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DANS REVUE DE L'OFCE 2024/1 (N° 184), PAGES 193 À 226  
ÉDITIONS OFCE

ISSN 1265-9576

DOI 10.3917/reof.184.0193

Article disponible en ligne à l'adresse

<https://www.cairn.info/revue-de-l-ofce-2024-1-page-193.htm>



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# THE FINANCIAL BURDEN OF PENSIONS IN EUROPE

## A CROSS-COUNTRY COMPARISON

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Across Europe, ageing populations strain national budgets as pension costs rise. This article aims to provide a comprehensive view on how much is being contributed and by whom into pension systems in eight European countries: Denmark, Finland, France, Germany, Italy, the Netherlands, Norway and Sweden. To obtain comparable results, the pension systems addressed in this paper include basic and earnings-related pensions organised in statutory (first pillar) and occupational (second pillar) pension schemes, but exclude private pension savings. Using 2020 data, the paper analyses contributions from employees, employers and taxes. When all pension schemes are combined, contribution levels converge across countries, averaging 14.6% of GDP. Italy and Denmark contribute the most (16.8% and 16.7%), while Sweden and Finland contribute the least (12.1% and 12.5%). Focusing on the contribution breakdown, employers' contributions generally account for the greatest share (50% on average), followed by tax revenue (30%) and employee contributions (20%). Denmark relies heavily on taxes (60%), while Sweden relies on employers (67%). At the individual level, financing costs are progressive in Denmark, France and (somewhat) Sweden, meaning higher earners pay more. They are flat in Finland and Italy, and regressive in the Netherlands and Germany.

*Keywords:* pension contributions, Europe, financing cost.

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1. The authors thank the anonymous referees of the review for their helpful comments.

## 1. Introduction

Europe is becoming older. The median age of the European Union (EU) population has risen from 36.5 years in 1995 to 44.1 years in 2021 (Eurostat 2022). The median age is expected to increase in future. Ageing is driven by changes in mortality and fertility. Longer life expectancy together with decreased birth rates translate into a change in the relative size of different age groups. The old-age dependency ratio<sup>2</sup> has increased, and this trend is projected to continue: the share of people aged 65 and over is getting bigger in the population. This translates into higher spending related to old age: pensions, health care and long-term care.

Currently, pension systems represent a major item of welfare spending in the EU member states, and pensions form the main part of income for many senior citizens. Thus, they are important from the perspective both of social policy and the public finances. In the last decades, pension expenditure has grown faster than the size of the economy. According to Eurostat (2022), pension expenditure in the EU as a share of GDP rose from 11.9% in 1995 to 13.6% in 2020.

In this article, however, we take a different point of view, and instead of focusing on the expenditure side, we look at the revenue side. We compile country-specific data on the total amount of revenues (contributions and taxes) in 2020 that were collected to finance pensions. We cover public (first pillar) and occupational (second pillar) pensions but exclude individual pension savings (third pillar) arrangements. Our article considers eight European countries.

This study is warranted, as more information is needed on how much revenue is collected to finance pensions in different countries. The fiscal burden that pension provision puts on an economy in a given year is not the expenditure, but the revenues that need to be collected that year. Furthermore, we are interested in how much is paid annually and who pays. There is peer pressure on pension reforms within the EU member states. As an example, the European Commission is giving recommendations on pension reforms yearly as a part of the European Semester (Guardiancich & Guidi 2022). This article will contribute to making pension comparisons at the European level more accurate.

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2. The old-age dependency ratio expresses the number of individuals aged 65 or more as a proportion of those aged 15 to 64 who are in “active age”.

## 2. Setting the scene – why study pension contribution income?

Pension expenditure is often viewed as an indicator or proxy for the costs of pension systems on the economy. This, however, can be misleading, as pension expenditure reflects only the amount of benefits payable in the pension systems at that particular point in time. It does not (necessarily) reflect the amount of contributions collected at that time. This is because the systems can be prefunded, meaning the contributions can be collected at a different time than the benefits are being paid.

Another issue making comparisons across countries difficult concerns the differences in the roles and importance of pension schemes. That is, a statutory scheme (1<sup>st</sup> pillar) in one country can consist of only basic pensions, whereas in another country it can include earnings-related benefits as well. Similarly, the role and importance of occupational (2<sup>nd</sup> pillar) schemes varies considerably across countries. In one country these can provide most of the earnings-related pension, and in another their role can be less significant. What's more, the roles of the different tiers seem to be interconnected: if the statutory scheme's role is limited, the importance of occupational pensions is usually higher, and vice versa (see section 3).

Therefore, to get a better picture of the burden that the financing of pension benefits places on the economy, we need to consider how much resources are directed to pension schemes at a given point in time, and not so much on the benefits paid from the schemes. Also, we need to identify and include comparable and comprehensive pension provisions of each country under comparison.

Measuring the contribution income of comparable pension provision is indeed a good starting point in finding out the costs of pension provision. It is, however, insufficient. Pension benefits can be financed in multiple ways. Pension contributions collected from wages are one possible financing method, and arguably the most important, but there can also be other income streams to cover the costs, such as tax revenues. This is why we need to identify all the income streams to come up with a comprehensive picture of the resources directed to the pension systems.

So, by switching our focus from the expenditure side to identifying and measuring all income streams directed to the pension schemes that provide comparable pension provision across countries, we can obtain

a clearer picture of the true costs and burden that the pension provision places on the economies. By identifying the income streams, we are also able to investigate the importance of each party in financing the pension provision. That is, we can measure how much employers, employees or the state contribute to the financing of pensions.

With respect to these points, we have formulated the main research question as follows:

- [RQ1] How much did different countries contribute (in pension contributions and taxes) towards pensions in 2020 and 2019?

Our sub-research questions are:

- [RQ2a] What are the different shares of employees, employers and taxpayers in pension financing?
- [RQ2b] How much of pensions are financed through contributions and how much by taxes?
- [RQ2c] What is the total contribution rate in relation to the earnings of salaried employees of average wage and twice the average wage?

The article is based on a novel dataset that stems from a report comparing pension contribution levels (Vidlund *et al.* 2022). The analysis is based on cross-national data for 2020. However, we have also added some comparative elements between 2019 and 2020 to stress the impact of the Covid-19 pandemic on pension bills as well as the medium-term change between 2014 and 2020.

## 2.1. What are the different sources financing pensions?

To get a holistic picture of the revenues, we need to examine more than the nominal contribution rates, as these will not tell us about the actual level of contributions paid. For example, the limits, if any, set on pensionable earnings differ between countries. Similarly, the scope and importance of public systems differ, and a large part of the pension provision may be provided through second-pillar schemes.

In addition, tax revenues may have a significant role in financing pensions, either as the direct financing mechanism, or through state subsidies, or by covering costs on pension accruals for career breaks such as unemployment spells or parental leaves. The EU Pension Adequacy Report (European Commission 2021) predicts that the share of tax financing is going to grow in the future. For example, in Denmark, public pensions are paid mostly out of tax revenues.

Typically, public pensions are financed by the pay-as-you-go mechanism in which current workers share part of their wages with retirees.

Some countries have also accumulated significant pension assets. However, in this article we do not explicitly analyze assets, or the returns pension funds get on these assets, but in as much as the main purpose of these assets is to cushion increases in pension contributions, they are implicitly included. The same applies to the possible use of debt that is issued by pension institutions as a means of pension financing.<sup>3</sup>

Two main ways to organize public pensions exist. The most common way is the Bismarckian model in which the pension benefit is a function of previous wages or paid contributions and the length of the working career. Another is the Beveridgean model in which pensioners are guaranteed a flat-rate pension benefit irrespective of paid contributions or previous wages. These ideal types usually also differ with respect to the type of financing: the former relies more on contributions levied on wages, whereas the latter may have a significant share of financing from general tax revenues. Minimum income security is covered in the data if it is organized through the pension system. Therefore, taxes collected to finance social allowances for the elderly are excluded in our study.

Most countries have supplementary occupational pensions, that is, a second pillar of pension provision, which exists to top up public pensions. These schemes can be organized on a nationwide, sectoral or workplace level. Typically, supplementary pensions are pre-funded: collected contributions are invested in financial markets to secure the payment of pensions later. In this article, we include both public and supplementary pensions to achieve a more holistic view, which is the aim of our article.

Pension systems between countries vary. To have an accurate comparison of the aggregate level of revenues towards pensions in different countries, we consider all first and second pillar schemes covering old-age, disability and survivor's pensions that finance current and future pension benefits in a certain year.

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3. This article does not present data on returns from financial markets or the financing of pension schemes by issuing debt. We understand that if these were included, our results would be somewhat different.

## 2.2. Does the pension contribution level matter?

The affordability of public pension systems and the adverse effect of high contribution rates on employment have been vastly studied in economic literature. Contributions towards public pension programmes differ from general tax-financed expenditures, as individuals expect to receive something back from these contributions (Dominitz *et al.*, 2002).

Based on a cross-country panel regression, Daveri and Tabellini (2000) and Alesina and Perotti (1997) conclude that the tax wedge, which includes contributions to public pension programmes, has an adverse effect on employment and unemployment. In contrast, Nickell and Layard (1999) find no evidence of any relationship between public pension contribution rates and the unemployment rate. Instead, they argue that institutional and demand factors explain the impact on employment.

Disney (2004) points out that payroll taxes used to finance public pension programmes have saving and redistributive components. The tax component has an adverse effect on employment. The saving component's potential adverse effect depends on the actuarial fairness of the system. The value of information about the benefits and their link to contributions lies in reducing the deadweight losses of a pension system. If people understand that there is a return from their contributions, they will forgo some leisure and work more, even if part of their gross pay will be withheld in the form of pension contributions.

## 3. Background, methods and data

### 3.1. Countries and pension schemes included in the study

We compare pension contribution income in 2020 for eight European countries. The countries are Denmark, Finland, France, Germany, Italy, the Netherlands, Norway and Sweden. These countries represent a good cross-section of multiple ways of arranging pension coverage through different pillars, varying the mixture of public-private pension provision, both in policy and administration, and they have diverse financing methods. The countries also fall under different types of welfare regimes, namely conservative and social-democratic regimes (Esping-Andersen 1990).

In this section, we first discuss the character of the first pillar i.e. is it Beveridgean or Bismarckian and the effect this has on the size of the second pillar. We then detail the scope and the indicators used to assess “who pays for what?”

As pension systems address multiple objectives such as poverty reduction and consumption smoothing, they consist of several pillars, each aiming to achieve a different objective. As an example, the generosity of the first pillar, the statutory pension scheme, influences the size and coverage of supplementary pensions. This is explained by the fact that the goal of pension provision is not only to prevent poverty in old age but also to maintain living standards in retirement to a reasonable degree. Hence, if the statutory scheme provides only flat-rate benefits with virtually no link to previous wages, there is typically also an extensive supplementary pension provision available to respond to the needs of middle- and high-income groups.

We test this argument by plotting the type of the statutory pension schemes of each country with the importance of its second-pillar supplementary pension provision (Figure 1). We have estimated the importance of the supplementary pensions with our data on the contribution income share of the second-pillar schemes with respect to the total contribution income of all pension schemes (y-axis). We believe that this is a more robust method than just comparing the coverage rates of the second-pillar schemes, as the importance of second-pillar schemes is also connected to the level of benefits they provide.

The type of the statutory pension scheme has been categorized according to the well-known Bismarckian/Beveridgean dichotomy. Bismarckian pension schemes can be characterized with emphasis on the insurance principle and a close connection of contributions and benefits. The Beveridgean pension schemes, on the other hand, place emphasis on poverty protection with flat-rate benefits and a weaker link between benefits and contributions.

We have used our data to place individual countries on the x-axis according to their statutory schemes’ relative shares of Beveridgean or Bismarckian scheme contribution incomes. However, the distinction between these two types is not always clear-cut. As an example, if there is a Bismarckian scheme in place, the earnings insurance could be limited with ceilings applied to the pensionable income. For instance, in Sweden, the statutory earnings-related pension accrues only from earnings under the ceiling, which is set at a rate only slightly over the



median earnings. So, for those whose earnings exceed this limit, the benefit turns into more of a flat-rate type.

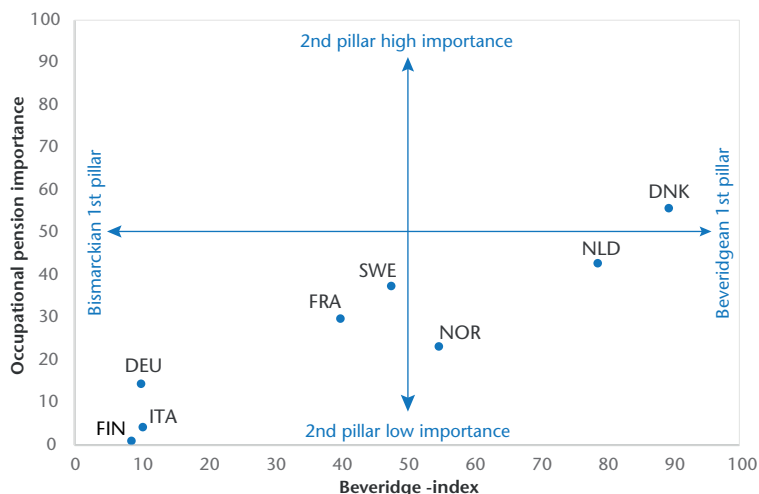
To account for these limitations in the insurance principle, we have compared the earning ceilings, if such exist, of the statutory schemes with the distribution (deciles) of the earning profiles of each country and included a correction factor to the Bismarckian share. The lower the earnings ceiling, the more flat-rate is the scheme. For example, if the ceiling is around the median earnings, only half of the insured workers can be thought of as being covered fully by a Bismarckian system, and the other half would be covered by a Beveridgean system. The resulting Beveridge-index on the x-axis would be 50, if no minimum pension exists. This value would be higher in case there is also a minimum or a flat-rate pension system in place. Thus, the index reflects the character of the whole statutory pension provision.

To illustrate the calculation of the Beveridge-index, we can look more closely to the German and the Swedish statutory pension systems. In Germany, only a small portion of the working population is affected by the earnings ceiling. It is set at around the 9<sup>th</sup> decile in the earnings distribution, and the resulting Beveridge-index is only ten, as there is no minimum pension system. On the other hand, in Sweden this index is around 50, as the pensionable earnings ceiling is close to the 6<sup>th</sup> decile (i.e. a Beveridge-index of 40) with a minimum guarantee pension accounting for just under 8% of the contribution income.

It should be noted that this is, of course, just a rough estimate of the true character of the statutory schemes. There are other factors, outside the scope of this paper, that influence the Bismarckian or Beveridgean character of the schemes. There are, for instance, housing allowances or other benefits and allowances provided for those with low pensions that can make the pension provision more flat-rate, i.e. Beveridgean, in nature.

Nevertheless, as we see from Figure 1, there seems to be a correlation between the character of the statutory scheme and the importance of second-pillar pension provision. The more Beveridgean the statutory schemes are, the more important the second-pillar schemes become. And vice versa, the less Beveridgean (i.e. the more Bismarckian) the statutory schemes are, the less need there is for supplementary second-pillar schemes.

Figure 1. Categorization of countries' pension systems



Authors' own calculations based on data from Vidlund *et al.*, (2022).

### 3.2. Scope: what are the relevant schemes under study?

We take into account statutory (referred also as public or first-pillar pension schemes) and collectively organised occupational schemes (second-pillar schemes). Individual savings or personal pension provision (third pillar) are not included in the report due to the lack of availability of comparable statistics.

Statutory pension schemes include basic poverty protection and possibly income insurance or earnings-related pensions. However, income insurance can also be arranged through occupational pension schemes. Comparing both the statutory and occupational pensions provides a more comprehensive picture of the total revenues and costs of pensions in cross-national studies. This is especially important from the point of view of Finland, which relies heavily on the first pillar for the whole pension provision, whereas in the Netherlands income maintenance is arranged through the second-pillar pension provision. Typically, international statistics and comparisons concentrate on statutory pension schemes. A more accurate and comparable picture of pension provision is obtained by analysing both statutory and occupational pension schemes.

Our country comparisons of aggregate pension contribution income cover both pillars. We consider all contribution income

collected to the different schemes covering old-age, disability and survivor's pensions to finance current and future pension benefits in a certain year. These risks are usually covered within pensions schemes, but for example in Sweden and France disability benefits comparable to disability pensions are provided through health insurance. We have included in our comparison the share of financing in health insurance that is allocated to the disability risk.

### 3.3. Breakdown: who pays for what?

We look at how the total contribution is divided between employers and employees to identify who contributes and how much. As regards measuring the level of pension contributions, it is not enough to examine only the nominal contribution rates, as these will not tell us about the actual level of contributions paid. For example, contributions vary depending on the scheme and the limits set on pensionable earnings. Table 1 summarizes the level and basis of nominal contribution rates.

Not only contributions but also tax revenues have a significant role in financing pensions, either through state subsidies or by covering costs on pension accruals for unpaid periods. State subsidies generally cover minimum pensions (old-age allowances are not part of pension schemes and therefore not included in the comparison).

The level of minimum pension benefits varies considerably, which may explain the differences in the share of tax revenues in overall pension benefits provision. In Denmark, Finland, Norway and Sweden, residence-based minimum pensions (old-age, disability and survivor's) are financed from general taxation. In the Netherlands, the minimum wage-based and income-tested disability benefit for young disabled persons (Wajong) is financed solely through general taxation. In France, minimum pensions, unemployment periods and pension top-ups for children are financed through a dedicated old-age solidarity fund, itself funded with general tax revenues.

The role of the state in pension financing has multiple facets. As an employer through central and local government and non-commercial public corporations, the state participates in pension financing by paying explicit employer contributions. In such cases, the state's revenues are considered as employer contributions and not included in "state financing".

Table 1. Mandatory pension contribution rates in 2020 (% of gross earnings; old-age and survivor pension schemes)

	Nominal rate					Ceiling (multiple of gross average earnings), public scheme/ private or occupational scheme	Effective rate on average earnings
	Employee, public scheme	Employer, public scheme	Employee, private scheme	Employer, private scheme	Total		
<b>DNK*</b>			4.0	8.0	12.0	None	12.8
<b>FIN*</b>	7.15 [a]	17.0			22.4 [a]	None	22.4 [a]
<b>FRA</b>	11.3 [w]	16.5 [w]			27.8 [w]	1.08 / 8.62	27.8
<b>DEU*</b>	9.3	9.3			18.6	1.59	18.6
<b>ITA*</b>	9.19	23.81			33.0	3.41	33.0
<b>NLD</b>	18.0	0.0	7.7 [w]	14.8 [w]	x [w]	0.63 / none	25.1
<b>NOR</b>	8.2	13.0	0.0	2.0	23.2	None / 1.93	23.2
<b>SWE</b>	7.0	10.8	0.0	4.5 [w]	22.3 [w]	1.08 / none	22.3

*Pensions at a Glance 2021, OECD.*

\* Contribution rate also finances disability or invalidity benefits. [a] and [w]: rate varies by age and earnings level respectively. In the private occupational schemes of the Netherlands, contributions are paid only on the part of individual earnings exceeding 39% and 27% of average earnings, respectively. Therefore, the total nominal contribution rate in the Netherlands equals 18% below 39% of average earnings, 40.5% between 39% and 66% of average earnings and 22.5% above. For occupational schemes in Denmark and the Netherlands, contribution rates are fund-specific, so typical rates are shown. In France and Sweden, the indicated public contribution rates include contributions to mandatory occupational or personal pension schemes. Flat-rate contributions to the ATP scheme in Denmark are included only in the effective contribution rate. Public pensions in Finland are partly funded and privately managed, while national accounts define them as public. For France, the total nominal rate drops from 27.8% to 26.4% at 108% of average earnings and – once the ceiling of the occupational scheme is reached (862% of average earnings for AGIRC-ARRCO) – it drops further to 1.9% without ceiling. For Sweden, the nominal rate in the private occupational scheme rises from 4.5% to 30% at 108% of average earnings. In Finland, employee contribution to the public scheme is 6.35% but for ages 53 to 62 it is 7.85%.

Our calculation does not of course explain the actual incidence of contributions (who ultimately pays for the pensions). The actual incidence of contributions may differ from the notional source. In economic theory, the balance between employer and employee contributions is neutral (or irrelevant) in the long run, because both are part of the total remuneration, so higher employer contributions translate into lower salaries (or other benefits) (Blommestein 2009; Melguizo and González-Páramo 2013; Sjögren Lindquist *et al.* 2011).

However, we believe that for the sake of clarity of comparison, the contribution income paid by the respective parties should be noted. Moreover, it can be argued that beyond the question of the actual incidence, the recognition of the (notional) division of contribution income into employer and employee shares makes explicit the justification of both parties' participation in the decision-making and governance of pension systems.

### 3.4. Indicators: what do we measure and how?

As presented, we have the total contribution income to first- and second-pillar pensions as our numerator. Typically, in cross-country pension expenditure comparisons GDP is used as a denominator. Such an indicator makes country's expenditure proportionate to the size of the economy. As payroll contributions are the main source of pension financing, we want to analyse our results with an indicator where employee compensation is used as denominator. The compensation of employees includes the wages, salaries and social security contributions paid by employers. The wage sum, which includes only paid wages and salaries, is a commonly used denominator but may give rise to inaccurate interpretations when comparing countries where employers' and employees' shares of social security contributions differ.

Such a situation arises especially when comparing two countries where the employer's social security contributions are high in one country (e.g. in France) and low in the other country (e.g. in Denmark). In the latter, social security schemes are generally financed by taxes or employee contributions, which are included in the wage sum. International statistics do not differentiate employee contributions from the wage sum (so-called net wages), and therefore the wage sum is proportionally higher in Denmark than in France. Thus, we have chosen the compensation of employees as the denominator.

We can illustrate our point with the following example: in country A, the social security contribution is paid in full by the employer and in country B, the payment is divided equally between the employer and employee. Even though the pension contribution is the same size in both countries, a comparison to the wage sum gives different results (Table 2).

Corresponding differences between countries may occur when comparing contribution incomes in relation to GDP at market prices and GDP at basic prices. GDP at market prices, which describes the total production, includes commodity taxes (VAT, excise taxes). GDP at basic prices corresponds to GDP calculated at market prices, reduced by commodity taxes, and increased by commodity subsidies (e.g. export subsidies).

GDP at market prices is the most common indicator in comparisons, but due to the different taxation structures, differences may occur. We may assume, for instance, that country D in Table 3 starts financing social expenditure through increased VAT instead of direct income

taxation. In that case, even if the pension contribution is of the same size in the two countries, a comparison in relation to GDP at market prices, which includes commodity taxes, leads to a different interpretation of the pension contribution amounts of these countries.

Table 2. Example of comparison of contributions in relation to wages

	Country A	Country B
GDP	200	200
Compensation of employees	100	100
Social security contributions	40	40
Employer contributions	40	20
Employee contributions	0	20
Wage sum	60	80
Pension contributions	20	20
– % of wage sum	33%	25%
– % of compensation of employees	20%	20%
– % of wage sum excl. employee's share	33%	33%
– % of GDP	10%	10%

Olsson (2007).

Table 3. Example of comparison of contributions in relation to GDP

	Country C	Country D
GDP, market prices	200	200
Value-added tax	0	20
GDP, basic (factor) prices	200	2000
Pension contributions	20	20
– % of GDP at market prices	10%	9%
– % of GDP at basic prices	10%	10%

Olsson (2007).

### 3.5. The data: what are the sources?

The data on pension contributions and income flows are mainly based on national statistics, accounts and budget data, as well as different official reports and recent EU publications. For maximum reliability, we have requested some of the figures directly from the national authorities. The data on GDP and wage sums have been obtained from the OECD database (OECD.Stat).<sup>4</sup>

4. The appendix in Vidlund *et al.* (2022) provides relevant data on the compensation of employees, wages and salaries, and GDP in 2015–2020, used for our calculation.

## 4. Results

### 4.1. Pension contribution levels are driven mainly by the level of pension expenditure

Pension contribution levels are explained mainly by the levels of pension expenditure, which are in turn driven by the evolution of population structure, the level of pension benefits and time spent in retirement. These drivers and their impact on the level of pension expenditure are described in what follows.

#### 4.1.1. Demographic factors influence the level of pension expenditure...

One explanatory factor for pension expenditure is the population structure. The larger the number of old-age pension recipients, the more likely it is that the country will have a high pension expenditure and possibly also a high contribution level.

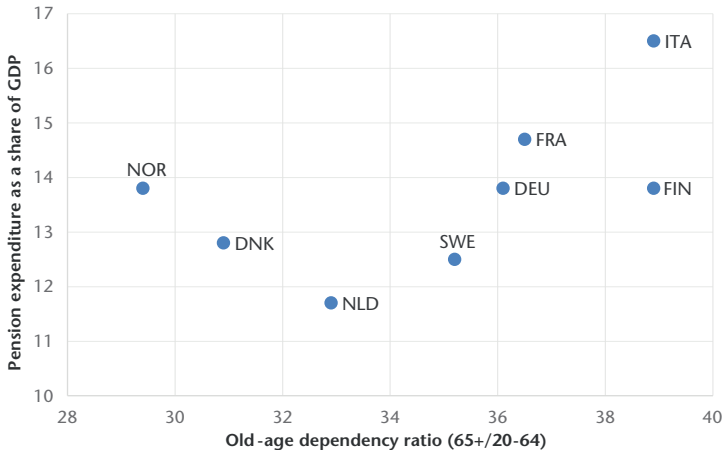
The most critical measures of population structure with respect to pension expenditure are the median age and old-age dependency ratio. A higher median age is related to a higher old-age dependency ratio, pushing up the number of pensioners relative to workers and increasing pension expenditure.

The youngest country in our comparison is Norway, which has a median age of 39.9 years. Italy has the highest median age, 47.2 years. The old-age dependency ratio (65+ / 20–64) is also highest in Italy, which together with Finland records a figure of 39%. The lowest old-age dependency ratios are found in Norway at 29.4% and Denmark at 30.9%.

Among the countries in this comparison, the highest statutory pension expenditure in relation to GDP is recorded for Italy (16.5%), France and Finland, and the lowest for Sweden and the Netherlands (11.7%).

Plotting the pension-expenditure-to-GDP ratio against the old-age dependency ratio shows that the demographic factors explain only a part of the story (Figure 2).

Figure 2. Correlation between pension-expenditure-to-GDP ratio and old-age dependency ratio



Based on appendix in Vidlund *et al.* (2022).

#### 4.1.2. ... but the overall design of pension systems plays a major role in the contribution level

The overall design of pension systems reflects the social choice for a publicly provided level of pension coverage. This design encompasses the level of pension benefits and the time spent in retirement. The latter variable is related to demographic issues (life expectancy at retirement age) and to both institutional design (legal retirement age or duration of insurance record) and behavioural patterns (choice of exiting the labour force).

*Average pension level crystallizes the many drivers that explain per se the overall level of pension expenditure?*

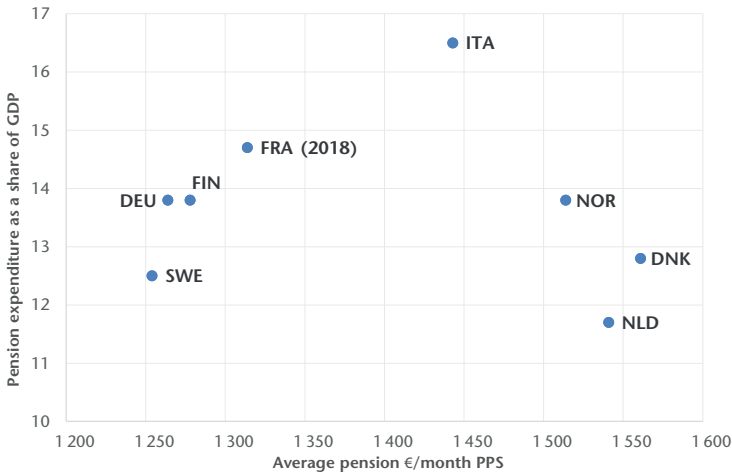
OECD (2021) provides information about the replacement rates of pensions in relation to pre-retirement wages. Even though the calculations are theoretical, the strength of the comparison is that it covers both statutory and occupational pensions and thus provides a good overall picture of the generosity of pension systems.

As the replacement rate calculations are based on current legislation and on average wage-earner, they do not reflect fully the pensions in payment nor income-tested minimum pensions. However, when we consult statistics on pensions in payment, which also reflect previous rules and include the minimum pensions in those countries where



these are income-tested, the emerging picture is rather similar, albeit with minor exceptions. According to Eurostat (2022), the biggest contrast to the theoretical calculations can be seen with Norway, where the average pension expenditure per beneficiary for old-age pensions is among the highest, even when considering the price level in the country. These figures show that there is no clear correlation between the average pension and the overall level of pension expenditure, since the average pension (in Purchasing Power Standard PPS) in each country embeds complex interactions between flows (of newly claimed pensions) and stocks (of past claimed pensions) with different acquisition rules for successive generations (Figure 3).

**Figure 3. Correlation between pension-expenditure-to-GDP ratio and average pension**



Based on appendix in Vidlund *et al.* (2022).

### *Retirement ages, both legal and effective, play a major role in pension expenditure and contributions*

Pension expenditure and required contribution income is dependent on how long people spend time in retirement. All the countries in our comparison have changed their policies with respect to early retirement (notably Denmark and Finland), and pension reforms have been geared mainly to adjust the pension systems to the fact that people are living longer. Countries have raised the statutory retirement age, reduced the (future) generosity of pension benefits and closed early routes to retirement (OECD 2021). These reforms have reduced

the projected increase in pension expenditure. Furthermore, the reforms have increased the fiscal sustainability of the statutory pension systems and eased pressure to increase contribution rates, which is no longer thought to be as feasible an option as it was a few decades ago. The developments in the contributions levied from employees and employers verifies this finding as contribution rates seems to have been stabilizing in the long term (see e.g. OECD 2007).

Figure 4a. Correlation between pension-expenditure-to-GDP ratio and effective retirement age for women

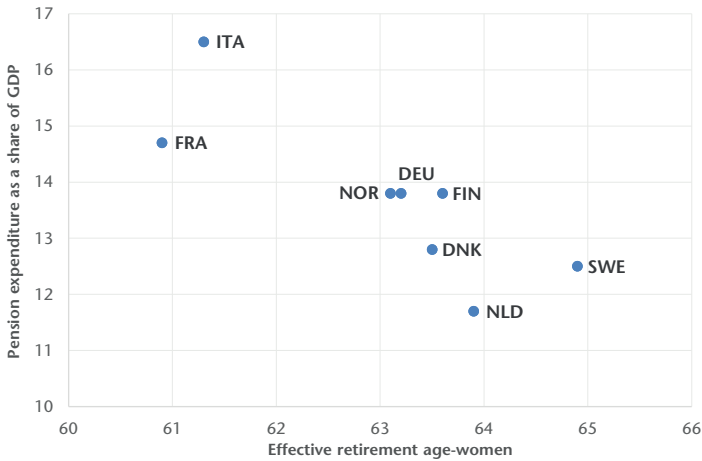
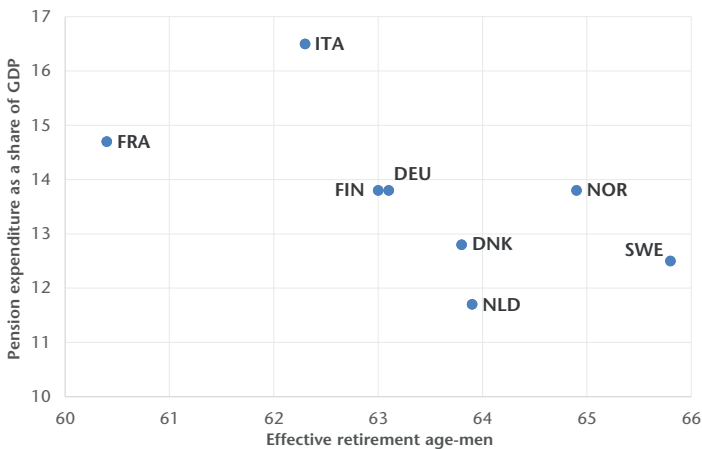


Figure 4b. Correlation between pension-expenditure-to-GDP ratio and effective retirement age for men



Based on appendix in Vidlund *et al.* (2022).

In France and Italy, effective retirement ages are the lowest, both for women and men, and correlated with the highest level of pension expenditure. On the opposite end, Sweden, the Netherlands and Denmark display high effective retirement ages, which are associated with a relatively low level of pension expenditure (Figures 4a and 4b).

Raising the statutory retirement age does not necessarily translate into later effective retirement. People might find other ways to exit the labour market, and raising the retirement age may also increase the number of disability pension beneficiaries. According to the OECD's (2023) SOCR database, the number of disability pensioners differs significantly between the countries studied. The number of disability beneficiaries relative to the working population is lowest in Italy and highest in Norway, where the figure is almost three times as high.

The above cross-country comparisons highlight the diversity in pension system design. The number of pension systems under scrutiny is too low to conclude on significant correlations, even if Figures 4a and 4b suggest a negative correlation between pension-expenditure-to-GDP ratio and effective retirement ages. Of course, what applies to cross-country comparisons holds for comparisons over time within a given country: incentivizing late retirement is not sufficient *per se* to reduce pension expenditure as a share of GDP.

#### 4.1.3. Pension expenditure and pension contribution: financing the gap

Pensions can be financed by current contributions and tax revenues. In addition, the use of assets can help to even out or lower the level of costs as pensions are paid out of previously collected contributions. Understood this way, pre-funding eases pressures to increase contribution rates in the face of population ageing. It also relaxes the constraint of equalising contribution income and pension expenditure within a certain year.

Even though statutory earnings-related pensions are based mainly on the pay-as-you-go (PAYG) principle, all the Nordic countries have accumulated funds since the introduction of their schemes. In Finland, for example, the statutory earnings-related pension system is partly pre-funded. Investment income from pension assets is an important element in the financing of the Finnish public pension system. Assets are increasingly used for keeping the contribution rate stable. Since 2012, expenditure has exceeded contribution income, and the difference is financed by the use of funds. In recent years, approximately one-fifth of private sector pension expenditure has been financed with pre-funded pension assets (Tikanmäki *et al.* 2019).

In Sweden, too, surpluses generated in buffer funds are used to balance the finances of the old-age pension system. Since 2009, these funds have been net contributors to the pension system, i.e. pension expenditures have exceeded contributions. Funds are expected to continue to make net disbursements to the pension system for another 20 years or so. Thereafter, the buffer funds are expected to receive net inflows again (Ministry of Finance 2021). In addition, in Norway the Government Pension Fund directs revenue to the state budget that is used as part of financing the PAYG pension system.

Germany, France, and Italy have chosen a different path, as their statutory pension systems rely on the PAYG principle without significant pre-funding. The French basic schemes rely on indebtedness (the consolidated deficit of basic schemes representing about 4% of their expenditure in 2020).

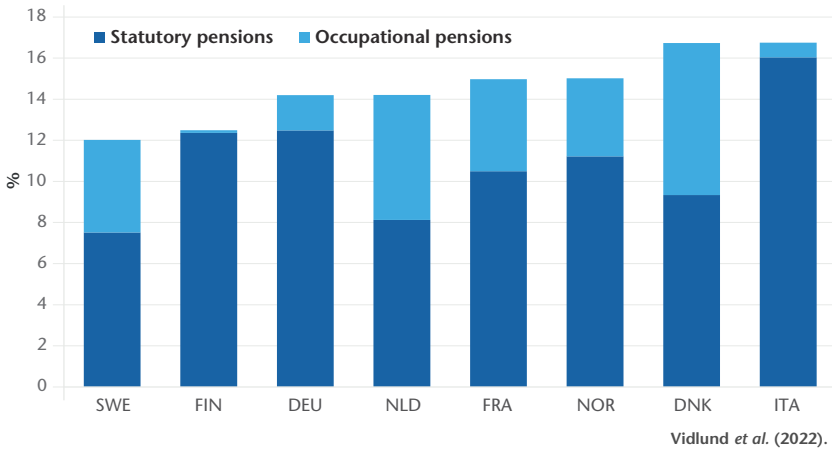
Occupational pension schemes are usually pre-funded. For example, the extensive pension assets of Denmark and the Netherlands are a result of comprehensive, fully funded supplementary pensions. It is worth mentioning that the French mandatory supplementary pensions (AGIRC-ARRCO) are an exception, as they are based on the PAYG principle.

#### **4.2. Pension contributions in relation to GDP and wages: country differences diminish with a comprehensive comparison**

In our analysis, we present the results both in relation to GDP and the compensation of employees. This is because the national income of an economy is always distributed between the two factors of production – labour and capital. How the economic growth, or value added, is divided between workers and owners of capital is a long-lasting issue in economic debates. The shares of capital and labour income differ between countries in general and in this study. If the share of these two factors stays constant in the economy in the long run, then looking at the results as either a share of GDP or employee compensation makes no difference. However, if capital (or wages) captures a larger share of the distributable surplus, it happens at the expense of wages (or capital).

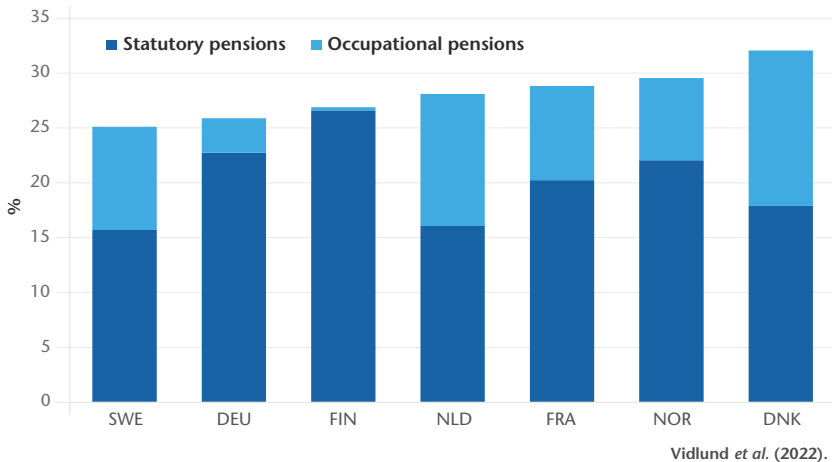
When we look at the revenues for only the statutory schemes, the average contribution income is 11 % of GDP. It is clearly highest in Italy (16%), followed by Germany (12.5%) and Finland (12.4%). The results reflect the importance of statutory pensions in these countries. It was lowest in Sweden (7.5%), the Netherlands (8.1%) and Denmark (9.3%).

Figure 5. Income from contributions and tax revenues in relation to GDP market prices in 2020



However, the country differences are reduced when occupational pensions are also considered. The catch-up effect is most evident in the countries with flat-rate statutory pensions, Denmark and the Netherlands. On average, the total pension contribution rate increases to 14.6%. It is still highest in Italy at 16.8%, but the figure for Denmark is almost the same at 16.7% of GDP. The ratio of contribution income to GDP is lowest in Sweden (12.1%) and Finland (12.5%).

Figure 6. Income from contributions and tax revenues in relation to compensation of employees in 2020



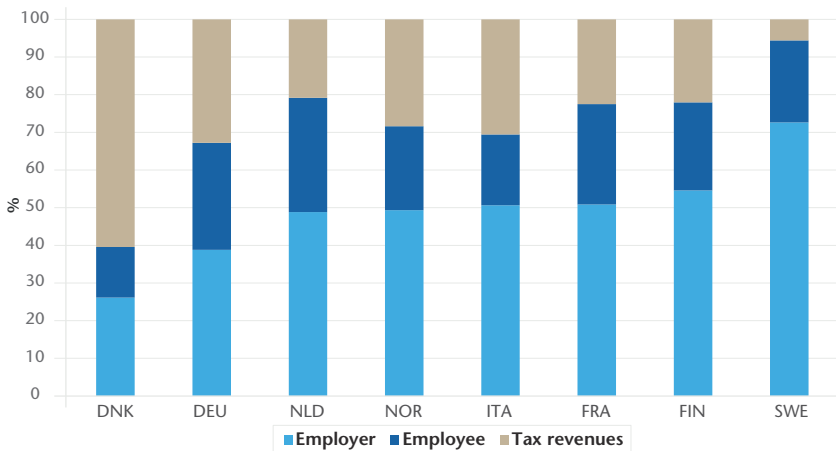
The contribution level is around double when compensation of employees<sup>5</sup> is used as the denominator instead of GDP, but the order of the countries is almost the same. The lowest level of contributions paid is in Sweden, at a rate of 25.1%, whereas in Denmark the contribution level reaches 32%.

### 4.3. Who carries the bill?

#### 4.3.1. The choice of taxes versus social contributions

In Denmark, statutory pensions are financed mainly by general tax revenues, which represent 40% of the pension bill. On the opposite end, tax revenues represent around 5% of the bill in Sweden. For all other countries, tax revenues represent between 20% and 35% of the overall bill. It is noteworthy that the share of tax revenues exceeds 30% in Italy and Germany. We can conclude that countries with a high level of redistributive mechanisms in their pension system are not necessarily those with the highest share of tax revenues.

Figure 7. Share of employer and employee contributions and tax revenues in the financing of total pension provision in 2020



Vidlund et al. (2022).

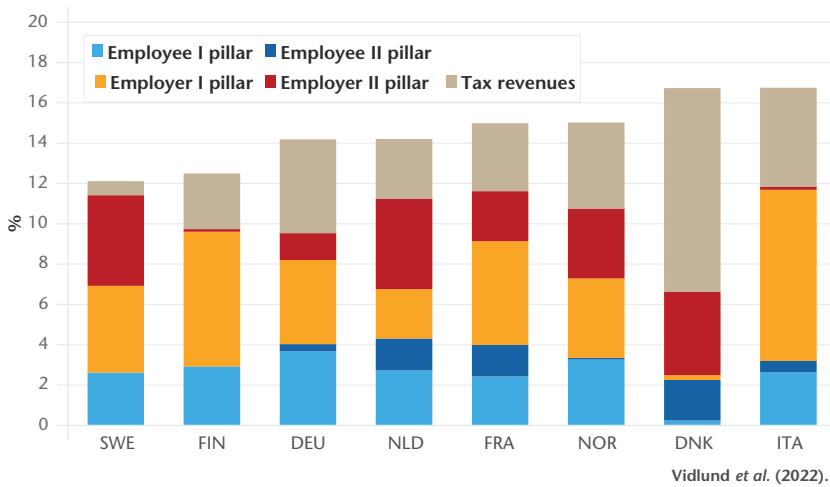
5. Italy is not included in Figures 6, 9, 10 and 11 due to lack of data on compensation of employees.

#### 4.3.2. The share of contributions between employers and employees

Overall, the employers' share in financing the pension provision is larger than that of employees. This is typically more pronounced in countries where occupational pension provision is large, as they are mostly employer-financed.

When looking only at the employers' and employees' contributions, employees account for the smallest part of contribution income in Italy (27%) and Finland (30%). In Germany (42%) and the Netherlands (38%), employees' share is the largest.

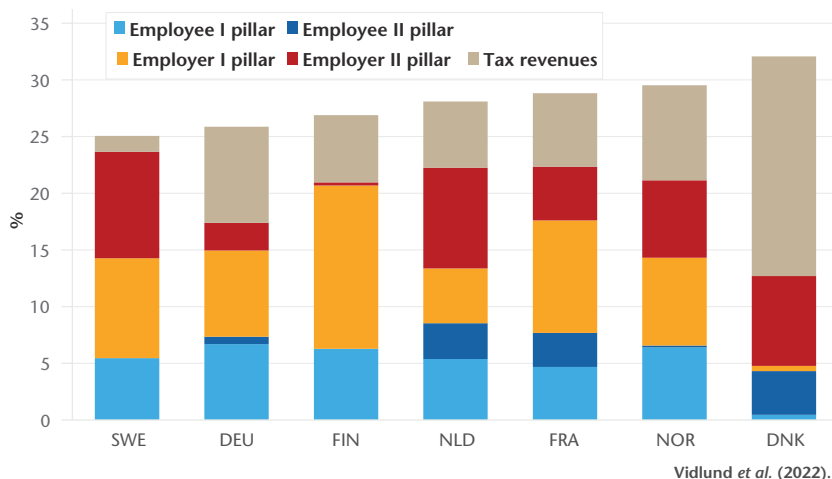
Figure 8. Pension contribution income in relation to GDP at market prices in 2020 by pillars



#### 4.4. Trends in financing level and structure: medium term and the Covid-19 shock

Even though our focus is on a year 2020, we have also added some comparative elements between 2019 and 2020 to stress the impact of the Covid-19 shock on pension bills. In addition, our previous study, which provides data from almost a decade ago in 2014, gives us a chance to evaluate how contribution levels have developed during that time (Vidlund *et al.* 2016). Unfortunately, Italy was not included in that earlier study.

Figure 9. Pension contribution income in relation to compensation of employees in 2020 by pillars



#### 4.4.1. The share of state financing in the overall bill has increased in most of the countries studied between 2014 and 2020

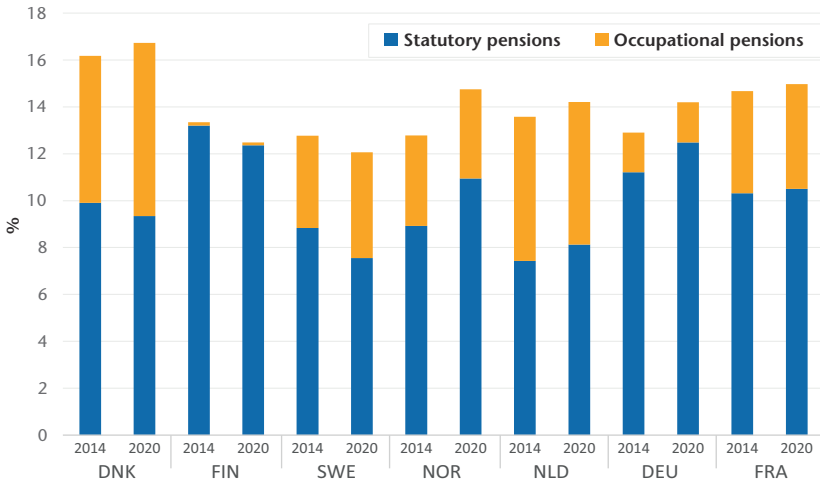
First, we notice that in most countries, the contribution levels have been increasing somewhat. Norway has seen a sharper increase, reflecting the rise in pension expenditures but also weak GDP growth from 2014 to 2020. In France, Denmark and Germany, the levels have been rising more moderately (Figure 10).

In Sweden and Finland, total contribution levels have been decreasing. A closer look reveals that statutory pension income has also diminished in Denmark. However, this has been offset by higher occupational pension contribution income, especially in Denmark and to some extent in Sweden.

Secondly, the share of state financing in the overall bill has increased in most of the countries studied (Figure 11). The share of tax revenues has increased in Norway, the Netherlands, Germany and France. A slight increase can also be seen in Finland, which is due mainly to the increased state contribution both in the self-employed persons' pension scheme and the state pension scheme as well as the temporary discount for private sector employers due to the Covid-19 pandemic. Only in Denmark and in Sweden to a lesser extent has the share of tax revenues been decreasing.



Figure 10. Contribution levels in 2020 and 2014 in relation to GDP at market prices

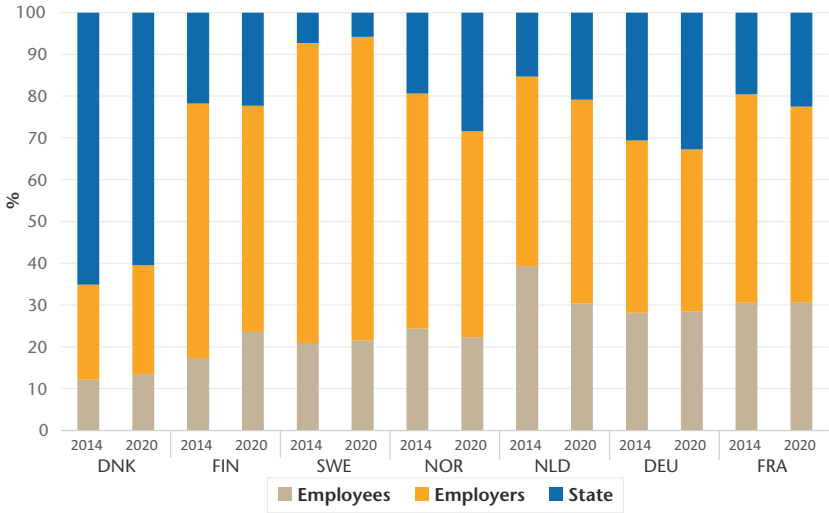
Vidlund *et al.* (2022).

In the Netherlands, the increase in tax revenues is connected to the higher level of state financing of minimum pensions, thus also reflecting a relative decline in employees' contribution. In the Netherlands, this is part of a pension policy plan, as is also the case to some extent in Germany, whereas in Norway the state decided temporarily to reduce social security contributions due to the Covid-19 pandemic (see 4.4.1).

The upward trend of state financing in France is linked to two driving forces. First, the employers' contribution relief on low wages that is partially compensated by increases in contribution rates in occupational schemes and by general tax revenues from the state. Second, the increase of VAT directed to the general basic scheme to compensate other contribution reliefs.

The share of employees has increased notably in Finland and to a lesser extent in Denmark, Sweden and Germany. In Finland, this development has its background in the tripartite competitiveness pact agreed in 2016 between the labour market organisations and the state, which aimed at getting employees to work more for less compensation. The main pension content of the pact was to transfer part of the liability for social security contributions from employers to employees (Eurofound 2016).

Figure 11. Shares of total contribution income in 2020 and 2014



Vidlund et al. (2022).

#### 4.4.2. Covid-19 increased the share of pension contribution income in all countries but Finland

The Covid-19 pandemic hit Europe in early 2020. It had a twofold impact on pension systems. Firstly, the health shock of Covid-19 caused excess mortality, especially in some vulnerable groups such as older people. To protect the health of their citizens, governments introduced distancing measures and various restrictions and lockdowns, with severe adverse effects on economies and employment.

Secondly, the excess mortality in older age groups had a direct impact on pension spending. The OECD (2021) reported that, on average, the number of people over 65 declined by 0.8% between January 2020 and August 2021, which would result in a temporary proportional fall in pension spending. In the short term, therefore, the impact remained rather limited.

European states relied on job retention schemes (JRS) during the pandemic. According to the OECD (2021), many countries subsidized pension contributions and wages through the state budget or other public funds. For example, Germany supported JRS, and workers on JRS accrued full pension entitlements. In Italy, pension entitlements accrued on full wages even though the subsidized part of the wage was

not subject to pension contributions. In France, a separate fund paid contributions on subsidized wages.

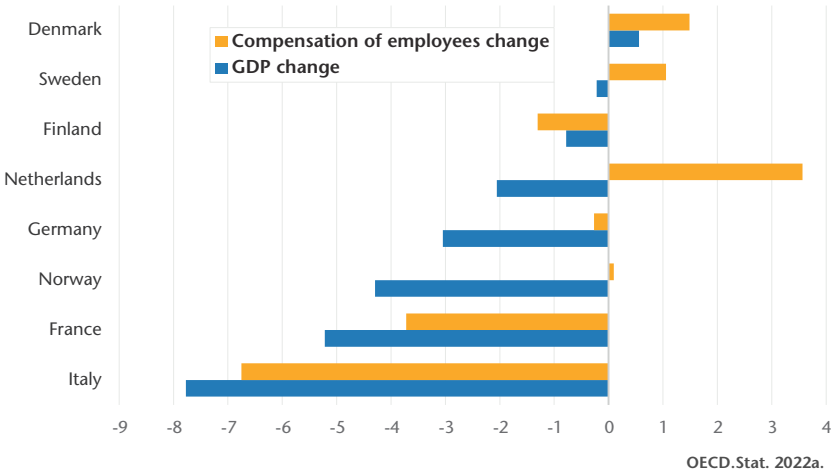
Some countries took measures to temporarily lower pension contributions. Finland lowered the employer's part of statutory pension contributions from May to December 2020 by 2.6 percentage points, without lowering future pensions. Norway temporarily reduced social security contributions by 4 percentage points, again without any effects on notional defined contribution (NDC) entitlements. France subsidized employers' contributions in selected sectors without lowering individual accruals. Italy allowed the deferral of pension contributions that were due between February and May 2020. These contributions were to be repaid by the end of 2022 (OECD 2021).

In addition, Finland, France, the Netherlands and Norway allowed the deferral of pension contributions for a few months, and temporarily lowered or removed penalties for delays in contribution payments (OECD 2021).

The pandemic shock caused a slowdown in economic activity. This reversed or at least slowed the growth trend of GDP and the compensation paid by employers (or wage sum). However, the decline has not been as large as for GDP. In fact, the total compensation of employees rose in four countries between 2019 and 2020, with the largest increase of 3.4% recorded in the Netherlands, followed by Denmark, Sweden and Norway. In France, the compensation of employees decreased by 3.8%, and in Germany by less than one per cent. This is in contrast to changes in GDP, which decreased in all countries except Denmark, which recorded growth of 0.6% (Figure 12).

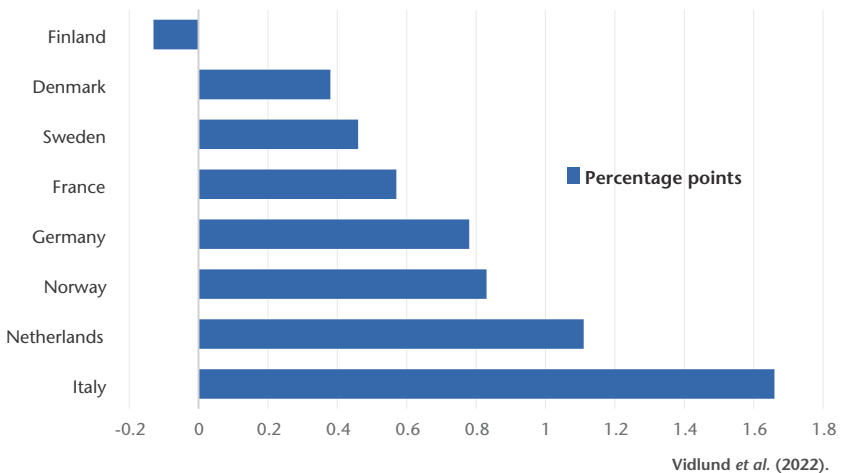
Countries have a priori protected employment, for example by increasing public expenditure by e.g. corporate subsidies or other measures as mentioned above, which is reflected in a moderate change in the wage sum compared to GDP developments. The change in the weight of contributions can potentially reflect both the extent of the increase in the weight of labour income and the weight of this tax base in the financing of pensions. The combined evolution of earnings and GDP ended in changes in pension contribution income in relation to GDP (Figure 13). Italy recorded a significant increase, from 15.1% in 2019 to 16.8% in 2020. In the Netherlands, the ratio increased by 1.1 pp from 13.1% to 14.2%. In France, Sweden and Denmark, it rose by less than 0.6 pp.

Figure 12. Change in GDP and compensation of employees from previous year, 2019-2020 in percentage points



Perhaps a bit surprisingly, Finland’s pension contribution income to GDP ratio decreased by 0.1 pp from 12.6% to 12.5% in 2020. The Finnish exceptionalism can be explained by the rather large (temporary) decrease in the pension contribution rate accompanied with a significant decrease in the wage sum. This reduced revenues that were not compensated from any other source. In addition, the decrease in the GDP was not as severe as in other countries.

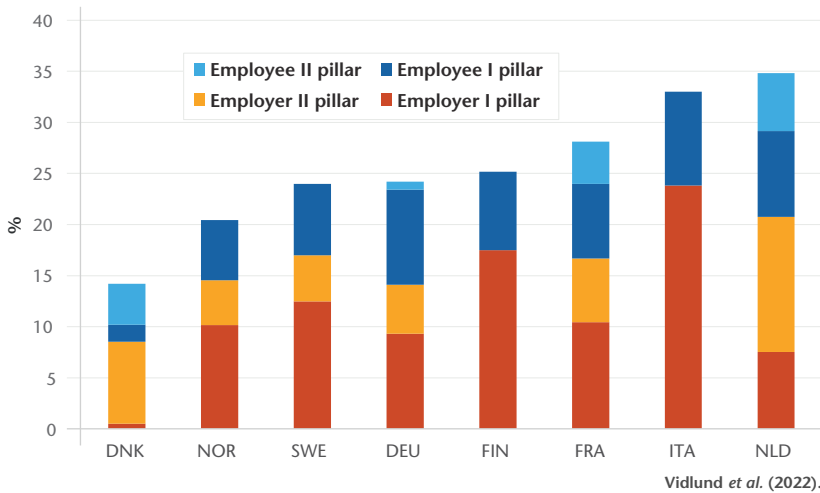
Figure 13. Pension contribution income change from previous year, 2019-2020 in percentage points (GDP, market prices)



#### 4.5. The cost of financing at the individual level

In the following, we present the employer and employee pension contributions paid for average and high-income employees (twice the average wage) in 2020. As the aim is to describe the impact of pensions on direct labour costs, the proportion financed through tax revenues is not included. However, our comparison is more comprehensive (including old-age, survivors' and disability pensions) than the OECD-based summary on contributions presented earlier (Table 1). For instance, for France and Sweden this means that the calculations include the share of disability pension contribution estimated based on sickness insurance expenditure.

Figure 14. Employer and employee pension contributions in relation to average wage in 2020

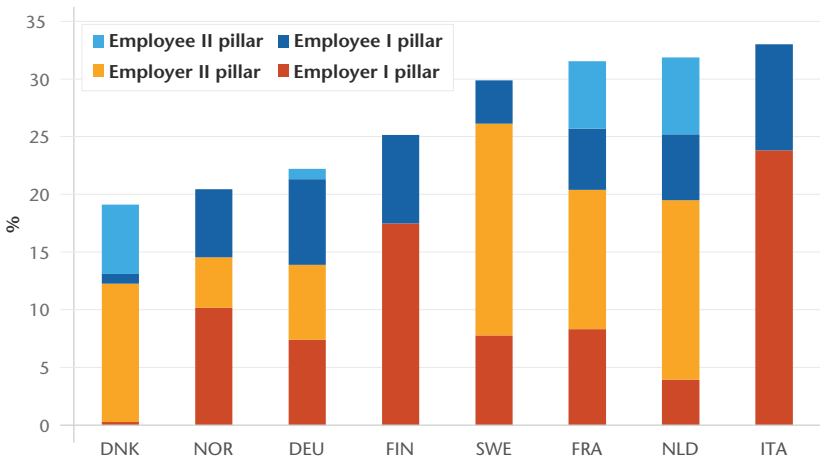


The calculation examples support the macro-level finding that, when both statutory pension contributions and contributions for occupational pensions are considered, the pension cost burden on employers and employees in different countries is much more evenly shared than indicated by a comparison of statutory contributions alone.

The cost of financing at the individual level is progressive in Denmark, France and Sweden. It is flat in Italy and Finland. This is explained by the fact that in both countries there is a strict proportionality between earnings and contributions. Furthermore, in Finland no pension ceiling exists, and in Italy the ceiling is high. In the Netherlands

and Germany, the cost is regressive, meaning that the cost of financing is about two percentage points higher for average-paid employees than for twice-average-paid employees. This is because the statutory schemes' income ceilings are relatively close to the average-earner, thereby lowering the effective contribution rate for high-income earners.

Figure 15. Employer and employee pension contributions in relation to twice the average wage in 2020



Vidlund et al. (2022).

## 5. Conclusion

The aim of this contribution is to shed light on how much is paid for the pension provision in a given year and who is making those payments when all relevant pension schemes and all contributing parties are taken into account. We have compared pension contribution income streams in eight selected European countries.

One of the key results of our comparison points at a convergence of contribution levels, especially in relation to GDP, despite very significant differences in the structures and ways of pension financing. One of the reasons for this, it can be argued, is that all countries share similar objectives of providing a sufficient level of income during retirement. This can be achieved through extensive statutory pensions, or a more limited statutory pension complemented by supplementary schemes.

Statutory schemes represent over half of total contributions in the compared countries. In Finland and Italy, their share is over 90%. In Germany, too, statutory pensions are clearly predominant, although occupational pensions have been increasing in importance. Occupational pensions already have a significant role in the Netherlands, Denmark and Sweden, where contributions to these schemes are substantial.<sup>6</sup>

Against this background, it is clear that to produce a solid cross-country comparison, both pension pillars must be included in the analysis, especially when discussing the labour costs of pension provision or total costs within the national economy.

From the point of view of those financing the pension system, what matters most for employers and employees, but also for the state, is not whether the payments are divided into a statutory and an occupational contribution, but rather the total level of contribution income and who bears the costs of a pension system.

A breakdown of pension contributions between the parties sharing the cost burden reveals significant country variation. Employers tend to account for the largest share, around 50% of contributions. The figure is highest in Sweden, where the share of employers is over two-thirds. This is explained by employers' high share in statutory pension financing and their 100% share of occupational pension financing.

The second largest source of contribution income are taxes, which on average account for around 30% of total revenues. Minimum benefits and pensions are generally covered by taxes, so it is unsurprising that Denmark, given its extensive basic pension provision, has the highest share of tax revenues (60%). Germany and the Netherlands also depend heavily on tax revenues, even though their pension systems differ significantly. In the Netherlands, around half of the costs of minimum old-age pensions are covered from the budget, and in Germany, the state contributes significantly to financing the statutory earnings-related pension system. The use of tax revenues is lowest in Sweden, where they account for no more than around 5% of contribution incomes.

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6. Occupational schemes also have a significant role in France, but they are mostly pay-as-you-go schemes and legally mandatory. Therefore, they are not comparable to occupational prefunded schemes in the Netherlands, Denmark, and Sweden.

The cost burden is lowest for employees: on average, their share of the cost of pension provision is slightly over 20%. This figure does not vary very much from country to country. Danish employees account for just over 10%, whereas Dutch employees cover the highest share, 30% of total costs.

A complex set of factors explain the country differences in contribution levels. These factors include the population age structure, benefit levels, the role of pre-funding, the effective retirement age and the number of retirees in relation to the active population. According to our results, the country with the highest contribution income is Italy, which has one of the highest old-age dependency ratios and an entirely PAYG-financed pension system that provides relatively generous benefits. Denmark has the second highest contribution level, even though its old-age dependency ratio is among the lowest. The elevated level of pension contribution income can be seen to reflect the high level of occupational pension revenues as well as the country's universal and relatively high level of basic pension.

At the other end of the spectrum, the lowest contributions are found in Sweden, reflecting a low statutory pension expenditure. Finland comes close to Sweden, even though its old-age dependency ratio is comparable to Italy's and pension expenditure is among the highest after Italy and France. However, as pensions are partially paid out of accumulated assets, the contribution level is significantly lower than current expenditure. The contribution level is also affected by the relatively moderate pension level.

The Economic Policy Committee's (2020) report on pension expenditure provides a useful point of comparison for our results, although the focus in that report is on statutory pension expenditures and forecasting them in the future. Member states provide information on private pension expenditure on a voluntary basis, and only a minority of countries have delivered comprehensive data on occupational pensions. The focus in our country comparisons is on revenues and the division of the revenue streams in 2020. In this respect, these two sets of works can be seen to complement each other.

Based on the diverse and changing pension landscape and the various recent reforms, it is fair to conclude that pension provision in European countries continues to remain in flux. The most recent example is the German government's proposal to improve the coverage of supplementary pension schemes. The Dutch process of



occupational pension reform and turning DB plans into DC plans also fits into a broader international pattern driven by fixed contribution rates. More recently, the reform process in France has shown that the financing side of pension provision is hard to monitor. It is therefore more important than ever to continue to explore and analyse systems of pension provision. If we fail to do that, we risk losing essential parts of the pension puzzle.

Overall, in all the countries included in our comparison, the employers' share in financing the pension provision is larger than that of employees. This is most evident in countries where occupational pension provision is high, as they are mostly employer-financed. In total, the employers' share is the largest in Sweden and Finland.

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### Box. Glossary on mandatory pension schemes

According to OECD taxonomy, pension systems can be described as a set of tiers (also known as pillars in other taxonomies), differing based on their role in providing income at retirement and their mandatory or voluntary status. The Table, adapted from OECD (2023), summarizes the structure of retirement-income provision through mandatory schemes in the countries under review.

	First tier (public)		Second tier	
	Residence-based	Contribution-based		
	Universal or income-tested	Minimum	Public	Private
<b>Latest legislation applying to future retirees entering the labour market in 2022 at age 22</b>				
Denmark	✓		FDC	FDC [q]
Finland	✓		DB	—
France		✓	DB + Points	—
Germany			Points	—
Italy			NDC	—
Netherlands	✓			DB [q]
Norway	✓		NDC	FDC
Sweden	✓		NDC + FDC	FDC [q]
<b>Current legislation applying to new retirees in 2022 where different from panel above</b>				
Italy		✓	DB + NDC	—
Sweden	✓		DB / NDC + FDC	FDC [q]

Adapted from *Pensions at Glance*, OECD (2023).

Notes: [q] = Quasi-mandatory scheme based on collective agreements with very high coverage rate; DB: defined benefit; FDC: funded defined contribution; NDC: notional defined contribution.

The first tier (or pillar) aims at providing a safety net of social protection in old age and is public. In all countries but France and Italy (for new entrants), first-tier pensions are not contribution-based.

The second tier (or pillar) provides earnings-related pensions and can be public or private according to accounting rules. Statutory pensions or contributions are not based on labour market participation *per se*; in contrast, occupational pensions or contributions are linked to an employment or professional relationship. Statutory pensions are public (that is, state-managed), whereas occupational pensions can be either public or private (that is, managed by social partners or collective labour agreements). When private, the pension schemes are said to be quasi-mandatory since almost all salaried workers are covered by collective agreements.