit de nouvelles informations sur le rôle des pensions d'assurance sociale dans les pays de l'OCDE et sur la manière dont les pays peuvent être affectés par le vieillissement de la population. Les résultats montrent que les engagements et les droits à pension sont en moyenne plus importants dans les pays européens que dans les pays non européens de l'OCDE. Il ressort également une préférence croissante dans le secteur privé, pour les régimes à cotisations définies par rapport aux régimes à prestations définies, liée aux défis du vieillissement démographique.

Mots clés : Retraites, assurance sociale, vieillissement, comptes nationaux, cadre central.
Classification JEL : E01, H55, H75, J32.

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1. Introduction

1.1. Background

1. Interest in pension statistics continues to increase, driven mainly by concerns about the solvency of pension systems and policy issues regarding generational equity, especially in ageing societies. The system of national accounts provides a lot of information, but as the central framework of national accounts only recognises liabilities for employment-related and individual pension schemes, and excludes social security type pension schemes, it only provides a partial picture. Furthermore, due to difficulties some countries have in drawing the line between employment-related and social security pension schemes, the international comparability of pension data may in some cases be compromised. For these reasons, the 2008 SNA introduced a supplementary table on social insurance pension schemes (Table 17.10), to provide a more comprehensive overview of liabilities of all social insurance pension schemes in an economy: both those that are recognised in the central framework of the national accounts and those that are not.

2. In December 2017, Eurostat began collecting pension data for the supplementary table from its member countries, focusing on reference year 2015, and published the results in December 2018.³ The OECD started to collect data from non-EU member states of the OECD in 2018, also focusing on reference year 2015 in order to ensure comparability with results for the EU countries, and published these results (including metadata per country) in October 2020.⁴ Both Eurostat and the OECD will collect these data every three years, the next collection being launched in 2020 focusing on reference year 2018. Data will become available approximately 24 months after the reference year,⁵ which means that the results of the new round of data collection will become available in the course of 2021. In addition to information on pension liabilities from the viewpoint of domestic pension schemes (as covered in Table 17.10), the OECD data collection (referred to as Table 2900 in this paper) also includes columns to derive data on pension entitlements from the viewpoint of resident households. This paper provides an overview of the table and presents results for a range of countries.⁶

1.2. Purpose of the database

3. The purpose of the supplementary table is to present a comprehensive overview of all social insurance pension schemes in a country, i.e. both those recorded in the central framework of the national accounts and those that are excluded from the core tables. The supplementary table, covering both employment-related pension schemes and social security pension schemes, thus provides a complete overview of social insurance pensions in a given country, allowing for substantially improved comparability of relevant results across countries.

4. As explained in §8.65 of the 2008 SNA, a social insurance scheme is an insurance scheme which meets the following two criteria: (i) the benefits received are conditional on participation in the scheme and constitute social benefits as defined in the SNA; and (ii) at least one of the three following conditions is met:

³ These were partially updated in August 2019.

⁴ See http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA_TABLE29.

⁵ Please note that a lot of the data for Table 17.10 relies on actuarial information which often only becomes available with a certain time lag.

⁶ The paper includes data and metadata as received up until the 31st of August 2020.

- Participation in the scheme is obligatory either by law or under the terms and conditions of employment of an employee, or group of employees;
- The scheme is collective, operated for the benefit of a designated group of workers, whether employed or non-employed, participation being restricted to members of that group;
- An employer makes a contribution (actual or imputed) to the scheme on behalf of an employee, whether or not the employee also makes a contribution.

5. Pension benefits provided via social security are commonly known as first pillar pensions. They are not recorded as assets of households or liabilities of government in the central framework of national accounts, as governments have the possibility to unilaterally change the basis on which the entitlements are determined (see §17.192 of the 2008 SNA).⁷ For that reason, they are only recorded in the supplementary table. Employment-related (or occupational) schemes, are schemes which derive from an employer-employee relationship, in which the entitlements to social insurance benefits are secured as part of the conditions of employment (see §8.7 of the 2008 SNA). Employment-related schemes (which can relate either to private or public employment)⁸ are often referred to as second pillar pensions. The third pillar refers to individual voluntary pension schemes. These schemes are individual agreements between a contractor and a pension provider, and may be set up by the contractor independent of whether he/she is employed, self-employed or unemployed. As these schemes are voluntary pension schemes, they are not part of social insurance and not covered in the supplementary table. Furthermore, the scope of social insurance stipulates that social assistance (where there is no contribution to the scheme) is also not covered in the table. Annex A provides more information on the specific differences between the various types of schemes and possible delineation issues.

6. It is worth mentioning here that there are two other OECD pension data collections, one led by the Directorate for Financial and Enterprise Affairs (DAF) and another one by the Directorate for Employment, Labour and Social Affairs (ELS). They focus on different aspects of pension schemes and also apply slightly different classifications. The similarities and differences, as compared to the terminology and definitions as applied in Table 2900, are summarised in Box 1.1 below.

Box 1.1. Other pension data collections at the OECD – Similarities and differences

The present paper refers to a new pension data collection by the OECD Statistics and Data Directorate (SDD) to provide a comprehensive overview of social insurance pension liabilities and entitlements at the macroeconomic level. However, it is important to clarify that the OECD has two other data collections on pensions, serving different policy needs.

The first is led by the Directorate for Financial and Enterprise Affairs (DAF) and aims to provide insight into the financial aspects of funded and private pension arrangements. This data collection was launched in 2002 by the *Working Party on Private Pensions* and its *Task Force on Pension Statistics* and collects information on the amount of accumulated assets, the way these assets are invested in financial markets and their investment performance, by type of plan (i.e. occupational/personal and defined benefit/defined

⁷ For more information on this issue see Zwijnenburg (2016), pp. 3.

⁸ In this respect, it should be borne in mind that the distinction between ‘public’ and ‘private’ schemes (and between ‘pay-as-you-go’ and ‘funded’ schemes) is not a decisive criterion in distinguishing between social security and employment-related pension schemes (for more information see Zwijnenburg (2016)).

contribution). It also gathers information on the number of members covered by a pension arrangement, their contributions and the benefits that they receive at retirement. The main difference in scope is that the DAF collection only focuses on private schemes and on funded public schemes, whereas the national accounts' data collection also includes unfunded public schemes, but does not include voluntary individual pension schemes. Furthermore, the DAF collection mainly focuses on the assets of the pension funds, collecting only a limited number of items related to pension liabilities, whereas the SDD data collection specifically focuses on the liabilities, aiming for a full reconciliation in their change over time.

The second data collection on pensions is led by the Directorate for Employment, Labour and Social Affairs (ELS) and aims to provide a detailed overview of the main characteristics of pension systems across OECD countries as an input for the OECD Pensions at a Glance (PAG) Database (jointly developed with DAF) (<https://doi.org/10.1787/b6d3dcfc-en>).⁹ As such, it focuses on the design of entire pension systems, collecting information on old-age safety-nets, contribution rates, entitlement accruals, qualifying conditions and future replacement rates. The taxonomy used in PAG differs from the three pillars taxonomy used in the context of Table 2900 and classifies pensions instead according to three tiers.¹⁰ The first 'mandatory' tier, i.e. minimum pensions, basic pensions and old-age safety-nets, generates retirement income independent of past earnings and comprises programmes offering the first layer of social protection in old age. PAG's first tier generally corresponds to social assistance pensions which are beyond the scope of the national accounts' supplementary table. The second 'mandatory' tier covers earning-related pension schemes which broadly correspond to social security pensions and mandatory employment-related schemes, which are covered respectively in the first and second pillar of Table 2900. The third tier covers individual voluntary pensions (i.e. not linked to any employment relation) which are beyond the scope of the national accounts collection on social insurance pension schemes (these schemes are covered in the third pillar), but also voluntary employment-related pensions which are included in the national accounts table. In addition to applying a different taxonomy, the results of the PAG publication also deviate from those included in the supplementary table, as it relies on a single set of actuarial assumptions (e.g. the real discount rate is assumed to be 2% per year), whereas these assumptions may differ across countries in Table 2900, depending on country-specific characteristics (guidance being provided on how to determine the relevant assumptions at the country level).¹¹

7. Based on the explanation above, Figure 1.1 provides a schematic overview of the types of schemes included in the supplementary table on social insurance pension schemes. While this overview seems straightforward from a conceptual point of view, it should be highlighted that this is not always the case from a practical point of view. Given the

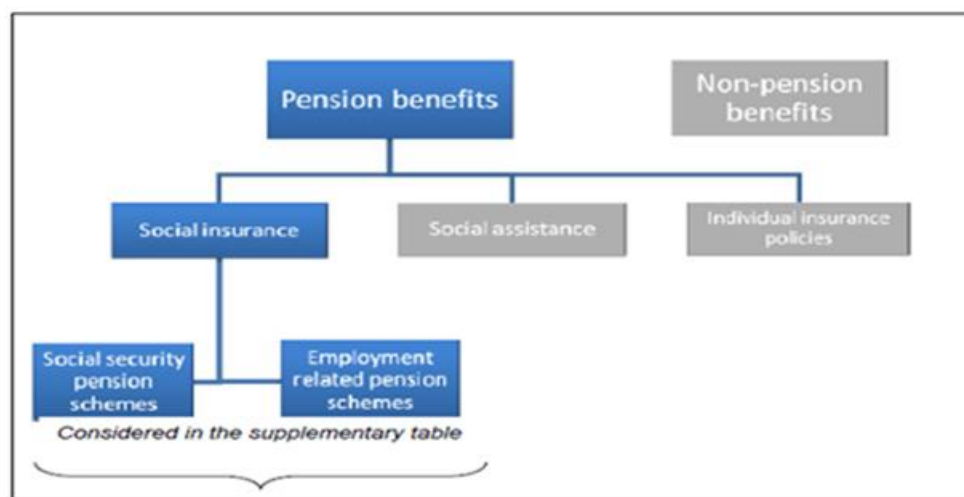
⁹ PAG presents data on pension expenditure from the OECD Social Expenditure Database (SOCX) which was developed to analyse trends in social spending and its composition at the detailed social expenditure programme level and, thereby, provides more detailed information than what is being collected in the area of national accounts. SOCX includes internationally comparable statistics on public, mandatory and voluntary private social expenditure. Among nine areas of social policy, SOCX distinguishes old-age expenditure that comprises all cash expenditures (i.e., both public and private, including lump-sum payments) on old-age pensions (www.oecd.org/social/soc/SOCX_Manuel_2019.pdf).

¹⁰ See Chapter 4 of the 2019 edition of the PAG publication. The publication mainly focuses on the first two tiers, but also provides information on widespread voluntary schemes (i.e. the third tier).

¹¹ This is believed to provide more comparable results across and within countries, taking into account that economic differences across countries may be quite pronounced.

complex historical evolution of pension schemes and the variety of pension arrangements across countries, it is not always easy to draw the line between the various types of schemes (see also Annex A).

Figure 1.1. Coverage of table on social insurance pension schemes



Source: Eurostat, European Central Bank (2011).

1.3. Overview of accrued-to-date pension liabilities and entitlements

8. The supplementary table presents ‘accrued-to-date’ liabilities and entitlements, reflecting the pension entitlements of the retired population as well as the pension entitlements that have been accrued up until the end of the reference period by future beneficiaries. The accrued-to-date method is also known as the closed group without future accruals method, and includes only the benefits that current members (hence closed groups)¹² have earned up to the present period in the calculation (hence without future accrual).¹³ This method provides an estimate of the cost of a hypothetical termination of a pension scheme at the reference date, i.e. the amount due if the accrued future pension entitlements had to be paid out at the reference date. Furthermore, it can be interpreted as representing an asset from the households’ perspective in national accounts’ terminology, which provides valuable information for the analysis of household wealth, as well as of households’ consumption and saving decisions.

9. Entitlements of resident households do not exactly match the liabilities of domestic pension schemes due to flows and positions *vis-à-vis* the rest of the world. This is why, in addition to columns reflecting the flows and positions of social insurance pension liabilities of domestic pension schemes, the social insurance pensions table also includes columns to reflect the counterparts of these liabilities, and an additional column for pension

¹² This means that it does not include any benefits that will be accrued in the future by members that are not yet part of the group.

¹³ Two other methods that are often used to measure pension liabilities concern: (i) the closed group with future accrual, which also takes into account the entitlements that current members will accrue in the future; and (ii) the open group with future accrual, which - in addition to the accrual of future pension entitlements by current members - also takes into account the accrual of future entitlements by future members of the scheme.

entitlements of resident households accrued abroad. This information helps to derive the total pension entitlements of resident households.

10. It is important to note that the results presented in this paper should not be considered as indicators of the sustainability of the various types of pension schemes. In this regard, it should be understood that the numbers only provide insight into the pension obligations that have been accrued up to the current period. This approach does not include (the discounted value of) any future contributions that will be made by current members and by future generations that, in a pay-as-you-go scheme, will fund the benefits that have to be paid out in the future (including those that have already been accrued). From the perspective of long-term sustainability, the open group method with future accrual¹⁴ is usually regarded as providing a more comprehensive evaluation, as it accounts for the discounted values of both the future benefits and the future contributions.

1.4. Outline of the paper

11. This paper presents results of annual estimates of liabilities and entitlements in social insurance pensions according to Table 2900, mainly focusing on results for non-EU OECD countries, but also presenting results for EU countries. The paper is structured as follows: Section 2 describes what is covered in the columns and rows of the supplementary table on social insurance pension schemes; Section 3 discusses the results that were received up until the 31th of August, 2020; and Section 4 concludes the paper.

2. Layout of the table

2.1. Explanation of the rows and columns

12. The supplementary table on social insurance pension schemes (see Annex B) shows all positions and flows related to pension obligations for all different types of social insurance pension schemes in an economy. It also includes information on the corresponding entitlements. In line with the 2008 SNA, the pension liabilities show the amount of entitlements accrued by the current workforce and current pensioners by the end of the reporting period. This corresponds to the closed group approach (i.e. future entrants are not considered) without future accrual (i.e. future contributions are not considered).

13. The table distinguishes pension schemes (the columns of the table) by five criteria:

- by type of recording: positions and flows of pension schemes for which the pension liabilities are recorded in the central framework of the national accounts (columns A, B, C, D, E and F), versus positions and flows of pension schemes for which the pension liabilities are only recorded in the supplementary table on social insurance pension schemes (columns G and H);
- by type of pension manager: schemes managed by non-general government (columns A, B and C) versus schemes managed by general government (columns D, E, F, G and H);¹⁵

¹⁴ See also footnote 13.

¹⁵ It is important to note that pension schemes for general government employees can be managed by a general government unit, but administered by an autonomous pension fund. In that case, the pension schemes are classified in the financial corporations' sector and not in the government sector in the central framework of the SNA.

- by type of benefit formula: defined contribution schemes (columns A and D) versus defined benefit schemes (columns B and E, F, G and H);¹⁶
- by type of administrator (for government sponsored defined benefit schemes): schemes administered by autonomous pension funds (column E) versus funds administered by general government (column F);
- by type of pension scheme (for government sponsored defined benefit schemes): employment-related schemes (columns E, F and G) versus social security pension schemes (column H).

14. An important distinction, as mentioned above, is the one between defined contribution schemes and defined benefit schemes. A defined contribution (DC) scheme is one where the benefits payable to a beneficiary on retirement are defined exclusively in terms of the level of funds built up from the contributions made over time and the increases in value that result from the investment of these funds by the manager of the scheme. The entire risk of the scheme to provide an adequate income in retirement is thus borne by the beneficiary (see §17.128 of the 2008 SNA). As defined in §17.129 of the 2008 SNA, a defined benefit (DB) scheme is one where the benefits payable to a beneficiary on retirement are determined by the use of a formula, often based on a certain percentage of past labour earnings. Unlike DC schemes, the risk of a DB scheme to provide an adequate income in retirement is borne by the manager of the fund.

15. Also worth noting is the difference between the role of the pension manager and the administrator in columns E and F. The pension manager is the entity responsible for managing the scheme, i.e. determining the terms of the scheme and bearing the ultimate responsibility for the entitlements, and therefore for any shortfall in the funds to meet the entitlements and having the right to any excess funds. The pension administrator is the entity that is responsible for the day-to-day administration of the pension scheme. In the central framework of the national accounts, pension liabilities are recorded according to the sector classification of the pension administrator. In some cases, the same unit may carry out both the functions of pension manager and pension administrator, but in other cases these roles may be performed by two different units. In the latter case, the administrator is classified as a financial corporation. While this distinction may be relevant for all schemes, in the table it is made only for DB pension schemes managed by the general government. Within this group, schemes administered by an autonomous pension fund which are classified in the financial corporations sector (column E) are to be distinguished from those administered by, and classified in, the government sector (column F).

16. The table also contains columns to reflect the counterparts of the pension liabilities, i.e. resident and non-resident households:

¹⁶ In addition to pure DB and DC schemes, hybrid schemes exist that combine the characteristics of DC and DB schemes. In these schemes, the risk of providing an adequate retirement income is shared between the pension manager and the beneficiary of the scheme. The most important forms of such hybrid schemes are notional defined contribution (NDC) schemes, which are similar to DC schemes but, usually, include a guaranteed minimum amount payable. These usually show up in public schemes. In NDC schemes, contributions from both employees and employers are credited to and accumulated on individual accounts. These individual accounts are notional in the sense that the contributions to the schemes are used to pay pension benefits of current pensioners. In the table, hybrid schemes are not distinguished separately, but combined with defined benefit schemes. It should also be noted that for “pure” defined benefit schemes, in the case of shortfalls, renegotiations of the terms and conditions may have an impact on previously agreed benefits.

- resident households' entitlements towards resident pension schemes recorded in column J, and those towards non-resident pension schemes in column L;
 - in the case where non-resident households have pension entitlements towards domestic pension schemes, this is recorded in column K.
17. The rows in the table contain a full reconciliation between the opening stock of pension liabilities and entitlements at the beginning of a period, and the closing stock at the end of a period. The main rows can be described as follows:
- opening stock of entitlements (LS_F63, row 1);
 - net social contributions relating to pension schemes received by pension schemes (D61, row 2), compiled as sum of the contributions (D6111 to D6141, rows 2.1 to 2.4)¹⁷ minus the service charges (D61SC, row 2.5);
 - other actuarial changes (only relating to social security) (D619, row 3), reflecting the difference between the increase in social security pension entitlements accruing in the current year (plus the cost of operating the scheme) and the actually paid social security pension contributions in that year;¹⁸
 - pension benefits paid (D62, row 4);
 - adjustment for the change in pension entitlements (D8, row 5), compiled as sum of net social contributions (row 2) and other actuarial changes (row 3) minus pension benefits (row 4);
 - changes in entitlements due to transfers of entitlements between pension schemes (D81, row 6) or negotiated changes in scheme structure (D82, row 7);
 - changes in pension entitlements due to revaluations (K7, row 8);
 - changes in pension entitlements due to other changes in volume (K5, row 9), relating to, for example, alterations in demographic assumptions;
 - closing stock of entitlements (LE_F63, row 10);
 - assets held by pension schemes at the end of the year (LE_F_NG, row 11).
18. A more detailed description of each row and column can be found in Annex C.

¹⁷ This includes actual social contributions as made by employers (row 2.1) and households (row 2.3) during the recording period, as well as imputed contributions. The latter are broken down into two components. The first component concerns employers' imputed social contributions (row 2.2) which ensure that the full accrual of new entitlements in the recording period is accounted for via social contributions. For defined benefit (DB) schemes, it is equal to the difference between the accrual of new entitlements in the current period due to employment (plus any costs of operating the scheme) and the actual contributions made. For defined contribution (DC) schemes it is equal to the value of the costs of operating the scheme if the employer is operating the scheme itself. Otherwise, it is not relevant for DC schemes. The second component concerns household social contributions supplements (row 2.4) which reflect the property income earned on the stock of pension entitlements in the recording period. For DC schemes, it is equal to the actual returns on the accumulated assets. For DB schemes, it is equal to the unwinding of the discount rate. This refers to the fact that the present value of the entitlements existing at the beginning of the year and still due at the end of the year have increased because the future is one year nearer and so one fewer discount factor must be used to calculate the present value. See also the description of rows 2.1 to 2.4 in Annex C.

¹⁸ This is to ensure a full reconciliation of the new social security pension entitlements and is similar to employer imputed social contributions related to the accrual of new employment-related pension entitlements (see row 2.2).

19. The value of pension liabilities and entitlements is measured differently for DB and DC schemes. For the latter, the entitlements depend on the performance of the financial assets that are acquired with the pension contributions, and the value of the entitlements is equal to the market value of the financial assets held by the pension fund. For DB schemes, on the other hand, the future benefits have been agreed upon in advance, meaning their entitlements can be derived on the basis of an actuarial estimation.

20. For schemes managed by private units, pension data are usually available and based on business accounting or supervisory data sources. However, such data may not always be available for DB schemes for general government employees and for social security schemes. Consequently, their data may often need to be based on a number of assumptions, as applied in actuarial estimation procedures. The key assumptions in actuarial estimates relate to the discount rate, wage growth and demographic data.

21. A suitable discount rate has to be chosen since pension entitlements are calculated in present value terms, which means that they reflect the discounted sum of present and future flows. According to the International Public Sector Accounting Standards (IPSAS 25),¹⁹ the discount rate reflects the estimated timing of benefit payments. In practice, an entity often achieves this by applying a single weighted average discount rate that reflects the estimated timing and amounts of benefit payments and the currency in which the benefits are to be paid, often approximated with reference to market yields on government bonds, high quality corporate bonds or another financial instrument at the reporting date. Dependent on whether the future flows are denominated in real or nominal terms, a real or nominal discount rate has to be applied.

22. With regard to the wage growth, it has to be borne in mind that the pension benefits will usually depend on the member's salary (e.g. their final salary, their average salary over a period of time, or their lifetime earnings). As a consequence, the entitlements depend significantly on expected future wage growth due to promotions/career path and general economic growth. The accounting profession considers two approaches on the treatment of future wage increases. The first is the accrued benefit obligation (ABO) approach, which does not take into account any future wage growth. Under this approach only the benefits that have actually been accrued to date are recorded. The second is the projected benefit obligation (PBO) approach, which takes into account expected promotions and other real or nominal wage growth factors.

23. Future pension payments are also dependent on future demographic developments, in terms of the age/gender balance of members and their longevity, future fertility rates and migration rates, as life expectancy determines the expected number of years for which the pension annuity has to be paid out. Therefore, pension entitlements vary according to the use of different life expectancies, future fertility rates and migration rates.

2.2. Differences between the collection of pension entitlements collected by the OECD versus those collected by Eurostat

24. As Section 3 presents results for both EU and non-EU countries, collected by respectively Eurostat and the OECD, it is important to note a couple of key differences between the OECD and the Eurostat data collection. The first relates to the discount rate. While the Eurostat collection asked compilers to use a baseline 3% discount rate (i.e. 3% real rate, 5% nominal rate) for the 2015 results, the OECD collection does not advise the

¹⁹ www.ifac.org/system/files/publications/files/ipsas-25-employee.pdf.

use of a fixed discount rate, as economic differences across non-EU OECD countries may be more pronounced. Instead, the OECD requests that countries determine the relevant discount rates for their table on the basis of the market yields on long-term government bonds, high quality corporate bonds and/or another financial instrument in their country. This is expected to provide more comparable results across countries from an economic perspective. In this regard, it is important to note that pension entitlements are very sensitive to the discount rate.²⁰ This is why the Eurostat collection includes a sensitivity analysis on the basis of -1% and +1% in comparison to the baseline discount rate. Such a sensitivity analysis has not been included in the OECD data collection (mainly to limit the administrative burden), but may be considered for future collections. The sensitivity of the results to the discount rate needs to be borne in mind when analysing and comparing the country results.

25. Another difference concerns the fact that the OECD collection also includes information on pension entitlements of resident households with regard to non-resident pension schemes, which is not included in the Eurostat data collection. This additional column allows for the derivation of total social insurance pension entitlements of resident households. Furthermore, unlike the Eurostat table, the OECD collection also includes a row on assets held by pension schemes at the end of the year. This allows for the assessment of the coverage ratio of each scheme, i.e. assessing to what extent the assets cover the pension liabilities.

26. Also worth noting is the difference between the two tables with regard to the coverage of column G: DB schemes for general government employees/administered by general government/not included in the core SNA accounts. While the ESA 2010 defines this pension fund type as covering all unfunded schemes for government employees, the 2008 SNA only refers to the inclusion of so-called intertwined schemes, i.e. employment-related pension schemes that are intertwined with social security schemes and for which it is not possible to clearly distinguish whether it concerns a social security or an employment-related scheme. As a consequence of this difference in interpretation, EU countries may include part of the employment-related schemes as managed by general government in this column (i.e. the unfunded schemes) and thus keep them outside the central framework of the national accounts, whereas for non-EU countries this will only be the case when it is not possible to clearly distinguish the scheme from a social security scheme.²¹

²⁰ See Table 9.3 in OECD's "*Understanding Financial Accounts*", van de Ven, P. and D. Fano (eds.) (2017) which presents the sensitivity of pension liabilities to changes in the discount rate for estimates of social security pension schemes in the case of Portugal.

²¹ There is no deviation between the OECD and Eurostat methodologies regarding the wage growth and demographic assumptions. Regarding the wage growth assumption, it is the same in the OECD and Eurostat collections, i.e. in both cases, the Projected Benefit Obligation (PBO) approach is advised. This approach makes an explicit non-zero assumption for future wage growth and, therefore, takes into account expected promotions and other real or nominal wage growth factors that may affect future benefits. Indeed, although the accrued-to-date method only includes the benefits that current members have earned up to the current period, the projected benefit obligation (PBO) is used to incorporate future wage growth as this may directly affect the future benefits that have been accrued so far. Regarding demographic assumptions, the OECD recommends to use the available information on life expectancy, fertility rates and migration. Eurostat applies a similar approach, specifically pointing to the relevant information available from the Eurostat population tables.

3. Discussion of results

3.1. Overview of the non-EU data received by the OECD

3.1.1. Description by column

27. The questionnaire on social insurance pension schemes was sent to all non-EU OECD members, OECD (pre-) accession countries, and BRIICS countries. For the purpose of this paper, all information as received by the 31th of August 2020 has been taken into account. Furthermore, information is available for all EU countries²² for which data have been collected by Eurostat.²³

28. Ten non-EU OECD countries were able to complete the table on social insurance pension schemes, namely Australia, Canada, Chile, Colombia, Costa Rica,²⁴ Israel, Japan, Mexico, New Zealand and the United States, as well as one BRIICS Country, i.e. Indonesia.²⁵

29. Table 3.1 presents an overview of the data as provided by the relevant countries. It should be mentioned here that for several countries it concerns first estimates that may still be subject to revisions.

30. All above mentioned countries have completed the table with data for 2015 and provided metadata for all columns. Seven countries provided results for multiple years, ranging from 2 to 23 years: Canada (2015-2016), Chile (2003-2018), Colombia (2015-2018), Israel (2015 and 2018), Japan (2013-2017), Mexico (2008-2018) and the United States (1996-2018).

31. Looking at the coverage, it is clear that countries were not able to provide data for all columns. In particular, the part relating to “Counterparts: Social insurance pension entitlements of resident and non-resident households” (columns J to M) is lacking for quite a number of countries. In fact, only Australia,²⁶ Canada and Mexico provided data for the counterpart information “Resident households towards domestic pension schemes” (column J).

32. The coverage is very good for pension schemes that are managed by non-general government entities (i.e. columns A to C). Furthermore, almost all countries (with the exception of Japan)²⁷ provided some data for pension schemes managed by general government (columns D to H). Column E (DB schemes for general government employees/Central framework/Classified in financial corporations) was completed by five countries (Canada, Colombia, Costa Rica, New Zealand and United States), while column F (DB schemes for general government employees/Central framework/Classified in general government) was completed by Australia,²⁸ Canada and Colombia. For Chile, Costa Rica, Israel and Mexico, columns E and F were either not relevant or reported as

²² Data for EU countries which are members of the OECD are presented in this document.

²³ Only data for Greece and Luxembourg are not (yet) available.

²⁴ On 15 May 2020, the OECD Council invited Costa Rica to become a Member. At the time of writing of the present paper, the deposit of Costa Rica’s instrument of accession to the OECD Convention was pending.

²⁵ The OECD pension data are available at the following link:

http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA_TABLE29.

²⁶ Counterpart information provided by Australia also include “net equity of households in pension funds” (which is 1993 SNA terminology, equating to what is known in the 2008 SNA as “pension entitlements”).

²⁷ Japan explained that column D is not relevant for them; furthermore, source data is lacking for columns G and H.

²⁸ Australia only reported the pension entitlements at the beginning and at the end of the period.

confidential. Data for column G (DB schemes for general government employees/administered by general government/not included in the core SNA accounts) was only reported by Israel. For most other countries this column was not relevant.

Table 3.1. Data inventory by column

	central framework			not in the central framework		total	counterparts				more information				
	Non-general government			General government			I	J	K	L	M	years available	# of columns reported		
A	B	C	D	E	F	G								H	
Australia*	O	O	X	O	O	X	—	—	X	X	X	X	X	2015	7
Canada	X	X	X	X	X	X	—	O	X	X	O	O	X	2015-2016	9
Chile	X	—	X	C	—	—	—	—	C					2003-2018	4
Colombia	X	X	X	O	X	X	—	X	X	O	O	O		2015-2018	7
Costa Rica	C	C	X	C	C	—	—	X	C	O	O	O		2015	7
Israel	X	X	X	—	—	—	X	X	O	O	O	O		2015; 2018	5
Japan*	X	X	X	—	—	—	O	O		O		O		2013-2017	3
Mexico	X	X	X	X	—	—	—	X	X	X	—	—	X	2008-2018	8
New Zealand*	O	O	X	X	X	—	—	—		O	O	O		2015	3
USA	X	X	X	X	X	—	—	X	X					1996-2018	7
Indonesia	C	C	X	C	—	—	—	C						2015	5

Notes: X: available column (year 2015); C: available column but confidential; _ : column irrelevant for the country; O: column not available; *: data refer to fiscal years.

Explanation of the columns: A: DC schemes managed by non-general government; B: DB schemes managed by non-general government; C: Total social insurance pension schemes managed by non-general government; D: DC schemes managed by general government; E: DB schemes for government employees, managed by general government and administered by an autonomous pension fund; F: DB schemes for government employees, managed and administered by general government; G: DB schemes for government employees, managed and administered by general government, for which liabilities are not included in the central framework of the SNA; H: Social security pension schemes; I: Total resident social insurance pension schemes' liabilities; J: Part of the social insurance pension liabilities of domestic pension schemes (i.e. column I) that relates to resident households; K: Part of the social insurance pension liabilities of domestic pension schemes (i.e. column I) that relates to non-resident households; L: Social insurance pension entitlements acquired by resident households in the rest of the world; M: total social insurance pension entitlements as accrued by resident households.

3.1.2. Description by row

33. Table 3.2 presents an inventory of data provided by row. The ratio presented in the table reflects the number of reported cells per row versus the number of applicable cells in that row for the relevant country. For example, Australia submitted data for “net social contributions relating to pension schemes” (D61, Row 2) for one column, even though it is applicable for seven. This is presented as 1/7.

34. The table shows that information for some rows is only available to a limited extent.²⁹ This is particularly true for “Other (actuarial) change of pension entitlements in social security pension schemes” (D619, row 3), which was only completed by Colombia and the United States; “Transfers of pension entitlements between schemes” (D81, row 6), which was only completed by Colombia and New Zealand; “Change in entitlements due to negotiated changes in scheme structure” (D82, row 7), which was only completed by

²⁹ Due to missing data or data only provided to the OECD Secretariat as confidential.

Canada and New Zealand; and “Changes in entitlements due to other changes in volume” (K5, row 9), which was only completed by Japan, Mexico and the United States.

35. On the other hand, the opening and closing stock of pension obligations (LS_F63 and LEF_63) is broadly available across countries. Only Colombia did not provide opening stocks for any of the social insurance pension schemes, although they did provide data on the various flows. In this respect, it can be noted that columns B, E, F and H are only partially reported. Indonesia did not provide closing stocks for column C, which is the only column for which the Indonesian data is publicly available.

36. Overall, most countries were able to provide data for “Changes in pension entitlements due to social contributions and benefits” (D8), “Reduction of pension entitlements due to payment of pension benefits” (D62) and “Increase in pension entitlements due to social contributions” (D61), including its breakdown (i.e. D6121, D6131, D6141, D6141, D61SC).

Table 3.2. Data inventory by row, 2015

	LS_F63	D61	D6111	D6121	D6131	D6141	D61SC	D619	D62	D8	D81	D82	K7	K5	LE_F63	LE_F_NG
Australia*	7/7	1/7	1/7	0/7	0/7	1/7	1/7	0/5	1/7	1/7	0/7	0/7	1/7	0/7	7/7	1/7
Canada	9/9	9/9	9/9	0/6	9/9	9/9	9/9	0/3	9/9	9/9	0/9	9/9	9/9	0/9	9/9	8/9
Chile	4/4	0/4	0/4	0/2	0/4	0/4	0/4	0/0	0/4	4/4	0/4	0/4	4/4	0/4	4/4	4/4
Colombia	3/7	7/7	5/7	5/5	5/7	3/7	3/7	2/2	7/7	5/7	4/7	0/7	3/7	0/7	7/7	7/7
Costa Rica	1/1	1/1	2/2	0/1	2/2	1/1	1/1		2/2	1/1	0/1	0/1	0/1	0/1	1/1	0/1
Israel	5/5	4/4	1/4	1/1	1/1	4/4	4/4	0/0	5/5	4/4	0/0	0/0	1/1	0/0	5/5	4/4
Japan*	3/3	1/3	1/3	1/3	1/3	1/3	1/3	0/0	1/3	3/3	0/3	0/3	0/3	3/3	3/3	3/3
Mexico	8/8	8/8	8/8	5/5	7/7	8/8	8/8	0/4	8/8	8/8	0/8	0/8	0/8	8/8	8/8	0/8
New Zealand*	3/3	3/3	3/3	1/3	3/3	3/3	2/3	0/3	3/3	3/3	2/3	2/3	3/3	0/3	3/3	3/3
USA	7/7	7/7	7/7	4/4	7/7	7/7	7/7	2/2	7/7	7/7	0/7	0/7	4/7	7/7	7/7	7/7
Indonesia	1/1	1/1	1/1	0/1	0/1	0/1	1/1		1/1	1/1	0/1	0/1	0/1	0/1	0/1	1/1

Note: *: information refers to fiscal years.

Explanation of the columns: LS_F63 and LE_F63 represent the opening and closing stocks of pension entitlements; D61: Increase in pension entitlements due to social contributions; D6111: Employer actual social contributions; D6121: Employer imputed social contributions; D6131: Household actual social contributions; D6141: Household social contribution supplements; D61SC: Pension scheme service charges; D619: Other (actuarial) change of pension entitlements in social security pension schemes; D62: Reduction in pension entitlements due to payment of pension benefits; D8: Changes in pension entitlements due to social contributions and pension benefits; D81: Transfers of pension entitlements between schemes; D82: Change in entitlements due to negotiated changes in scheme structure; K7: Changes in entitlements due to revaluations; K5: Changes in entitlements due to other changes in volume; LE_F_NG: Assets held by schemes at end-year.

3.2. Availability of metadata

37. Both Eurostat and the OECD also collected additional metadata. This helps to arrive at a better understanding of what is covered under the various columns in the table and what types of assumptions have been used to derive the results. Furthermore, this information helps to correctly interpret the data. All countries that did complete the questionnaire also provided metadata.

38. The metadata file includes separate sheets for each column in the table. For all relevant and completed columns, countries are requested to provide a brief description, including the data sources for the schemes covered in a specific column. The metadata sheets that related to DB schemes and social security schemes contain additional questions to obtain more information with regard to the calculation of the results. These questions focus on the discount rate (asking respondents to specify the percentage(s) used and how these have been derived), wage growth assumptions (when results have been based on the PBO approach), and demographic assumptions (asking for any relevant information with regard to life expectancy, future fertility rates and migration assumptions). For the columns relating to the breakdown of social insurance pension liabilities into counterpart sector (i.e. columns J and K), the questions mainly focus on the type of information that is available to make this split. This is also the case for the column related to social insurance pension entitlements of resident households with regard to the rest of the world (i.e. column L), in addition to some questions on the type of schemes covered under this column and (if possible) on some of the assumptions underlying the results.

39. The metadata showed that pension schemes and data sources can differ substantially across countries and across columns (e.g. Chile reported one source for column A, whereas Canada reported eight). Some countries also reported additional information providing more insight as to the relative importance of schemes within a column (e.g. Canada and the United States), which proved to be very useful in arriving at a better understanding of the setup of the pension systems in the relevant countries.

40. Regarding the estimation of the entitlements for DB schemes (columns B and E to H), countries provided various levels of methodological detail concerning the key assumptions. Israel provided information on the institution responsible for determining the discount rates, on the wage growth assumptions and the demographic assumptions for columns B, G and H. Mexico provided the discount rates for columns B and H and information on the wage growth assumptions. The United States provided quite detailed information on the discount rates (in particular details for three different schemes according to years and columns), wage growth assumptions and the demographic assumptions (particularly relevant for column H). Costa Rica and Indonesia also provided some information on the discount rates, even though some of the resulting numbers on pension entitlements were reported as confidential.

41. When looking at private DB schemes (column B), the available discount rates (for Indonesia, Mexico and the United States) are quite different across schemes and in some cases over time. The United States uses the Fed's AAA corporate bond rate as its discount rate for column B, which stands at 5% for 2010-2012 and at 4% from 2013 onwards. Mexico uses the discount rate applied in the actuarial estimation model which varies significantly between public and private companies (respectively 8% and 6%). Indonesia noted that, based on the Pension Fund actuarial report, the discount rate is around 9-10%.

42. Disparities in discount rates can also be observed for social security pension schemes (column H). Costa Rica, for example, applies 4% for the current contributors to the Costa Rican social security agency, the United States applies rates ranging between 5.2% and 5.8% between 2010 and 2018, while Mexico and Indonesia use rates of 3% and 9.6% respectively. The information regarding the discount rates is discussed in more detail in Annex E.

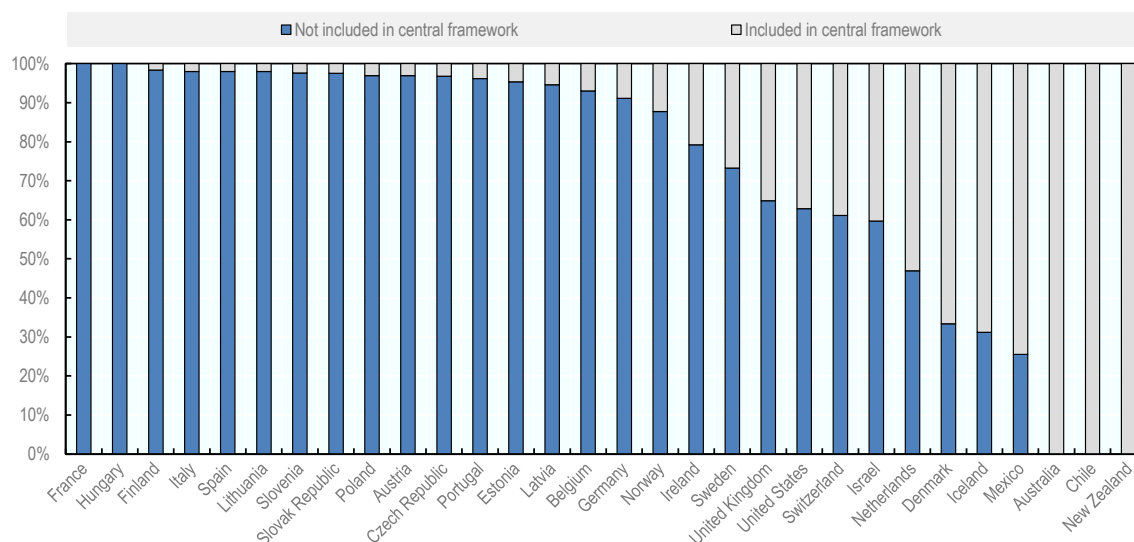
43. Only Mexico and the United States were in the position to provide information on the wage growth assumption and apply the PBO and ABO method respectively.

3.3. Results of the data collection

44. This section presents results from the data collection on social insurance pension schemes, not only focusing on the results from the OECD data collection, but also including results on EU OECD countries as obtained from the Eurostat's data collection. The analysis builds on previous work by the ECB³⁰ and Eurostat on Table 2900, focusing on the various breakdowns into types of pension schemes, conducting cross-country comparisons, and where possible, analysing changes over time.

45. Figure 3.1 shows that for most of the reporting countries the majority of pension entitlements fall outside the central framework of the national accounts. Only Australia, Chile and New Zealand have pension entitlements entirely covered in the central framework.³¹ For about half of the countries, over 90% of their pension entitlements are not included in the central framework. This can be explained by the great importance of social security pension schemes across countries and the presence of significant amounts in column G for a number of EU countries (in which cases it typically refers to the liabilities of unfunded DB employment-related schemes sponsored by the government); see also Figure 3.2 for more detail. For countries providing longer time series, this share is relatively stable over time, with the exception of Mexico, which records a drop in the share of entitlements outside the central framework from 52% in 2008 to 25% in 2018. This reflects a reduction in social security pension entitlements and an increase in DC private pension scheme entitlements (see Figure AF.1 in Annex F).

Figure 3.1. Share of total social insurance pension entitlements included/not included in the national accounts central framework, end of 2015



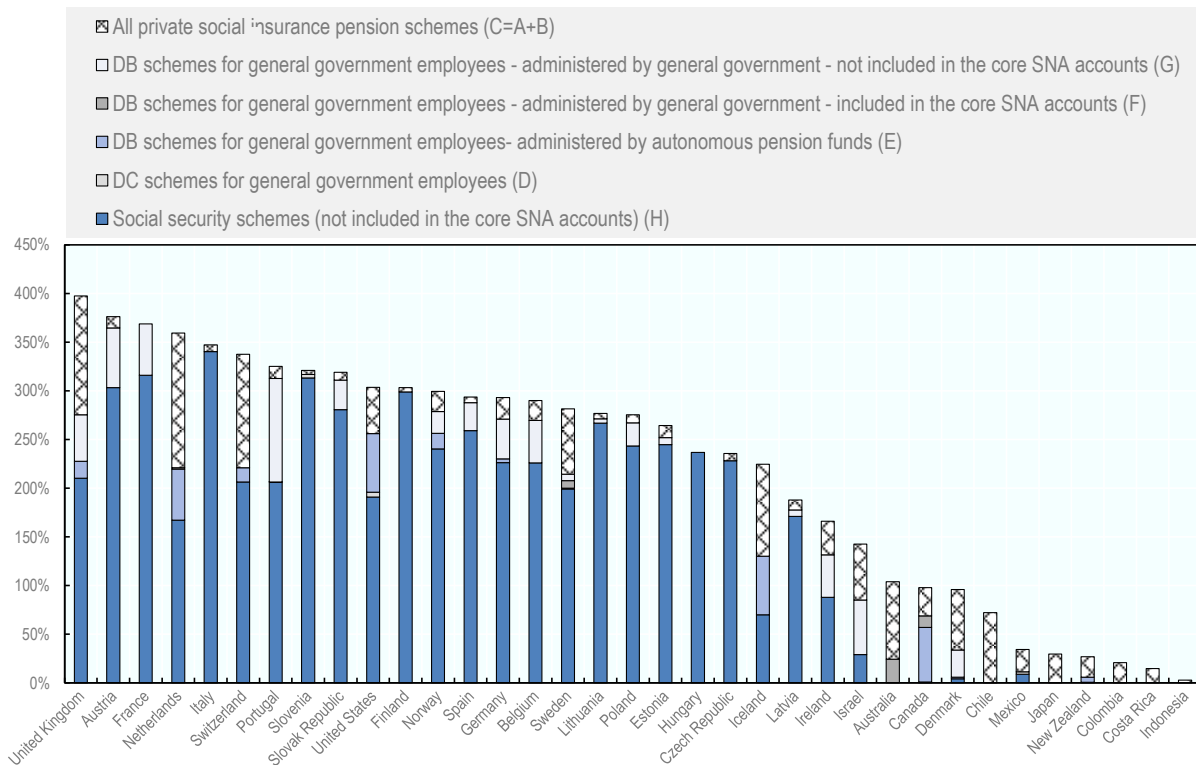
Notes: (i) Canada, Colombia, Costa Rica, Indonesia and Japan have been omitted due to lack of relevant or non-publicly available data; (ii) Data for Australia and New Zealand relate to fiscal years (respectively to 2015 ending June and 2015 ending March).

³⁰ European Central Bank (2019), "New Eurostat statistics on pension entitlements of households: Accrued-to-date pension entitlements – first release of Table 29".

³¹ Please note that for Canada no data is available for social security pension liabilities.

46. Figure 3.2 shows where pension entitlements, both those that are included and those that are excluded from the central framework, are highest as a share of GDP, also providing insight in the composition of those entitlements. The United Kingdom sits at the top, with pension entitlements amounting to around 400% of GDP, followed by Austria (376%), France (369%) and the Netherlands (359%). For EU countries, social security pension entitlements represent the bulk of total pension entitlements. This is also the case for the United States where social security represents two thirds of the entitlements. Most of the non-EU OECD countries are found at the right hand side of the figure, where pension entitlements make up a considerably lower share of GDP. However, it must be borne in mind that this may simply reflect missing information for some of these countries, for example, due to lack of source data for social security pension schemes (Canada and Japan), or because data have been provided, but on a confidential basis (Colombia, Costa Rica).

Figure 3.2. Breakdown of pension entitlements by type of pension scheme, end-of-2015, % of GDP



Notes: (i) Colombia is missing source data for social security schemes. For schemes in the core accounts, further splits are confidential. Therefore just data on column A are included for Colombia. (ii) Further splits on Costa Rican schemes as well as social security closing stocks are confidential. (iii) Japan is missing source data for social security schemes. Pension data relate to 2015 ending March. GDP for 2015 is on a calendar year basis. (iv) Data for Indonesia are only publically available for column C opening stocks. Therefore, end-of-2014 GDP data are used. (v) For Australia and New Zealand both pension and GDP data relate respectively to 2015 ending June and 2015 ending March.

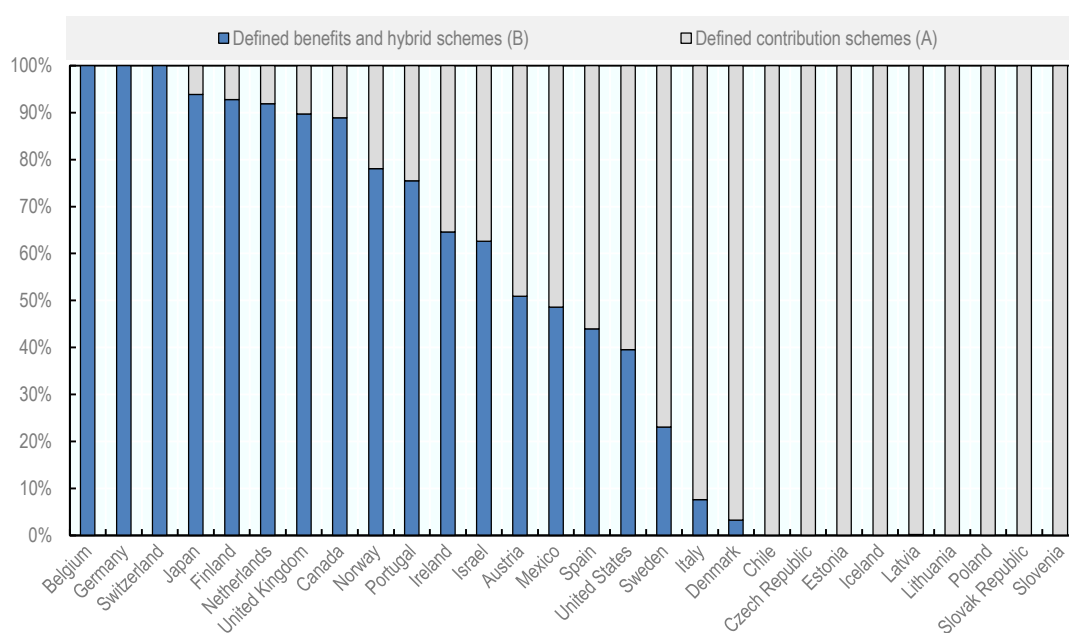
47. For countries providing longer time series, the composition is relatively stable over time, although there are a few exceptions. For example, in Latvia and the United States, the shares of social security pension entitlements grew from 171% to 197% of GDP (from 2015

to 2017) and from 115% to 198% of GDP (from 1996 to 2018) respectively. On the other hand, Lithuania and Mexico saw a decrease in the shares of social security pension entitlements from 263% to 193% of GDP (from 2013 to 2017) and from 17% to 7% of GDP (from 2008 to 2018) respectively. In the case of the Netherlands, the share of private scheme entitlements grew from 115% of GDP in 2012 to 149% in 2016 (see also Figures AF.2 to AF.6 in Annex F).

48. Also worth noting are the high shares of liabilities of private pension schemes in a few countries, with the Netherlands recording the highest share (138% of GDP), followed by the United Kingdom (122%), Switzerland (117%), Iceland (95%) and Australia (80%).

49. Figure 3.3 focuses on the split between private DC (column A) and private DB and hybrid schemes (column B), which are both included in the central framework. This breakdown allows for the identification of who bears the risk (the beneficiary or the manager) in case of potential shortfalls. With a DC scheme, the level of benefits payable to beneficiaries is determined by the accumulated funds from past contributions and investment returns, so the beneficiaries bear the risk of receiving lower benefits when the pension fund experiences lower investment returns. With DB schemes, the financial risk that contributions and investment returns are insufficient to pay the predetermined levels of benefit, is borne by the pension manager (and in case of hybrid schemes also partly by the beneficiaries).³²

Figure 3.3. Private pension entitlements broken down by defined contribution and defined benefit and hybrid schemes, end of 2015.



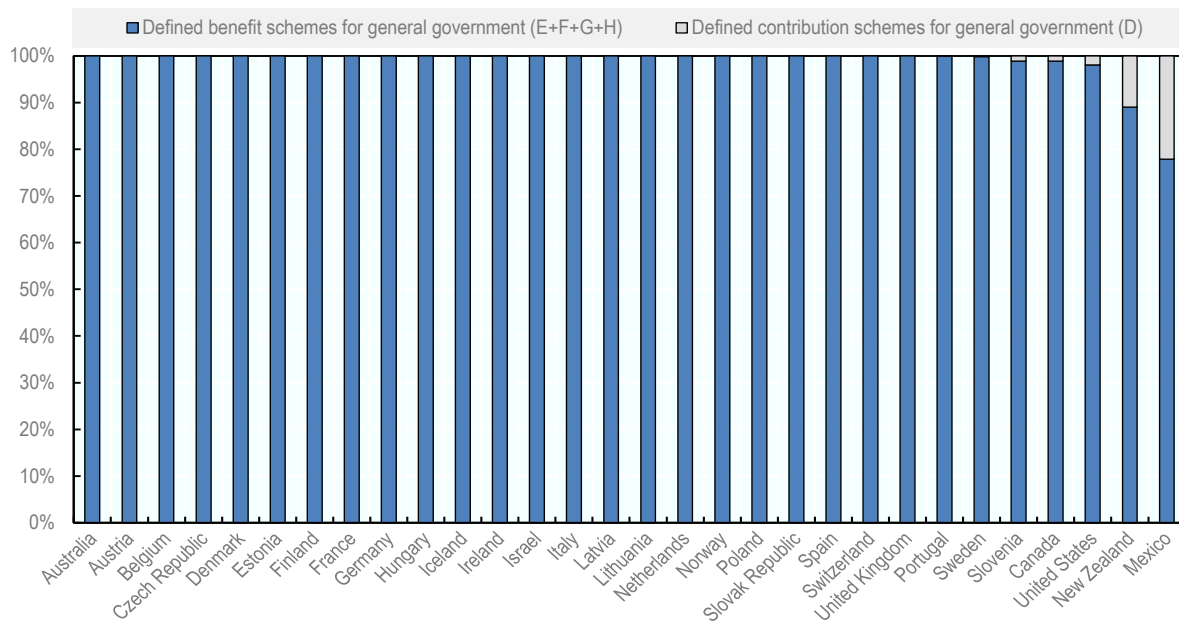
Notes: (i) For Australia, Indonesia and New Zealand no split is available. For Columbia and Costa Rica, the split is confidential. For Chile all private pension entitlements are allocated to column A; (ii) Data for Japan relate to fiscal years (2015 ending March).

³² See also *Understanding Financial Accounts*, OECD, 2017, pp. 315.

50. As compared to Figure 3.4, which shows the same distinction for government schemes, there seems to be a larger preference in the private sector to set up schemes according to DC plans. For several countries, all private schemes are setup in this way, whereas a lot of the other countries rely on DC schemes to a certain degree. For those countries that provided data for a longer time series, it can also be observed that the share of DB schemes is decreasing at the expense of DC schemes. For example, in the case of Sweden, Mexico and the United States, the share dropped from 29% to 20% (from 2012 to 2017), from 49% to 36% (from 2008 to 2018) and from 47% to 36% (from 1996 to 2018) respectively.

51. Figure 3.4 shows the split between DC (column D) and DB schemes (E, F, G and H)³³ for pension schemes managed by general government. As clearly indicated by the figure, DC schemes are virtually non-existent among general government pension schemes.³⁴ Even in countries where they do exist, they are dwarfed by DB schemes, the largest usually being the social security schemes as seen in Figure 3.2 above. The only real exception is Mexico where the share of DC liabilities amounted to 22% of total liabilities in 2015, showing a further increase over time, expanding from 9% in 2008 (and further increasing to 25% in 2018).

Figure 3.4. General government pension entitlements broken down by defined benefit and defined contribution schemes, end of 2015



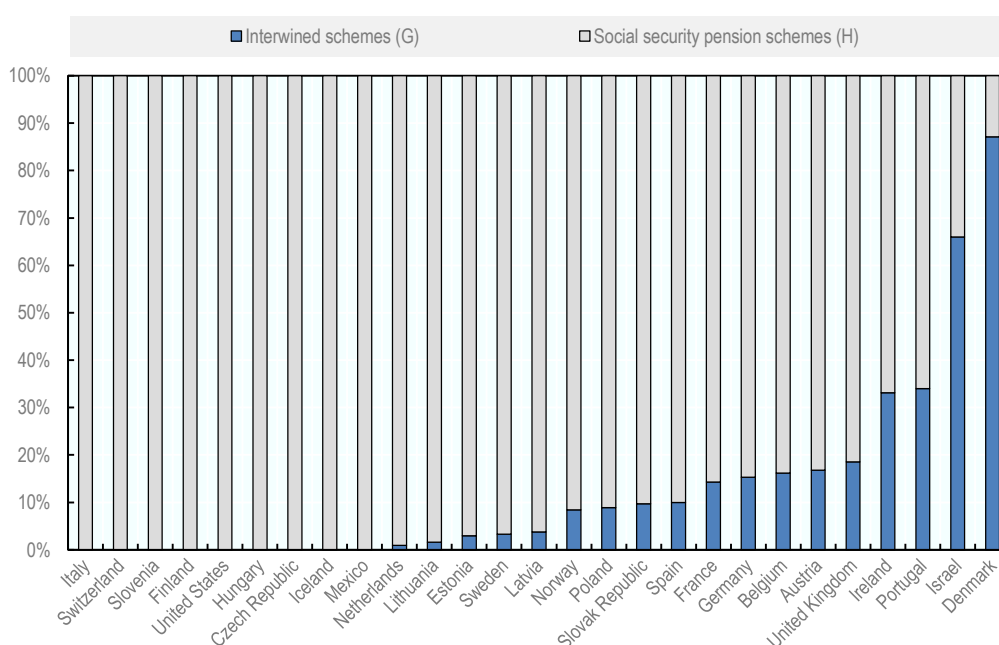
Notes: (i) Chile, Colombia, Costa Rica, Indonesia and Japan are missing due to either insufficient data sources or the information has not been made publicly available; (ii) Data for Australia and New Zealand relate to fiscal years (respectively to 2015 ending June and 2015 ending March).

³³ The defined benefit schemes G and H are excluded from the central framework.

³⁴ Please note that the information on the defined benefit schemes may also cover some hybrid schemes, such as notional defined contribution schemes, that may have characteristics of defined contribution schemes.

52. As explained in Section 2.2, it is not expected that many non-EU countries record data for column G, as this is only relevant when it is not possible to make a clear distinction whether a scheme is an employment-related or a social security scheme. For most non-EU countries, all general government employment-related pension liabilities are recorded in the central framework of the national accounts. Pensions recorded outside the central framework only concern schemes that can be fully regarded as social security. As shown in Figure 3.5, of the non-EU countries, only Israel provided data for column G, explaining that this refers to fully DB plans of active employees and retirees of the government for workers hired until 2004. After 2004, all new employees entered a DC pension plan. For that reason, the share of intertwined schemes as percentage of liabilities not recorded in the central framework has decreased over time, from 66% in 2015 to 61% in 2018.

Figure 3.5. Non-central-framework pension schemes entitlements broken down by intertwined schemes and social security, end of 2015



Notes: (i) Australia, Canada, Chile, Colombia, Costa Rica, Indonesia and New Zealand are missing due to either insufficient data sources or the information has not been made publicly available; (ii) Data for Japan relate to fiscal years (2015 ending March).

53. The OECD collection on pension entitlements for non-EU countries includes data on assets held by schemes at year-end,³⁵ which allows for the assessment of whether the assets of various pension schemes cover the pension liabilities. Figure 3.6 provides an overview of the coverage ratios. By definition, assets are equal to entitlements for DC schemes. For that reason, the figure focuses on DB schemes only.

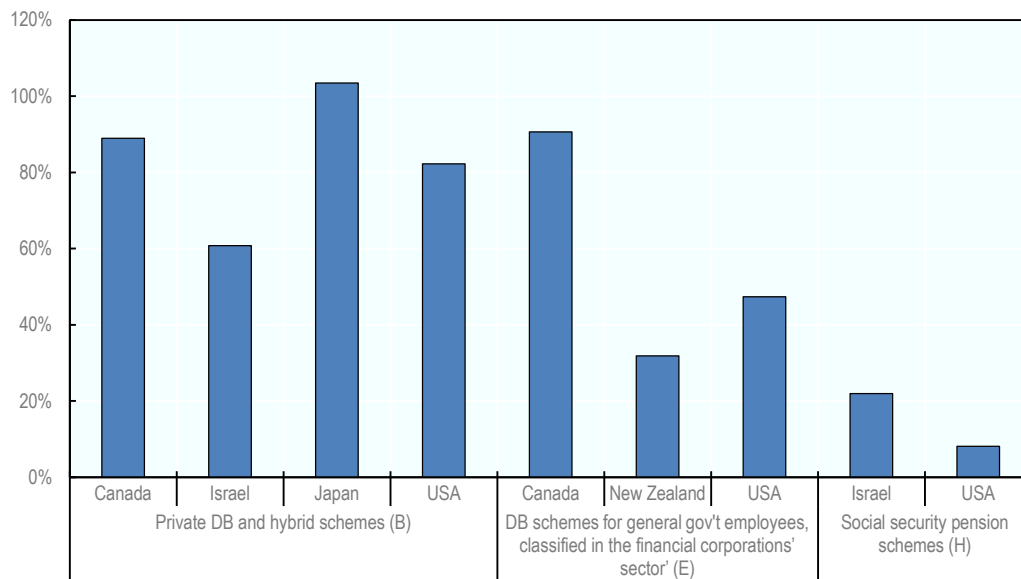
54. In general, the coverage ratios for the government managed schemes are quite low, while they come much closer to 100% for all private schemes. This relates to the fact that many government schemes are set up as pay-as-you-go meaning that current benefits are

³⁵ Only non-EU countries are shown because the Eurostat table does not include assets held by pension schemes at year-end.

paid for via current contributions. In this regard, as was mentioned earlier, these coverage ratios cannot be used to assess the sustainability of the relevant schemes. For that purpose, one should also take into account projections of future benefits and contributions, applying an open group approach with future accrual.

55. For private DB schemes (Column B) the coverage ratio is 84% on average, with only Japan (103%) having assets in excess of pension entitlements. In the past, this was the case for more countries. For example, the United States recorded assets in excess of entitlements up until 2000. However, in 2018 assets only amounted to 87% of entitlements (see Figure AF.7 in Annex F). The coverage ratio is generally lower for DB schemes for general government employees, although they are often still relatively high in cases where these are managed by autonomous pension schemes (column E). For example, Canada records a ratio of 91% for this column. On the other hand, the United States³⁶ and New Zealand present much lower coverage ratios for this column (respectively 47% and 32%). Only two countries reported assets in social security pension schemes, the United States and Israel, which have assets held by social security schemes covering only 8.1% and 22% of the scheme's accrued-to-date liabilities respectively.³⁷

Figure 3.6. Asset-to-pension entitlement ratio for non-EU OECD countries, end of 2015



Note: Data for Japan and New Zealand relate to fiscal years (2015 ending March).

56. To provide more insight into how the various items affect the pension entitlements, Figure 3.7 provides an example for the United States, showing a full reconciliation of the change between the opening and closing balance sheet of pension entitlements for 2018.

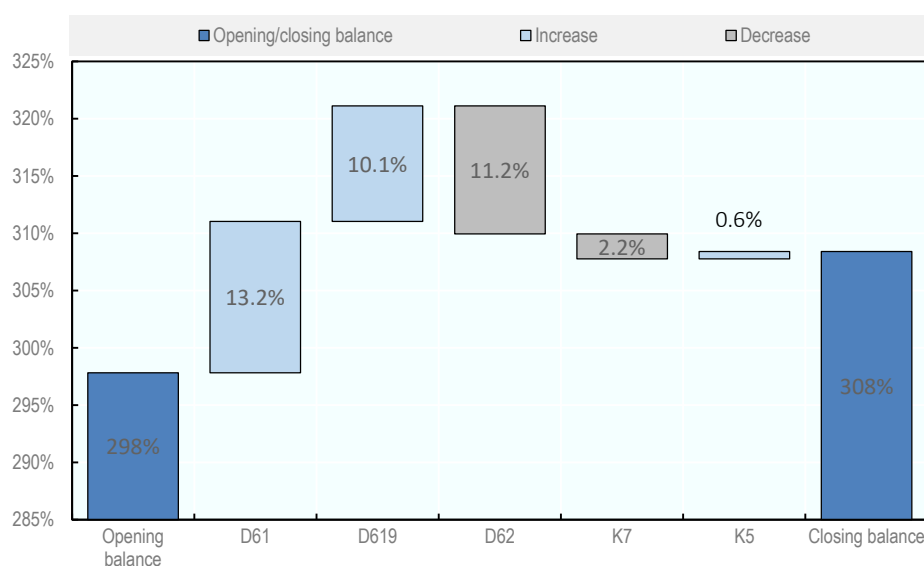
³⁶ It is interesting to note that in the United States, the coverage ratio varies considerably across states. For most states the coverage for these schemes is between 40 and 60% with some negative outliers (coming close to around 25%) and positive outliers (coming close to 90%).

See www.federalreserve.gov/releases/z1/dataviz/pension/funding_ratio/table/.

³⁷ Please note that the Canadian social security schemes are not based on an entitlement basis, but are unfunded plans which are considered to have a fully funded status at any given time. As this is not in line with the guidelines, these have not been included in the figure.

The net increase in total entitlements over the year amounts to 10% of GDP (from 298% to 308% of GDP), where the increase is driven mostly by social contributions (D61)³⁸ (with an upward effect of 13.2%) and the changes in social security pension schemes (D619) (an upward effect of 10.1%), and where the pension entitlements are mainly reduced by the payment of pension benefits (D62) (having a downward effect of 11.2%). Changes in entitlements due to revaluations (K7) led to a decrease of 2.2%, while other changes in volume (K5), related to changes in actuarial assumptions, led to a minor increase of 0.6%.

Figure 3.7. Changes between the opening and closing stock of pension entitlements of all schemes for the United States, % of GDP, 2018



57. Figure 3.8 shows all the flows affecting the stock of pension entitlements for OECD countries in 2015.³⁹ On average there was a net increase in pension entitlements, with social insurance pension contributions (D61) accounting for the most substantial part of that increase. Poland saw the highest net increase in pension entitlements (21%), followed by Iceland (20%) and the Netherlands (18%). The substantial net increases in those countries are driven by different factors. For all three of them, net social contributions were the most substantial component leading up to the increase. This component also accounted for the major part of increases in most other countries, outweighing the negative impact of benefits paid out during the recording period. Additionally, in Poland, a significant part of the increase in entitlements was due to other changes in the volume of the entitlements (which may for example relate to changes in demographic assumptions used in the actuarial calculations), while in the Netherlands other (actuarial) changes of pension entitlements in social security pension schemes were substantial. These latter changes reflect the increase in social security entitlements due to new accruals in the current year that have not been matched by the actual social security contributions paid. On the other hand, the stock of

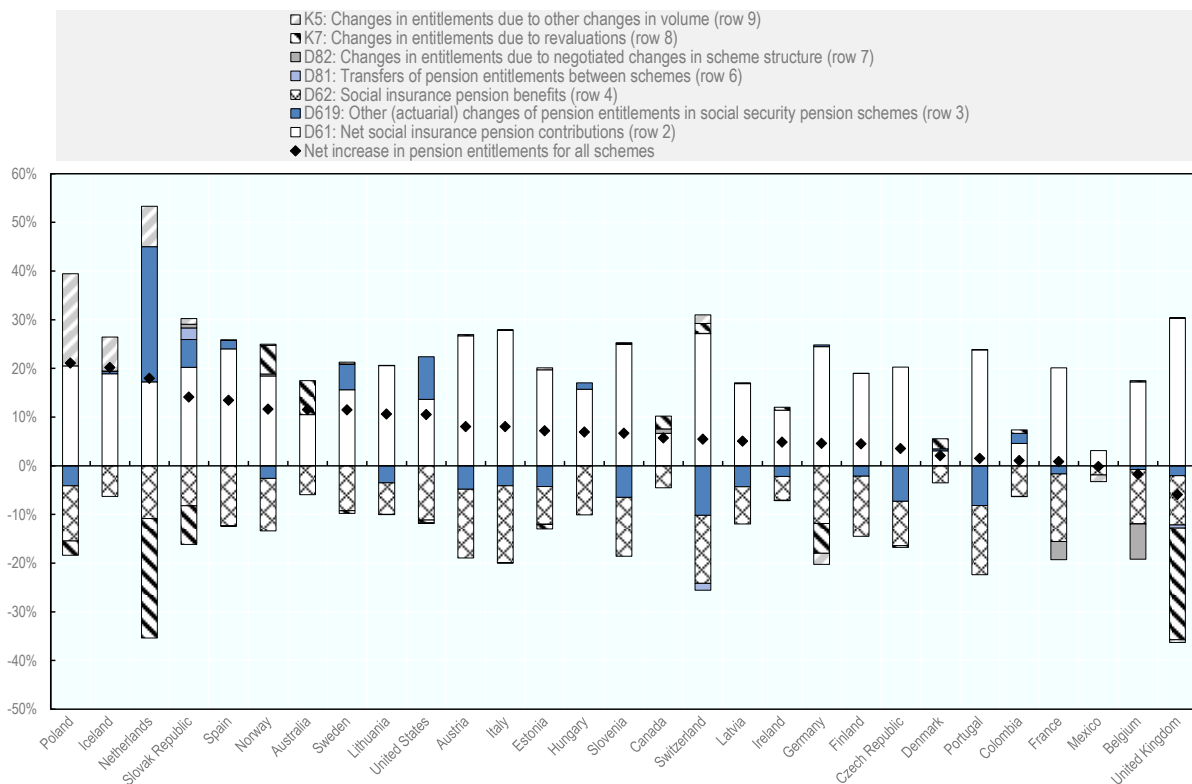
³⁸ Employers' actual pension contributions, households' actual pension contributions and households' pension contribution supplements contribute equally. The impact of employers' imputed pension contributions is minor while that of pension scheme service charges is negligible.

³⁹ The numbers between brackets (e.g. "row 9") refer to the row numbers as explained in section 2.1 of the present document.

pension entitlements in the Netherlands was negatively affected by revaluations (-25%). Revaluations of similar importance have also been observed in the United Kingdom.

58. For countries that provided longer time series, the evidence shows that the change in pension entitlements can fluctuate significantly over time.⁴⁰ While pension contributions and benefits are quite stable over time, some of the other items can have a relatively large impact in some years. For example, Latvia recorded a large net increase in pension entitlements in 2016 (28% versus 5% in 2015) as a result of large positive revaluations. On the other hand, Lithuania recorded a large decrease in pension entitlements in 2016 (-51% versus 11% in 2015), due to negotiated changes in the scheme structure.

Figure 3.8. Net increase in pension entitlements for all schemes across OECD countries, % of GDP, 2015



Notes: (i) Chile, Costa Rica, Indonesia, Israel, Japan and New Zealand are missing due to either insufficient data sources or because the information has not been made publicly available; (ii) Data for Australia relate to fiscal years (2015 ending June).

59. Figure 3.9 provides additional insights into the change in pension entitlements across OECD countries, specifically focusing on contributions and benefits. In the central framework this change is reflected in item D8 (adjustment for the change in pension entitlements),⁴¹ only taking into account changes related to employment-related schemes.

⁴⁰ See Figures AF.8 to AF.10 in Annex F for results for Latvia, Lithuania and the Netherlands, and Figure 3.11 which presents results for the United States.

⁴¹ This item is needed because of the way contributions paid to and the benefits received from pension funds are treated in the SNA. They are recorded as current income and expenditure, while on the other hand they are also considered as a (dis)saving, adding to (or reducing) the value of pension entitlements. Because the related transactions are not treated as purely financial, but also as income flows, a correction has to be made when

In the supplementary table, this item now also includes changes related to intertwined and social security pension schemes. To provide further insight into this difference, Figure 3.9 breaks down the changes into those that are reflected in this item in the central framework, i.e. (i) the actual and imputed contributions and (ii) (with a negative sign) the pension benefits related to employment-related pension schemes; and those that are only included in the item in the supplementary table, i.e. (iii) actual and imputed contributions^{42 43} and (iv) (with a negative sign) the pension benefits related to intertwined and social security pension schemes.

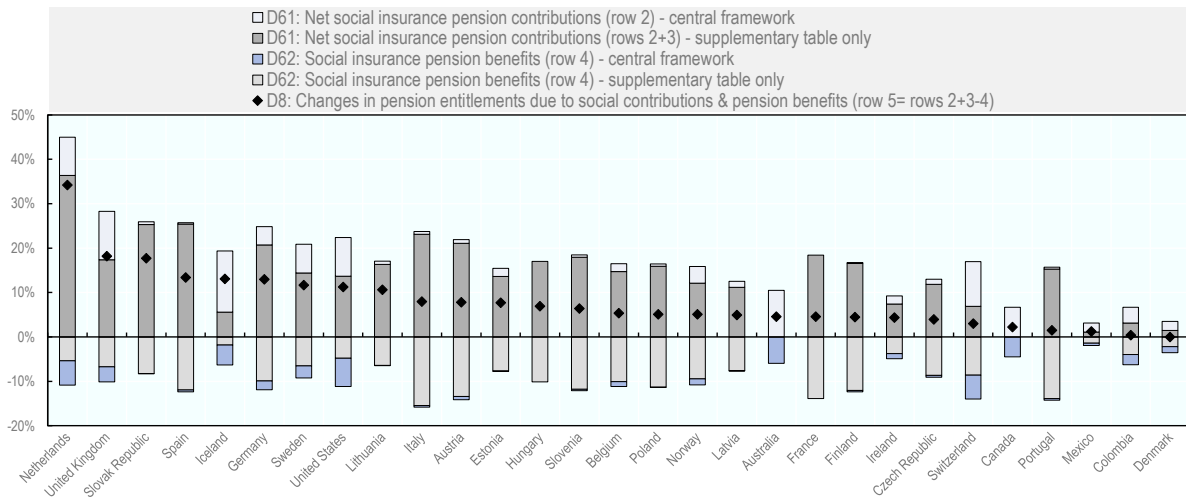
60. As was already clear from Figure 3.7, for most countries contributions are significantly higher than benefits, leading to a positive overall change in pension entitlements due to social contributions and benefits. In this regard, the Netherlands showed a marked increase in pension entitlements in 2015, mostly due to imputed contributions related to social security pension schemes. However, it is clear from the results that the impact of this item may differ over time. For example, in 2012, 2013 and 2016 the change in pension entitlements due to (imputed) contributions and benefits was negative, whereas it was positive in 2014 and 2015, all predominantly driven by the sign of the imputed contributions related to social security pension schemes in these years in the Netherlands (see Figure AF.11 in Annex F). In other countries one can also observe the important impact of net (actual and imputed) social contributions on entitlements for schemes for which these entitlements are only recorded in the supplementary table, with Austria, Italy, Slovak Republic and Spain recording the highest relative numbers, in addition to the Netherlands. For the United States these net contributions are also important. For the period 1996-2018 they exceed the (actual and imputed) contributions for the schemes for which the entitlements are recorded in the central framework, with particularly high values in 2011 and 2012 (see Figure AF.12 in Annex F).

deriving savings to reflect the fact that these flows also affect households' savings, increasing their pension entitlements as a consequence of pension contributions and decreasing their entitlements due to the receipt of pension benefits.

⁴² For intertwined schemes, the difference between the accrual of new entitlements in the recording period and the actual contributions is reflected in employers' imputed contributions (D6121). For social security schemes, this difference is reflected in the item 'other (actuarial) change of pension entitlements in social security pension schemes' (D619). The property income earned on the stock of pension entitlements is reflected in household social contributions supplements for both types of schemes (D6141). This amount is equal to the unwinding of the discount rate, reflecting the fact that the present value of the entitlements existing at the beginning of the year and still due at the end of the year have increased because the future is one year nearer and so one fewer discount factor must be used to calculate the present value.

⁴³ Please note that, whereas the actual contributions related to these schemes (as well as the pension benefits) are reflected with the same denomination and coding in the central framework, this is not the case for the imputed contributions (i.e. the employers' imputed social contributions, the other (actuarial) change of pension entitlements in social security pension schemes, and the household social contribution supplements). The supplementary table only presents these items as a component of social contributions. However, it has to be borne in mind that recognising the entitlements of these schemes in the financial accounts and balance sheets (as is the case in the supplementary table) would also require imputing the same amounts as part of compensation of employees (i.e. the employers' imputed social contributions), social benefits (i.e. the other (actuarial) change of pension entitlements in social security pension schemes), and property income (i.e. the household social contribution supplements). This would lead to the impact of the inclusion of these items being neutral for disposable income of the household sector, and affecting household savings via the adjustment for the change in pension entitlements (i.e. item D8).

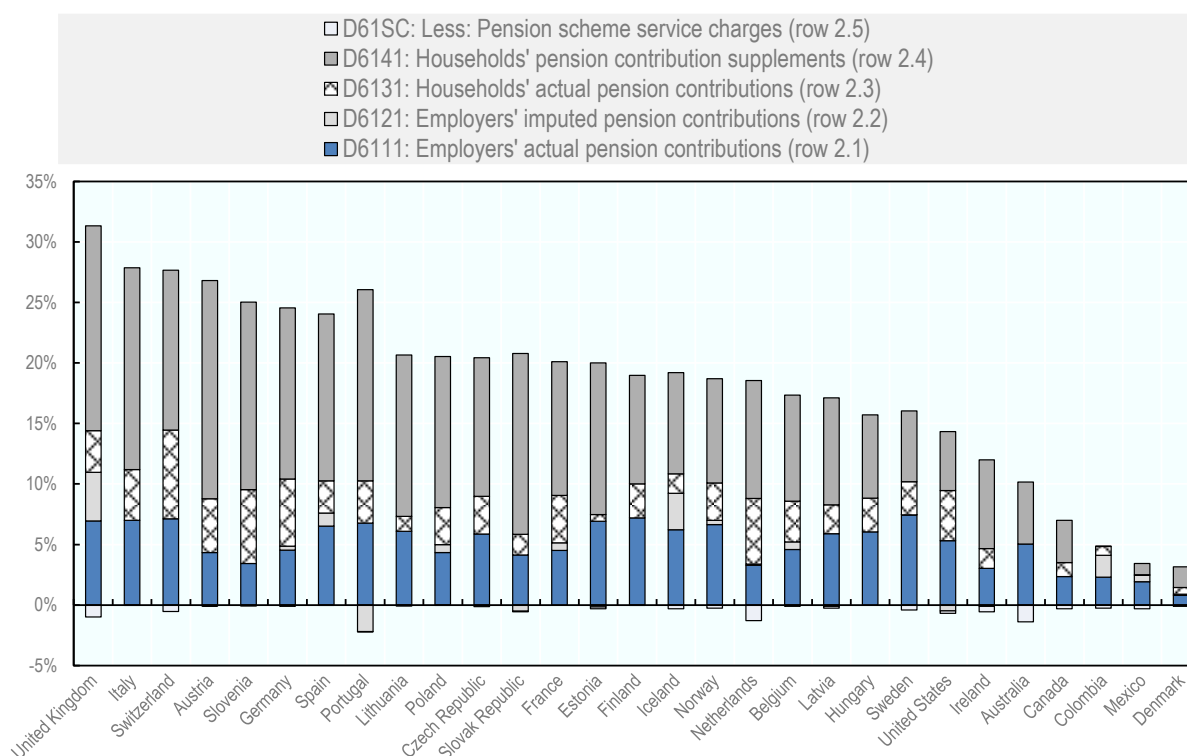
Figure 3.9. Changes in pension entitlements due to (imputed) contributions and benefits across OECD countries, % of GDP, 2015



Notes: (i) Chile, Costa Rica, Indonesia, Israel, Japan and New Zealand are missing due to either insufficient data sources or the information has not been made publicly available. (ii) Data for Australia relate to fiscal years (2015 ending June).

61. Figure 3.10 displays the increase in pension entitlements (D61) due to the payments of pension contributions by households for all pension schemes, as a percentage of GDP, for the year 2015. In most cases, the majority of the increase can be attributed to households' pension contribution supplements, even exceeding the actually paid contributions. In the case of DB schemes, these supplements reflect the unwinding of the discount rate, which refers to the fact that the present value of the entitlements existing at the beginning of the year and still due at the end of the year have increased because the future is one year nearer and so one fewer discount factor has been applied to calculate the present value (see §17.147 of the 2008 SNA). In contrast, for DC schemes these contribution supplements equal the investment income on the accumulated assets (see §17.134 of the 2008 SNA). Overall, actual contributions paid by employers exceed those borne by households, although relatively high household contributions can still be observed for Germany, the Netherlands, Slovenia and Switzerland. For most countries that provided longer time series, the increase related to households' pension contribution supplements is stable over time, with the exception of Mexico and Sweden (see Figures AF.13 and AF.14 in Annex F).

Figure 3.10. Social contributions across OECD countries, all pension schemes, % of GDP, 2015

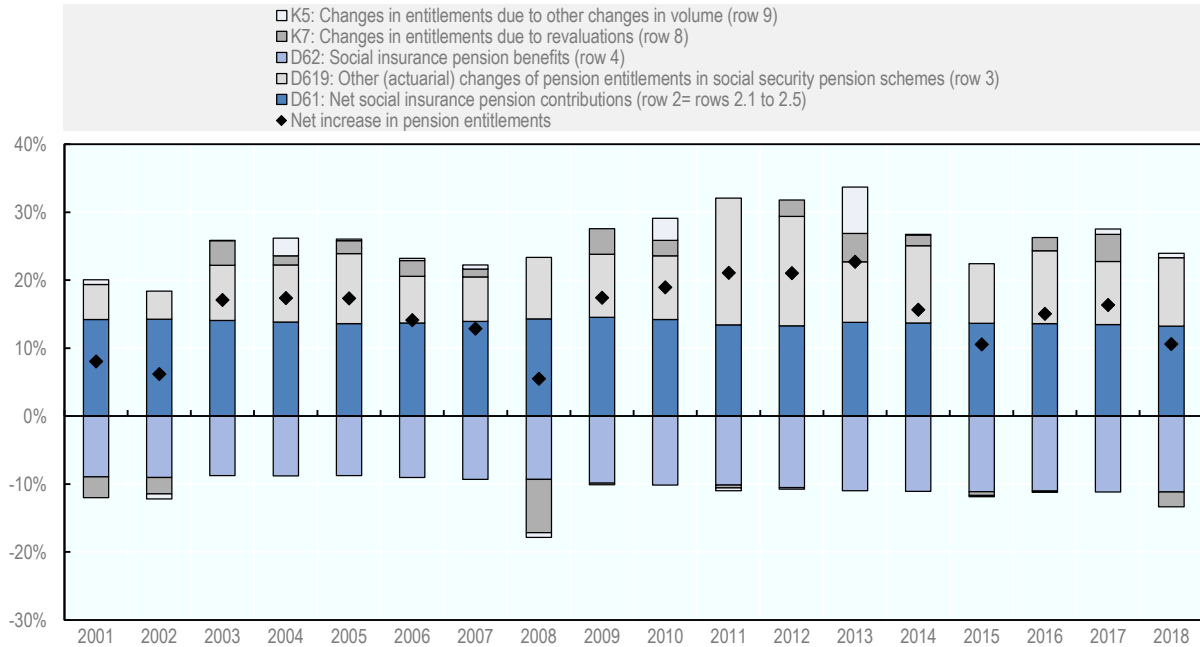


Notes: (i) Chile, Costa Rica, Indonesia, Israel, Japan and New Zealand are missing due to either insufficient data sources or the information has not been made publicly available; (ii) Data for Australia relate to fiscal years (2015 ending June).

62. The United States provided a relatively long time series, which facilitates the analysis of developments over time. Figure 3.11 shows the change in the stock of pension entitlements across all schemes, broken down into its subcomponents, from 2001 to 2018.⁴⁴ The average annual increase in the stock of pension entitlements was 15% of GDP over the period, with social insurance pension contributions (D61) accounting for most of the increase (14% of GDP). Other (actuarial) changes to pension entitlements in social security pension schemes (D619) are also contributing significantly to the increase in pension entitlements over the period, with on average a positive impact of 10% of GDP per year. Pension benefits paid (D62) decrease the stock of pension entitlements on average by 10% of GDP over the period. Overall, the stock of pension entitlements increased by \$39.9 trillion from 2001 to 2018.

⁴⁴ For each year, the different components (e.g. pension contributions (D61), pension benefits (D62)) of the net increase in pension entitlements for the total of all pension schemes are shown as a percentage of GDP.

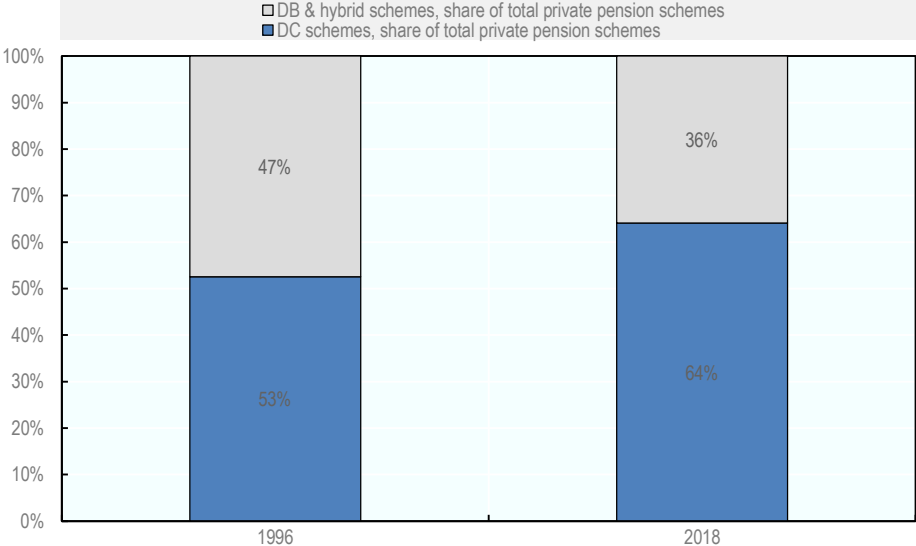
Figure 3.11. Changes in the stock of pension entitlements across all pension schemes for the United States, 2001-2018, % of GDP



63. The increasing relative importance of DC schemes over time can also be observed in the long time series provided by the United States. This increase seems to be a response to the ageing society,⁴⁵ reflecting a shift from DB schemes where the risk of insufficient funding is borne by the pension manager to DC schemes where the risk is borne by the pension beneficiaries. Figure 3.12, which compares the relative weights of DB and DC schemes among private pension schemes in the United States, demonstrates this trend. DB and DC schemes were roughly equal in size in 1996, but in 2018 DC schemes accounted for almost two thirds of all private pension schemes. It is interesting to note that a similar trend cannot be observed for US government managed pension schemes, with DC pension schemes (column D) accounting only for approximately 2% of all government managed pension schemes in 1996 and 2018.

⁴⁵ See also *Understanding Financial Accounts*, OECD, 2017, pp. 315.

Figure 3.12. Relative shares of private DC and DB pension schemes of total private pension schemes for the United States, closing stocks for 1996/2018



4. Concluding remarks/going forward

64. This paper presented results of the first OECD data collection on social insurance pension schemes according to the supplementary table on social insurance pension schemes (Table 2900), for which data collection for non-EU OECD countries started in 2018. It provides a comprehensive overview of liabilities and entitlements of all social insurance pension schemes in an economy, both those that are recognised in the central framework of the national accounts and those that are not.

65. The results collected from EU OECD countries (thanks to the cooperation with Eurostat), and from 11 non-EU countries which provided data on this new collection, highlight that a large part of the pension entitlements is not covered in the central framework. This is an important observation which can mostly be explained by the significance of social security pension entitlements and the presence, in Europe, of significant amounts of unfunded defined benefit employment-related schemes sponsored by government, which are not included in the central framework of national accounts. Table 2900 thus presents a significant amount of additional information, which may be very useful in obtaining a better understanding of the importance of social insurance pensions across countries and in obtaining additional insights into how countries may be affected by ageing populations.

66. The paper shows an increasing preference in the private sector to set up schemes according to defined contribution plans. This increase appears to be a response to the ageing society, reflecting a shift from defined benefit schemes where the risk of insufficient funding is borne by the pension manager to defined contribution schemes where the risk is borne by the pension beneficiaries. Furthermore, the data show that pension entitlements represent a smaller share of GDP for non-EU countries as compared to EU countries.

67. The OECD Secretariat launched a second round of collection of nationally available data for Table 2900 in July 2020. This initiative is in line with the Eurostat data collection, where the focus year has moved from 2015, which was the previous target year, to 2018. The results are expected to be published in 2021. More generally, work will be continued to increase the coverage and international comparability of the results.

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Annex A. Delineation issues

68. As highlighted in the Section 1 of the present note, social assistance and individual insurance are excluded from the supplementary table. Further discussions on the delineation are taking place in the Eurostat pension expert group to clarify existing guidance.⁴⁶ The 2008 SNA, as a starting point, also provides some useful explanation as outlined below.

Social Insurance/Social assistance

69. As noted in §8.90 of the 2008 SNA, there is a fundamental difference between benefits provided by government under social security and those provided under social assistance. It is explained in §8.91 that social security schemes relate to contributory schemes, as a consequence of which there is some sort of contract between the government and the beneficiaries. [...]. On the other hand, for social assistance, there is no need for a contribution to a certain scheme to receive the benefits, although there usually are certain (income related) conditions (e.g. the households are means tested).

70. As highlighted in §8.93 of the 2008 SNA, the extent to which social assistance provides income to households varies extensively from country to country. In some countries, there may hardly be any social security, and all provision of income by government to meet social needs is provided without concomitant contributions. In the case a country provides universal pension benefits which are not conditioned by any contribution, these amounts will not be shown in Table 2900, as the latter table only includes social insurance pension schemes. This also underlines the importance of further exploring a table on household retirement resources.⁴⁷

71. Eurostat maintains, in the context of its pension working group meetings, a “living” document on “borderline (cases) of social insurance, private pensions and life insurance”,⁴⁸ which highlights some EU country cases where the boundaries of social insurance are not always interpreted in the same way by national accounts compilers. Several cases for which the classification was not clear on the basis of the characteristics of the scheme have been discussed. This, for example, concerns a scheme recorded as second pillar for which one of the three sources financing the scheme⁴⁹ is payable out of state budget, with no relation to contributions, however payable only to members contributing to the scheme, thus representing a borderline case between social insurance and social assistance.

⁴⁶ The 2020 edition of the Eurostat and European Central Bank “Technical compilation guide for pension data in national accounts” includes examples of borderline cases with social assistance (Box 5) and individual insurance (Box 6).

⁴⁷ The OECD is exploring the possibilities for collection of additional information in a table on household retirement resources to obtain more insight in resources that resident households have accrued with regard to their retirement. This table is still under development.

⁴⁸ Eurostat, (2019b-Unpublished), “Borderline of Social Insurance, private pensions and life insurance”, Pension Expert Group Meeting, 5 April 2019.

⁴⁹ Defined percentage of obligatory social security pension contributions; defined percentage of participant wages; defined percentage of the country’s average wage additionally paid by the state budget.

Social Insurance/Individual insurance

72. §17.94 of the 2008 SNA explains that many social insurance schemes are organised collectively for groups of workers, so that those participating do not have to take out individual insurance policies in their own names. In such cases, there is no difficulty distinguishing social insurance from insurance taken out on a personal basis. However, some social insurance schemes may permit, or even require, participants to take out policies in their own names. The determinants for the insurance to qualify as a social insurance policy are that the benefits must be of the social benefit type and an employer makes an actual or imputed contribution to the scheme on behalf of an employee (see the full 2008 SNA definition of social insurance with criteria listed in Section 1). §17.97 notes that individual insurance policies do not qualify as social insurance, and are described as other insurance.

73. §17.51 of the 2008 SNA further elaborates on the difference between (individual) life insurance and social insurance. A major difference in the recording of a normal life insurance policy and one qualifying as social insurance policy is that under the former, the benefits from the policy are treated as rundowns of wealth, only reflected in the financial accounts. For a policy qualifying as social insurance, the benefits (pensions) are recorded as income in the secondary distribution of income account (and the ones relating to employment-related social insurance also in the financial accounts). The reason for the different treatment is that an individual policy other than social insurance is entered into entirely on the initiative of the policyholder. Policies that qualify as social insurance reflect the intervention of a third party, usually the government or the employer, to encourage or oblige the policyholder to make provision for income in retirement.

74. According to the above guidance, individual insurance does not qualify as social insurance and should be excluded from the pension table.

75. Eurostat (2019b) pp. 8, raises an example of private occupational schemes (collective company pension plans) for which the creation is a voluntary decision of a company; once it is created, it is offered to all employees of a company, but employees may refuse to enter the scheme. Accumulated amounts are normally blocked until retirement, but in some cases, the beneficiary can request early release of the amounts, including the need to cover debts, acquisition of principal residence or its repair in case of natural disaster, expiration of rights to unemployment benefits. Even if the scheme is collective and employment-related, taking into account its rather voluntary nature on both sides as well as the possibility to withdraw accumulated funds for reasons other than retirement, such a scheme could possibly be considered as an individual insurance rather than as pension in social insurance. Such cases are being further investigated in the context of the Eurostat expert group.

Annex B. The OECD table on social insurance pension schemes

Row number	Position / transaction / other flows	Liabilities appear in the core national accounts							Liabilities do not appear in the core national accounts	Total social insurance pension liabilities of domestic pension schemes	Counterparts: Entitlements of			
		Non-general government			General government				Social security pension schemes		Resident households	Non-resident households	Social insurance pension entitlements of resident households in the rest of the world	Total social insurance pension entitlements of resident households
		Defined contribution schemes	Defined benefit schemes	Total	Defined contribution schemes	General government employee defined benefit schemes		Social security pension schemes						
						In the financial corporation sector	In the general government sector							
Column number	A	B	C	D	E	F	G	H	I = C to H	J	K	L	M = J + L	
	Opening balance sheet													
1	Pension entitlements													
	Transactions													
2 = 2.1 to 2.5	Net social contributions relating to pension schemes													
2.1	Employer actual social contributions													
2.2	Employer imputed social contributions													
2.3	Household actual social contributions													
2.4	Household social contribution supplements													
2.5	Less service charges													
3	Other (actuarial) accumulation of pension entitlements in social security funds													
4	Pension benefits													
5 = 2+3-4	Adjustment for the change in pension entitlements													
6	Change in pension entitlements due to transfers of entitlements													
7	Change in entitlements due to negotiated changes in scheme structure													
	Other economic flows													
8	Revaluations													
9	Other changes in volume													
	Closing balance sheet													
10	Pension entitlements													
	Related information													
11	Assets held by pension schemes at end-year													

Annex C. Layout of the OECD table on social insurance pension schemes

Columns of Table 2900

76. The OECD table on social insurance pension entitlements covers all positions and flows of pension entitlements of all schemes in social insurance. The columns represent the multiple types of pension schemes:

77. Column A: This column refers to defined contribution (DC) schemes that are recorded in the central framework of the national accounts, and that are managed by non-general government entities. This means that it may be managed by non-financial corporations, financial corporations, households in their role as employer, and non-profit institutions serving households. It will depend on the sector classification of the pension administrator in which sector these liabilities appear in the central framework of the SNA.

78. Column B: This column refers to defined benefit (DB) schemes that are recorded in the central framework of the national accounts, and that are managed by non-general government entities. This means that it may be managed by non-financial corporations, financial corporations, households in their role as employer, and non-profit institutions serving households. Information on other non-DC schemes that are managed by non-general government entities should also be reported under column B. These schemes are often described as hybrid schemes as they combine the characteristics of DC and DB pension schemes. Similarly to column A, the sector in which these liabilities appear in the central framework of the SNA will depend on the sector classification of the pension administrator.

79. Column C: This column represents the total of non-general government pension schemes (column A + B). For some countries, it may be difficult to distinguish between private DC and DB pension schemes. In this case, only column C can be completed.

80. Column D: This column refers to DC schemes that are recorded in the central framework of the national accounts, and that are managed by a general government unit. This usually concerns employment-related schemes for government employees. It may be administered by the government or by an autonomous pension fund. In the former case, the liabilities appear under the general government sector in the central framework of the national accounts, whereas in the latter case they are recorded under the financial corporations' sector.

81. Column E: This column refers to DB pension schemes for general government employees (its current and former employees) that are recorded in the central framework of the national accounts, and that are managed by a general government unit, but administered by an autonomous pension fund. Because of the latter, the pension liabilities reported under this column are classified in the financial corporations sector in the central framework of the SNA. These schemes are public schemes and generally cover pension funds for civil servants.

82. Column F: This column refers to DB pension schemes for general government employees (its current and former employees) that are recorded in the central framework of the national accounts, and that are managed and administered by a general government unit. Unlike pension schemes recorded under column E, the pension liabilities reported under column F are classified in the general government sector in the central framework.

These schemes are public schemes and the government is responsible for the pension provisions.

83. Column G: This column refers to DB pension schemes for general government employees (its current and former employees) that are not recorded in the central framework of the national accounts, because they are intertwined with social security schemes. These schemes are managed and administered by a general government unit and share both characteristics of employment-related and social security pension schemes.

84. Column H: This column refers to social security pension schemes. These are schemes that cover the entire community, or large sections of the community, and are imposed, controlled and financed by government units and their pension liabilities do not appear in the central framework of the national accounts.

85. Columns I: This column sums up the information of all domestic social insurance pension schemes (i.e. columns C+D+E+F+G+H) and as a consequence reflects total social insurance pension liabilities of domestic pension schemes. It also reflects all social insurance pension entitlements acquired or held by resident and non-resident households towards domestic pension schemes.

86. In addition to columns reflecting the flows and positions of social insurance pension liabilities of the various types of pension schemes in the domestic economy, the social insurance pensions table also includes columns to reflect the counterparts of these liabilities, and an additional column to derive total pension entitlements of resident households. The relevant columns concern:

87. Column J: This column reflects which part of the social insurance pension liabilities of domestic pension schemes (i.e. column I) relates to resident households.

88. Column K: This column reflects which part of the social insurance pension liabilities of domestic pension schemes (i.e. column I) relates to non-resident households. This often relates to pension entitlements accrued by non-residents as part of their (current or former) employment in the domestic economy.

89. Column L: This column reflects social insurance pension entitlements acquired by resident households in the rest of the world. As with column K, this often relates to their (current or former) employment abroad on the basis of which they accrued pension entitlements with non-resident pension schemes. This may both concern entitlements with employment-related and social security pension schemes abroad.

90. Column M: This column reflects the total social insurance pension entitlements as accrued by resident households. It is equal to the sum of columns J and L.

Rows of Table 2900

91. The rows in the table contain a full reconciliation between the opening stock of pension liabilities and entitlements at the beginning of a period, and the closing stock at the end of a period.

92. Rows 1 and 10 – Pension liabilities (and entitlements) (LS_F63 & LE_F63): Row 1 (LS_F63) illustrates the opening stock of pension liabilities (for columns A, B, C, D, E, F, G, H, I) and entitlements (for columns J, K, L, M), which is identical to the closing stock of the previous year. The corresponding closing stock of pension liabilities and entitlements at the end of the relevant period is presented in row 10 (LE_F63).

93. Rows 2.1 and 2.3: Actual social contributions (D6111 & D6131): Employer and household actual social contributions are recorded in respectively rows 2.1 (D6111) and 2.3 (D6131). Note that all these contributions are recorded in the central framework of the national accounts, including those for columns G and H. For these latter columns these are the only entries, together with the information recorded in row 4, that appear in the central framework.

94. Row 2.2: Employer imputed social contributions (D6121): In some cases imputations are made to account for part of the social contribution to be paid by the employer. For DC schemes this is only the case when the employer operates the pension scheme her/himself.

95. For DB pension schemes, employer imputed social contributions are generally measured as a residual. In addition to this residual amount, row 2.2 also covers so-called 'experience effects' where the observed outcome of pension modelling assumptions, such as with regard to wage growth, the inflation rate and the discount rate, differs from the levels assumed (see for more information §17.136 of the ESA 2010). In the table, imputed social contributions derived in this way apply to all DB schemes, including the 'intertwined' pension schemes as included in column G. Please note, however, that it does not apply to social security schemes. All 'other' changes in pension entitlements in social security pension schemes should be reflected in row 3 (see below).

96. Row 2.4: Household social contribution supplements (D6141): Row 2.4 relates to the property income earned, or imputed, on the stock of pension entitlements during the accounting period. In the national accounts, this income is treated as being received by the policyholders and paid back into the pension scheme via social contribution supplements. The calculation of the amount differs between DC and DB schemes.

97. Row 2.5: Less: Pension scheme service charge (D615C): Set against the social contributions is the service fee charged by the unit administering the pension scheme. This may be an explicit or an implicit charge and is treated as being paid by households as part of their final consumption expenditure. It should be deducted from the contributions paid to arrive at the net social contributions. It is presented as a separate item in the table, but in some cases it may already have been reflected in lower values of the social contributions recorded in rows 2.1 to 2.4. In the latter case, the row can be left empty.

98. Row 3: Other (actuarial) changes of pension entitlements in social security pension schemes (D619): For DB pension schemes (including the 'intertwined' schemes in column G) the difference between the increase in pension entitlements from current service plus the cost of operating the scheme on the one hand, and the actual social contributions on the other hand, is recorded as employer imputed social contributions (see row 2.2). An item calculated on the same basis is shown in row 3 as "other (actuarial) accumulation of pension entitlements in social security funds" for social security pension schemes. In correspondence with the recording of row 2.2 for DB schemes, row 3 also includes so-called 'experience effects' with regard to social security pension liabilities. These occur when the observed outcome of pension modelling assumptions (with regard to wage growth, discount rate, etc.) for social security pensions differs from the levels assumed in the previous estimation (see also row 2.2).

99. Row 4: Reduction in pension entitlements due to payment of pension benefits (D62): Row 4 comprises the pension benefits that are paid out during the recording period. The payment of pension benefits has the effect of 'settling' some of the

liabilities/entitlements included in the opening stock in Row 1 and is therefore reflected as a reduction in the liabilities/entitlements.

100. Row 5: Change in pension entitlements due to social contributions and pension benefits (D8): Row 5 shows the changes to pension entitlements due to net (actual and imputed) social contributions and pension benefits. It is equal to the sum of rows 2 and 3 minus row 4.

101. Row 6: Transfers of pension entitlements between schemes (D81): Row 6 records any transfers of pension liabilities from one scheme to another, which may for example occur when employees change jobs.

102. Row 7: Change in entitlements due to negotiated changes in scheme structure (D82): In response to demographic and economic changes, pension managers may decide to reform their pension schemes. This may for example involve a change of the retirement age, the indexation rule or the benefit formula. Some of these reforms may affect the current pension liabilities and should therefore be reflected as a change of the liabilities/entitlements. Changes to pension entitlements that are imposed without negotiation are recorded as “other changes in the volume of assets” (included in row 9).

103. Row 8: Changes in entitlements due to revaluations (K7): Row 8 shows changes in pension liabilities due to revaluations. For DC schemes these correspond to the holding gains and losses on the assets held by the scheme to meet the obligations (see §17.142 of the 2008 SNA). For DB schemes these relate to changes to the key model assumptions in the actuarial calculations. These assumptions concern the discount rate, the wage rate and if used in the model, the inflation rate. Please note that it does not include changes related to alterations in demographic assumptions. These should be reflected in row 9 (see below).

104. Row 9: Changes in entitlements due to other changes in volume (K5): Row 9 shows the changes in pension liabilities due to other changes in volume. This for example relates to changes in demographic assumptions used in the actuarial calculations or to changes in the retirement patterns, as long as they do not derive from negotiated reforms or legislative reforms approved by parliament (in that case, they should be recorded under row 7). Furthermore, it includes changes in the general framework of the actuarial model applied to improve the accuracy of the results.

105. Row 11: Assets held by schemes at year-end (LE_F_NG): Row 11 covers the amount of assets, both financial and non-financial, held by the pension scheme at the end of the recording period. In relation to row 10, this provides information on the level of funding of the schemes. The amount of assets will largely depend on the type of scheme. For DC schemes, the amount of assets will be equal to the amount of pension liabilities (except for any own assets and for liabilities other than pension liabilities). For DB schemes it will depend on whether the scheme is setup as a funded scheme (in which the contributions receivable in a period are used to accumulate assets to fund the future benefits of the contributors) or as a pay-as-you-go scheme (in which the contributions receivable in a period are used to fund the benefits payable in the same period).

Annex D. Definition of the adjustment for the changes in pension entitlements, (SNA 2008, §9.20 – 9.25)

106. SNA 2008 § 9.21 explains that pension schemes are treated in the SNA as having liabilities towards the households with claims on the schemes. The payments of pension contributions into the schemes and the receipts of pensions by pensioners constitute the acquisition and disposal of financial assets [...]. SNA 2008 § 9.22 notes that in order to present income information that may be more useful for analysing the behaviour of the households concerned, the payments of pension contributions to all pension schemes and to social security and the receipts of pensions by pensioners' households under both pension schemes and social security are recorded in the secondary distribution of income account as social contributions and social insurance benefits, respectively. They therefore affect the level of disposable incomes of households [...].

107. § 9.23 clarifies that to the extent that contributions and benefits are not exactly equal, there is an impact on household saving. For example, if households as a whole pay more contributions than they receive as benefits, their saving is reduced by this difference. Similarly, if household benefits exceed their contributions, saving does not reflect the fact that the negative change in entitlements represents a reduction in net worth. However, as is clear in the financial account, the change in pension entitlements is part of household net worth. It is therefore necessary to adjust saving for the difference between contributions payable and benefits receivable shown in the secondary distribution of income account

108. 2008 SNA §9.24 notes that an item described as the adjustment for the change in pension entitlements therefore appears in both the use of disposable income account and the use of the adjusted disposable income account. It is equal to:

- the total value of the actual and imputed social contributions payable into pension schemes,
- *plus* the total value of contribution supplements payable out of the property income attributed to pension fund beneficiaries,
- *minus* the value of the associated service charges,
- *minus* the total value of the pensions paid out as social insurance benefits by pension schemes.

Annex E. Obtaining actuarial estimates for defined benefit schemes

109. This annex summarises the information provided by non-EU countries regarding actuarial estimates for publicly and privately managed defined benefit (DB) schemes. The key assumptions for compiling these estimates relate to the benefit formula, the discount rate, the wage growth and demographic data.

Actuarial estimates for social security and intertwined schemes (columns H and G)

110. For Israel, the liabilities of the social security pension (column H) refer to old age and survivors at the date of the financial statements. As shown in Table A E.1 below, the discount rate used for calculating these pension liabilities, as well as for the liabilities as included in column G, is the interest on government zero coupon bonds and has been determined by the national insurance institute actuary. In the case of the United States, social security pension schemes cover the old age and survivor insurance and the disability insurance (OASDI) programs.⁵⁰ The discount rate is determined by the social security administration and is based on estimates about the real interest rate for special public-debt obligation issuable to the trust funds, and the consumer price index.

111. For Mexico, column H corresponds to public pension schemes with public management (defined benefit, defined or notional contribution). The basis for these estimates are actuarial projections made primarily with the Projected Benefit Obligation (PBO) method and estimates from the social security funds.

112. Costa Rica and Indonesia provided confidential data for column H, but with some methodological information. In the case of Costa Rica, column H records three obligatory substitute pension funds of collective capitalisation with a tripartite contribution: State, employer and employee. The most important is the Disability, Old Age and Death Regime of the Costa Rican Social Security (57.8% of Social security pension rights) which is complemented by some more specific schemes. A discount rate of 4% is applied for current contributors of the Disability, Old Age and Death Regime. The calculation also assumes an increase in the payment of pensions equal to inflation and mortality tables according to the internal regulations of the institution at stake.

113. For Indonesia, column H records a social security program that aims “to maintain a decent degree of life for participants and/or their heirs by providing income after participants retire, suffer permanent total disability, or die”. The data provided to the OECD is confidential, but for reference it was reported that the discount rate (9.59%) is based on the Projection of Yield of Investment (YOI) in 2019 as well inflation rates, growth rates of Gross Domestic Product (GDP), wage growth rates and actuarial interest rates. Demographic assumptions amongst others concern the mortality rate as available from the BPJS (Social Insurance Administration Organisation) as well as assumptions on the future

⁵⁰ The OASDI provides monthly benefits designed to replace, in part, the loss of income due to retirement, disability or death. Entitlement to benefits and benefits levels are related to earnings in covered work and defined by law. Coverage is nearly universal; about 96% of U.S. jobs are covered. The program is a pay-as-you-go system where contributions of current workers are used to pay the benefits of prior generations. It is financed by payroll and self-employment taxes with contributions from both employers and employees. The full-benefit retirement age is 67 for beneficiaries born after 1960.

labour force participation. It was noted in the metadata that assumptions related to membership and the economy were also used.

114. In the case of Canada, social security funds (Canadian Pension Plan (CPP) and the Quebec Pension Plan (QPP)) are not presented on an accrued-to-date entitlement basis. As a result, data for social security pension schemes are omitted until Statistics Canada can provide comparable estimates. Statistics Canada is exploring alternative data sources and working towards developing these estimates.

115. Japan also identified a social security pension system (column H) as well as intertwined DB schemes for government employees managed by the general government (column G), but due to lacking data sources they have not been able to provide estimates yet. The data for Colombia, is confidential. As noted earlier, Australia, Chile and New Zealand do not have social security pension schemes.

Table A E.1. Actuarial information regarding column social security pension schemes (H)

	Discount rates	based on	Wage growth assumption (PBO recommended)	Demographic assumption
Australia	Not applicable			
Canada	Not available			
Chile	Not applicable			
Colombia	Exists but Not available	Exists but Not available	Not available	Not available
Costa Rica	4% (current contributors of Disability, Old Age and Death Regime of the Costa Rican Social Security Agency)	Information provided by the Superintendencia de Pensiones (Superintendence of Pensions) (SUPEN)		Mortality tables according to the internal regulations of the institution at stake
Israel		National insurance institute actuary's interest of the government zero coupon bond (also for column G)		
Japan	Not available			
Mexico	3%	Federal government reports/pensioners (Mexican Social security institute and institute of security and social services of state workers)	PBO	Not available
New Zealand	Not applicable			
United States	5.781% for 2010-2012, 5.678 from 2013-2014, 5.370% from 2015-2017, and 5.165% for 2018	Social security Administration estimates about the real interest rate for special public debt obligations issuable to the trust funds and the CPI.	ABO	Determined by the Social security Administration and based mainly on mortality projections.
Indonesia	Projection of Yield of Investment (YOI) in 2019: 9.59%	Assumptions related to the economy consist of inflation rates, growth rates of Gross Domestic Product (GDP), wage growth rates, Yield of investment (YOI) or actuarial interest rates and contribution rates for the Pension Security Program	Not available	Mortality Rate (TM) of the BPJS Employment 2017 is used Assumptions related to Manpower, include the level of labor force participation (TPAK), the level of the labor force employed, and the proportion of workers receiving wages (PU). There are also assumptions related to membership and to the economy

Notes: (i) PBO stands for Projected Benefit Obligation which take into account carrier progression; (ii) ABO stands for Accumulated Benefit Obligation (ABO) and does not take into account any future salary increase.

116. As explained above, direct actuarial estimates of social security pension entitlements are rarely available (as can be derived from the metadata sheets provided to the OECD Secretariat), meaning additional estimates may have to be compiled. For this reason, a further exchange of best practices in deriving the relevant estimates might be useful. This may assist countries in coming up with proper estimates and would enhance cross-country comparability of the results.

Actuarial estimates for privately managed defined benefit schemes (column B)

117. Estimates are often sparsely available for privately managed defined benefit (DB) schemes and the metadata shows that in most of the cases, these have not been obtained from actuarial information (as shown in Table A E.2). This means that national statistical offices and central banks may have very little access to information from national actuarial associations, and must often rely on various assumptions to arrive at the relevant estimates. For that reason, a further exchange of best practices might also be useful for these types of schemes, assisting countries in coming up with proper estimates and enhancing cross-country comparability of the results.

118. Regarding specifically the discount rates, only Mexico, the United States as well as Indonesia were in the position to provide relatively detailed information. Mexico flagged that the discount rate applied in the model-based actuarial estimates varies significantly between public and private companies and the type of benefits granted by pension schemes. For example, while a public corporation applies a discount rate of 8%, a private corporation uses more conservative nominal rates, usually 6%.

119. The United States notes that a discount rate of 5% (based on the AAA corporate bond rate published by the Federal Reserve Board) was used to estimate pension entitlements for 2010-2012. The rate was lowered to 4% for 2013 to the most recent annual estimate.

120. Indonesia explains that in the actuarial report, actuarial calculations are always performed by actuaries using interest rate assumptions. Based on the Pension Fund actuarial report, the assumption of interest rate used ranged from 6% to 12%. From this data, it can be seen that the assumptions of interest rate widely used by Pension Funds are 9% and 10%.

Table A E.2. Actuarial information regarding privately managed DB schemes: Column B

	Discount rates	Based on	Wage growth assumption (PBO recommended)	Demographic assumption
Australia	Not available ⁱ			
Canada	Not computed	Not computed	Not collected	Not collected
Chile	Not available ⁱⁱ			
Colombia	Exists but not available	Exists but not available	Not Available	Not available
Costa Rica	Not available ⁱⁱⁱ			
Israel	This item is calculated by the actuaries of the pension funds in accordance with the directives of the supervisor of insurance of the ministry of finance.			
Japan	Not available ^{iv}			
Mexico	Public corporations :8%, private corporations: 6%	Financial statements of parastatal sector, development banking, Energy sector, INEGI, Financial asset AF. 64	PBO	Not available
New Zealand	Not available			
United States	5% for 2010-2012 ; 4% for 2013-after	The Fed's AAA corporate bond rate	ABO	Not available to the Fed for each plan
Indonesia	9 and 10%	Pension Fund actuarial report		The assumptions of mortality rate widely used are GAM 71 ^v and AMT 49. ^{vi}

Notes: (i) A and B are compiled at total level and cannot be separated out at this stage; (ii) No information is available for column B; (iii) The information in columns A & B is confidential for Costa Rica; (iv) B is derived as C less A; (v) The Group Annuity Mortality table (of 1971) is used by pension actuaries for funding calculations; (vi) The AMT describes realised mortality trends.

Annex F. Supplementary figures showing changes over time

Figure A F.1. Changes in the breakdown of pension entitlements for Mexico, end of period from 2008 to 2018



Figure A F.2. Changes in the breakdown of pension entitlements by type of pension schemes for Latvia, 2015-2017



Figure A F.3. Changes in the breakdown of pension entitlements by type of pension schemes for the United States, 1996-2018.

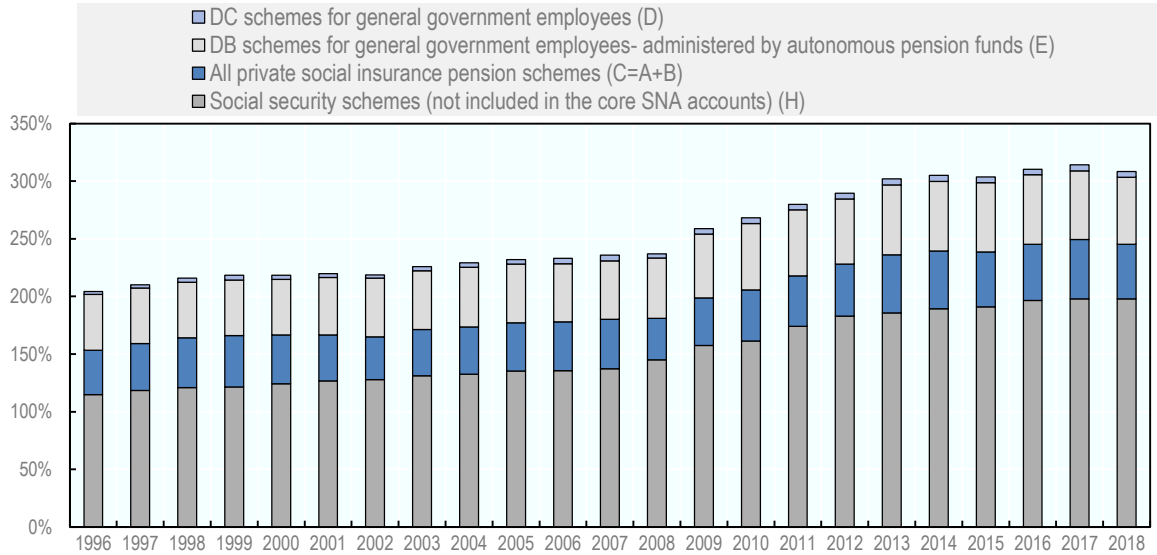


Figure A F.4. Changes in the breakdown of pension entitlements by type of pension schemes for Lithuania, 2013-2017

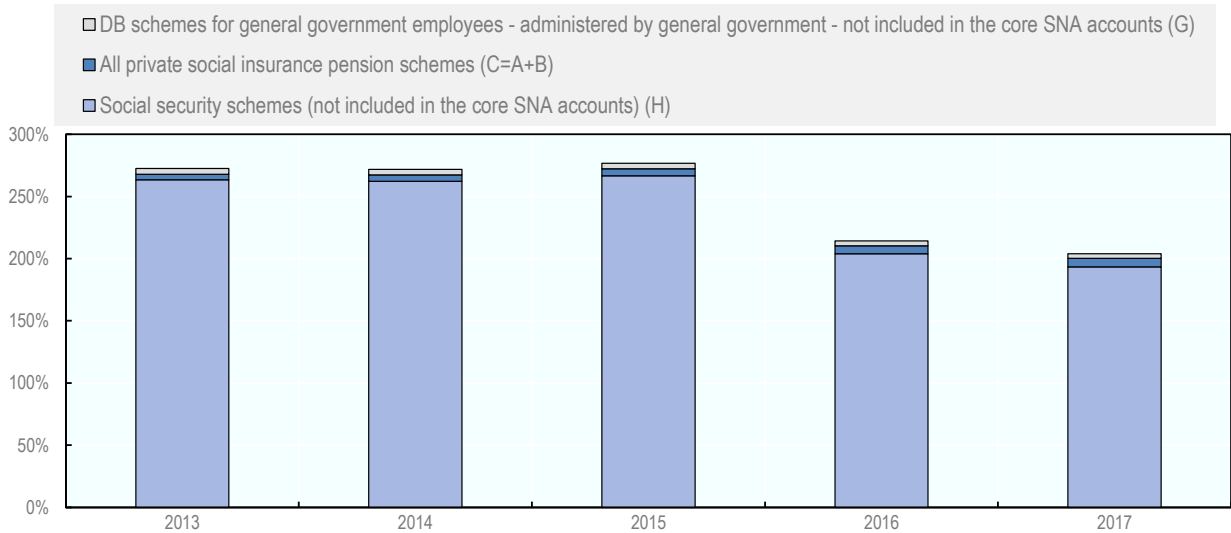


Figure A F.5. Changes in the breakdown of pension entitlements by type of pension schemes for Mexico, 2008-2018

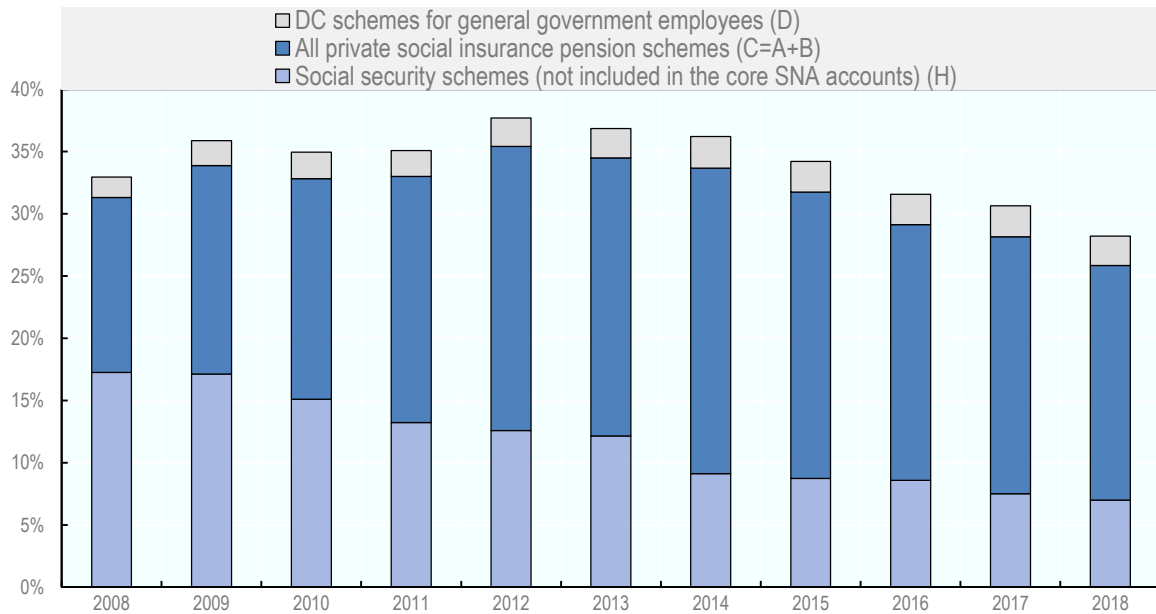


Figure A F.6. Changes in the breakdown of pension entitlements by type of pension schemes for the Netherlands, 2012-2016

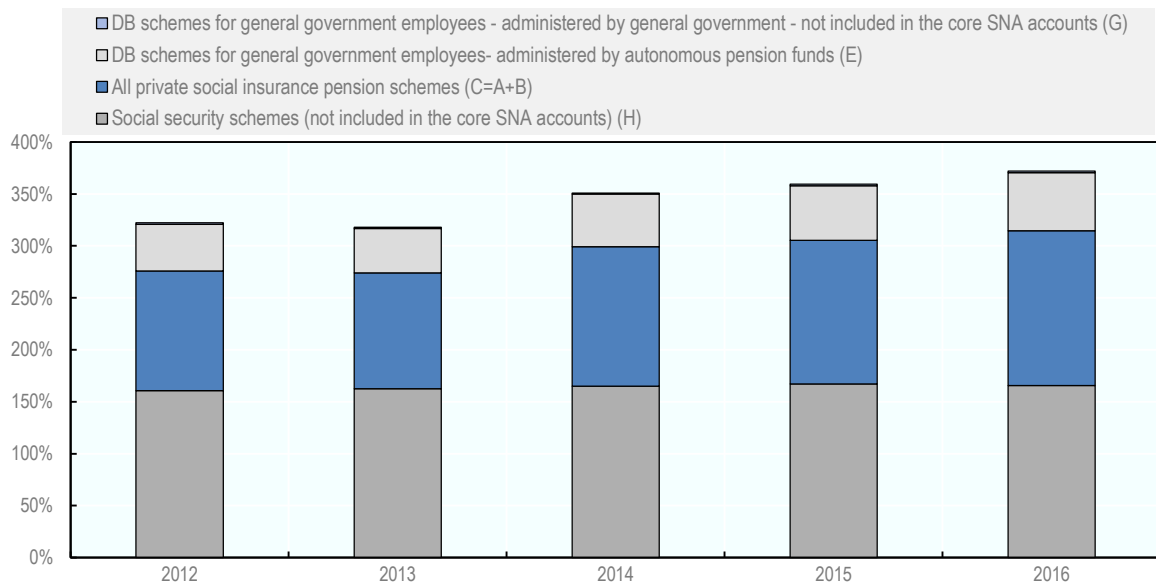


Figure A F.7. Changes in the asset-to-pension entitlement ratio for private DB and hybrid schemes (B) for the United States, 1996-2018.

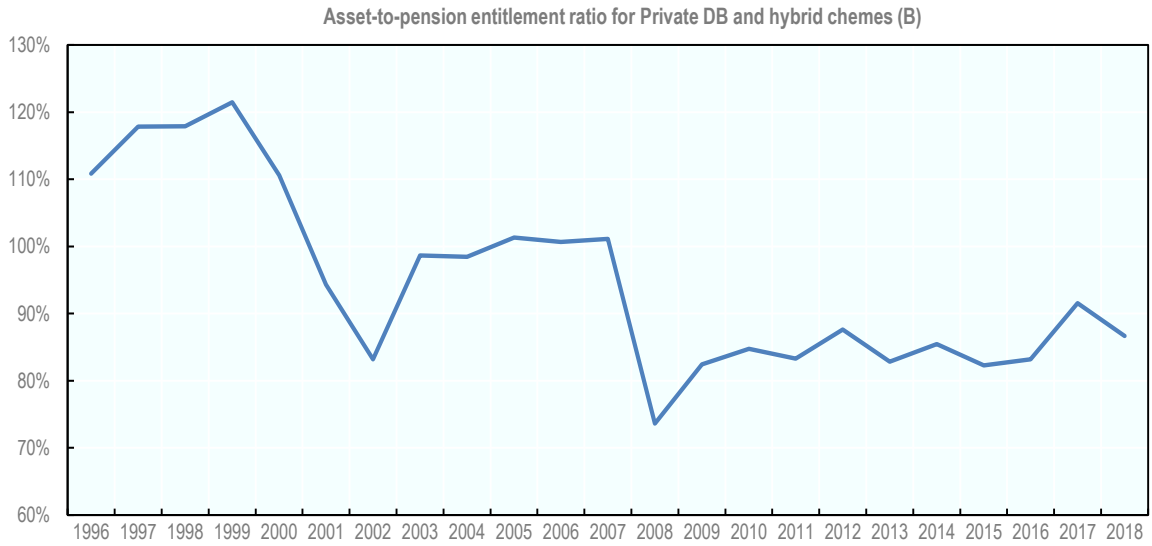


Figure A F.8. Changes in net increase in pension entitlements for all schemes for Latvia, 2015-2017, % of GDP

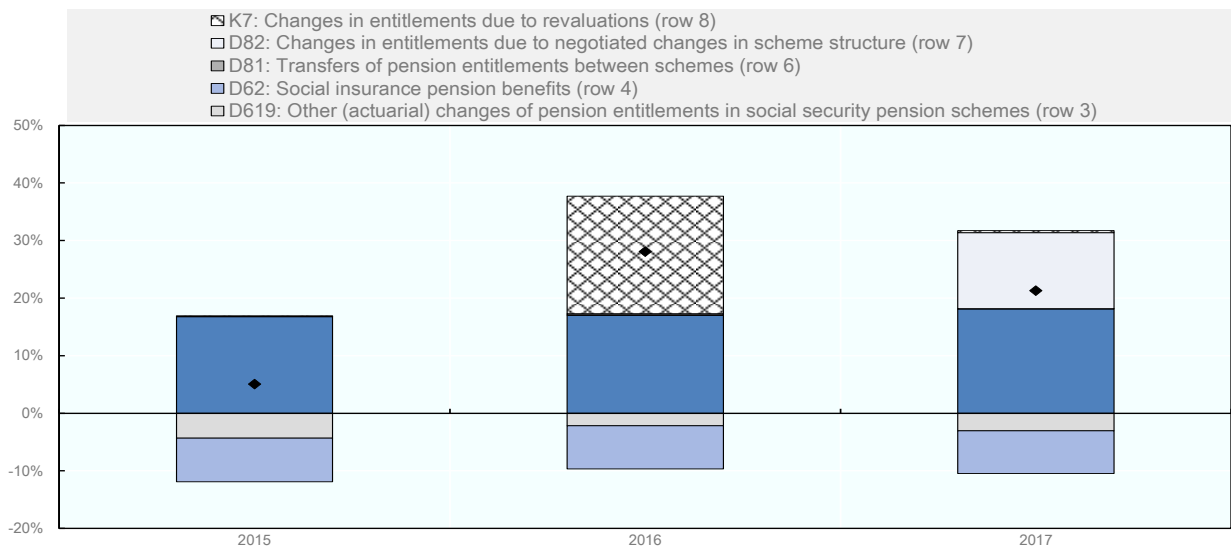


Figure A F.9. Changes in net increase in pension entitlements for all schemes for Lithuania, 2013-2017, % of GDP

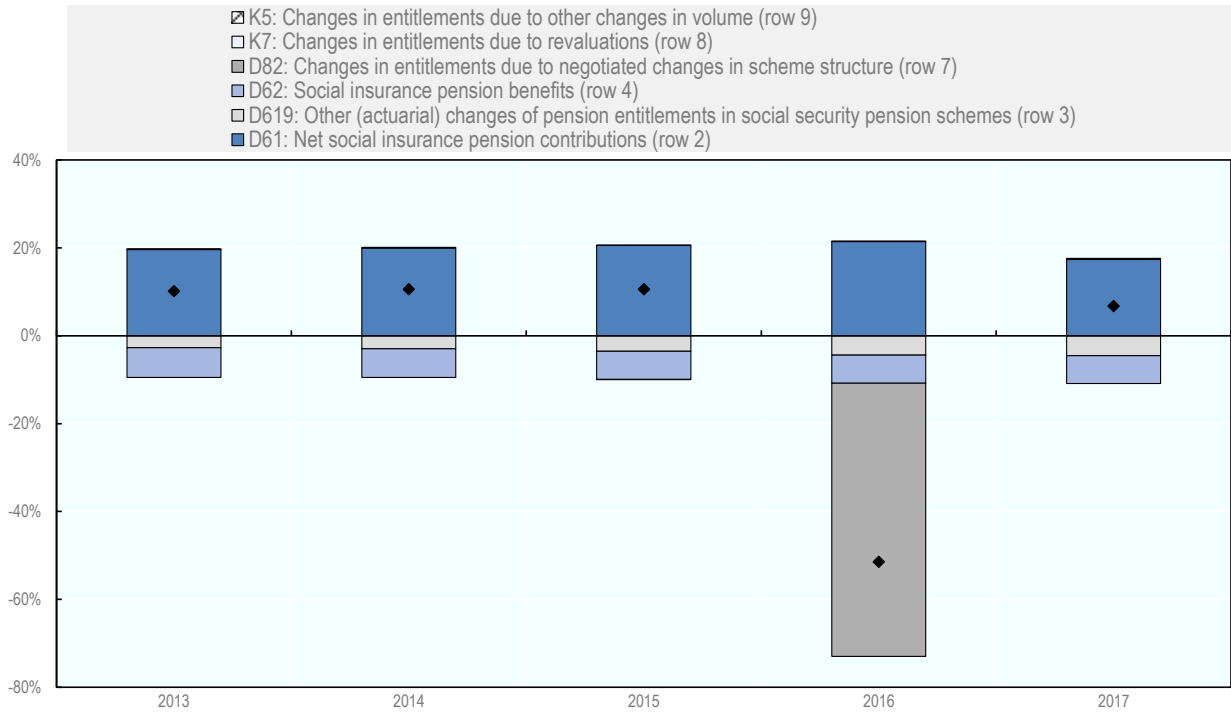


Figure A F.10. Changes in net increase in pension entitlements for all schemes for the Netherlands, 2012-2016, % of GDP

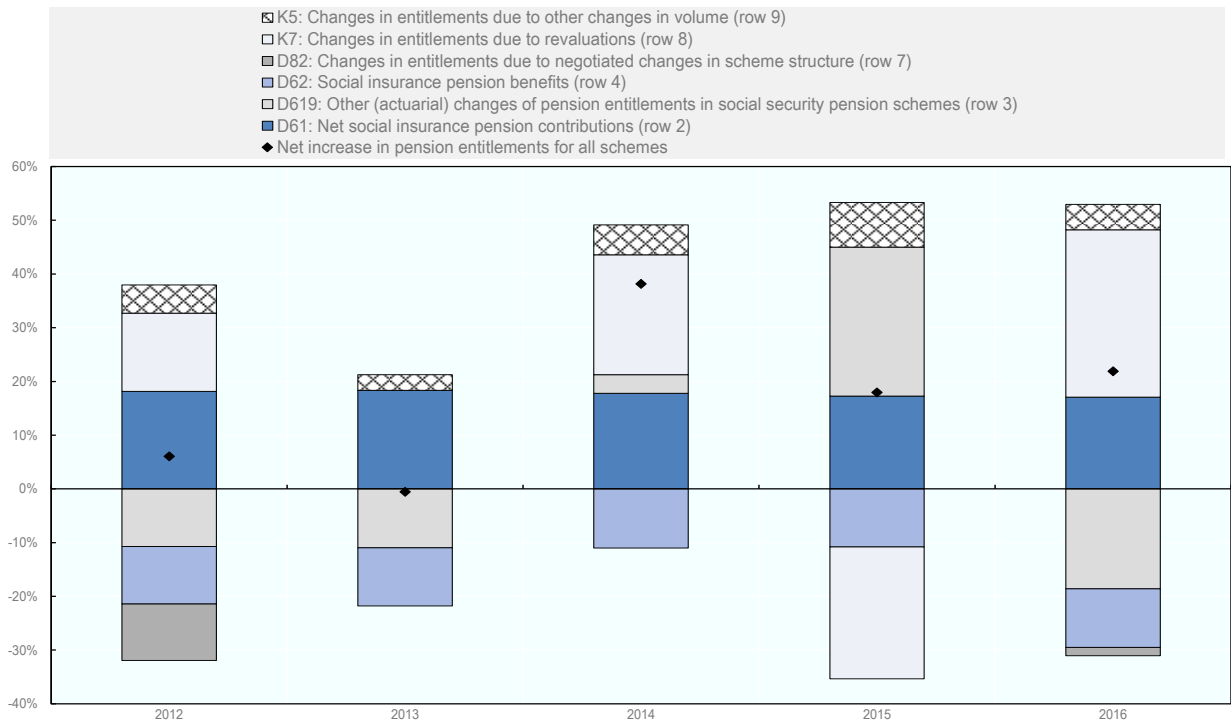


Figure A F.11. Changes in pension entitlements due to (imputed) contributions and benefits for the Netherlands, % of GDP, 2012-2016

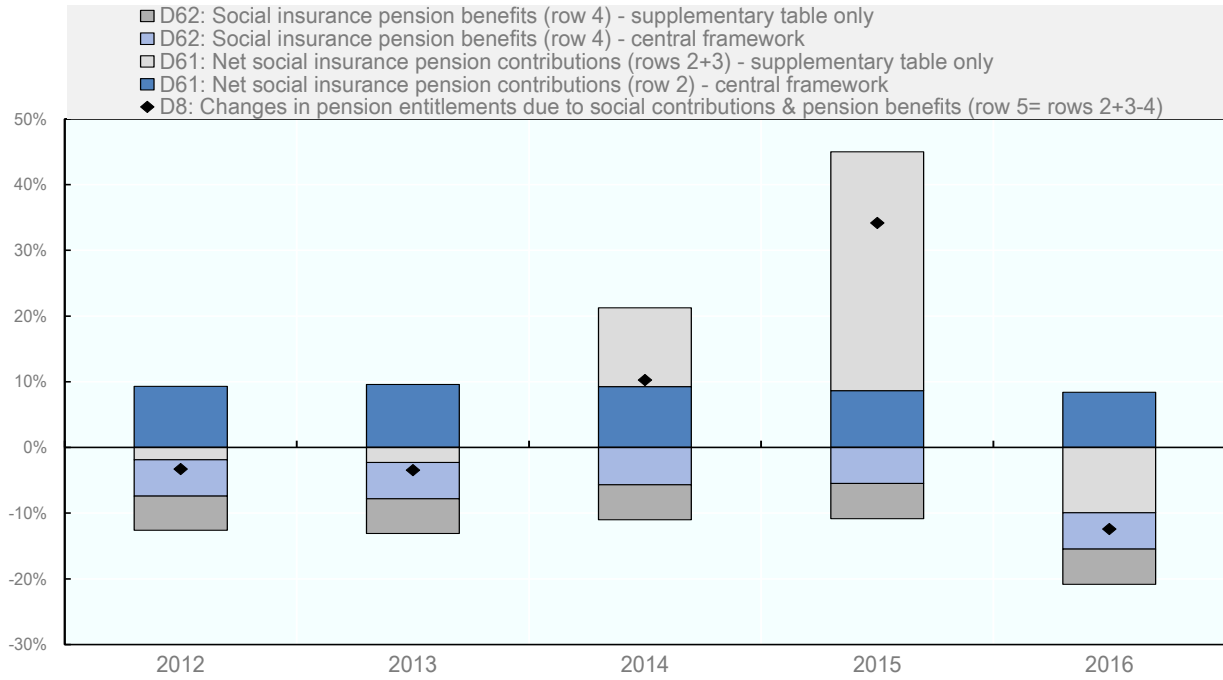


Figure A F.12. Changes in pension entitlements due to (imputed) contributions and benefits for the United States, % of GDP, 2001-2018

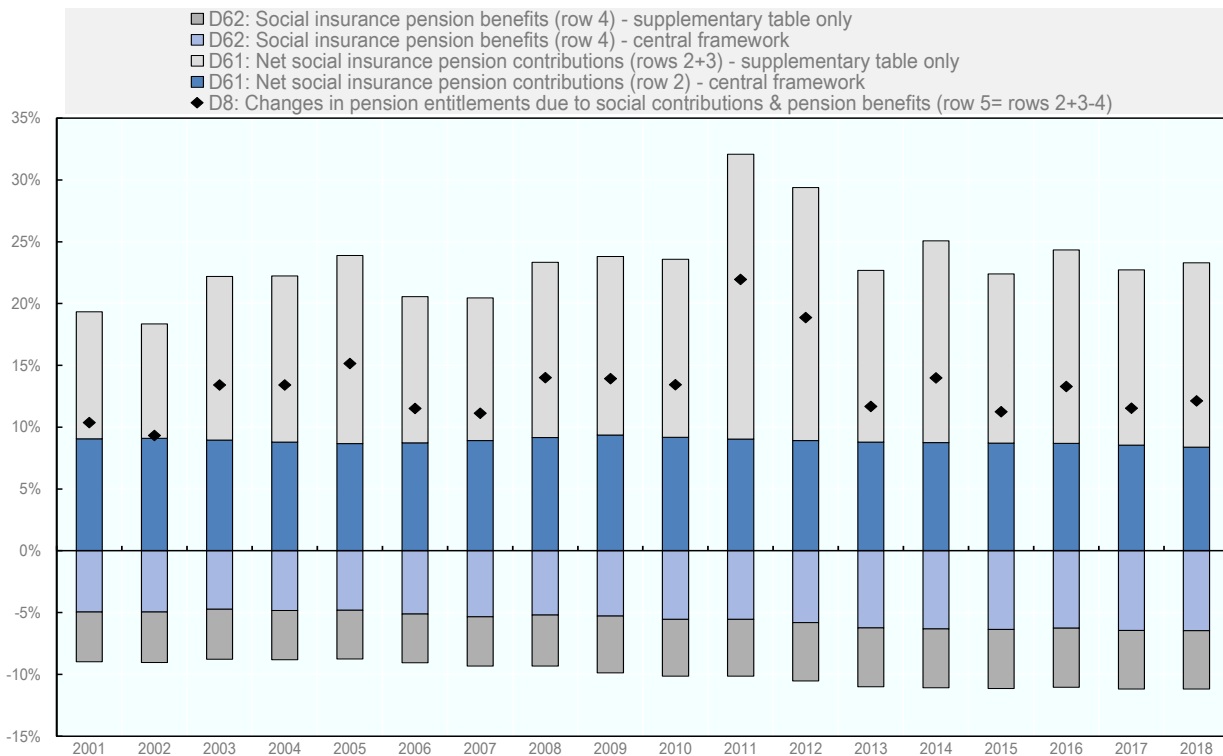
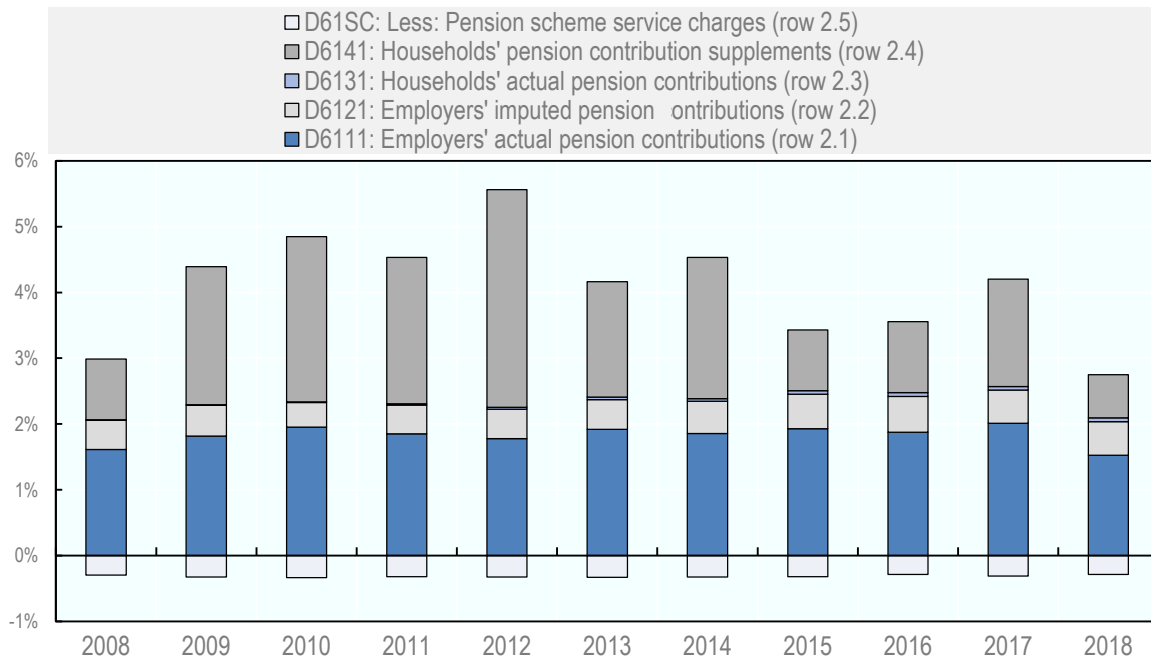


Figure A F.13. Social contributions for Mexico, all pension schemes, % of GDP, 2008-2018**Figure A F.14. Social contributions for Sweden, all pension schemes, % of GDP, 2012-2017**