Booklet #5

Booklet Series
"Be in charge of your life cycle"

MAPPING YOUR FUTURE: PREPARING FOR RETIREMENT

ANGLE

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This booklet is number five in a series of five booklets that aim at improving economic and financial literacy of young people. Economic and Financial Literacy is basic knowledge possibly to be acquired early in life to make individual financial decisions better informed and more effective. This applies particularly to decisions that have long-term consequences and require thinking in terms of the individuals' complete life cycle. Although the five booklets are connected and refer to each other, each of them can be read independently of the others.

The first booklet in the series provides a general introduction on the concepts needed to make financial decisions over the life cycle. The other four booklets cover the most important economic decisions relevant at various stages of the life cycle. The second booklet is about educational choices, such as the decision when to leave school and enter the labour market or how much effort to invest in studying. Booklet 3 deals with the economics of saving and borrowing and what to do with money that is saved. Booklet 4 discusses many aspects of what is often one of the most important financial decisions in people's lives: the purchase and financing of their own house. Finally, Booklet 5 (this booklet) is about pensions and financial security after retirement.

The five booklets are part of the project "A network game for lifecycle education" (ANGLE), funded by the Erasmus+ programme of the EU. This project aims at promoting and enhancing Europe's younger generations' financial and economic literacy. It adopts a life-cycle perspective to help the young to consider a long-time horizon and to think about the future consequences of their decisions. In addition to the booklets, ANGLE focuses on creating a board game that helps the young to improve their financial and economic skills through active involvement and participation. Reading the booklets is an excellent preparation for playing the game. Also for readers who do not play the game, however, they help to make people more conscious and skilled in making important economic and financial decisions.

The booklet has been realised by Arthur van Soest of **Tilburg University**

Realised with the financial support of the European Union – **Erasmus+** programme

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Co-funded by the Erasmus+ Programme of the European Union

Booklet 5

MAPPING YOUR FUTURE
Preparing for retirement

Many people near the end of their working career regret 'not saving early enough': According to recent research by the insurance company Aegon, more than half of all workers wish they had started to save for their pension earlier or regret having taken a break from saving.[1, 2]

Similarly, another survey finds that 'failure to save earlier in life to build up a pension is the biggest financial regret for over a quarter of over 65-year-olds.[3]

In all developed countries, the large majority of individuals retire when they get old: they no longer earn wages and usually receive an *old age pension* instead. During their working life, part of their earnings is withheld and used to build up this pension. The pension gives them a monthly income from the time they retire until they die or simply gives them the amount they have built up through their contributions in the form of financial wealth that they can use to maintain their standard of living or spend in other ways. The way in which pensions are organized varies across countries and occupations. In many countries, pensions organized and provided by the government play a large role (first pillar). In other countries, employers work with an occupational pension fund to organize the pension savings for their workers (second pillar). Additional voluntary pension arrangements can be made on an individual basis, for example, by self-employed workers (third pillar).

In this booklet, we focus on what pensions mean for individuals before and after retirement, and not so much on pension institutions or how the pension system is organized. The general idea is that pension contributions essentially

[1] Creative, 'Pension Savings and Members' Biggest Pension Regret', creativebenefits.co.uk.
[2] Retirement Planner, 'Members' biggest pension regret is "not saving early enough", Survey, retirement-planner.co.uk.
[3] Blue Sky Financial Planning, 'Failing to save for pension is top money regret of over 65s', blueskyfp.co.uk.

transform current income into future income, independent of the exact nature of the pension system.

Pension savings are crucial to guarantee an adequate standard of living and financial well-being in old age. Depending on many factors, some individuals will almost automatically build up an adequate pension, while others must be more active to save enough for retirement. Pension contributions at working age provide income after retirement, and, due to the expected return on investment, contributions at an early age can be particularly valuable, even though retirement is still far away. This makes it important to account for the pension consequences of labour market choices early in one's career. A job with a good pension provision and somewhat lower pay can be more attractive than a similar job with higher pay but without a pension provision.

In this booklet, we discuss the main common features of pension systems in Europe. We will explain why retirement planning and pensions already matter for the labour market decisions and financial planning of individuals at an early stage of their career. Some questions we consider are the following:

- Should you worry about your pension when choosing your first job or when deciding to switch jobs?
- If you have the choice to save for a voluntary pension or to save in a different way, what are the considerations that can help you make that decision?
- What does it mean to have an adequate pension, and how can you investigate whether your pension will be adequate?
- What are the consequences of your pension arrangement for your partner and children, and do these matter for the choices you make?
- How do pensions relate to your planning for earlier or later retirement?
- How does your pension fit into the complete picture of your financial life cycle planning?

Two very different labour market careers

In this section, we introduce several important concepts in the context of pensions, using two very different examples. While institutional arrangements vary greatly across countries, the main characteristics of financial preparation for retirement in these two examples are representative of many European countries.

1. Juliette: An employee with a model pension

Juliette has made a career in the public sector, working for several ministries in different jobs. She started as a young civil servant, helping to write policy reports for the Ministry of Employment, and after a series of promotions and switches to different ministries, she is now turning 63 and is the head of one of the departments of the Ministry of Finance. Since she has always worked in the public sector, there have not been any changes in her pension arrangement. Part of her salary was always used to build up her pension, and her employer contributed an even larger share. This was the default plan offered by her employer (and other employers in the public sector). Juliette did not have to worry too much about it, as long as she stayed in the public sector and automatically accumulated more pension rights every month.

Following the advice of her colleagues, Juliette always kept track of her pension wealth, since she realized that the process of making sure you have an adequate pension starts already early in one's career. Now that she has reached age 63, she wants to get a more detailed view of her financial situation after retirement. In terms of non-pension wealth, she has put all her savings into her house, with the result that she paid the last payment on her mortgage last month: she is now completely free of mortgage debt! On the other hand, she has no financial wealth.

Recently, however, not only has Juliette been studying the pension overview that she receives every year, but she has also been visiting her personal pension website, where she can use a tool to explore her choice opportunities at retirement. The first thing she wants to know is how much pension wealth she has accumulated throughout the years and how much she can still add during the years to come. Her official retirement age is 67, which is the age at which her employer will normally force her to retire. She can retire earlier if she wants.

Juliette's accumulated pension wealth is illustrated in the figure below. If she were to retire now, her accumulated pension wealth would be €680,000 (left-hand side of the graph in the figure). If she keeps working until age 67, the expected amount (assuming her earnings do not change) will be €800,000 (right-hand side of the graph). The longer she works, the higher the total amount will be. There are two reasons for this: First, as long as Juliette works, she and her employer make new contributions. Second, the contributions from the past are invested by the pension fund, with a positive return on

investment. The longer wealth remains invested, the higher its ultimate value will be.

Although not directly relevant to what Juliette can do once she retires, it is interesting to see how accumulated pension wealth builds (see the different colours in the graph, ignoring the yellow line at the top). The orange portion at the bottom is Juliette's own contribution, the amount she has paid and is paying herself directly over the years, subtracted from her gross wage. The light blue portion is the amount directly paid by her employer. (This is not part of Juliette's gross wage, but it does incur additional labour costs for the employer.)

The dark blue portion of the graph comes from the return on investment. This is by far the largest chunk (€440,000 at age 63 and more than €500,000 euros at age 67)! The reason is that many contributions were already made years ago, at earlier stages of Juliette's career. This part of her pension wealth has had a long time to grow, with, on average, positive returns during quite some years. In Booklet 1, you already learned that, in the long run, the total gain of an investment can become substantial, even with a modest rate of return per year.

Exercise 1 Accumulated pension wealth at different retirement ages (see Booklet 1 for details on compound interest)

a. Suppose the rate of return is 4% and you start investing with wealth €10,000. You leave the money alone and do not make new contributions either. How much wealth do you have after 10 years? After 30 years? How long does it take to double the amount with which you started?
b. Now suppose that you contribute €10,000 in each year for 10 years. The rate of return is again 4%. How much wealth do you have after 10 years? Let us assume that all contributions are made on January 1, and we want to know the value at the end of the year in which you made the final contribution.

Answers

a. With compound interest, after 10 years, we obtain 10,000 x $(1 + 0.04)^{10}$ = 10,000 x $(1.04)^{10}$ = €14,802.44; after 30 years, we obtain 10,000 x $(1 + 0.04)^{30}$ = 10,000 x $(1.04)^{30}$ = €32,433.98. After k years, the amount is 10,000 x $(1.04)^k$. If we set the amount equal to €20,000, we get $(1.04)^k = 2$. Now $(1.04)^{17} = 1.948$ and $(1.04)^{18} = 2.026$, so it takes 18 years to double the amount.

b. The first contribution (made at $t = 0$) has 10 years to generate a return, so its final value is 10,000 x $(1 + 0.04)^{10}$. The second contribution is made one year later and only has nine years to generate a return, so its final value is 10,000 x $(1 + 0.04)^9$, and so forth. The last contribution has one year to generate a return, and its final value is 10,000 x (1.04). The total value of all contributions at $t = 10$ is 10,000 x $(1.04^{10} + 1.04^9 + \cdots + 1.04^1)$ = 10,000 x 1.04 x $(1 + 1.04 + \cdots + 1.04^9)$. Using the formula for a geometric series (see Booklet 2) or just adding up the 10 numbers, we find that this value is 10,400 x $(1 - 1.04^{10})/(1 - 1.04)$ = 10,402 x 0.4802/0.04 = €124,863.

Assuming that Juliette will retire at age 67, the amount €800,000 sounds great, but, in fact, this amount is not so informative to her. The rules of her pension fund imply that she cannot use this amount in whichever way she wants. It will be used to generate monthly income from the moment she retires for as long as she lives. (Juliette is single, otherwise there could also be an arrangement for her partner if Juliette were to die.) In principle, the monthly income will remain the same during the rest of her life in purchasing power terms, that is, price changes will be accounted for by raising the nominal amount. This means that, to evaluate what Juliette can do with this amount, she can assume that prices remain the same over time; if they change, her cost of living and her income will change in the same way.

The annual payment as long as Juliette lives is called a (*pension*) annuity. The amount obviously depends upon her total pension wealth when she retires (used to buy the annuity), as well as on her retirement age: if she retires later, the expected number of years that she will receive the annuity will drop, so the monthly amount can be higher. Using the tool on her personal pension website, Juliette figures out that her before-tax (gross) monthly income from the annuity if she retires at age 67 will be €3,200. If she retires at age 63, it will be €2,800. Using the income tax rules that apply to Juliette, the tool shows that her after-tax monthly income (net income) from the annuity will be approximately €2,080 if she retires at age 67, and €1,904 if she retires at age 63.

PENSION ANNUITY

An annuity is a product that pays you a regular income. A **pension annuity** is a special case of this, meant to provide a stable income after retirement. Once in payment, it cannot be changed, and it is payable for the rest of your life, no matter how long you live. It therefore provides ***insurance against longevity***: you will never run out of money, even if you live much longer than the average individual.

The income you will receive depends on the amount of money in your pension plan, your age when the annuity starts, and other options you may be able to choose (e.g. a provision for your partner if you die before your partner). Depending on the nature of your pension plan, the amount can also depend upon the market conditions at the time you buy the annuity.

Exercise 2 Income from a pension annuity:

a) Explain why this annuity implies an insurance against living very long.

b) Check that net income is a larger percentage of gross income if Juliette retires at age 63 rather than if she retires at age 67. Can you explain why?

c) Assume Juliette retires at age 67. At age 67, Juliette's expected remaining lifetime is about 21 years. Compute the total gross amount she expects to receive during these 21 years (just the total amount, not the present value). Compare this with her pension wealth at age 67.

d) If Juliette had a partner and wanted her partner to receive some of the pension if dies before her partner does, would the monthly amount she gets be higher, lower, or the same?

Answers

a) The longer you live, the higher your total living expenses are. If you just spent your wealth, you run the risk of running out of money if you live very long. With an annuity, this risk is covered, since the annuity guarantees the same income every year for the rest of your life.

b) In case of retirement at age 63, the net amount 1,904 is 68% of the gross amount 2,800. In case of retirement at age 67, the net amount 2,080 is 65% of the gross amount 3,200. The reason for the difference (68% is larger than 65%) is that the tax system is always progressive: the higher your gross income, the larger the percentage of your gross income paid as income tax, so the lower the percentage that remains as after-tax income.

c) A total of 21 years, 12 months each year, so 12 x 21 x €3,200 = €806,000. this differs from pension wealth at age 67 (€800,000), since the amount still generates a return after age 67. On the other hand, there are also costs and an insurance premium charged by the pension provider, which reduce the monthly annuity.

d) Lower, since part of the pension wealth Juliette has accumulated will be used to provide insurance for her partner.

The amounts mentioned above do not depend, in principle, on the returns that the pension fund makes on the invested wealth of the participants, since the plan is a Defined Benefit plan (DB). (There is a small risk that the pension fund will face financial hardship and will be forced to lower the amounts it gives to all its participants, but Juliette decides to ignore this.) This would be different for a Defined Contribution plan (DC) (see Booklet 1), where the annual pension income depends directly on the returns the pension fund makes in the financial market.

The final step in evaluating the adequacy of Juliette's pension is the comparison with what she wants to spend once she is retired. Her pension fund offers a tool for this as well. Juliette can indicate how much money she expects to spend per month on different categories of commodities and services: mortgage or rent; heating, electricity, and other fixed costs; insurance; transportation; food and sundries; personal care; health; leisure activities; and other. Adding up these expenditures gives the income that she would need.

DEFINED BENEFIT (DB) and DEFINED CONTRIBUTION (DC) PENSION SCHEMES

A **defined benefit (DB) pension plan** is a type of pension plan that promises specified pension payments, computed from the employee's earnings history, tenure of service, and age. It does not depend directly on the individual investment returns. Traditionally, many governmental and public entities, as well as many larger companies, provide DB plans. Contributions are usually made by the employer (on top of the employee's salary) and the employee (using part of the gross salary) and are often treated favorably for tax purposes. A DB plan is defined, in the sense that the benefit formula is defined and known in advance.

Conversely, for a **defined contribution (DC) retirement saving** plan, the formula for computing the employer's and employee's contributions is defined and known in advance, but the benefit to be paid out is not known in advance. In many countries and for many occupations, participation in the plan is mandatory. Sometimes, the contributions are flexible within certain bounds, so the employee can (to some extent) choose how much to invest in pension wealth. In other cases, there is no flexibility whatsoever, and everything is automatic.

To help her with this difficult task, the pension fund informs her what an average household with a similar income would spend in each category. Juliette can use these amounts but will probably deviate from them. For example, she owns her house and has already completely paid off her mortgage, so her housing costs will be much lower than the comparison benchmark. (See also Booklet 3, which describes the key principles of budget management.)

Juliette concludes that she expects to spend €2,000 per month, but there is uncertainty: she might also want to spend more. For example, if her health deteriorates, she may want to hire someone to do the cleaning and shopping. She considers it very unlikely, however, that she will need more than €2,300 per month. If necessary, she could also exploit her housing wealth and acquire a *reverse mortgage*, enabling her to spend part of the money invested in her house without having to move. (See Booklet 4 for more on mortgages and housing.)

Exercise 3 Early retirement and making ends meet:

a) Would you advise Juliette to retire at age 63? Why or why not?

b) If Juliette insists on retiring at age 63 because she is really fed up with her job (and does not think another paid job will be better), what can she do to make this financially feasible?

Answers

a) Without additional income, the answer seems to be a clear no, since her monthly income (€1,904) would not be enough to cover her expected cost of living (€2,000).

b) Essentially, there are two possibilities. One is to spend less than originally planned and accept a lower standard of living. This has the obvious disadvantage that Juliette would not be able to afford the luxuries she is used to. The other possibility is to borrow money. The most attractive way to do that, in her case, is probably through a *reverse mortgage*. This would allow her to spend the savings that she has invested in her house.

Albert and Joe: Never worked for a boss!

Albert and his partner, Joe, always valued their independence and take pride in saying that they never worked for a boss. This does not mean that they did not work, of course: throughout the years, they made a living with freelance jobs. Albert worked many years as an independent photographer, and his partner is a freelance journalist. Since several years, they have been specializing in history and architecture and now they mainly offer guided walking tours, showing foreign and domestic visitors their city's historic highlights and beautiful architecture. They enjoy their work, taking Mark Twain's words in 📖 Booklet 1 very seriously: 'Find a job you enjoy doing, and you will never have to work a day in your life.'

Albert and Joe always made a point of enjoying life more than saving for an unsure future or a distant old age. They rent an apartment in the city's centre and spent most of the income they did not need for expenditures on traveling to exotic places such as Brazil and Thailand. Consequently, they have not accumulated any financial wealth and no housing wealth.

Although Albert and Joe like their jobs and have no intention of retiring, they recently faced some health problems and started thinking that perhaps they cannot continue working like this forever. They both recently turned 60 and, for the first time

in their lives, considered their financial future in the somewhat longer run, beyond their next trip to another exotic part of the world. They talked to some friends and went on the Internet to learn the basics of the pension system in their country.

The first thing they discovered was that, as in many other countries, the pension system has essentially three pillars. First, they will be entitled to a state pension (first pillar) as soon as they reach the official retirement age of 67 years. According to the rules in their country, this will provide them with a basic income of about €1,000 per month, enough to keep them out of poverty if they do not have debts or excessive fixed costs, such as a very high rent. They will get this pension in any case, whether they continue to work or not. As long as they retain their monthly earnings, it is just extra income every month – something to look forward to!

The second pillar does not apply to Joe and Albert, since they were always self-employed and never worked as employees. Like almost all self-employed and freelance workers, they did not contribute to an occupational pension and never will. They could have built up their own pension voluntarily in the third pillar, but until now they did not – they had other priorities! They might regret this now, but they enjoyed their lives until now and there is no reason for immediate panic, particularly not as long as they continue to work.

What can Joe and Albert conclude and what should they do in terms of planning for their future? The first thing they conclude is that it is probably not a good idea to retire earlier than or even at age 67. This would lead to a dramatic loss in earnings and without other income sources on which to rely. Their only income would be the state pension. They would have to move to a much cheaper apartment, probably on the outskirts of the city instead of in the lively city centre, and they would have to change their lifestyle dramatically.

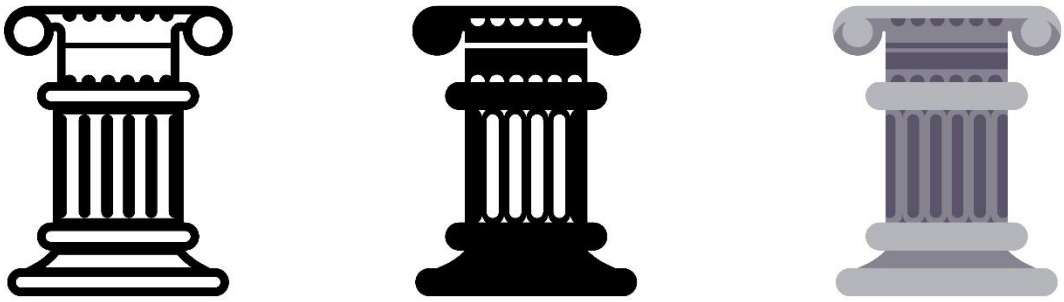
THE THREE PILLARS OF MOST EUROPEAN PENSION SYSTEMS

First pillar: The first pillar is the state pension, organized at the national level. It usually pays a monthly annuity that can depend on the number of years of residence in the country, the individual's earnings and contribution history, and/or the individual's needs (i.e. other sources of income). In some countries (e.g. Italy, France, Poland, and Germany), the first pillar is the main pension provision, whereas in other countries (e.g. the Netherlands), it only provides a basic income that is just enough to stay out of poverty in old age. First pillar pensions are usually funded through taxes or the contributions of current workers (called a pay-as-you-go system).

Second pillar: The second pillar is a pension linked to an occupational fund, usually a DB or DC and often mandatory, with independent investment management by a pension fund or insurance company, usually organized through the employer or a group of employers in the same sector. It supplements the state pension and aims to help employees smooth consumption over their life cycle and maintain their pre-retirement standard of living when they retire.

Third pillar: The third pillar consists of voluntary pension contributions in various forms, including occupational and private saving plans, offered by insurance companies, banks, or other financial companies. These can supplement the first and second pillar pensions or replace these pensions for groups with little first or second pillar savings, such as the self-employed.

This is not really a problem for them in the short run, as long as they stay healthy and enjoy the work they are doing. After all, the advantage of being one's own boss is that there is no age-related mandatory retirement, and Joe and Albert can keep doing what they do now for as long as their health permits. They can also gradually downsize their effort by working fewer hours. The state pension would allow them to do so at age 67 without a reduction in monthly income.



Still, there is a risk due to ageing and deteriorating health. The smaller health issues they already face have made them realize that they probably will not be

able or want to do the same job when they are 77, for example, and negative health shocks might even come sooner. Finally, they decide to start planning for retirement!

Joe and Albert are currently still healthy enough to work as much as before and make the same earnings. They decide to change their lifestyle and give up part of their life, reducing, for example, the number and extravagance of their exotic trips and their visits to fancy restaurants. That way, they think they can save about €10,000 each year in the years to come. They decide to invest the money in a third pillar voluntary pension and make an appointment with a reliable financial advisor recommended by some friends to arrange this.

The financial advisor is immediately enthusiastic about making a decent and feasible plan. For a moment, she wants to say how sorry she is that Albert and Joe did not come to her earlier, since earlier investments would have given positive average returns for more years, and it would have been much cheaper to build up a decent amount of pension wealth (see Juliette's story). However, she keeps these thoughts to herself, since there is no use in blaming her clients for something they cannot undo.

Since the state pension provides a basic income and because the time horizon is reasonably long, the adviser thinks that Albert and Joe should invest their money in risky financial assets, to raise the expected return. She advises a pension investment with a company that guarantees that the money will only be used to finance socially responsible and sustainable companies. The company convincingly argues that the expected annual return on the investment is 5%.

Exercise 4 Accumulating pension wealth (an optional exercise that requires some serious calculations):

a. Suppose Albert and Joe invest €10,000 each year for the next five years. They do not want to commit to investing more in the five years after that, but they do intend to

let the investment grow for another five years. What will their expected pension wealth be after 10 years?

b. There is no guarantee that the actual return will always be 5%, but their financial advisor convincingly argues that it is very unlikely that the average return will go below 2% (the worst case). There may be a few years with negative returns, but, most likely, these will be compensated by years with returns that are higher than 5%. It is also very unlikely that the average return will be above 8% (the best case). What will be the pension wealth amount be after 10 years in these two extreme cases?

c. The financial advisor is a real expert and knows that pension contributions are tax deductible, since Albert and Joe did not accumulate much pension wealth yet relative to their earnings, because the tax rules allow for *delayed taxation*. This means that Albert and Joe can invest much more than €10,000 per year. The (marginal) tax rate they face is 37.5%. How much can they invest each year if the net amount (after tax) they spend on pension savings is €10,000? What will be the answer to question a if they invest this amount instead of €10,000?

Answers

a. The investment amount is €10,000 every year for five years, with a rate of return of 5% for a period of 10 years. Similar to Exercise 1b, the expected pension wealth after 10 years is $(1 + 0.05)^5$ x 10, 000 $(1.05 + 1.05^2 + \cdots + 1.05^5)$ = 10, 000 x $(1.05)^6$ x $[1 - (1.05)^5]/(1 - 1.05)$ = €74,048.74.

b. Using similar calculations with different rates of return yields the following: if the rate of return is 0.02, €58,605.94; if the rate of return is 0.08, €93,095.58.

c. Since the tax rate is 37.5%, if the amount they invest in pension wealth is 1/(1 – 0.375) x €10,000 = €16,000, the tax they will have to pay is reduced by 37.5% of this, that is, by €6,000. This means their net pension savings will be €10,000. In that case, their pension wealth of 1.6 x €74,048.74 = €118, 478. Quite a bit more than the amount obtained in a!

DELAYED TAXATION (THE REVERSAL RULE)

Delayed taxation means that pension contributions are exempt from income tax. Instead, the pension income is taxed once it is received by the individual (after retirement). Many countries use this as a tool to stimulate pension savings. The most common situation is that income is higher during the working years than after retirement. Since marginal tax rates increase with income, this means that delayed taxation not only delays paying taxes, but also reduces the total income tax paid over the life cycle. In other words, delayed taxation is an implicit subsidy on accumulating pension wealth.

Before making their decision, Albert and Joe want to know what the accumulated amount of pension wealth really means for them. A condition for favourable tax treatment is that the amount be used to buy an annuity, in this case an annuity on two lives: Albert's and Joe's. To simplify matters, let us split the amount into two equal parts, used to buy two separate annuities, one on Albert's life and the other on Joe's life. This means that the surviving spouse receives half of what the couple receives when the other spouse passes away.

The financial advisor proposes buying two simple annuities with certain annual amounts and no risk due to changing financial market conditions. Albert and Joe intend to claim their annuity once they turn 67. The situation is the same for each of them and essentially also the same as for Juliette in the previous example. The only difference is the total amount of pension wealth, but the annuity amount is proportional to the amount of pension wealth: if pension wealth is twice as high, the monthly annuity before tax is also twice as high.

Exercise 5 Income from a pension annuity optional (requires some serious calculations):

a) Using the numbers for Juliette's annuity and combining them with the results in Exercise 4c, determine the expected before-tax monthly annuity payments for Albert and Joe individually and as a couple.

b) Determine the same amounts, but now in the worst-case scenario of Exercise 4.

c) Assume that Albert and Joe face the same income tax rules (the tax system treats them as individuals who both receive the same income). What can you say about the after-tax monthly amounts that Albert and Joe can expect?

Answers

a) Retiring at age 67 gave Juliette a pension wealth of €800,000. For this amount, she could buy an annuity of €3,200 per month (before tax). Albert and Joe expect to have €118,478 in total pension wealth, or €59,239 each. Assuming that everything works proportionally (ignoring fixed costs and assuming that Juliette's and Albert and Joe's company operate in the same way), this would provide a gross monthly annuity of 59,239/800,000 x 32 = €237 per month for each of them, or €474 for the couple. This would be in addition to their basic pension of €1,000 per month, so their total income would be €1,474 per month.

b) In the worst-case scenario, their pension wealth would be 1.6 x €58,606 = €93,770 (€46,885 each). This would give them an annuity income of €375 per month plus a basic pension of €1,000.

c) The proportion of income that must be paid in the form of taxes will be lower than for Juliette (even if Juliette retired at age 63; see Exercise 2), since their income is lower and the tax system is progressive. Their net income will therefore be at least 0.68 x €1474 = €1,002 per month.

Pension systems across countries

The two case studies presented above hopefully give you some first insights into the complicated world of pensions. For more details, country-specific rules matter a great deal. Each country has its own pension system, with its own complexities and advantages and disadvantages. It is not possible to explain the features of all these pension systems in this booklet. Some pension systems are arguably better than others, and there is an international ranking that makes the pension experts proud in some countries, such as the Netherlands and Denmark, and less proud in other countries, including Japan, perhaps surprisingly (see Figure 1).

Figure 1 The 2019 Melbourne Mercer Global Pension Index

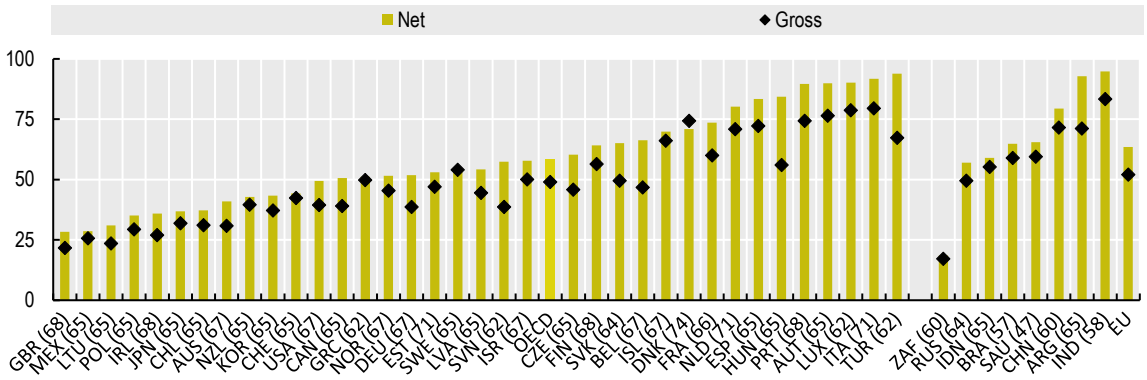
Grade	Index Value	Countries		Description
A	>80	Denmark Netherlands		A first class and robust retirement income system that delivers good benefits, is sustainable and has a high level of integrity.
B+	75–80	Australia		A system that has a sound structure, with many good features, but has some areas for improvement that differentiates it from an A-grade system.
B	65–75	Canada Chile Finland Germany Ireland	New Zealand Norway Singapore Sweden Switzerland	
C+	60–65	France Hong Kong SAR Malaysia	UK USA	A system that has some good features, but also has major risks and/or shortcomings that should be addressed. Without these improvements, its efficacy and/or long-term sustainability can be questioned.
C	50–60	Austria Brazil Colombia Indonesia Italy	Peru Poland Saudi Arabia South Africa Spain	
D	35–50	Argentina China India Japan Korea	Mexico Philippines Thailand Turkey	A system that has some desirable features, but also has major weaknesses and/or omissions that need to be addressed. Without these improvements, its efficacy and sustainability are in doubt.
E	<35	Nil		A poor system that may be in the early stages of development or non-existent.

Source: Table 5 in https://info.mercer.com/rs/521-DEV-513/images/MMGPI%202019%20Full%20Report.pdf.

One criterion for the ranking is the average earner's net replacement rate, that is, the ratio between the net pension income and net earnings before retirement. This amount varies substantially across countries, as shown in Figure 2. In the European Union (EU), the average net replacement rate in 2018 for an average earner was approximately 64%, varying from less than 28% in the United Kingdom to more than 90% in Italy.

However, the average earner is not the only person that matters; perhaps the most important factor is how the pension system prevents poverty among the elderly (say, the population of those 65 and older). Figure 3 tells us that, in South Korea and China, poverty among the elderly is very high, much higher than in other age groups, whereas in countries such as the Netherlands and France, poverty among the elderly is quite rare. This can largely be explained by the pension system, which provides a basic income to almost everyone, irrespective of their employment or earnings history.

Figure 2 Net and gross replacement rates for an average earner



Source: OECD Pensions at a Glance, 2019. Official retirement ages are in parentheses.[4]

[4] See https://www.oecd-ilibrary.org//sites/b630ed29-en/index.html?itemId=/content/component/b630ed29-en#figure-d1e28616.

Exercise 6 Use Figure 2 to answer the following questions:

a) What is the average net replacement rate for an average earner in the EU countries?

b) Which EU country had the highest net replacement rate for an average earner? And which EU country had the lowest net replacement rate?

c) Why is the net replacement rate usually higher than the gross replacement rate?

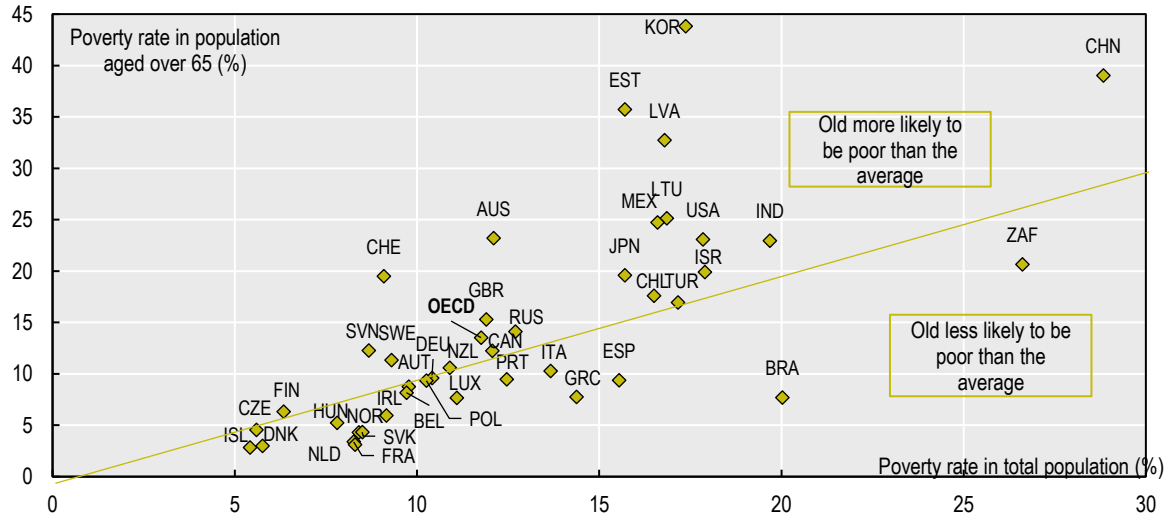
Answers

a) Approximately 65%. See the histogram bar on the far right of the figure.

b) The United Kingdom had the lowest net replacement rate, and Italy the highest.

c) This is because the tax rate is higher for higher incomes. Since income before retirement is higher than after retirement, the tax is also higher before than after retirement.

Figure 3 Income poverty rates by age, older versus total population in 2016 or the latest available year



Source: OECD Pensions at a Glance, 2019.[5]

Exercise 7 Use Figure 3 to answer the following questions:

a. What is the poverty rate among the elderly in the OECD, on average? And the poverty rate for the entire population?

[5] See https://www.oecd-ilibrary.org//sites/fb958d50-en/index.html?itemId=/content/component/fb958d50-en#figure-d1e41733.

b. Which countries have the lowest poverty among the elderly in the EU? Are these also the countries with the lowest poverty rates for the entire population?

Answers

a. See the square with the OCSE tag; approximately 14% among the elderly and approximately 12% for the entire population.

b. Denmark, France, and the Netherlands have the lowest poverty rates among the elderly (approximately 3%). The Czech Republic has the lowest poverty rate for the population as a whole (less than 6%).

If you want to know more details about the pension system in your own country, you can find an incredible amount of information on the Internet, perhaps too much. A better way to start for most of you is probably to consult your human resources manager, a senior colleague, or an expert friend or family member.

THE MAIN ISSUES

- It is important to account for the pension consequences of choosing among different jobs. If your employer contributes to building up pension wealth, you can see this as delayed earnings. A good pension arrangement can compensate for a lower wage. This already applies at early stages of your career.

- Generally (but not always), a permanent job as an employee for a large or medium-sized firm automatically comes with a pension arrangement. In other cases, particularly if you are self-employed or work freelance, you should make your own arrangements.

- If you can choose how much to save for your pension, you should realize that it is often beneficial to invest in your pension wealth rather than in financial assets, because of the tax-favoured treatment of pension contributions and, sometimes, subsidies on pension contributions provided by your employer.

- Contributions made at an earlier age have more time to generate positive returns and will normally provide a greater increase of your pension than contributions made just before you retire. This makes it worthwhile to start planning for your retirement at an early stage in your career, particularly if you do not fall under a mandatory pension arrangement.

- There are many different pension schemes (e.g., mandatory or not, DB or DC, paid by the employer or the employee). DC pensions are usually riskier than DB pensions, since pension wealth depends directly on financial market conditions.

- There are many other sources of risk: inflation (purchasing power vs. nominal value), unemployment risk, earnings variation, household composition (divorce, widowhood), medical expenditures, and so forth. This makes it impossible to plan everything perfectly. This uncertainty can encourage you to be prudent in your choices and account for the worst-case scenario.

- Not only does your income after retirement matter, but also your expenditures. If you know you will spend much less once you have retired (e.g. because your mortgage is completely paid off), a lower pension could be enough to maintain your standard of living.

- When you retire, your pension wealth can be transformed into an annuity. Sometimes this is mandatory and sometimes you can choose to receive part or even all of your pension wealth immediately (a lump sum). The annuity usually gives you a fixed amount until you die, insuring you against running out of money due to living longer than expected. The annuity guarantees that you will have an income as long as you live (and it will stop if you die).

- On the other hand, a lump sum provides liquid wealth that you can use in several ways, for example, to pay off your mortgage. If you die, what remains of the lump sum goes to your heirs as a bequest.

- If you have a partner and/or dependent children, you should, of course, consider the financial adequacy of your pension in the context of your household. For example, it is important to carefully look at what would happen to the income of your household if you were to die either before or after retirement. In most cases, you can choose a (somewhat lower) annuity that provides your partner with an income after you have died.

- When you retire matters a great deal for your annual income after retirement. If your retirement age is flexible, you may be able to use the option value of retiring later if your pension wealth is lower than expected. Gradual retirement (working part-time at an older age) can also be an attractive option.

Realized with the financial support of the European Union - Erasmus+ project n. 2020-1-IT02-KA203-079758

Co-funded by the Erasmus+ Programme of the European Union

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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