

# Intergenerational Fairness in the Portuguese Labour Market

**Pedro S. Martins**



FUTUREFORUM

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**Email:** [pedro.martins@novasbe.pt](mailto:pedro.martins@novasbe.pt)

**Web:** <https://pmrsmartins.wixsite.com/website>

**Address:** Nova School of Business and Economics,  
Rua da Holanda, 1, 2775-405 Carcavelos, Portugal.

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**Note:** This study was developed when the author was a professor  
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# PREFACE

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The Gulbenkian Foundation, through the Future Forum, aims to contribute to the identification, study and discussion of the fundamental challenges of society's future. We aim to promote critical mass about these topics and to entail the reflection about today's public policies based on the challenges ahead.

With these objectives in mind, an initiative is being carried out to introduce Intergenerational Justice on the public agenda and to encourage the different public representatives to answer the intergenerational impact of public policies.

These are complex and ambitious objectives: on the one hand, because the focus is on covering the rights of people that, in many cases, are not yet born and, for this reason, still don't have a voice in the public space; on the other hand, because we attempt to counter what the Spanish political philosopher Daniel Innearity named short-termism in public policies design, whose benefits are frequently dominated by the short-term interests.

One of the key elements of this initiative is a set of studies that aims to evaluate the impact of the different public policies among generations. That is the only way to measure all the costs and benefits of these public policies. This is particularly important in structural and long term areas with high impact on people's lives: housing, public finances, labour market and environment.

This study in particular – “Intergenerational Fairness in the Portuguese Labour Market” – aims to analyse labour market in Portugal, identifying the main questions of intergenerational fairness that have been affecting the different generations in the last decades.

We would like to thank the author Pedro S. Martins for the work done, as well as to all the experts that contributed with their comments and revisions.

We believe that the Intergenerational Justice initiative, along with Foresight Portugal 2030 and other projects in the pipeline, can provide an important contribution to the reflection on the great future challenges that the country faces and to the strategical options to address it on the long term.

**Miguel Poiaras Maduro**

President of the Future Forum Scientific Committee

**Luís Lobo Xavier**

Coordinator of the Intergenerational Justice Project

**Work is a crucial activity to assess and improve intergenerational fairness. This study empirically analyzes the case of Portugal, focusing on the period 1986-2018 and the private sector, using different microdata sources.**

The various analyses conducted point to a strong convergence of the average wages of different generations in recent years, which may be consistent with intergenerational fairness. On the other hand, we find that the economic cycle has affected different generations in different ways, with more negative impacts on workers born in the 1990s. These differences can be explained by the situation of the economic cycle when each generation enters the labour market and the lasting scars that follow. The findings also indicate that the education wage premium has been falling for younger workers, although this decline is less pronounced when considering periods of non-employment. We also identify a very broad and stable use of fixed-term employment contracts between 2002 and 2018, especially among younger workers. With respect to social security benefits during the working life, we found that some of these were received mostly by older workers (as in the case of unemployment benefits), which again negatively affects intergenerational fairness.

**Keywords:** Generations, Inequality, Wages, Employment.

**JEL Codes:** J21, J31, I26, H55.

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1.

# EXECUTIVE SUMMARY

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Work is a crucial activity to understand and improve intergenerational fairness in Portugal. Indeed, different generations are present simultaneously and dynamically throughout the decades in the country's labour market. In addition, labour earnings (as well as the social protection that work provides) represent nearly the entirety of the income of the vast majority of the Portuguese.

This study analyzes this type of fairness through different angles, focusing on the period 1986-2018 and on the private sector (employees). The microdata from 'Quadros de Pessoal', Social Security (2000-2010) records and the Labour Force Survey (2011-2020) are used extensively. Each generation is defined according to the decade of birth of the person (1920s to the 1990s), in a total of eight different generations that are then followed over different, partly overlapping periods. Firstly, the various wage-based views point to a strong convergence of these generations, in particular at the level of the basic and median wages. Most generations, over much of the period considered, including the two most recent decades, have monthly average real salaries of only about 600 euros. This wage convergence could promote intergenerational fairness - but at a particularly low level of income and productivity. In fact, we find somewhat similar patterns of generational convergence when analyzing the sales turnovers of the different "generations" of companies in the country, in this case considering the years when these firms were created.

We have also identified a pronounced stability and widespread use of fixed-term employment contracts among younger workers. The percentage of these contracts is much higher in the most recent generations over the past two decades - more than 60% of the generation born in the 1990s as opposed to about 40% in the generation born in the previous decade. Furthermore, there is no indication in the data that this phenomenon will be significantly reduced even as these generations age.

In terms of social security benefits, the study finds that some of these (such as unemployment benefits) tend to be used to a large extent by older workers, despite the large unemployment rates for the young. Such imbalance can again affect intergenerational fairness negatively. For example, during the 2000s, social security benefits (unemployment, illness, layoff and parenting) received by workers born in the 1940s accounted for 69% of their contributions (55 percentage points of which derived from unemployment benefits). In clear contrast, the relationship between subsidies received and contributions paid in the same period but for generations born in the 1960s and later was only 22%.

We found evidence that the economic cycle has affected different generations differently, with more negative impacts on workers born in the 1990s and less negative impacts on workers born in the 1970s and 1980s. According to our results, these differences can be explained by the situation of the economic cycle at the time each generation enters the labour market, and the lasting "scars" that follow.

We also found that the wage increase related to schooling has been falling significantly for younger generations (from 10% to 5%). On the other hand, this drop is less pronounced when considering lifetime pay (10% to 7%). Education thus continues to contribute to higher pay and lower unemployment - but this contribution is smaller for younger generations.

# 2.

## **INTRODUCTION**

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This study presents empirical evidence to inform the answers to the following questions: How have the results of the various generations of workers in Portugal varied over the last 30 years? What lessons can be made about intergenerational fairness in the labour market? What public policies can increase intergenerational fairness in the country?

This analysis is motivated by the perception in Portugal (and in other countries) of the end of the trend of successive improvements in the socio-economic results of the new generations. This perception may have become particularly clear from the great financial crisis in 2009. In contrast, some consider that, for some older generations, there has continued to be an improvement in their socio-economic results also in recent decades, thus generating a decoupling process. These perceptions and their contrast may lead to a break in expectations that were created in the 1980s and 1990s of equitable growth with intergenerational solidarity. However, both perspectives have not yet been rigorously quantified or documented, which is an obstacle to a more constructive debate on this subject and on the desirability of different public policies.

The study is developed adopting an empirical, generational and longitudinal perspective. Microdata of workers of different ages and in different years are analyzed, following individually each worker in each cohort over a period of up to 30 years. These generational and longitudinal dimensions bring significant added value to the study. Indeed, most of the analyses existing in the national and international literature tends to focus on restricted sets of individuals, observed during short periods of time (the bibliography of this report includes several such examples). In addition, these analyses also tend to be focused only on the early years in the labor market and do not consider the transitions to inactivity at the end of careers for workers.

In contrast, this study characterizes the participation in the private sector of the labor market as well as the results of this participation by all generations of workers over an extended period (from 1986 to 2018 in most cases). This includes the periods of labor market entry, maturity and or exit of each cohort. The focus is placed on generations, defined as sets of individuals born in a given period of time. More specifically, we consider generations defined by the decade of birth of each person, namely the 1920s (years 1920 to 1929), 1930 (1930 to 1939), and so on until the 1990s, in a total of eight different generations.

We also try to take into account that the outcome of each generation is due to possible aspects specific to the generation concerned (such as the profile of the basic education it has received or the social-political framework of its youth) but also to the relative period in which generation is observed in the labour market (when individuals are 20 years or 50 years old, for example) and the period itself in which this observation takes place (in the 1990s or the 2010s, for example). The latter may be of particular importance in the results of each generation, particularly in the economic cycle. In any case, it may not be possible to completely unravel the three dimensions above, since each generation is only observed at a certain age (e.g., the generation born in the 1970s is necessarily around 30 years old in the 2000s).

Our empirical analysis is developed to a large extent using a particularly rich micro database from Portugal: “Quadros de Pessoal” (Personnel Records). This database, compiled by the Ministry of Employment, includes individual detailed and anonymised information on all employees in the private sector in Portugal as well as their companies. An important aspect of this data set, mandatory by all companies in Portugal with at least one employee, is the availability of longitudinal information for each individual, through an invariant identifier specific to each person (which is the same and unique regardless of the year or company in which the person works). In this way, it is possible to follow each worker over time, particularly during the 32 years that the study analyzes. We also use the Labour Force Survey (from Statistics Portugal) and microdata from the remuneration and social benefits registry (from the Social Security Information Institute).

The analysis conducted in the study describes several characteristics of workers of various generations and over the years considered. Firstly, in the labour supply dimension, several attributes of workers are characterized, namely age, schooling, and gender. Secondly, we describe companies in Portugal, also from a generational perspective. Finally, in its main results, the study analyzes the interaction of individuals with companies in a set of variables that are critical for the assessment of intergenerational fairness: employment, non-employment (in the context of the data set, including possible unemployment and retirement, but also emigration and other situations), real salary and other income (deflated using the consumer price index), occupation, and employment contract (permanent, fixed term, and temporary).

Overall, the analysis includes the different indicators mentioned above (annual salary, probability of employment, job profiles, etc.) for each generation and year between 1986 and 2018. As indicated above, the generation is defined as a group of individuals born in a certain set of years, namely 1920-1929, 1930-1939, ..., until 1990-1999, for a total of eight generations, followed during the years in which the base is available.

The longitudinal dimension of the database and the approach adopted in the study allows quantifying not only the annual levels of these variables but also their cross-sectional variability (via standard deviation or other indicators of dispersion) between individuals in each year. This is also important in that this potential temporal volatility can significantly impact perceptions of generational fairness. The analysis of the study also includes dynamic aspects, such as labour market stability (change or not of employment and occupation) and wage variability over time. These types of longitudinal variation may constitute a more informative risk and instability metric than the cross-sectional variation above. The income analysed includes both the gross salary (indicated by the companies in the database in terms of various components, including the basic pay) and the net salary (indicated by the individual, in the case of the Labour Force Survey).

We also estimate the relationship between social security contributions and benefits for each individual of different generations, another potentially relevant source of intergenerational fairness. An additional analysis consists of the returns to education from a generational perspective (comparing the sum of income over a period of up to 30 years of each individual born in the same period, for people with different levels of education). In terms of the interpretation of the results and the discussion of the public policy implications, it is important to take into account that the period analyzed was subject to various types of shocks and other influences. These include: the business cycle (including the recessions initiated in 1993, 2003, 2008 and 2011), the macroeconomic environment of the euro and its consequences (lower inflation, growth in the nontradable sector, poor credit allocation by the financial sector, etc.), enlargements of the European Union to Eastern Europe, China's growth in international trade, business concentration (including possible oligopsony situations), the various labour and social security reforms (1989, 2003, 2008 and 2012), the economic and financial adjustment programme of 2011-2014, and the pandemic.

Since it is not possible to establish strict causal relationships between several of these factors and the empirical results found, the study considers possible links, even if suggestively, between them. A challenge of this type of analysis is the separation between life-cycle effects (30-40 years vs 40-50 years, for example), cohorts ("vintages" or generations) and the period (notably the macroeconomic angle). One dimension with greater potential is the impact of the economic cycle, as recessions are external ("exogenous") events from the perspective of individuals, in particular those entering the labour market for the first time. In specific terms, the analysis seeks to assess the extent to which recessions have permanent and specific effects on these individuals (even after the recovery of the cycle), whether the nature of the labor market generates impacts of these similar shocks in the various generations, and whether crises have had different impacts over the last decades. An assessment of the impact of the economic cycle (and in particular recessions) on inequality and intergenerational fairness is thus conducted, a point of clear relevance to public policies.

We structure our analysis around six themes. We start with a first description of the different generations over the last 30 years, focused on the number of individuals (section 3). We then compare different aspects of the schooling of each generation (section 4). After this analysis of the main dimensions of the labour supply side, we present an analysis of the labour demand side, analyzing the profiles of companies founded in different periods and their activity in subsequent years (section 5). Next, section 6 focuses on the main variable we consider to ascertain intergenerational fairness: wages. The remaining sections - 7, 8, 9, and 10 - focus on employment contracts, job stability, the effect of economic recessions, and social benefits, respectively. Finally, section 11 discusses our main results and presents suggestions for public policies while section 12 presents an epilogue focused on the impact of the pandemic crisis on intergenerational fairness.

3.

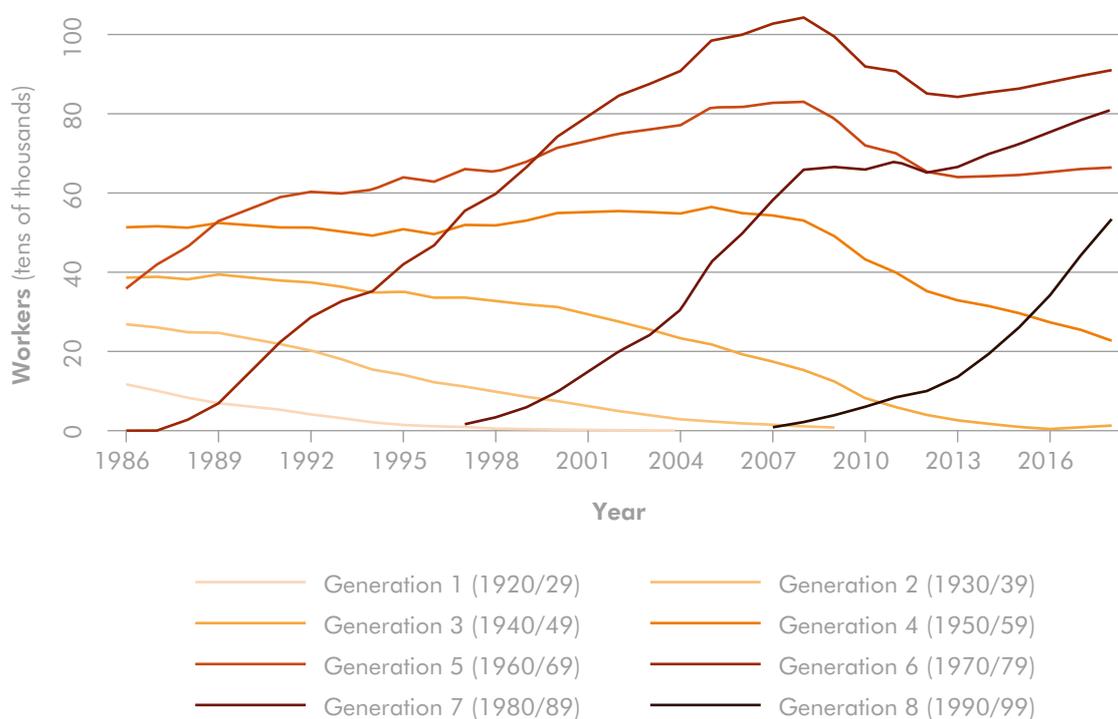
**PEOPLE**

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**How many workers are there from each generation and in each year? We started our analysis with the characterization of different generations focused on the number of people and workers throughout the period 1986-2018.** Figure 1 shows these numbers corresponding to each of the eight generations analyzed, defined according to the decades in which they were born. We consider here the individuals aged between 18 and 68 years and declared as employees, in the “Personnel Records” database, described in Appendix 14 (and corresponding to a total of about 80 million observations). Each generation is identified with a different color and with a continuous line (generations born in odd decades – 30s, 50s, 70s, and 90s) or dashed (even decades – 20s, 40s, 60s, and 80s).

Figure 1  
Number of workers (per year)



Notes: Number of workers (in tens of thousands) per year and per generation. Each individual is considered only if they work as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations is defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Results from 1990 and 2001 here and in the following graphs are obtained through interpolation.

Sources: All individuals from the “Personnel Records” data set (1986-2018) and author's analyses.

Given the fixed period considered (1986-2018), some generations are observed in the final phase of their participation in the labor market (such as the 1920-29 generation, already at least 57 years old in 1986). Other generations are observed only in the initial phase of their entry into the labour market (such as the 1990-99 generation, at least 18 years old only from 2008). Still other generations are observed throughout much of the main period of their connection to the labour market (notably the generation born in the period 1960-69, with at least 18 years - in 1987 - and no more than 58 years - in 2018).

We can therefore consider three groups of generations in our analysis: those generations whose numbers of workers are in decline over the period considered (generations born in the years 20, 30 and 40), those who maintain great stability and which are observed in their maturity (born in the 50s and 60s), and generations growing over the period (born in the 70s, 80 and 90). These generations are constantly interacting in the labor market over time, leading to changes in the supply of work (the availability to work by individuals) and their composition, particularly regarding levels of education and professional experience, and different results in terms of salaries and several other variables analyzed in this study.

It should be noted that the variation in the number of workers in each generation over time is due to several factors. First, the variation of birth years within each generation (each generation is defined with up to ten years of difference in their ages). This variation implies that younger people will enter the labour market later, leading to an increase in the number of workers in the first years of each generation. Differences in fertility levels may also be relevant here, both for each generation and in the comparison between generations. Second, the different levels of education may also explain the differences in the number of workers. For example, individuals who complete their schooling later tend to enter the labor market later. Third, the different levels of importance, over time, for each generation, from other states to the labor market not covered in the database: self-employment, public sector, informal work, unemployment (young), inactivity (including school attendance), and migration. Fourth, the different levels of reform incidence (including early retirement) at different ages, notably from the age of 55.

The generation of the 1970s illustrates well the great variation in the number of workers (employees) in its initial phase, with values from zero until 1987 (before the first individuals reached the age of 18), continuously growing to a peak of slightly more than one million people in 2008. The number of workers drops to about 800,000 in 2013, rising from there until the last year analyzed (2018). The next generation, born between 1980 and 1989, also exhibits a similar evolution, albeit with some differences. For example, this generation has earlier declines in its growth, also in 2008, or ten years earlier in relative terms when compared to the generation born in the 1970s.

The reversal of growth trends in 2008 will be related to the outbreak of the international financial crisis that year. It should also be noted that previous generations, notably those of the 1950s and 1960s, also exhibit some inflection in their figures that year, although in the case of the former this can be partially explained by the transitions to inactivity via reforms. The most recent generation, born in the 1990s, had a pronounced growth trend in line with the last year for which data are available, 2018, with a slowdown or even decline expected from 2020, with the outbreak of the crisis related to the Covid-19 pandemic.<sup>1</sup>

Overall, Figure 1 also allows us to understand the constant recomposition of the Portuguese labour market, in its private sector, over the last four decades, namely with different relative importances of each generation each year. The generations born in the 60s and 70s stand out for their importance in numerical terms for much of the period analyzed, the first only being supplanted by the generation of the 1980s from 2013.

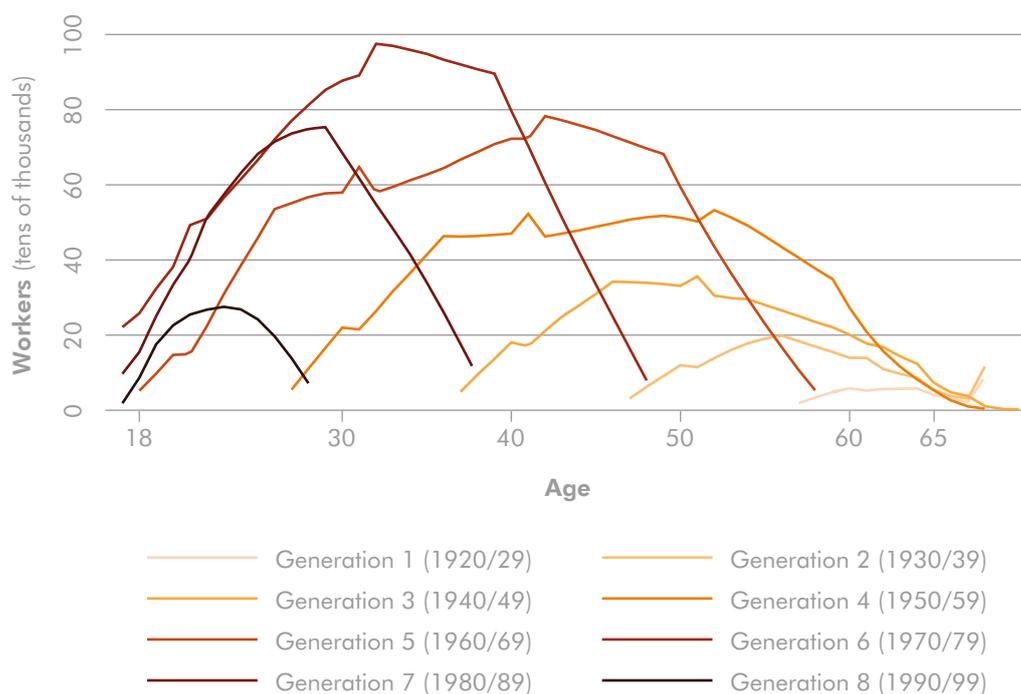
An alternative way to analyze the dynamic distribution of different generations in the labor market involves focusing on the age of workers as opposed to the year in which they are observed. Figure 2 presents these results, considering precisely the age of each worker (and not the year of observation, as before). This alternative format underlines the fact that each generation is observed only in part of their working life, with a higher incidence at different age levels. For example, the generation born in the 1970s

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<sup>1</sup> It is also interesting to see the change in the slope of the curves of the new generations in their lower ages. While in the 1970s generation, the slope of the curve was about 45 degrees on the chart, subsequent generations have gradually lower inclinations. This pattern may result from fertility breaks as well as increased schooling, including the extension of compulsory schooling to 18 years old introduced in 2012.

is mostly observed when they are 30 years old. This underlines the need to contextualise some of the results that will be presented below, as it is not possible to separate the intrinsic effects of each generation (differences in attitudes or personalities, for example) from the specific effects of the period in which generation is observed (economic growth cycle, for example) and also from the age-specific effects of the workers concerned (50 years and not 40 years, for example).<sup>2</sup>

Figure 2  
Number of workers (by age)



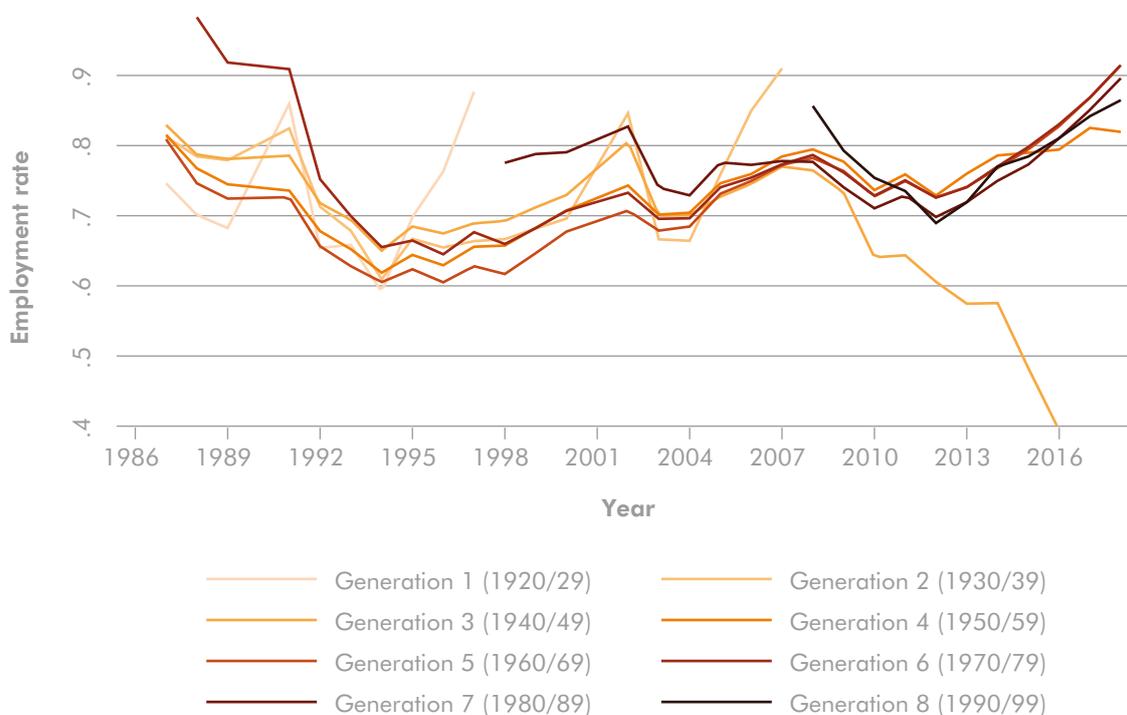
Notes: Number of workers (in tens of thousands) by age and by generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations is defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

<sup>2</sup> Figure A1 illustrates the evolution of the average age per generation over the covered period. As you would expect, the average age per generation and per year tends to increase by one year for each additional year considered. This relationship is not only found in the first and last years of age considered (18 and 66 years, respectively), when individuals enter or leave in each generation of ten years.

It should be noted that the database used in most analyses in this study considers individuals only when they are working (and as employees). It is therefore necessary to ascertain to what extent non-employment situations - of which unemployment will be an important dimension - are relevant and differ markedly between generations and or between periods of time. Figure 3 seeks to answer this question by extending the analysis of Figure 1 to all individuals of each generation, regardless of whether they are employed between these initial and final years. In other words, each person is considered between the first year they are in the database until the year following the last year in which they are in the database (and between 18 and 68 years old). For example, a 20-year-old worker in 2002 who did not appear in the data in 2003 but re-made part of the returned in 2004 is considered in 2003 in the analysis of Figure 3 (but not in the analysis of Figure 1). This analysis seeks to illustrate the rate or probability of employment (as opposed to non-employment) of each generation in each year.<sup>3</sup>

Figure 3  
Employment rate



Notes: Employment rate per year and per generation. Each individual is considered as a worker if he works on behalf of another person in October of the respective year (March up to 1993 inclusive) and not working in the remaining situations and in the years between starting and ending work as a TCO. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

<sup>3</sup> This variable (effective presence in the database) is also used for the potential employment levels for each generation in each year, presented in Figure A2. The scale of the figure naturally changes from the previous figure, from 0 to 100 (tens of thousands of individuals) to 0 to 150 (in the same unit). We found that, for example, the generation born in the 1970s had 1.4 million workers (effective or potential) at the peak reached in 2005, while in the previous analysis there were about one million effective workers. This difference results from individuals who worked at least one year (or, more precisely, at least one month – the period considered in the database) until that year and who return to work with registration on the basis later.

Sources: "Personnel Records" (1986-2018) and author's analysis.

The analysis of Figure 3 - the ratio between the effective employment and the potential employment of each worker per generation and per year, presented in Figures 1 and A2 - suggests a significant homogeneity between generations, with similar values, generally around 70%. Time fluctuations are also relatively similar between generations, reflecting to some extent the economic cycle, notably the recessions that began in 1993, 2003, 2008 and 2011.<sup>4</sup>

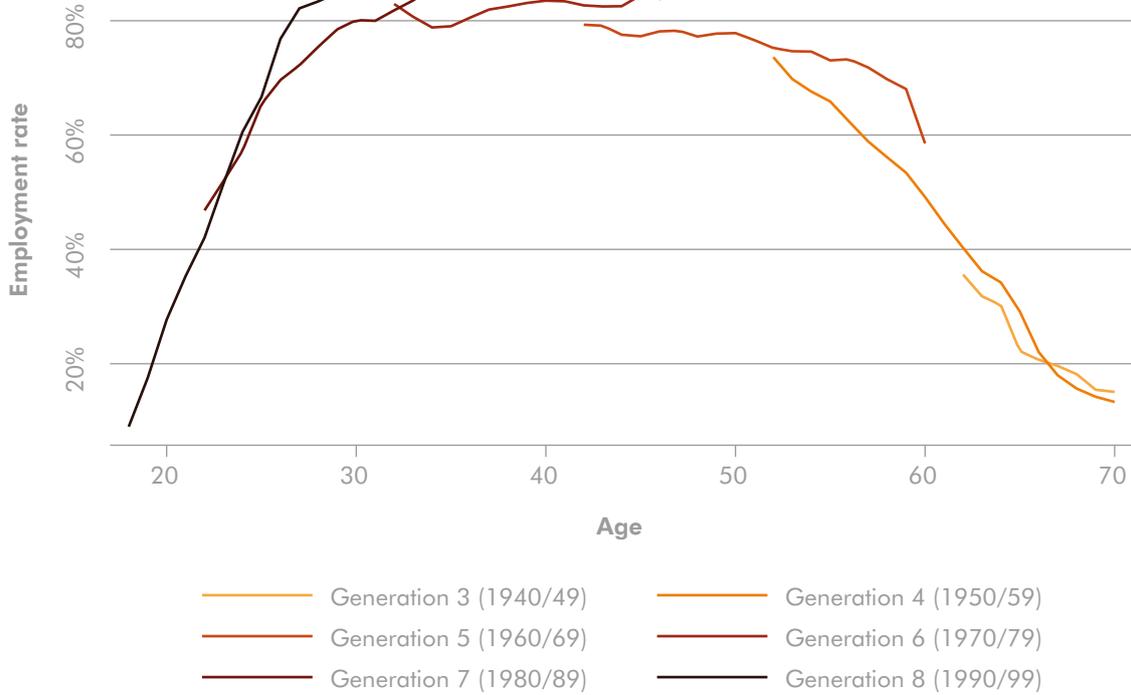
In the appendix, we also present information on the number of employees and unemployed over the last decade (2011-2020) - Figures A3 and A4, respectively - based on information from the Labour Force Survey. At the level of employment, the generation born in the 1970s is dominant during this decade, with more than 1.25 million workers each quarter, followed by generations of the 1960s and 1980s, with about one million workers each. It is also among the individuals of the generation of the 70s that it is clearer the effect of the crisis of 2011-13, with a drop of about 100,000 jobs during the period, only recovered from 2018. Finally, there are generations of the 1950s and 1990s - the first in decline and the second growing, with between 200 and 750,000 workers - and the generation of the 1940s, with less than 250,000 workers. (Generations in the 1920s and 1930s are not considered here, as the overwhelming majority of its members are already inactive this decade.) Overall, these employment figures per generation are about 25% higher than those presented based on "Personnel Records" for the same period, reflecting the significant importance of other forms of work other than employee work.

As for the number of unemployed per generation - Figure A4 -, this reaches about 200,000 individuals at the peak of the 2011-2013 crisis for generations of the 1960s, 70s and 80s, falling to less than 100,000 in the three cases at the end of the decade. On the other hand, the number of unemployed among the generation of the 1990s is relatively stable over this period, with figures in the order of 100,000 workers in all quarters. It should be noted that in the third quarter of 2020 - the most recent for which there is data in the context of the pandemic - the number of unemployed in this generation shows a pronounced growth of about 30,000 individuals, higher than that seen for any other generation. This result suggests greater exposure of younger workers to the pandemic and the weakening of intergenerational fairness. A complementary perspective of these data involves the analysis of employment and unemployment rates by generation and age, again using data from the Labour Force Survey (2011 to 2020). In the first case (the ratio between employment and population), shown in Figure 4, we find a traditional pattern of growth (for young people) and decline (for older ones). On the other hand, there are several results that deserve to be highlighted. First, the increase in the employment rate of the generation of the 1990s compared to the generation of the 1980s, which may result from the lower exposure of the former to the 2011/13 crisis. Second, the beginning of the reduction of the employment rate among older people from 50 years of age, long before the reference retirement age (65 years). Third, a significant adjustment in this age of exit from employment when comparing the generations of the 1950s and 1960s, with an increase in the duration of employment in the latter. This difference between the two generations can be explained by the lower level of education of the older generation and consequent earlier entry into the labor market, leading to the fulfillment of retirement criteria based on the number of years of work at an earlier age.<sup>5</sup>

<sup>4</sup> It should be noted that, in the construction of the base of individuals (potential workers), it was decided to stop considering individuals after the year following the last year in which they work or from 68 years, as well as not considering them until the first year in which they start working (according to the information in the database). These options may lead to overestimation of the employment rate, in particular in relation to the version of this rate based on the Labour Force Survey.

<sup>5</sup> Also see Figure A5, which presents the total number of individuals of different ages in each quarter during the last decade (2011-2020).

Figure 4  
**Employment rate (by age)**

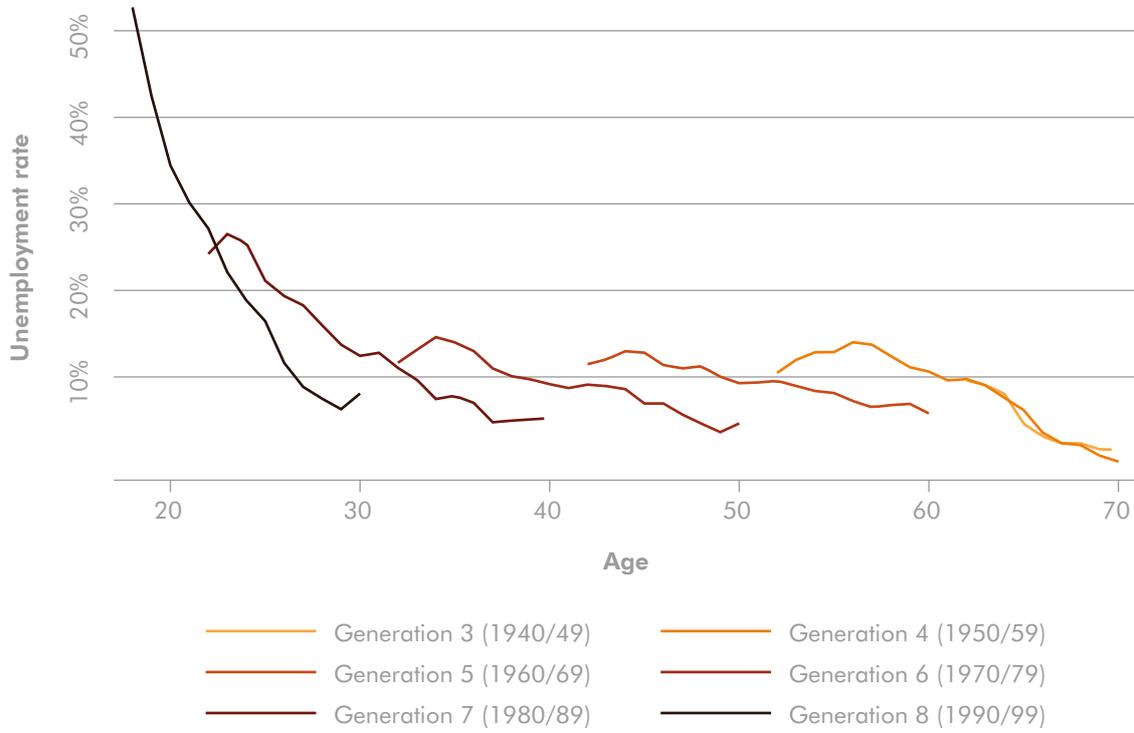


Notes: Employment rate by year and by age. Each of the six generations defined by the year of birth of the individual (1940-1949, 1950-59, ..., 1990-1999).

Sources: Labour Force Survey (2011-2020) and author analyses.

In the second complementary perspective, we analyzed the unemployment rate by generation and age, presented in Figure 5. Again, partial overlap allows the focus on the effect of a generation, and it may also be capturing the effect of the economic cycle or other variables that change over the years. We can once again pull out a number of results from this graph: First, the unemployment rate is particularly high for younger people - something that is partly due to the smaller number of young active people, as an enlarged proportion of the cohort is studying. Second, consistent with the results of the employment rate, the unemployment rate for the generation of the 1980s is higher than that of the next generation. Third, this pattern also applies to older generations, that is, the unemployment rate is higher for each generation compared to the previous one for the same years of age. Both results are consistent with the effects of the recession in 2011/13, precisely the first years of each generation in the version of the database.

Figure 5  
**Unemployment rate (by age)**



Notes: Unemployment rate by year and by age. Each of the six generations defined by the year of birth of the individual (1940-1949, 1950-59, ..., 1990-1999).

Sources: Labour Force Survey (2011-2020) and author analyses.

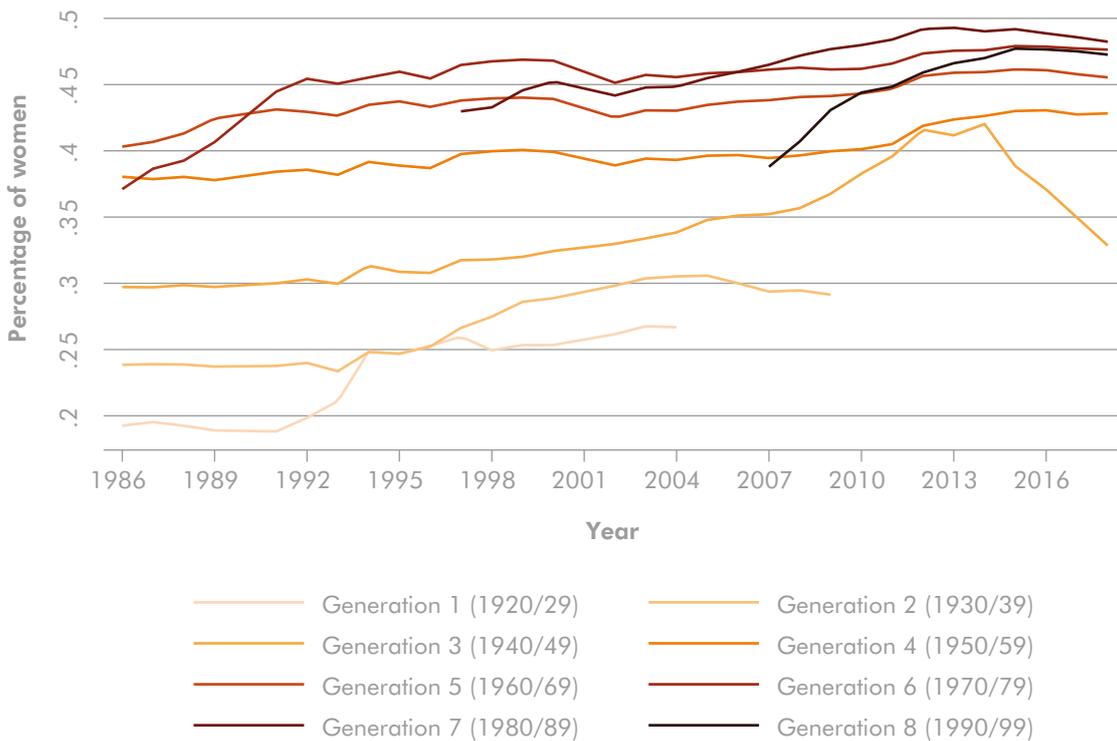
Another source of information we use is the social security database, described in Appendix 14. This database allows us to analyze the number of workers employed per generation and month in 2000-2010, which we present in Figure A6 for employees - comparable to Figure 1 - and Figure A7 for all social security registrants (including also self-employed persons, members of statutory bodies, domestic service workers).

### 3.1

## THE FEMINISATION OF EMPLOYMENT

We analyze here the feminization of the labor market - Figure 6 - measured by the percentage of women working in each generation and in each year and using again the information from “Personnel Records”. The differences are particularly clear in this dimension, with a large increase in the percentage of women from generation to generation, up to at least the generation of the 1970s. For example, while the proportion of women barely exceeds 25% for the generation born in the 1920s, this figure is almost 50% for generations born in the 1980s and 1990s, particularly in the most recent years of each generation, after the completion of their school journeys.

Figure 6  
Percentage of women



Notes: Percentage of women per year and per generation. Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the “Personnel Records” data set (1986-2018) and author's analyses.

In terms of the longitudinal profile, over time, of each generation, the data also indicate a **trend of growth in the percentage of women, both in the early and last years in the labor market of each generation.** The first result will be related to the greater schooling of women in recent decades, which delays their entry into the labor market and prompts an increase in feminization over the first years of each generation in terms of employment. For instance, take the case of the generation of the 90s, whose first workers have a percentage of women of less than 40% in 2007 that then rises to almost 50% from 2015.

The second result (growth in the percentage of women in recent years in the labour market) indicates a **greater predisposition to longer employment durations among women.** This result will also reflect the convergence of the legal retirement age between genders that took place from 1995, with the gradual change of retirement age for women from 62 to 65 years or more.

4.

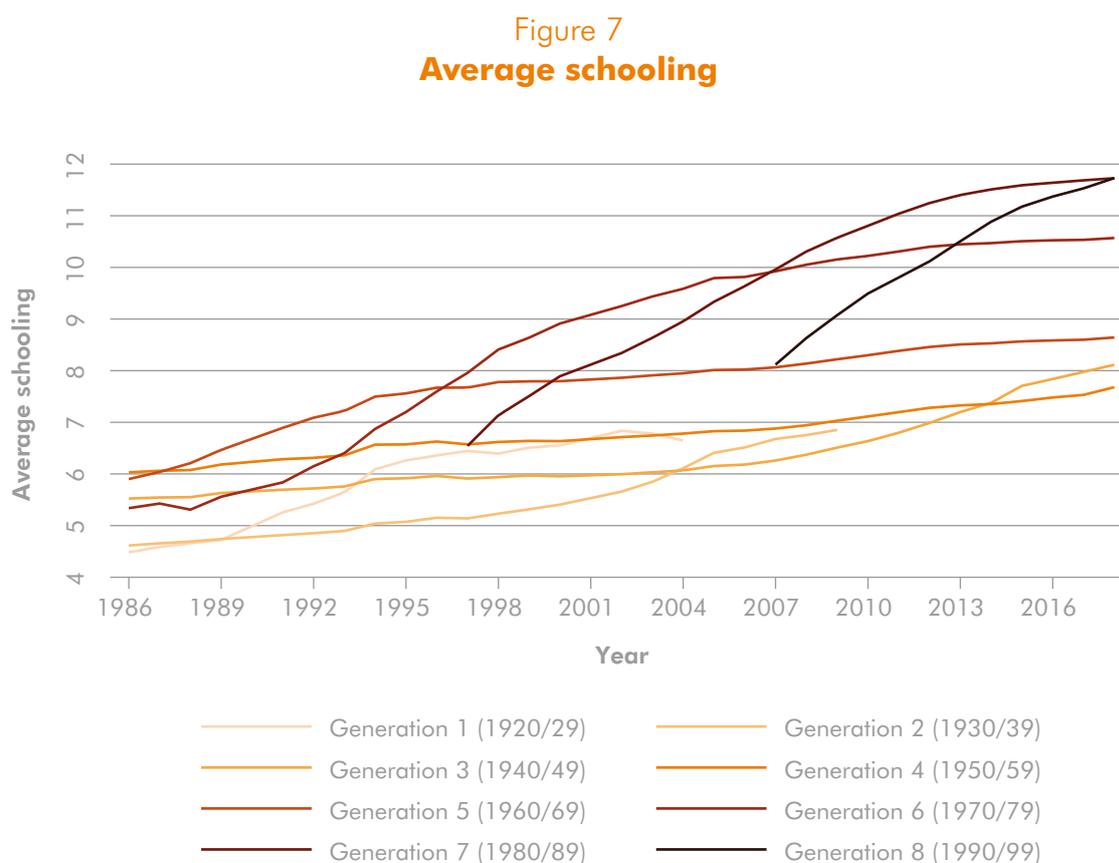
# **SCHOOLING**

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Having characterised the labour market in terms of the number of individuals and employees of each generation over the period examined (or at different ages), **we now look at another key supply-side dimension, namely human capital and, in particular, the schooling of workers.**

Figure 7 presents the average levels of schooling per generation and year of the workers present in the database. These data indicate very pronounced differences between generations, with values close to 12 years of schooling for the generations of the 1980s and 1990s – and only seven years of schooling for the generations born in the 1920s and 1930s. While the generation of the 1960s does not reach nine years of schooling, the 1970s already exceeds 10.5 years – a jump of almost two years of schooling between generations born only ten years apart.



Notes: Years of schooling on average per year and per generation. Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

These differences follow from the pronounced growth of educational supply in the country, particularly from the 1980s including the increase in compulsory schooling from six to nine years. The growth in education levels may also have resulted from economic growth during the period, allowing families to postpone entry of their young into the labour market while increasing their schooling attendance years.

In this sense, this outcome can constitute a situation of intergenerational iniquity, since the new generations have had much wider opportunities to increase their levels of education. Although there may be an expectation of an increase in education levels from generation to generation, the particularly low values among older generations create a very strong contrast in relation to the more recent generations. At the very least, this will counterbalance aspects where new generations will have had fewer opportunities or have been exposed to inequities compared to older generations.

On the other hand, it is important to understand to what extent schooling is associated with higher levels of income in the same way for different generations. For example, the increase in schooling may have entailed a reduction in its reward in the labour market, counterbalancing the possible effect of intergenerational iniquity mentioned above. This issue is addressed in section 6 below, using econometric techniques. We also analyze the related process of adjustment between occupations and levels of education for different generations.

A second result, of more general interest, that can be withdrawn from Figure 7 is the increase in the education of each generation over its first years of entry into the labor market. For example, the generation of the 1970s began in its early years in the labor market with an average level of education of only about 5.5 years in 1986. However, this figure increases to almost double in 2009, when the vast majority of the generation has already completed their schooling. As those who complete their schooling later tend to have more schooling, average education levels tend to increase over time.<sup>6</sup> On the other hand, the increase in education over time, for a given generation, is also observed in the last years in the labor market of each generation.<sup>7</sup>

As was done in the previous section, this analysis of the differences in schooling between generations is also developed by comparing generations over the ages of their members and not in different years - Figure 8. This approach allows us to compare individuals from different generations more directly when they are the same age. **These results once again underline the great growth of schooling among younger generations, particularly between the generation born in the 1960s and their counterpart in the 1970s.**<sup>8</sup>

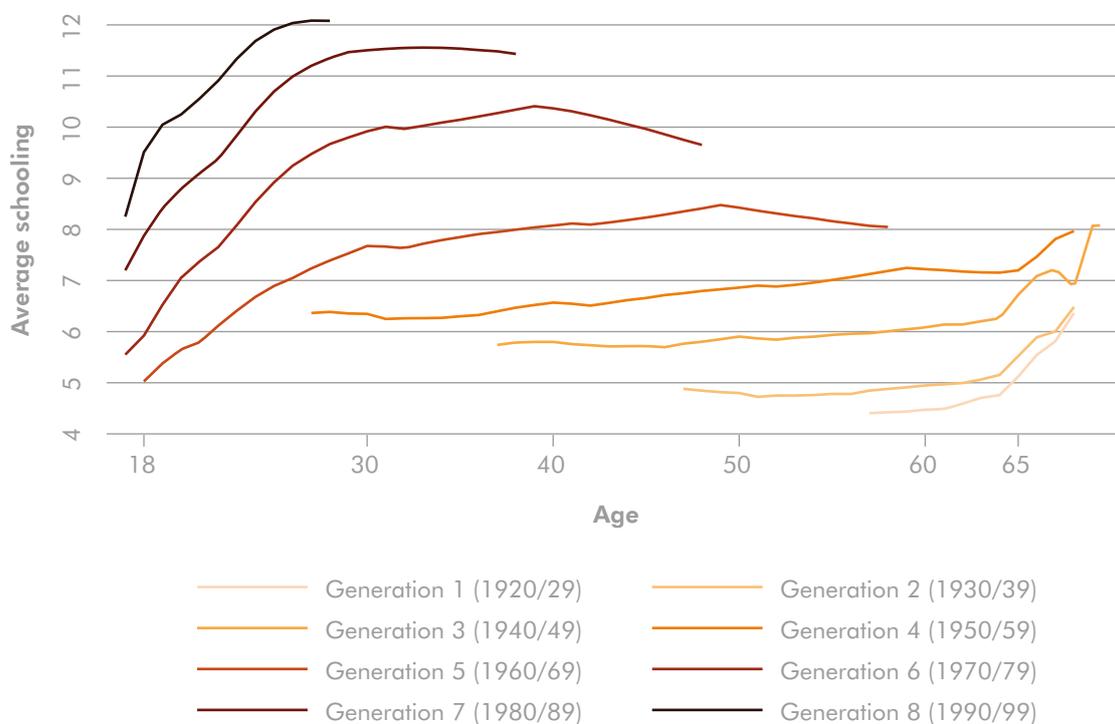
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<sup>6</sup> In addition to the average levels of education per generation and per year, we also analyzed the levels of dispersion of the schooling of each generation in each year - Figure A8. We found, as expected following the previous analyses, that this dispersion (measured here in standard deviations of years of schooling among workers of a generation observed in a year) increases over time for younger generations. This is due to the entry into the labour market, in employment, of workers with more education in recent years, leading to a growing heterogeneity of the profile of workers of the generation to the level of their education, particularly over the first ten years of each generation.

<sup>7</sup> This latter result reflects the longer contributory careers of workers with less schooling, due to earlier entry into the labor market. This increase in schooling may also stem from a predisposition to later reforms (and or less use of early retirement) of those with more schooling, for example because of lower wear and more or higher income in their professions.

<sup>8</sup> It should also be noted that, according to these results, the generation of the 1990s is the first to reach twelve years of schooling on average, in the case of workers about 30 years of age. This result is certainly influenced by the increase in compulsory schooling for 18 years of age in 2012.

Figure 8  
Average schooling (by age)



Notes: Years of schooling on average by age and by generation. Each individual is considered only if he works as a worker on behest of another person in October of the respective year (March until 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

## 4.1 OVER-SCHOOLING?

**To what extent are these different levels of education between generations and within each generation adjusted to the profiles of the professions that workers perform?** Our analysis of the schooling of the various generations considers this issue from the perspective of the literature of over- and under-education. In this literature, a worker is considered to be over-(under-)educated if his/her schooling is higher (lower) than the "required" (or, in practical, average) schooling of workers who perform the same occupation. This comparison may also seek to take into account the dispersion of this schooling, in order to allow a certain range of levels of education to be considered "reasonable".

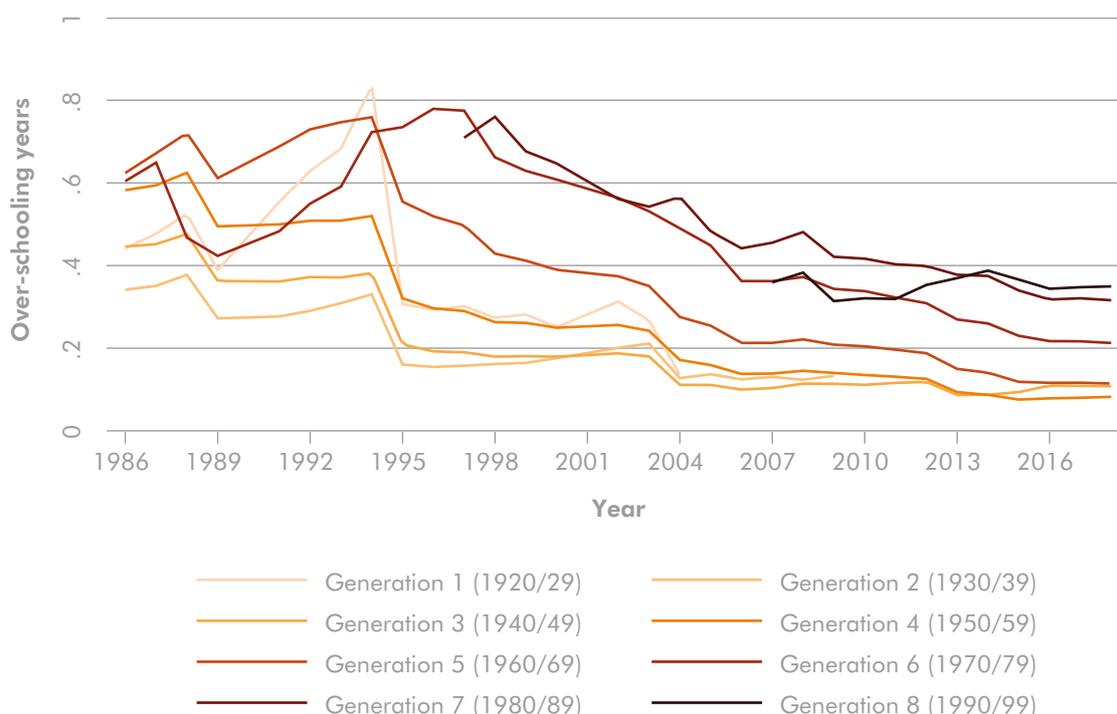
In our analysis, for each occupation each year, we calculated the median (and standard deviation) of schooling among workers who perform the same profession (regardless of their generation). The profes-

sion is defined using the three-digit version of the profession codes (CNP or CPP), applicable each year (note that these codes change twice in the analyzed period, in 1995 and 2010). Next, we defined as over-(over-)schooled in a year (a dichotomous variable) a worker whose schooling is greater than the sum (less than the difference) between these two values (median and standard deviation).

We also defined the level of over-education (a continuous variable) as the difference between the worker's schooling, on the one hand, and the sum of median schooling and the standard deviation of schooling (in the worker's occupation). Similarly, the level of under-education corresponds to the difference between, on the one hand, the median schooling and the standard deviation of schooling (in the worker's occupation, and, on the other hand, the worker's schooling). Finally, we calculate the average years of over- and under-education among all workers per generation and year, considering that overeducated workers have zero years of under-education and vice versa.

We present the results in Figures 9 and 10. In the first case, about over-education, it shows average values of about half a year of schooling in the mid-1980s, falling to about a quarter of a year of schooling in the late 2010s. This pattern is relatively common across multiple generations. On the other hand, over-education levels tend to be higher among workers in younger generations, suggesting difficulties among younger people in finding occupations in which they can make full use of the schooling they have acquired.

Figure 9  
Average over-schooling

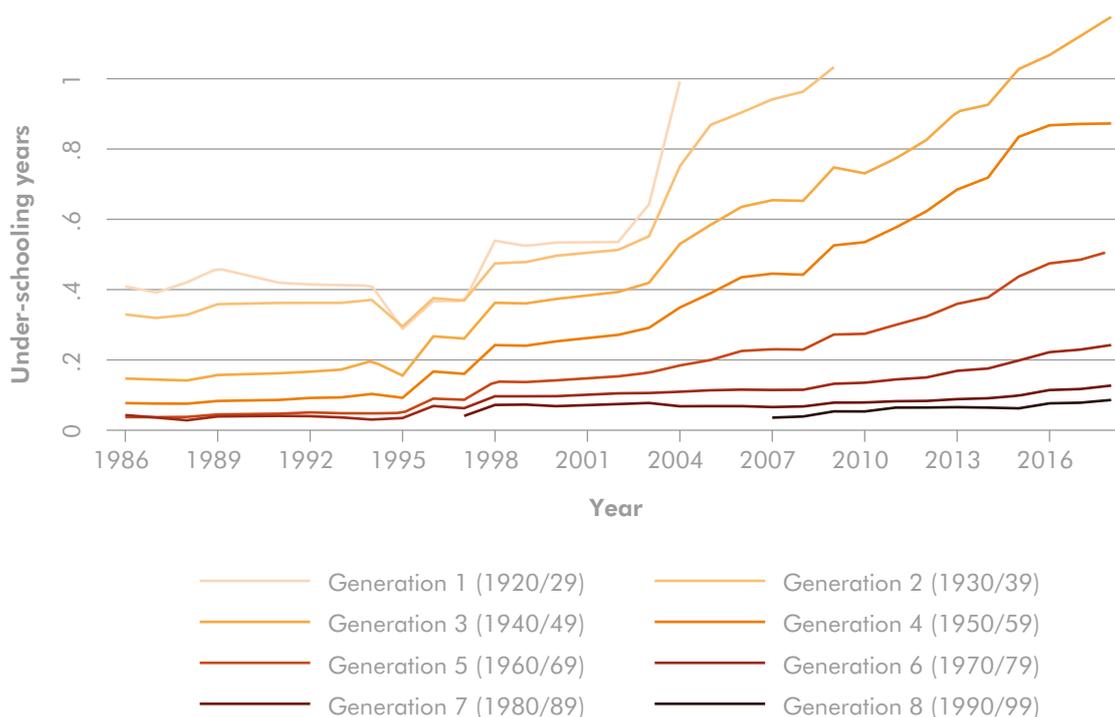


Notes: Years of over-schooling on average per year and per generation. Each individual is considered only if he works as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

In the case of under-education (Figure 10), the pattern is the opposite: the initial values of under-education are low but gradually increase over time, in this case especially with older generations. Under-education levels are also generally higher for older generations, as one would expect. Overall, these patterns are consistent with a gradual increase in the schooling of most workers in each occupation, consistently with our previous analysis.

Figure 10  
Average under-schooling



Notes: Years of under-schooling on average per year and per generation. Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Both perspectives may explain the **reduction of over-education and the increase in under-education over time** we encounter, as well as the higher levels of over-education and lower levels of under-education for younger generations.<sup>9</sup>

<sup>9</sup> It should be noted that some of these effects may also result in part from the redefinition (and, in particular, increase) of the reference level of education in several of these occupations.

5.

**COMPANIES**

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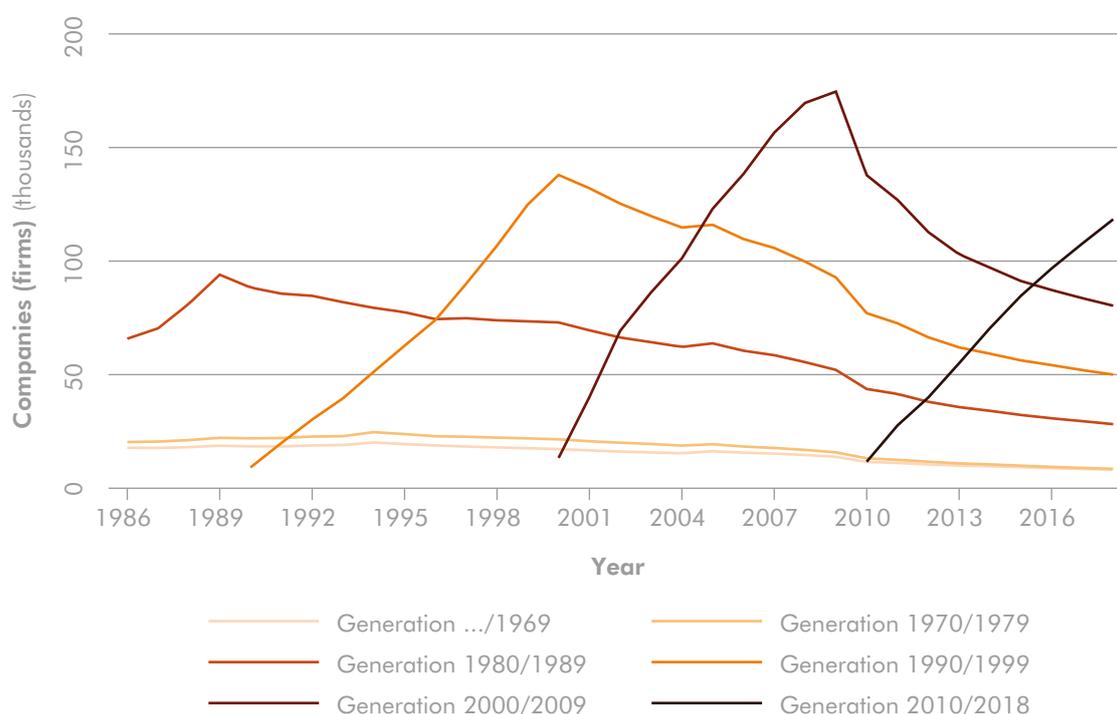


Having concluded in the previous sections our analysis of the supply side of the labour market (number and profile of workers), we now move to the labour demand aspect. Since our focus is on the private sector, **we analyze here the profile of companies (or firms)**, considering all those that employ workers in at least one year over the period 1986-2020. These are precisely the companies that are responsible for intermediating the effects on intergenerational fairness analyzed in this work.

With a view to a first characterization of companies in Portugal, we use a methodology similar to that of the analysis of employment, considering companies in different generations, according to the year in which each company was founded. We defined six groups, namely those that were founded until 1969, between 1970 and 1979, and in the following decades until 2010 and 2018.<sup>10</sup>

Figure 11 shows the number of these companies of each generation each year. We found that the first two groups (older companies, with a foundation year prior to 1986, the first year of activity included in the base) are composed of a maximum of about 25,000 companies per year, down to about 15,000 companies per group in 2018. The remaining four groups are characterized by an increasing number of companies up to the last year of foundation considered in each group, followed by a decreasing trend. In addition, the peaks reached by each generation are increasingly from generation to generation (100, 140, and 170,000 companies for the generation of the 80s, 90s and 2000s, respectively).

Figure 11  
Number of companies



Notes: Each of the six generations defined by the company's constitution year (until 1969, 1970-79, 1980-89, 1990-99, 2000-2009, 2010-2018).

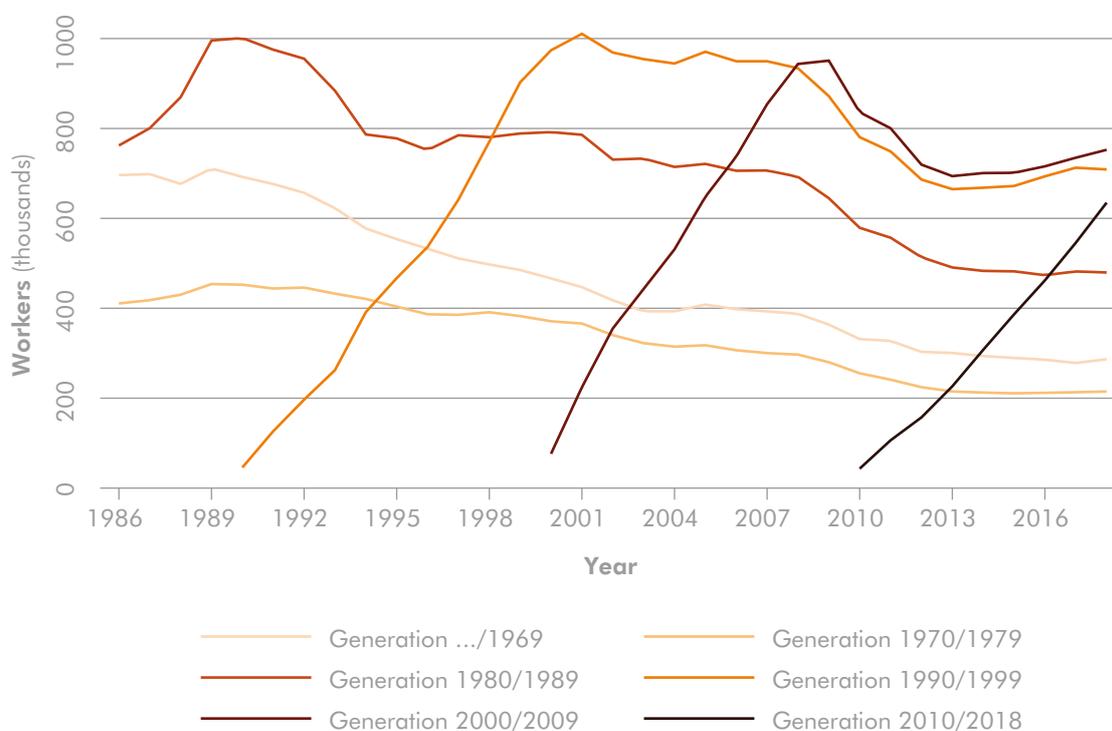
Sources: All companies of the "Personnel Records" (1986-2018) and author's analyses.

<sup>10</sup> One of the variables available in the "Personnel Records" database is precisely the year of foundation of the company. For the years 1986-1989 this information is not available, having been constructed in this study from observations of the same companies in later years or (if the company does not appear on the basis in later years) setting the first year in which the company appears on the basis as the year of foundation.

On the other hand, the drop in the number of companies when the last year of the generation is reached - and, therefore, when new companies are no longer considered and only the closure effect of companies is applied - progressively worsens from generation to generation. This effect is particularly clear in the 2000 generation of companies, where many companies face the international financial crisis and the public debt crisis in their first years of operation.

These patterns also result from the analysis of the companies of each generation according to the total number of workers they employ each year - Figure 12. Companies founded in the 1980s, 1990s and 2000s peak at about one million workers by the end of the reference decade and begin to reduce their employment thereafter. This pattern is particularly clear in the case of companies founded in the 2000s.<sup>11</sup>

Figure 12  
Total workers



Notes: Each of the six generations defined by the company's constitution year (until 1969, 1970-79, 1980-89, 1990-99, 2000-2009, 2010-2018).

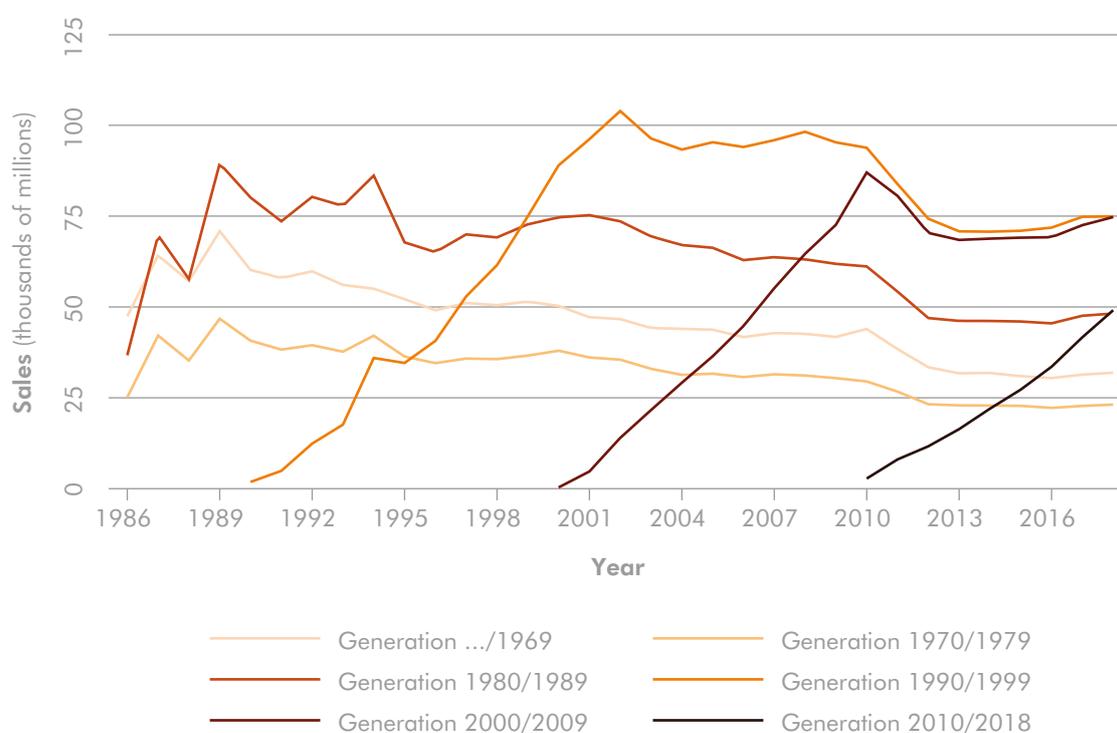
Sources: All companies of the "Personnel Records" (1986-2018) and author's analyses.

<sup>11</sup> Figure A9 analyzes the median number of workers per company, according to the latter's generation and the year. The results indicate very low values, between three and five workers per company in most cases. The very large percentage of very small enterprises can be an obstacle to business productivity and resilience, with possible impacts on intergenerational fairness.

In general, these growth and contraction dynamics underscore the various challenges faced by companies in their operations and survival. These dynamics also anticipate some interactions that may take place with intergenerational fairness, particularly in view of the role of young companies in the hiring of young workers.

We also consider the increase in sales volume of different generations of companies over the period 1986-2018. The results - presented in Figure 13 - indicate patterns similar to those of previous analyses, with large growth during the years of formation of each generation, with the birth of new companies, and a subsequent break from there. For example, companies founded in the 1990s achieve a maximum invoicing of EUR 100 billion (at 2020 prices) in 2002, gradually reducing this amount in the following years.<sup>12</sup>

Figure 13  
Total sales



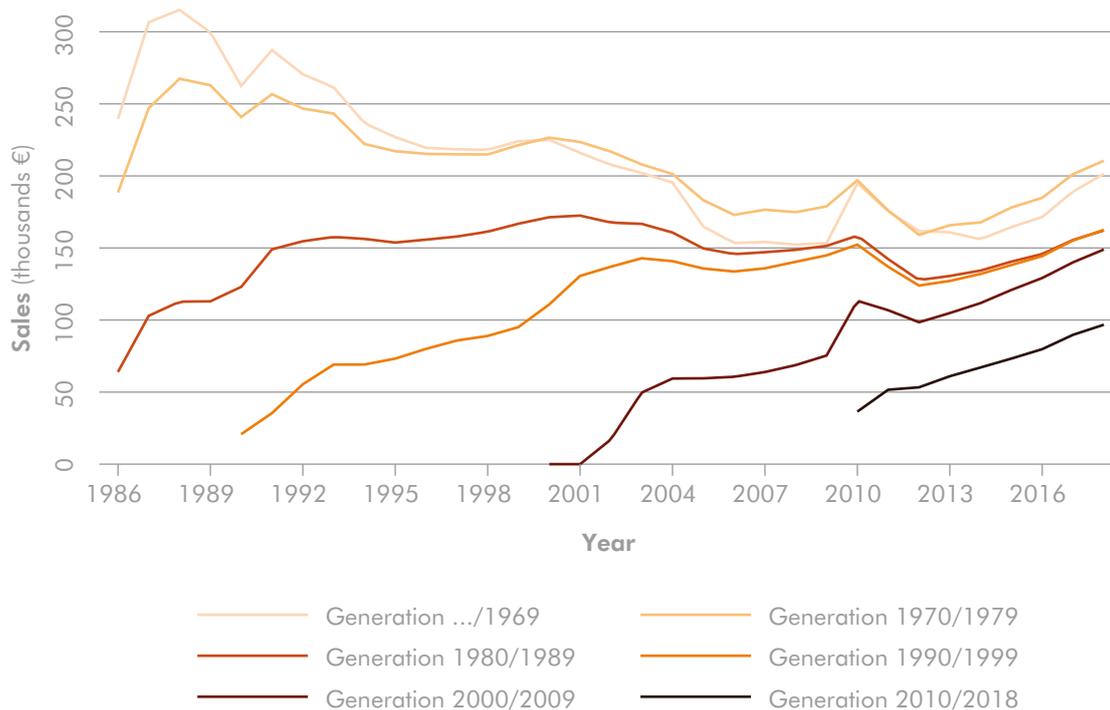
Notes: Each of the six generations defined by the company's constitution year (until 1969, 1970-79, 1980-89, 1990-99, 2000-2009, 2010-2018).

Sources: All companies of the "Personnel Records" (1986-2018) and author's analyses.

<sup>12</sup> However, this dynamic is much less expressive than in the case of the number of companies and even in the case of the number of workers in the reduction after the peak reached at the end of each decade. In other words, while the number of companies tends to decrease significantly at the end of each decade, the reduction equivalent to the level of billing is less significant. This situation is consistent with a large selection of surviving companies, notably towards those with more employment and billing. It should also be noted that the analysis metric here is billing and not added value, since the latter is not possible to calculate with the information available until 2004.

Finally, we also analyze the sales volume of companies in terms of their medians (not total values) by generation and year. Figure 14 shows the results of this analysis and indicates a significant level of convergence of around EUR 150,000 per year, particularly for generations of 80, 90 and 2000. Older companies (1970 generation and earlier) reach median values of around 200,000 euros while companies in the 2010 generation have values of 100,000 euros.

Figure 14  
Median sales



Notes: Each of the six generations defined by the year of the company's constitution (until 1969, 1970-79, 1980-89, 1990-99, 2000-2009, 2010-2018).

Sources: All companies of the "Personnel Records" (1986-2018) and author's analyses.

**In conclusion, this analysis of economic activity in Portugal over the last 33 years underlines the dynamism of the economy in the creation and destruction of firms.** At the same time, this analysis also denotes some differentiation of the path of companies according to their generation, namely with greater growth and greater decline in their numbers in more recent generations. On the other hand, the analysis **also underlines the small size of most companies** and also a process of strong convergence of their turnover (sales) between firms of different generations. These patterns and dynamics may be important to explain the evolution of various indicators resulting from the interaction between labour demand and supply, with relevance with respect to intergenerational fairness, such as wages. This is the theme of the next section.

6.

**SALARIES**

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**Wages are an unavoidable aspect of intergenerational fairness in the labour market. The first variable we analyze – in Figure 15 – is the basic monthly salary.** Next we consider the total salary, which includes the basic salary as well as several other variable benefits, such as remuneration for supplementary work, daily fees, bonuses and other payments.

It should be noted that the basic salary in Portugal is, in a large number of cases, influenced or even determined externally to the company and the worker. This process is due to the setting of the minimum wage (“guaranteed minimum monthly remuneration”), a responsibility of the Government (after consultation with the social partners). Another dimension involves the setting of occupation-specific wage floors by trade unions (or works councils) and employers' associations (or individual firms), through collective bargaining agreements, and their extension through ordinances issued by the Government (“portarias de extensão”).<sup>13</sup>

All salaries considered here refer to the month of October of each year (except in the initial period 1986-1993, in which the month of March is considered, due to the different criterion adopted in the database in those years). These are, in all cases, salaries declared by companies to the Ministry of Labor, subject to monitoring by the Labor Inspectorate. The monthly salary analyzed here is further deflated through the Consumers' Price Index, and presented in 2017 euros.<sup>14</sup>

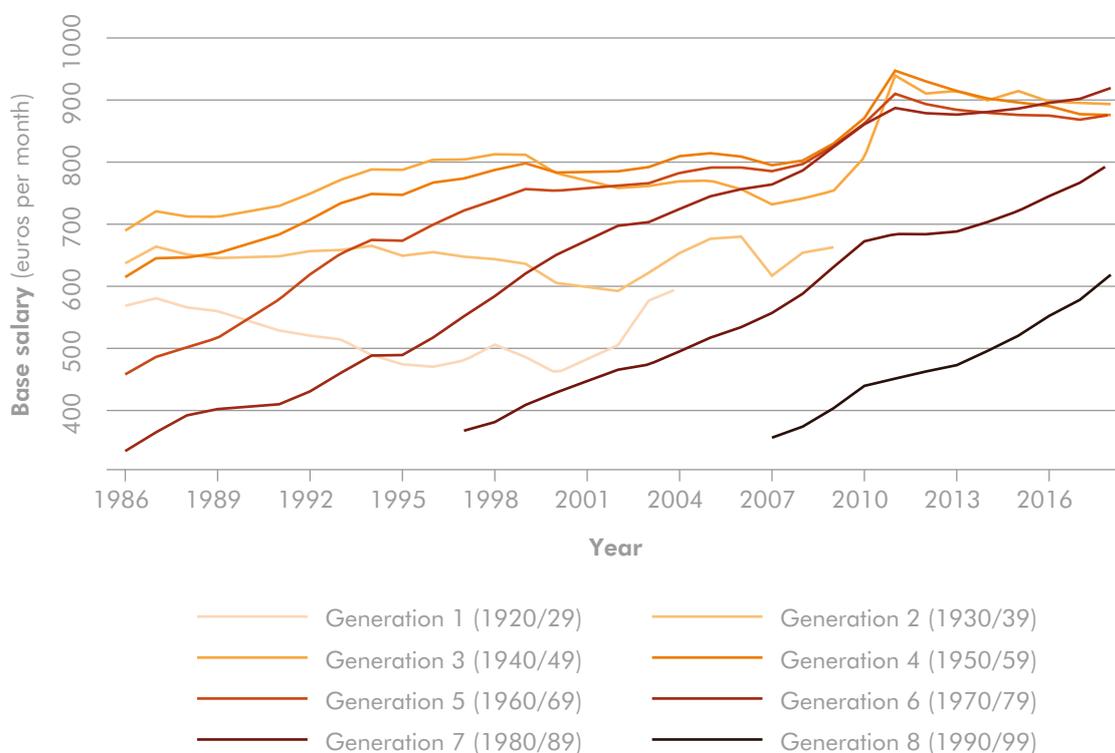
From the analysis of the results presented in Figure 14, we find high levels of *convergence* in the average base wages of four of the main generations studied here – the generations born in the 40s, 50s, 60s and 70s. All these generations have real base salaries of around 900 euros throughout the 2010s. On the other hand, the first three generations have real base salaries of around 800 euros over the previous decade. Considering the older generations, their salaries were generally even lower, in real terms, in previous years, particularly in the 1980s and 1990s, with average values of around 600 euros or less.

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<sup>13</sup> Moreover, unlike additional benefits, the basic salary is normally subject to the legal principle of irreducibility of remuneration, which prohibits its unilateral reduction in nominal terms by employers. This principle has few exceptions, one of which is the “layoff” – a regime for reducing the normal working period or suspending the employment contract – which has had great support in the current economic crisis in Portugal, particularly in its new version – “simplified layoff”.

<sup>14</sup> It is possible that, in some cases, particularly in smaller companies, actual wages are higher than the salaries declared, in order to illegally reduce the social security (and income tax) burden borne by the employer and the worker. It should also be noted that, in order to be converted into annual salaries and better compared to salaries in other countries, each monthly salary must be multiplied by 14 due to the allocation of holiday and Christmas allowances, which is mandatory in the case of employees analyzed here.

Figure 15  
Average base salary



Notes: Average real base salary per year and per generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations is defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Focusing on the last 20 years, the results we present suggest the existence of a (double) plateau – or valley – pre- and post-financial crisis, in which there is relatively little wage differentiation between the mean wages of workers of the main generations. This "plateau" effect can result from the mutual cancellation of the factors leading to (positive and negative) differences of each generation. For example, the increased education of younger generations (and the increase in productivity and remuneration that should result, given the positive effect of schooling on the overall human capital of workers) may be counterbalanced by greater experience and seniority of older generations. This last effect also allows advantages in terms of productivity and remuneration, given the best matching with employers and the higher levels of firm- and industry-specific human capital.<sup>15</sup>

<sup>15</sup> As discussed earlier, it should also be taken into account that the results of each generation can be influenced by important composition effects over time, through the entry or exit of workers with different profiles, particularly given the higher levels of both schooling and unemployment among younger people.

Another perspective for the high convergence of average base wages between different generations that we document here may result from the relevance of national and, above all, conventional minimum wages. By establishing minimum wages per profession and sector of activity each year, extended to companies that participate directly in negotiations through the extensive ordinances, collective bargaining can create a very high level of wage compression that had partly explained the results found.<sup>16</sup>

As already mentioned, the wage levels of earlier generations (born in the 1920s and 1930s) are significantly lower than those of the following three generations. However, when compared to younger generations – workers born in the 1980s and 1990s – the latter only exceed them from 2010 and in the case of the generation of the 1980s. The generation of the 1990s has not yet exceeded the salaries earned by the generation of the 1930s in the last available year of the database (2018) and it is possible that it will not do so in the coming years following the economic crisis derived from the pandemic.

Another relevant aspect in the results presented is the apparent impact of the increase in unemployment at the end of the 2000s on the increase in wages observed in this period. This surprising relationship, at first sight, can be explained by a statistical phenomenon of “composition”. If this increase in unemployment is concentrated among workers with lower wages, the average wage will increase due to the recomposition of the group of workers, with the relative growth of the weight of those with higher wages, who are more likely to keep their jobs.<sup>17</sup>

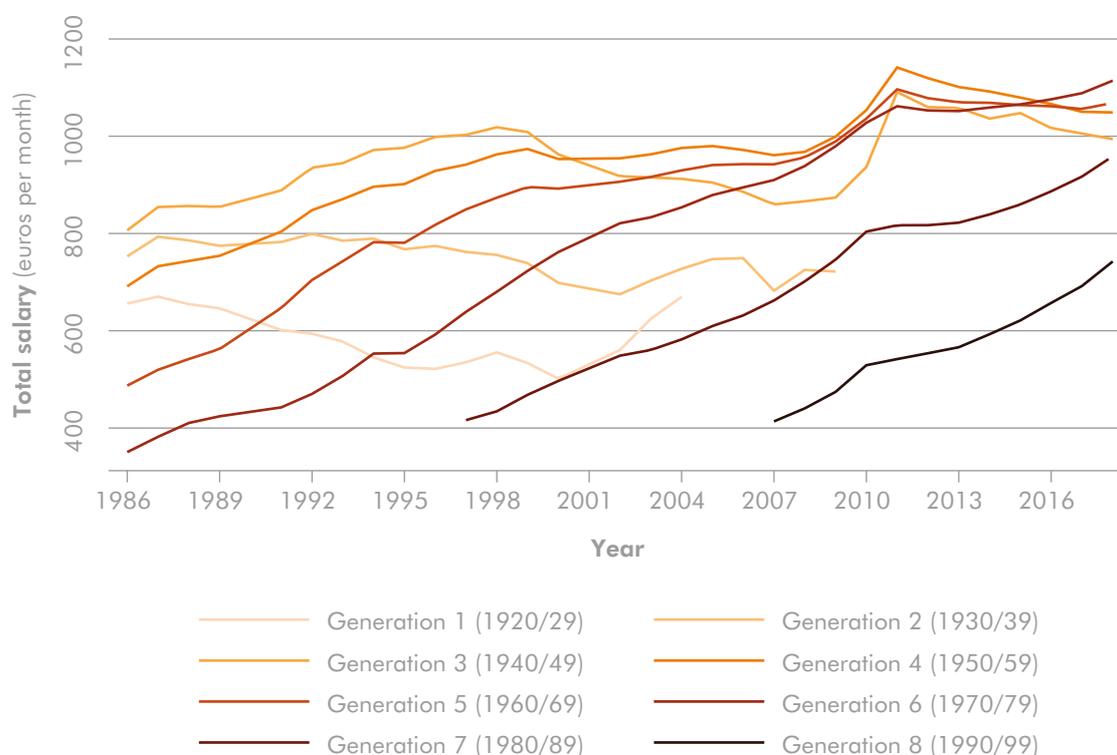
The results described above for the case of the average base salary also apply to a large extent to the case of the average total salary, as shown in Figure 16. The most significant difference is that the total salary values are naturally higher, usually by about 20% or 25%. In other words, the above-mentioned remuneration components that are added to the basic salary (remuneration for supplementary work, tenure-related pay, bonuses, etc.) are relevant in the private sector in Portugal. However, we continue to see a plateau effect, particularly in the 2010s, with values very close between the four main generations (those born in the 40s, 50s, 60s and 70s), in this case of about 1,100 euros per month.

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<sup>16</sup> Yet another explanation relates to practices of coordination and market power (monopsony) between employers. These possible practices, in which employers in a given industry and or region reduce the salaries or their growth, can lead not only to the reduction of wage dispersion as well as to lower wages and a weaker link between wages and productivity.

<sup>17</sup> It should also be noted that the transition that took place in 2010 from the Personnel Records format to the Single Report (“Relatório Único”) format (more demanding in terms of required information) led to a significant decrease in the number of data submissions by companies to the Ministry of Labor that year, probably especially among smaller companies with lower average salaries.

Figure 16  
Average total salary

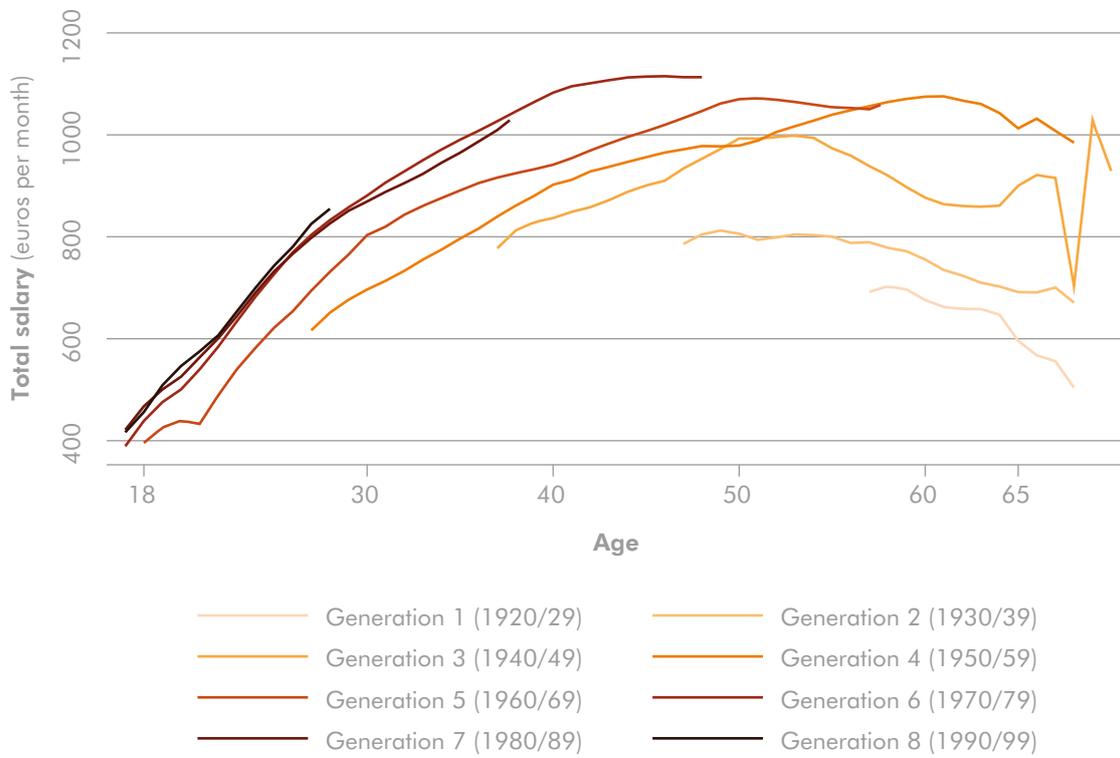


Notes: Average real total salary per year and per generation (2017 euros). Each individual is considered only if he works as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

As in previous analyses, we also present the salaries of different generations for the same years of age (and not for the same calendar year) - Figure 17. This also results in the great similarity of wage paths between workers of the last three generations, in particular in the age years in which these generations can be monitored in the database (18-30 years). Another important result is the lower real wage figures of workers of previous generations, even if observed at later ages, 40 or older. For example, a 40-year-old worker (observed in the 1980s) is paid on average and in real terms as workers 30 years old from the generations of the 1960s or later. This generational difference reflects the economic growth experienced in Portugal in the 1980s and 1990s.

Figure 17  
Average total salary (by age)

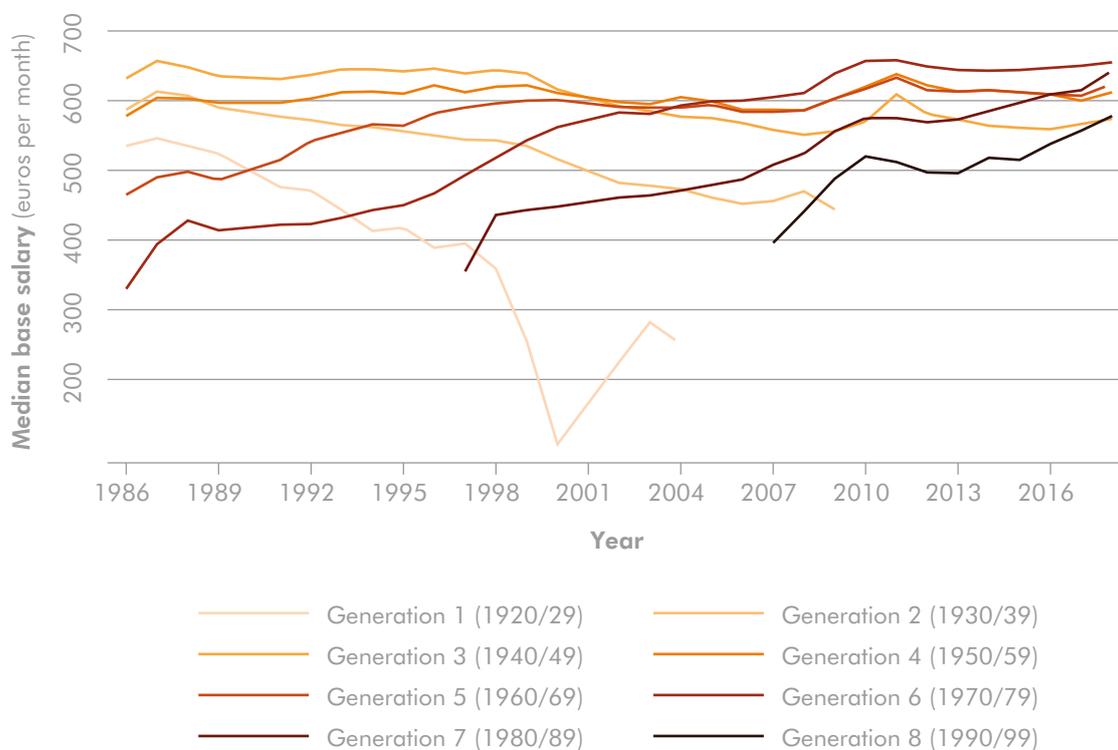


Notes: Average real total salary per year and per generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

The results on salaries presented above refer to average values, by generation and year (or age). As such, these results are naturally sensitive to higher wages that can distort the representation of the average, namely the typically very long right side of the wage distribution. To analyze this issue, we now analyse median wages, which are less influenced by higher values. Figure 18 shows the case of the base salary, which presents significantly lower values (as expected) but also more stable than in the case of the average. Indeed, most generations, over most of the period considered, have real median monthly salaries of only about 600 euros. The exceptions relate exclusively to the lower values presented by the new generations (those born in the 1960s and later) in their early years in the labour market as well as the older generations (those born in the 1920s and 1930s) in their last years in the labour market. Some particularly low figures, particularly for the generation of the 1920s, may be due to the small number of workers of that generation in those years.

Figure 18  
Median base salary



Notes: Median real base salary per year and per generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

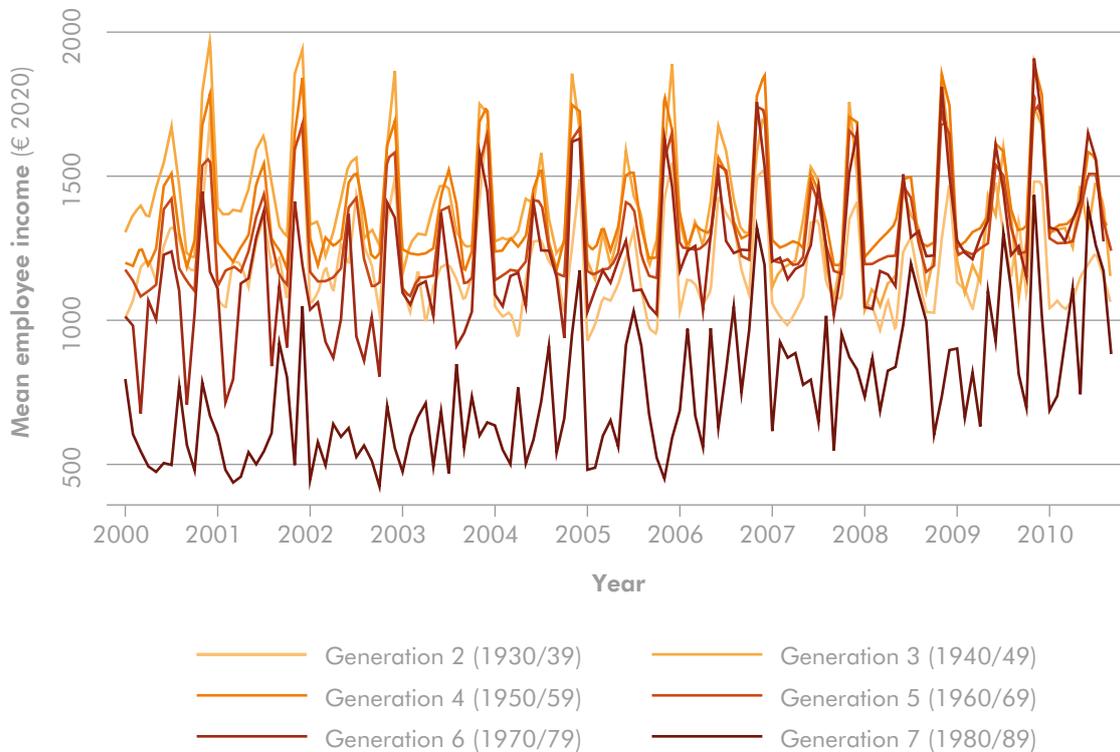
Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

These results also occur to a large extent in the case of total median salary (including remuneration for supplementary work, diurnities, bonuses, etc.), as shown in Figure A10. However, the figures are naturally higher, around 700 euros, and are more dispersed, particularly in the case of the generation of the 1970s, with total median wages of around 800 euros over the last decade.<sup>18</sup>

When considering an alternative data set, the monthly records of social security remuneration, we find once again a pattern of great convergence, with the exception of the younger generation - Figure 19. Note also the seasonality pattern that results from these data, given its monthly nature and the payment of holiday and Christmas allowances.

<sup>18</sup> These results can also be found in the case of the base and total salary when considering the 90th percentile (the salary of the worker that has only 10% of workers at higher salary levels). As presented in Figures A10\* and A10\*\*, in both cases we find a significant stability in these salaries for most generations, namely the older ones and in the last decade. As to the base salary, the 90th percentile is around 1,700 euros; while in the case of the total salary (including overtime pay and other pay items), the 90th percentile is around 2,000 euros over the last decade.

Figure 19  
**Employee labour income, Social Security**

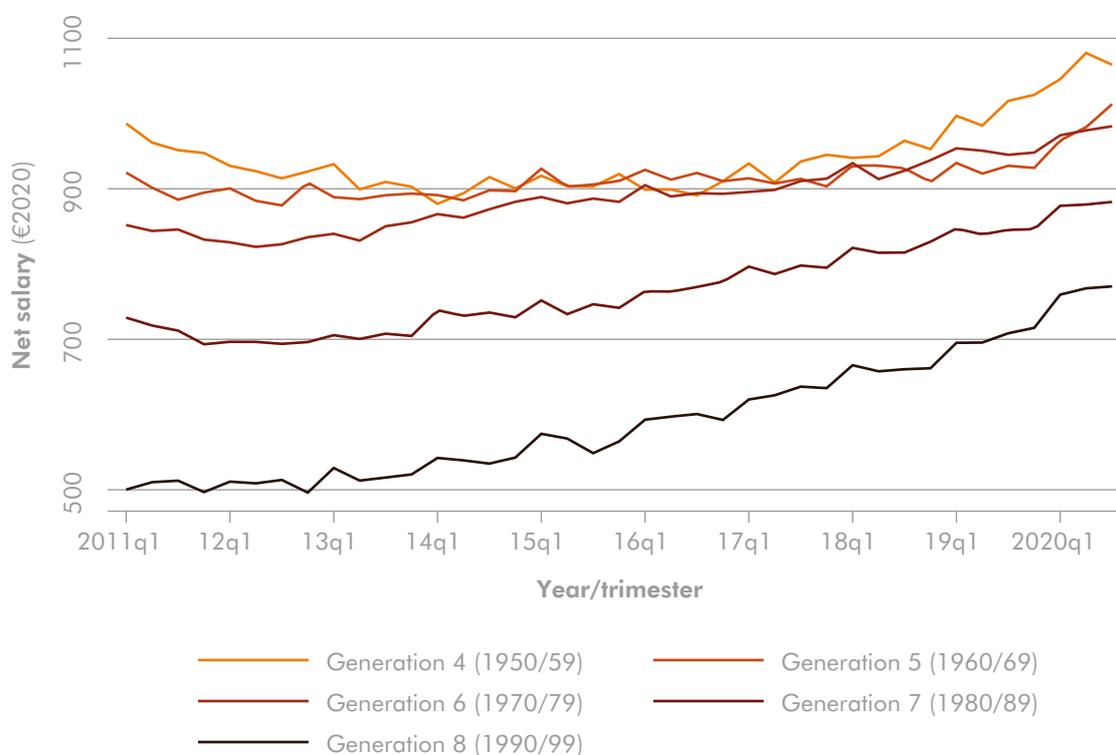


Notes: Average monthly income per generation (1930-39, 1940-49, ..., 1980-89) worker registered in social security as a worker on behalf of others.

Sources: Records of remuneration of social security (2000m1-2010m9) and author's analyses.

To what extent are these results sensitive to the effects of income taxes and social security rebates? Figure 20 analyses this issue using data from the Labour Force Survey for the period 2011-2020. In the case of this survey, participants indicate their net salaries, unlike the other bases used in this study. Given the most recent and reduced period of analysis, we consider only the five younger generations born from 1950. We find results that, once again, underline the great convergence of wages between different generations of the Portuguese, with values very close to 900 euros for generations born in the 50s, 60s and 70s, and lower values for younger generations. On the other hand, these figures show an upward trend in the most recent period, particularly in 2019 and 2020, even among workers from the 60 and 70 generations, amounting to values of around 1,000 net monthly.

Figure 20  
**Net salary (Labour Force Survey)**



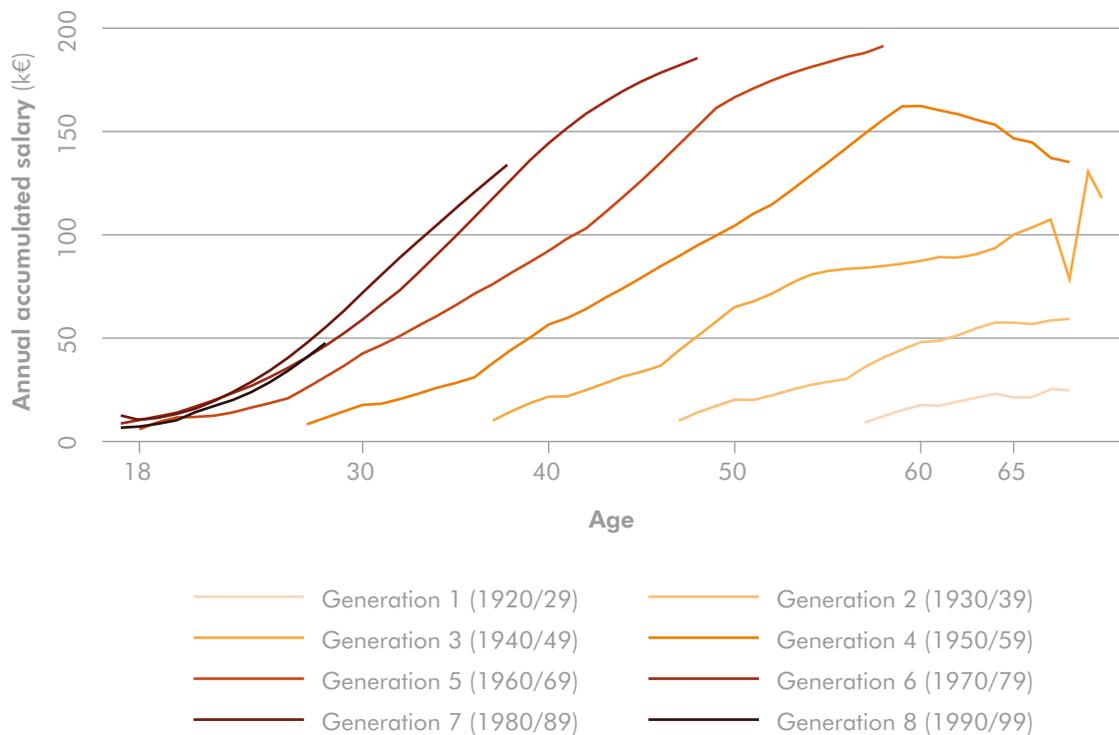
Notes: Median real monthly base salary per year/quarter and per generation (2020 euros). Each of the eight generations defined by the year of birth of the individual (1950-1959, 1960-69, ..., 1990-1999).

Sources: All individuals with remuneration records in the Labour Force Survey and author reviews.

Another dimension of intergenerational fairness can result from the evolution over time of the results (salaries) of each individual of each generation. This approach allows us to analyse the volatility of workers' pay as well as the effect of periods of non-employment, including unemployment. This approach is possible because the "Personnel Records" database is longitudinal in nature (allowing the monitoring of each individual worker over the years, even in cases of change of employer). Thus, Figure 21 presents the accumulated wages of workers of each generation for each age.<sup>19</sup>

<sup>19</sup> We estimate the total amount of each year by multiplying the monthly amount recorded in the "Personnel Records" by 14 (the number of months of remuneration per year, including holiday and Christmas allowances). We do not make adjustments related to social security discounts or income tax, thus being gross (actual) amounts. Note that the accumulated salary shown is calculated from the first year in which each worker is present at the database, which will be cover or not all earnings depending on the generation to which it belongs. For instance, workers of older generations have their accumulated wage values calculated only from the age of 30 or later.

Figure 21  
**Accumulated salary (by age)**



Notes: Individually accumulated salary by age and generation (2017 euros). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: Sample of 33% of individuals present at least one year in the period 1986-2018 in the "Personnel Records" and analysis of the author.

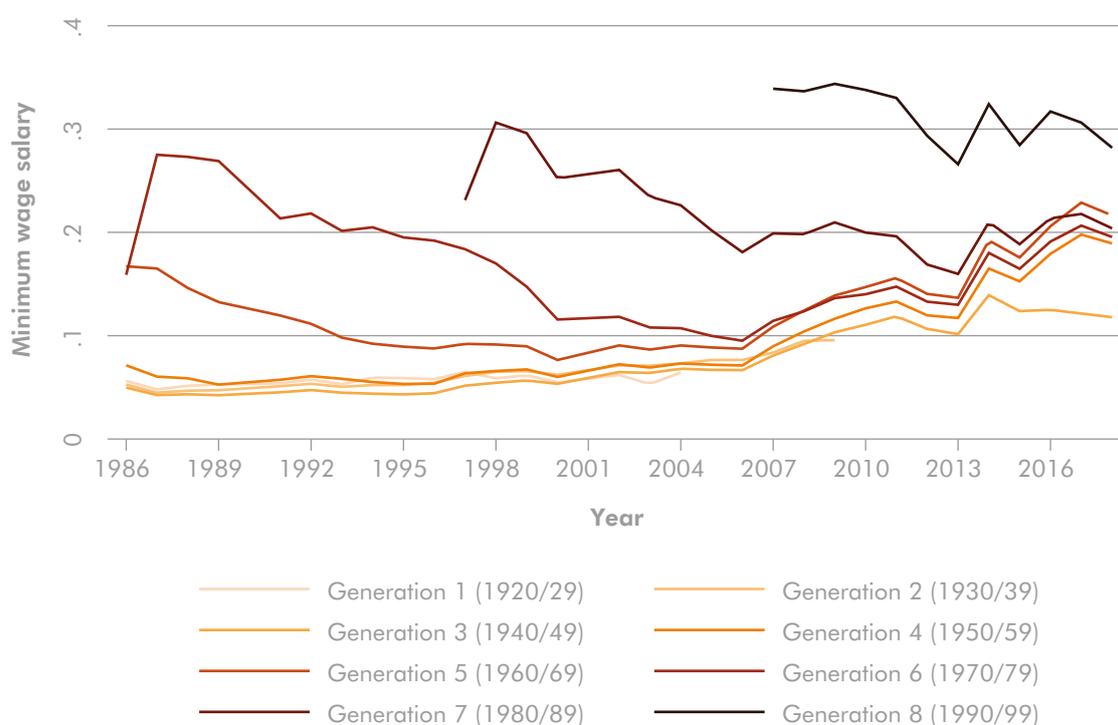
The results of this approach indicate, once again, a considerable compression of the median accumulated wages among younger generations. For example, for the four generations born from the 1960s, the median amounts of their accumulated salaries at the age of 30 are in all cases around 50,000 euros.

What explains this pronounced wage compression, even among workers of different generations? One potential factor is the minimum wage. If the value of this economic policy and income instrument is relatively high (compared to the average wages paid in the country), the generational wage differentiation may be reduced. This explanation may be particularly important given the recent periods of significant increases in minimum salary, notably between 2007 and 2011 (from EUR 403 to EUR 485) and between 2015 and 2020 (from EUR 505 to EUR 665, in nominal terms in both cases).

Figure 22 presents our analysis of this theme, calculating the percentage of workers of each generation in each year who receive a basic remuneration equal to the minimum salary applicable in that same year. The results indicate that, over the 33 years analyzed, the new generations tend to have a large percentage of workers who earn the minimum wage of about 30% or more in their first years in the labor market.

However, while this percentage decreased to 10% after about 15 years in the case of the generation of the 1970s, the weight of minimum wage workers remained at higher levels (about 20%) for the generation of the 1980s. This difference will be explained by the pronounced minimum wage increases in recent years, notably from 2016 but also in 2014. Moreover, during the second half of the 2010s, there was a growth of the minimum wage weight in virtually all generations, including among workers in the 1960s and 1970s. These pronounced minimum wage increases in the last five years will also explain the stability of the minimum wage weight between the generation of the 1990s, always around 30%, until at least the last year of our analysis (2018).<sup>20</sup>

Figure 22  
Minimum wage weight in employment



Notes: Percentage of workers of each generation in each year who receive a basic remuneration equal to the minimum salary amount applicable in that year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

<sup>20</sup> Given the minimum wage increases that took place in both 2019 and 2020, it is likely that these percentages have not decreased.

As we have indicated, the results we have presented so far can be influenced by composition effects resulting from the inputs and/or departures of workers in each generation. For example, the average wage can increase in a recession not necessarily because the majority of workers' wages increase but simply because lower-wage workers are more likely to stop working through unemployment. One way to address this issue more rigorously is to monitor over time only the same workers who keep working, particularly in a set followed by years, thus controlling for this composition effect.

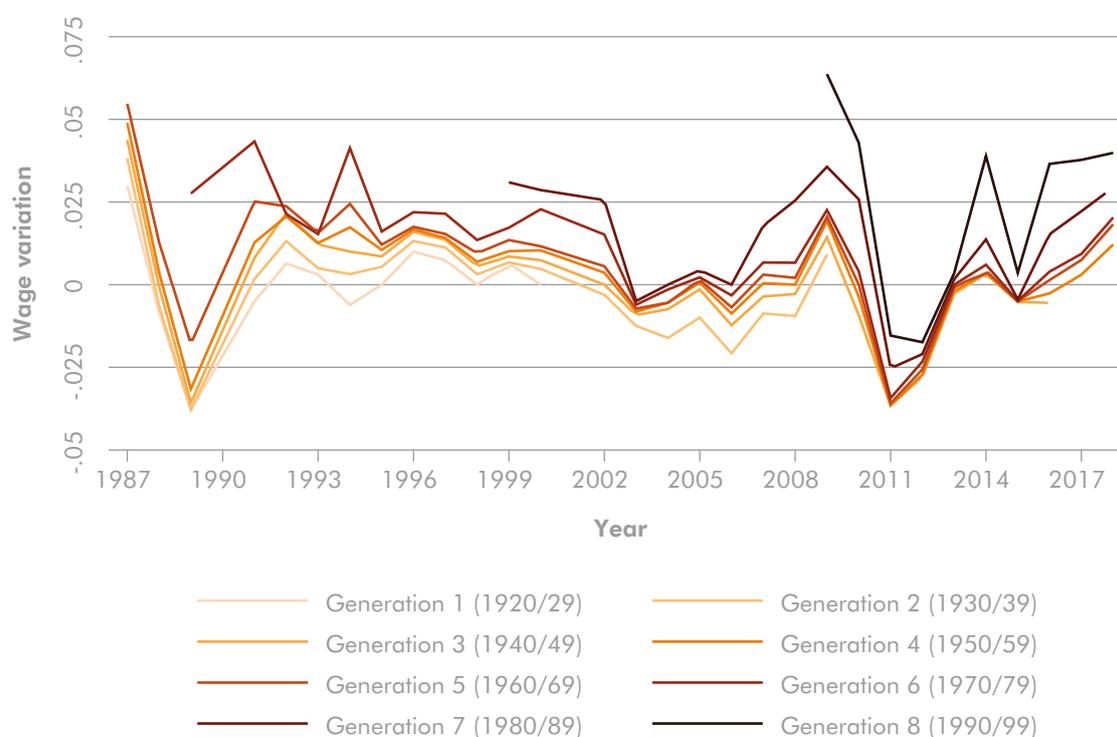
Figure 23 presents the results of this analysis, in which only workers who remain at the dataset in each pair of subsequent years are considered. For example, the results of 1987 (the first year in this analysis, unlike previous analyses beginning in 1986) indicate the average percentage variation in individual wages between 1986 and 1987 (in relation to the value of 1986) for the workers of each generation present in both two years. We found that, when considering exclusively the workers who remain employed from year to year, the wage growth is relatively low, with values close to or even equal to 0% in several years. On the other hand, we only find real wage reductions across the various generations in real terms over three years (in a total period of 32), notably in 1989 (due to the high inflation rate in that pre-euro period) and in 2011 and 2012 (in the context of the economic and financial adjustment programme of those years).<sup>21</sup>

We also see that younger generations tend to exhibit higher wage growth. For example, the generation born in the 1990s had real annual wage growth between the late 2000s and the 2010s (their first years in the labour market) of more than 2.5% in several years. These figures reflect, to varying degrees, factors such as low entry wages, the accumulation of human capital among companies (generally very significant in the first years of experience), improvements in pairings with companies (via job changes), the exclusion of cases of job loss (given the criteria for the construction of this sample), and possible increases in hours worked in relation to the initial period (part-time work – more common in first jobs – for full-time work and/or first jobs which start after the beginning of the month). These figures are also consistent with the higher wage increases of younger generations in their early years in the labour market, as shown in Figures 15 and 16, for example.

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<sup>21</sup> The results of 1988, or other subsequent years, develop the same comparison, with the group of workers concerned being in principle different from the group analysed in 1987. It should also be noted an additional set of technical aspects in this analysis: the salaries considered are the total salaries; and that the workers analyzed include both those who remain in the same company and those who change companies between the two years. On the other hand, we considered a sample of one third of the individuals (and not the entire population employed, as in the previous analyses) and excluded workers who work in more than one company in the same month. Finally, in the cases of 1991 and 2002, half of the percentage difference compared to 1989 and 2000, respectively, was considered, since the information for 1990 and 2001 is not available.

Figure 23  
Individual wage variation (median)

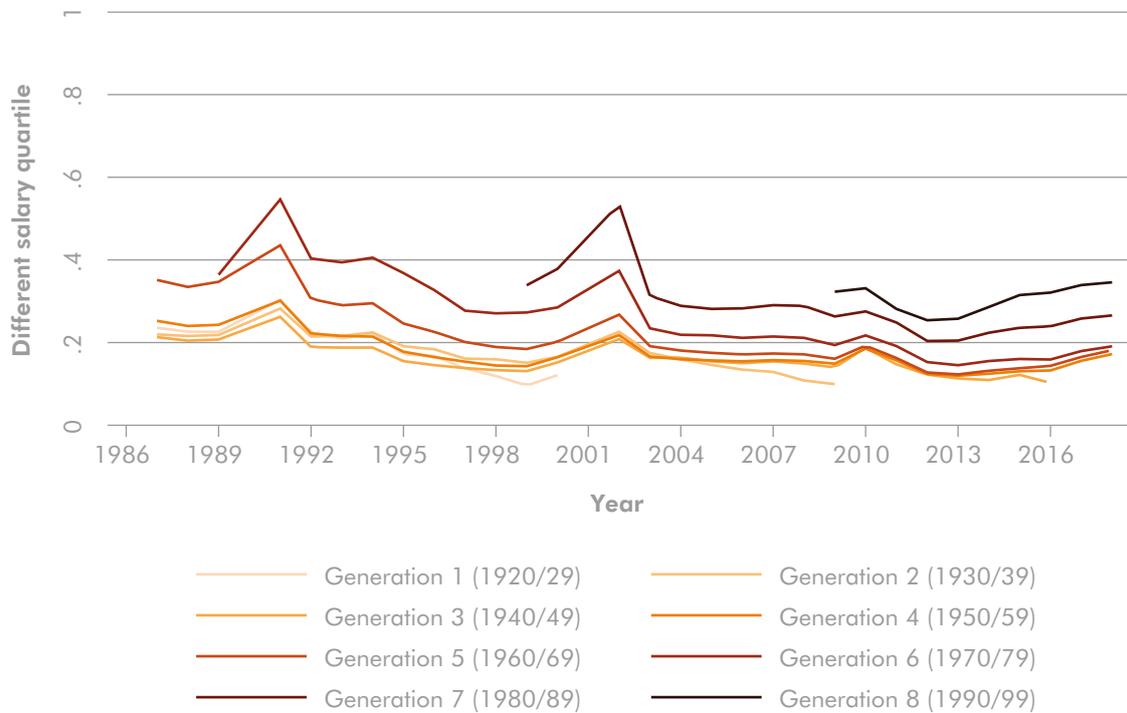


Notes: Median real individual wage change by year and per generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Individuals who do not work in the year and the previous year are excluded. Wage variation between 1991 and 1989 and between 2002 and 2000 divided by two (individual data for 1990 and 2001 are not available). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

Sources: "Personnel Records" (1986-2018) and author's analysis.

Another longitudinal dimension potentially relevant to intergenerational fairness concerns wage mobility. To what extent will a worker in a certain part of the wage distribution find himself or herself in another part of that distribution in a different year? What differences are there in these probabilities between workers of different generations? Figure 24 presents our results, based on the consideration of quartiles and defining a mobility situation when a worker is in a different quartile than the one in the previous year. For example, a worker who moves from the first quarter of the wage distribution in 1986 to the second quarter of the wage distribution in 1987 corresponds to a situation of wage mobility, according to the approach adopted here.

Figure 24  
**Wage mobility**



Notes: Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

Sources: "Personnel Records" (1986-2018) and author's analysis.

We found that younger generations are more likely to exhibit wage mobility. However, this phenomenon has lost some relevance over the past few years, with reductions from 40% (for the generation of 1970s in the late 1980s) to just over 30% (in the case of the 1990s generation in the 2010s).<sup>22</sup>

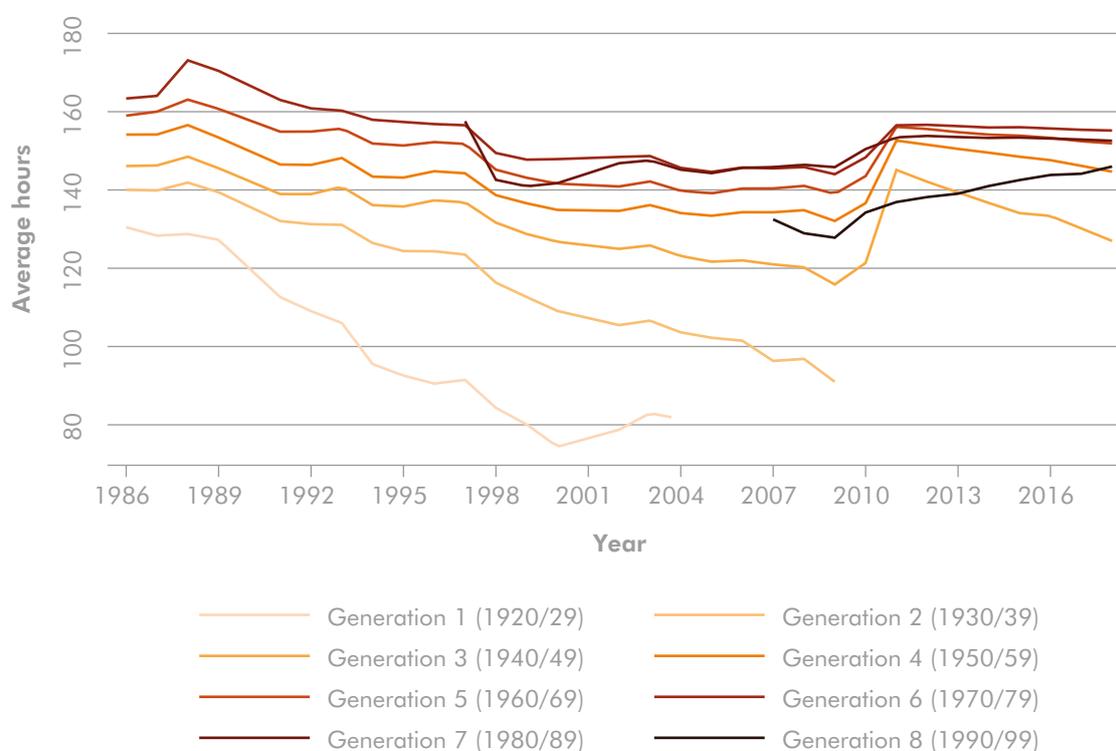
Finally, we also consider the inequality between workers in each generation and year, measured here through the standard deviation of the total monthly salary. Figure A12 shows an increasing trend over time in this dispersion in each generation. On the other hand, we see that this measure of inequality tends to be lower for younger generations. This result may be due to the typically lower wages of younger people and the consequent greater proximity of the minimum wage, creating a concentration effect.

<sup>22</sup> This result also applies when we redefine quartiles according to their own generations and not globally as above - Figure A11.

## 6.1 HOURS WORKED

Another aspect in which intergenerational fairness can manifest itself is working hours. Figure 25 shows the average normal monthly working hours, by generation and year, indicating a downward trend throughout the period (with a reversal of this trend in 2011). On the other hand, the comparison between generations indicates that older generations systematically work fewer hours than younger generations, with the exception of the generation born in the 1990s.<sup>23</sup>

Figure 25  
Average hours



Notes: Average monthly working hours per year and per generation (2017 euros). Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

<sup>23</sup> There is a significant increase in the hours worked from 2011 onto the various generations. According to a more detailed analysis of the data, this increase is due to the reduction in the percentage of workers with zero working hours, such as workers on sick leave, service commissions or on holiday.

It is also important to look closely at the wage dimension and the size of the hours worked. Figure 51 considers the case of the average hourly (total) salary. Once again we find high levels of convergence or wage similitude between different generations, particularly over the last 15 to 20 years. During this period, the average real hourly wage has fluctuated around seven euros (at constant prices in 2017), particularly for generations of the 1940s and 1950s. The next two generations have approached this value, particularly from the beginning of the current decade. Only the two younger generations – the 1980s and 1990s – have lower hourly figures, although with a sharp upward trend, at least until 2018.

## 6.2 WHAT ROLE OF EDUCATION?

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A second set of issues we address here relates to the role of education (schooling) and other variables in the salaries of different generations. As we have already seen, schooling presents great dynamism over the period analyzed in the study, with very pronounced growth for the new generations as opposed to very low levels for older generations. **To what extent has this increase in the schooling of new generations effectively translated into better labour market outcomes, especially in the context of the wage stagnation documented earlier?**

In a first analysis of this and other related questions, we consider the role of schooling in salaries in each year in which the individuals of each generation work. In technical terms, we estimate simple wage equations, regressing the logarithm of each worker's real salary on their schooling (corresponding to years of education), gender, and a linear control for the year in question. The latter variable seeks to capture potential growth trends in the productivity of the economy that can otherwise overshadow the effect of schooling, which also grows over time. The results regarding the contribution of schooling can be interpreted as the average percentage increase in the real salary of the worker associated with an increase in the education of workers of one year.

It should be noted that these results cannot necessarily be interpreted in a causal way, i.e., estimates of the role of schooling do not necessarily indicate the increase in income that would have taken place for the same worker if he had attended an additional year of schooling. Specifically, there may be other factors behind the positive relationship between schooling and salaries that are not taken into account in these analyses and that confound these estimates. In any case, the large academic literature that has analyzed these questions concludes that the estimates obtained under the format used here tend to be close to those that use methods oriented to estimate causal effects.

The results – presented in Table 1 – indicate a trend of lower education wage premium, particularly among generations born in the 1950s (a prize of 9.1%) and generations born in the 1990s (a premium of just over half, 4.8%). In other words, the contribution of education to improving individual labour incomes is much more significant for older generation workers than for those born in recent decades, particularly in the 1980s and 1990s. This pattern also occurs when the initial specification is widened to include not only checks for the worker's gender and the year of observation but also the age of the worker (and his square) – Table B1. In this second case, the drop in the salary premium of schooling is even more pronounced, from 9.7% for the generation of the 1940s, to only 4.1% for the generation of the 1990s.

Table 1  
**Profitability of education,  
 1986-2018**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Educ</b>	.077 (.0004)	.090 (.0002)	.097 (.0001)	.091 (.00008)	.087 (.00006)	.076 (.00005)	.060 (.00009)	.048 (.0003)
<b>Woman</b>	-.344 (.004)	-.415 (.002)	-.408 (.0009)	-.338 (.0006)	-.301 (.0004)	-.236 (.0004)	-.177 (.0006)	-.155 (.001)
<b>Year</b>	-.013 (.0005)	-.005 (.0001)	-.002 (.00006)	.002 (.00003)	.008 (.00002)	.010 (.00003)	.015 (.00007)	.036 (.0003)
<b>Obs.</b>	123132	631142	1782443	3942185	5839215	5937420	3087891	678733
<b>R<sup>2</sup></b>	.236	.284	.329	.322	.339	.306	.182	.09

Notes: The coefficients presented result from a regression of the logarithm of the actual total salary of each worker (of each generation) in each year in schooling, gender and a linear control for the year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at the year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

It should be noted that part of this difference may be related to the smaller number of years in the labour market of the younger generations. This factor limits the potential for wage differentiation among workers with different levels of education, particularly due to the aggregation effect from the minimum wage and the weak capacity for real wage adjustment in times of crisis (a factor related to very low inflation). Indeed, most of the workers who entered the labor market in the 2010s had the minimum wage as their first wage, regardless of their level of education. This creates a significant negative bias in the education wage premium compared to other generations.

It is also important to note that, both in one model and in the other, the gender pay gap is significantly reduced for the most recent generations, although it continues to show very high values (between 16% and 18%) even for workers born in the 1980s. On the other hand, for generations in the 1930s and 1940s, these gender pay gaps reach more than 40%. While these results mainly concern *intragenerational* fairness, this analysis addresses the question of the degree of convergence in reducing the gender pay gap for different generations over time, a question we leave for future analysis. For example, to what extent have the high gender pay differentials of older generations been reduced in line with the substantially lower differentials of the younger generations? Another perspective relates to systematic differences in wage differentials between workers of different ages, regardless of their generations, particularly before and after the transition to a maternity situation.

A final variant of the analysis of the relationship between education and salaries focuses on *total* labor income over the several years in which each individual works. Contrary to the previous analyses, here we consider only one observation of each worker, but in which the dependent variable is the logarithm of the *sum* of the wages of each worker over the period followed by the base (1986-2018). This approach seeks to assess the differences between generations in education premiums, also taking into account possible differences in non-employment periods. In other words, more education can translate not only into higher

salaries (when one has a job) but also to a higher probability of employment. In this sense, previous analyses that considered only observations of employed workers may be underestimating the effect of education and biasing comparisons on the role of schooling in labour income between different generations.

These new results are presented in Tables 2 and B2 and indicate that, once again, the most recent generations tend to have lower wage premiums. However, in this approach of total income throughout the career of each worker, the drop in the salary premium occurs almost exclusively for the generation born in the 90s, with values of between 6% and 7%. For the remaining generations, the salary premium is quite similar, although also higher, with values between 9% and 10%.

Table 2  
**Income from education,  
total income per individual, 1986-2018**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Educ</b>	.091 (.0008)	.100 (.0005)	.102 (.0004)	.093 (.0003)	.102 (.0003)	.108 (.0002)	.100 (.0003)	.074 (.0004)
<b>Woman</b>	-.340 (.007)	-.456 (.004)	-.432 (.003)	-.287 (.002)	-.202 (.002)	-.188 (.002)	-.172 (.002)	-.159 (.002)
<b>Year</b>	-.104 (.001)	-.093 (.0004)	-.075 (.0002)	-.061 (.0002)	-.053 (.0001)	-.046 (.0002)	-.107 (.0002)	-.189 (.0004)
<b>Obs.</b>	132408	424826	819758	1326928	1776986	1918129	1337258	679319
<b>R<sup>2</sup></b>	.151	.214	.22	.158	.119	.1	.177	.284

Notes: The coefficients presented result from a regression of the logarithm of the sum of the total real wages of each worker over the years in which the individual (of each generation) worked on the following variables: schooling, gender and a linear control for the year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at the year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Overall, these results confirm the previous perspective that one of the advantages of schooling is to increase the probability of employment, in addition to increasing wages amongst those who are employed. This employment effect is particularly relevant to younger generations, where links to the labour market tend to be more fragile. In any case, even considering this last dimension, the wage premium of education has been falling with the last generations. In other words, **while younger generations have benefited from much higher levels of education than previous generations, the impact of these higher levels of education on work income has been lower.** This result is also holds when including the effect of education on access to employment.

7.

# **EMPLOYMENT CONTRACTS**

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**A dimension much discussed in employment policies with potential repercussions on intergenerational fairness is the legal framework of employment contracts.** This question applies in particular to the specific case of fixed-term employment contracts.<sup>24</sup> According to Portuguese legislation (in particular the Labour Code), the latter contracts serve to meet 'temporary needs' of labour by companies, such as in the case of the replacement of a worker on maternity leave or in the case of a temporary increase in work (e.g., for seasonal reasons). However, these contracts can still be used legally to meet not necessarily temporary needs but under employment policy objectives, such as in the case of hiring unemployed workers, workers looking for their first (permanent) job, and at the launch of new companies and new establishments of existing enterprises.

To the extent that fixed-term contracts have a limited time duration, these contracts may involve more insecurity among the worker. This perspective also applies to temporary employment contracts involving a third-party company that promotes intermediation between the worker and the company in which the work is performed. In both cases, these contracts can contribute to greater labour instability, with several economic, social and other impacts. For example, a company may have fewer incentives to invest in training workers with this type of contracts; the greater instability inherent in contracts may adversely affect the fertility of the workers concerned. On the other hand, fixed-term contracts can serve to create job opportunities that would not exist if the only alternative involved open-ended contracts (or permanent). The latter type of employment contract has much higher levels of legal protection against dismissal in the case of Portugal, particularly in the case of individual dismissal. This follows from the country's Constitutional Court's interpretation of Article 53 of the Constitution and also from the various international comparisons conducted by organisations such as the OECD or the European Commission. In this context, it is not clear whether the contrafactual of a fixed-term contract is necessarily a permanent contract - in some cases, the alternative may be the non creation of a job.<sup>25</sup>

Our first analysis in this section focuses on the probability of using the fixed-term contract between different generations and years. It should be noted that information on the type of employment contract is available for a narrower period but still particularly long: 2002-2018. It should also be noted that we also consider temporary employment contracts (involving "triangular" employment relationships with temporary employment agencies as a fixed-term contract, both in the fixed term and term terms, although their legal framework is somewhat different (generally more restrictive than the case of the fixed-term employment contract). More generally, in our analysis we considered all types of fixed-term contracts except fixed-term (or permanent) employment contracts as fixed-term contracts.

Figure 26 shows the percentage of fixed-term contracts between workers of different generations and in various years. The results indicate great stability in the prevalence of these contracts over time - but also significant differences in the use of these contracts with workers of different generations, namely the three most recent ones (generations of the 70s, 80s and 90s). The generation of the 1970s presents a prevalence of fixed-term contracts in the order of 30% during the 17 years analyzed, a percentage that increases to between 40% and 50% for the next generation and to more than 60% for the genera-

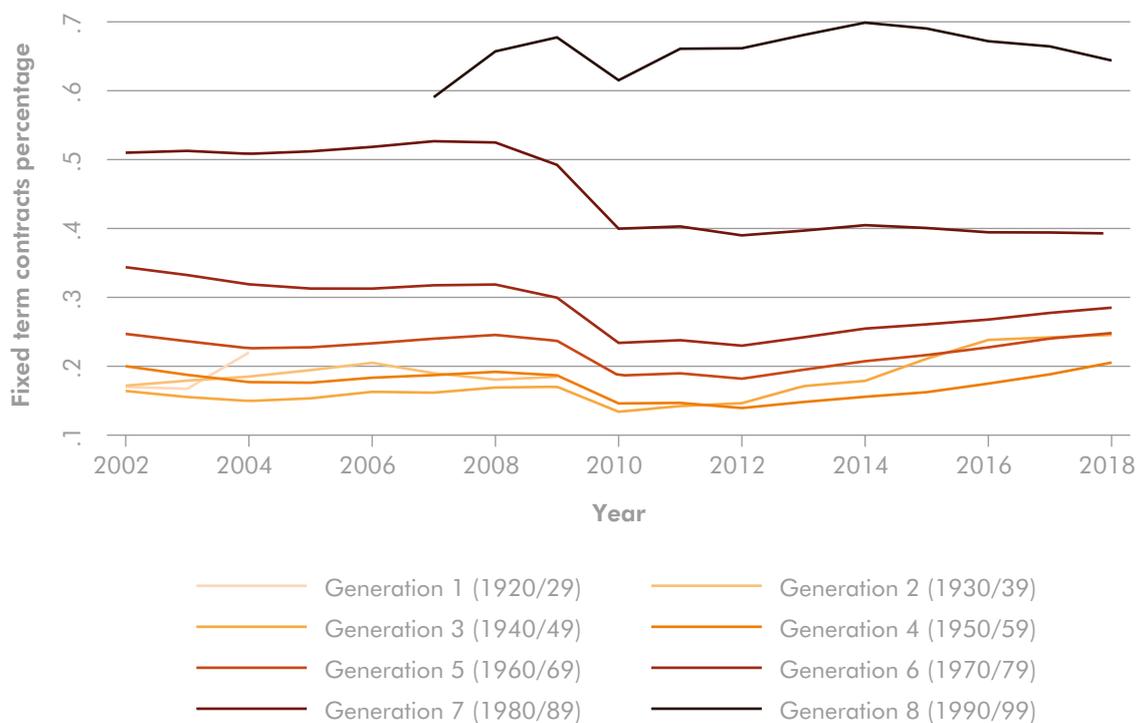
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<sup>24</sup> Another aspect of this issue, not examined here but also relevant to the debate on the segmentation of Portugal's labour market, relates to service provision contracts.

<sup>25</sup> These latter aspects of contracting via fixed-term contracts have been eliminated or restricted in the framework of the reform of the Labour Code in 2019, which came into force in October 2019, already after the last year examined in this section (2018). On the other hand, this reform extended the trial period of fixed-term contracts, in which individual dismissal is free. This second amendment will allow many short-term contracts, corresponding to temporary employment needs, to be concluded through fixed-term contracts. It should also be noted that fixed-term contracts may have a defined or open-ended duration at the beginning of the contract.

tion of the 90s. These high percentages for younger generations and the great stability of these values over time is an important challenge in terms of intergenerational fairness.<sup>26</sup>

Figure 26  
Fixed-term contracts



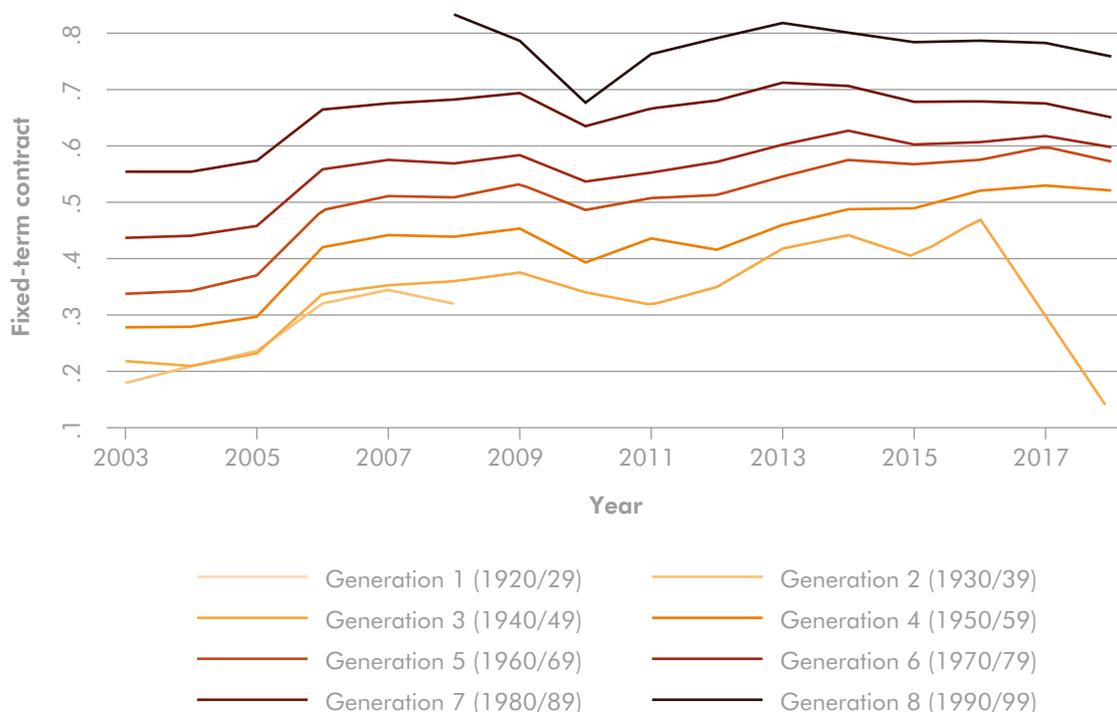
Notes: Percentage of fixed-term contracts per year and per generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Information on the type of employment contract is not available for years prior to 2002.

Sources: "Personnel Records" (2002-2018) and author's analysis.

<sup>26</sup> There is also a breakdown in the weights of fixed-term contracts between 2009 and 2010 but it will be related to statistical issues such as changing the code of the contract type variable in 2010 or the transition from the survey format (to the new Single Report framework) or the economic downturn in that period. The reform of the Labour Code that took place in 2009 may also be relevant although such results could be expected here as early as 2009 and not only in 2010, since most of the amendments came into force in March 2009 and the results presented refer to October of that same year.

In Figure 27, we analyse the importance of fixed-term contracts in labour market (re-)entry. As we mentioned above, hiring unemployed workers is precisely a case in which fixed-term contracts are automatically allowed (up to 2019), even if the labour need by firms is of a permanent nature. These contracts are thus an important way to reduce the uncertainty faced by firms as to the costs of a potential future dismissal. Such uncertainty is particularly relevant in the case of individual dismissals for subjective reasons (related to the individual performance of the worker), when the Portuguese labour market is more restrictive from an international perspective. We thus considered the percentage of fixed-term contracts amongst the workers of each generation that start their jobs in each year (i.e., that were not working in the previous year, according to the data set).

Figure 27  
**Entry into employment on a fixed-term contract**



Notes: Average entry into employment via fixed-term contract, per year and by generation. Each individual is considered only if in the previous year it is not registered in the database (which corresponds in many cases to a non-employment situation). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Information on type of employment contract not available for years prior to 2002. Sample of 33% of individuals present at least one year in the period 1986-2018 (each selected individual is then followed up every year).

Sources: "Personnel Records" (2002-2018) and author's analysis.

This analysis indicates that the weight of fixed-term contracts in new hires (transitions to employment) is generally even higher than in the previous analysis which also considered workers employed in the previous year. In this new analysis, we find weights of fixed-term contracts greater than 30% in almost all generations and years. On the other hand, these weights are also relatively constant over time for each generation, being higher the younger the generation. For example, while fixed-term contracts account for about 60% of new hires among workers born in the 1970s, this percentage increases to 70% among those born in the 1980s and to around 80% for those born in the 1990s. These differences may result from greater negotiating weight on the part of older workers (particularly in the context of voluntary mobility between firms) or from different preferences on the part of younger workers (with less value of more flexible employment relationships). These differences may also result from some lack of information regarding labour law by younger workers, leading to a lower appreciation of the protection that permanent contracts may offer. Younger workers may also be more oriented to younger businesses, which are generally more fragile (with lower turnover volumes, as indicated in section 5). These companies will make greater use of fixed-term contracts, even for the flexibility provided in these cases by labour legislation (until 2019). In short, this analysis underlines the high share of fixed-term contracts in transitions to employment, which illustrates their role in combating unemployment. This analysis also shows the growth of this weight for more recent generations, even when compared to other generations at the same age ranges.

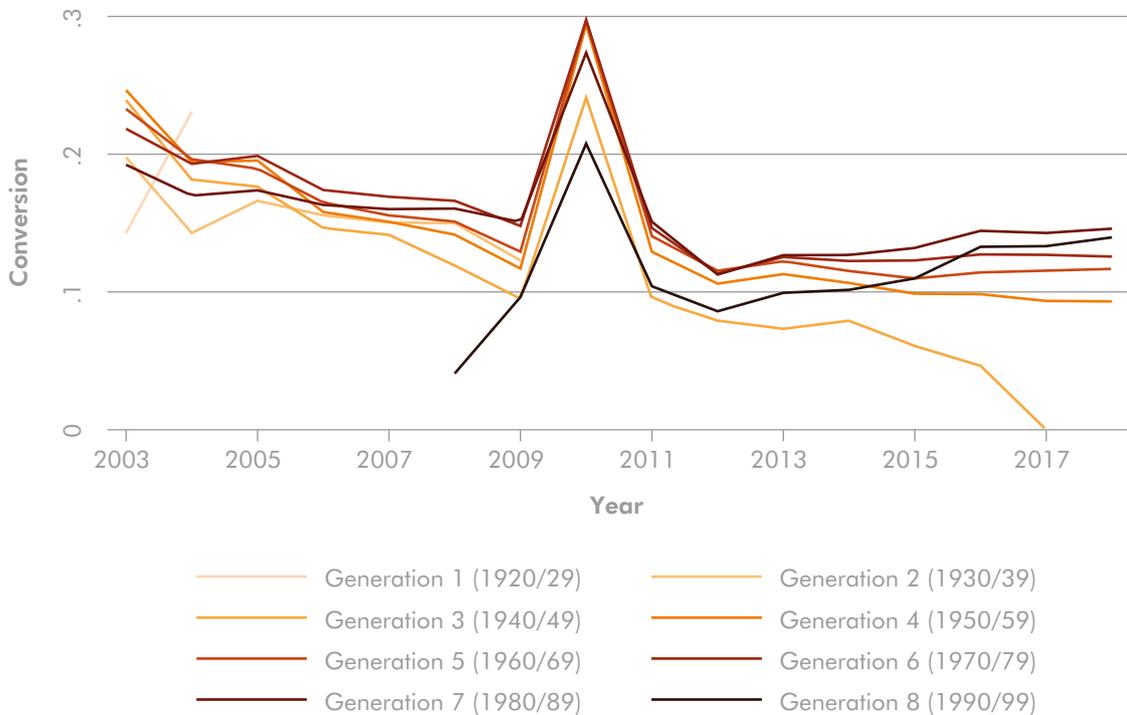
Another important issue in fixed-term contracts is the likelihood of their conversion into permanent contracts. According to the Labour Code, this conversion takes place when so decided by the employer and worker or (automatically) when the maximum term duration of the fixed-term contract is reached (and the employment spell is not terminated). This maximum duration is generally between 18 and 36 months during the period examined, depending on the reasons for the full-term contracting, the initial duration of the contract and the number of renewals that have taken place. It should be noted that, given the nature of the temporary need (seasonal work, replacement of absent workers, etc.), there is not necessarily a presumption that many of the fixed-term contracts give way to permanent contracts.

We analyze this issue by considering only the workers with fixed-term contracts each year and calculating the probability of them being converted into permanent contracts in the following year (the year indicated in the analysis). The analysis is conducted regardless of whether the worker is in the same company or not. The results are presented in Figure 28 and indicate a high level of homogeneity between generations in this conversion probability, as well as a tendency of reduction over time. The figures range from about 20% to 25% in 2003 and between 10% and 15% in 2018. In other words, the conversion of fixed-term contracts is a relatively infrequent, and has become even less frequent in more recent years, but is relatively homogeneous between generations.<sup>27</sup>

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<sup>27</sup> There is also a significant increase in this probability in 2010 for all generations, which may result from a statistical issue, namely the change in variable codes on the type of employment contracts in the database.

Figure 28  
**Conversion to permanent contract**

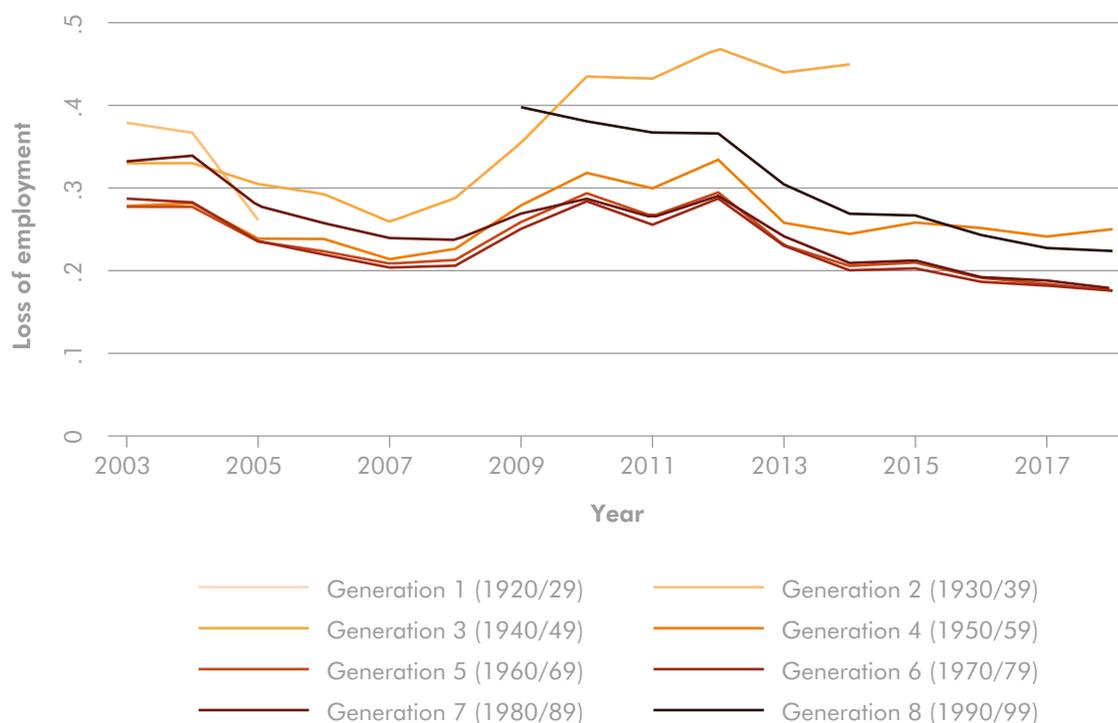


Notes: Probability of passage from fixed-term employment contract to permanent contract by year and by generation. Each individual is considered only if they work as a worker on behest of others in October of the respective year and the previous year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Information on the type of employment contract not available for years prior to 2002. Sample of 33% of individuals present at least one year in the period 1986-2018 (each selected individual is then followed up every year).

Sources: "Personnel Records" (2002-2018) and author's analysis.

As for the probability of job loss (transition to non-employment) for workers on fixed-term contracts, our analysis in Figure 29 indicates that it is always at least 20% and up to 30% or more. In other words, on average, at least 20% of workers employed on a fixed-term contract in one year are in a non-employment situation the following year. This probability also tends to be higher for younger workers, of the generation of 90. However, unlike previous analyses, there is no clear pattern in this case compared to other generations. This may be explained, at least in part, by the automatic conversion of the open-ended contract into a fixed-term contract for workers reaching retirement age and the subsequent increase in transitions to non-employment (reforms in these cases).

Figure 29  
**Loss of employment in fixed-term contract**



Notes: Probability of passage of fixed-term employment contract for non-employment, by year and by generation. Each individual is considered only if they work with a fixed-term contract in October of the respective year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Information on the type of employment contract not available for years prior to 2002. Sample of 33% of individuals present at least one year in the period 1986-2018 (each selected individual is then followed up every year).

Sources: "Personnel Records" (2002-2018) and author's analysis.

Overall, the results presented in this section – in particular the greater likelihood of fixed-term contracts (in general and when becoming employed) for younger generations and the low or non-existent convergence over time – will hardly be consistent with a situation of intergenerational fairness. Despite the disproportionate weight of fixed-term contracts with younger people, there is no greater likelihood of conversion to permanent contract between the latter compared to workers of earlier generations. In other words, **the new generations seem to represent a very pronounced part of the more flexible contracts, with no prospect of a reversal of this trend in the near future according to the evidence available by 2018.**

8.

# **JOB STABILITY**

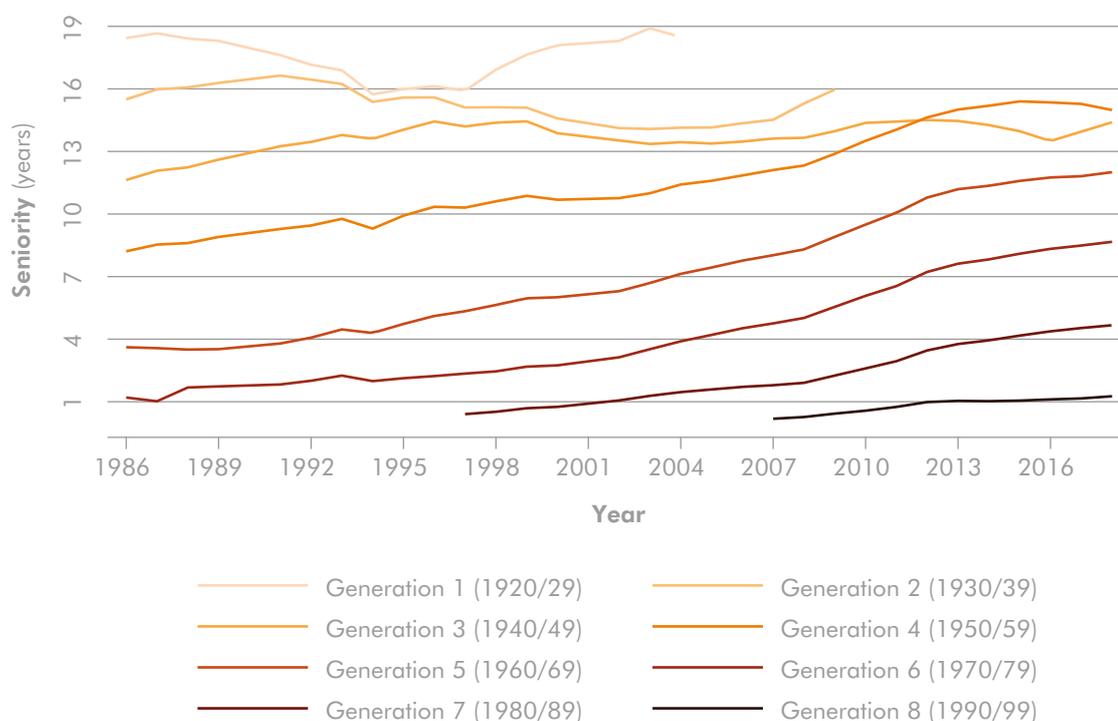
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**Job stability is another potentially important dimension of the labour market in terms of intergenerational fairness.** This stability is related to the theme of employment contracts examined in the previous section but also includes other more general issues, such as the transitions between jobs and to and from unemployment. A perspective in this context is related to the potential greater instability experienced by young people and younger generations in their industrial relations, which would constitute a situation of intergenerational iniquity.

Figure 30 presents a first analysis of this issue by presenting the average seniority values – defined as the years of service in the current employer – of each worker of each generation in each year. This indicator reflects a wide range of factors, such as the age at which the worker completes his/her school career, the duration of possible periods of unemployment, and mobility between employers.

Figure 30  
**Medium-term seniority**



Notes: Average years of seniority in the company, by year and by generation. Each individual is considered only if they work as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

The results indicate that older generations have higher average seniority levels and that the average seniority of each generation tends to increase over time. For example, the average seniority of the 1960s generation was four years in 1986 but 12 years old in 2018. The results of Figure 30 also indicate that there is a maximum average level of seniority per generation, of about 16 years, visible in the generations of the 1930s, 40s and 50s (reaching 19 years in the case of the generation of the 1920s).

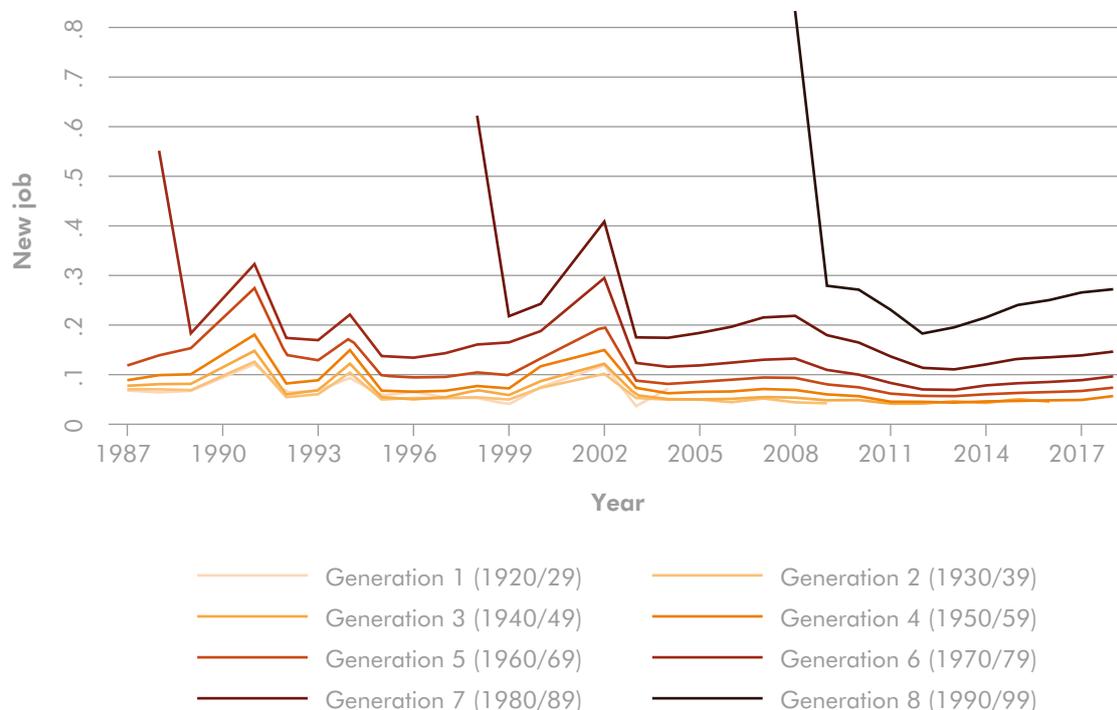
On the other hand, the first eight to ten years of each generation tend to be characterised by a great stability of the average seniority, around only one year, given the entry into the market of new workers and the high levels of rotation between companies. These results are consistent with the view that workers spend the first years of their careers looking for the best possible pairings with different companies (and vice versa). There is then an increasing probability of stability in the company, with the worker's ageing. These results are not consistent with the prospect that professional careers in the same company are disappearing or in sharp decline. Specifically in cases in the most recent generations (70s, 80s and 90s), there are very similar patterns throughout their early years in the labor market.<sup>28</sup>

In this context, and also considering the discussion about the determinants of wage growth (e.g., Figure 22), we now analyze more specifically the process of change of company. Figure 31 analyzes this issue, presenting the probability of changing companies of workers of different generations over the several years considered. This type of situation may be one of the main factors behind the evolution of the average age of workers, although it does not necessarily imply an instability of a negative nature (as opposed to the case of unemployment). In fact, these changes may result from a voluntary separation of the worker, possibly with the aim of improving their pairing, already in the framework of an offer received from another company. These changes may also result from an involuntary separation, promoted by the company in the context of a restructuring, its closure, the non-renewal of a fixed-term contract, or an individual dismissal, leading the worker to seek and possibly find another job in another undertaking. The analysis considers exclusively workers employed in both years, comparing the employer of the reference year with the employer of the previous year of each individual.

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<sup>28</sup> A question resulting from this analysis relates to the future evolution of the generation of the 1990s in the context of the pandemic crisis - will this generation follow the same pattern as its predecessors or will it experience higher levels of professional instability?

Figure 31  
New Job



Notes: Probability of change of employer, by year and by generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Individuals who do not work in the year and the previous year are excluded. Individual data for 1990 and 2001 are not available - 1991 and 2002 compared to 1989 and 2000, respectively. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018 (including all observations of selected individuals).

Sources: "Personnel Records" (1986-2018) and author's analysis.

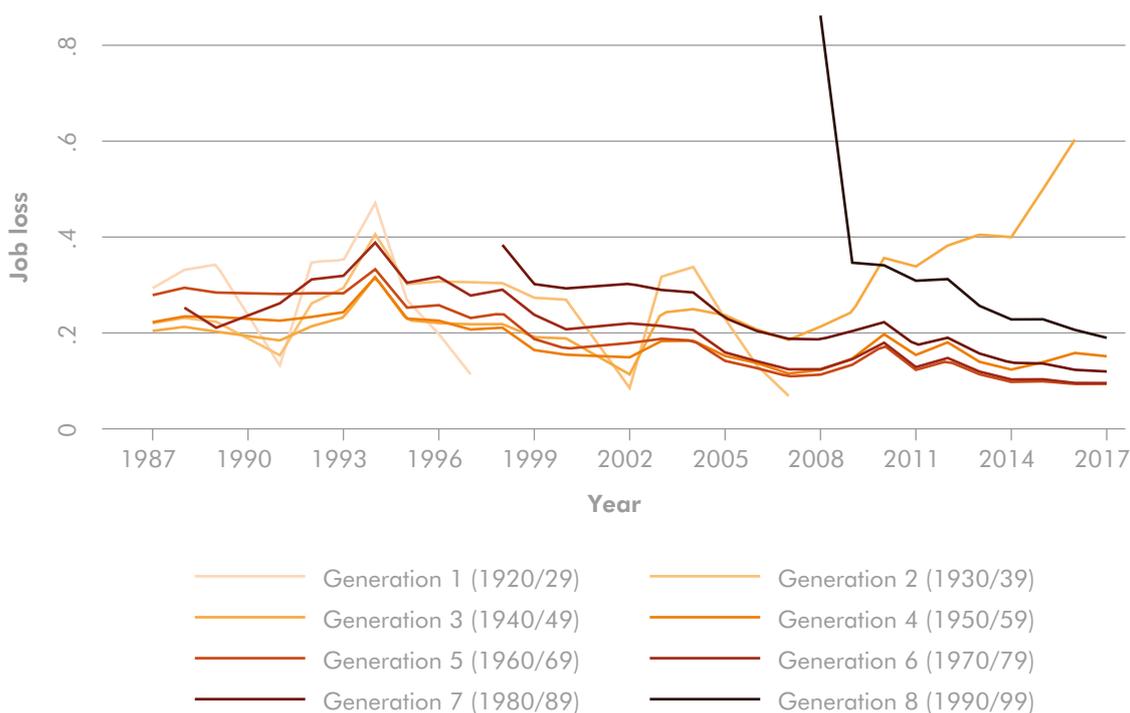
The results indicate that the first years in the labor market are characterized by (very) high probabilities of change of employer, reaching about 80% in the case of the generation of the 90s. These chances of changing employers are significantly reduced for older generations and especially when observed later in their careers, reaching a minimum level of about 8% per year. It should be noted that certain years exhibit higher chances of change of employer for statistical reasons, namely the lack of data in 1990 and 2001 as well as the longer comparison period that also occurs in 1994 (change from the reference month of March 1993 to October 1994).

On the other hand, comparing the different generations at equivalent stages, in particular in their first years of entry into the labour market, there is a trend of generational increase in mobility between employ-

ers. For example, the second years of the last three generations have a chance of change of less than 20% (70s), slightly more than 20% (80s) and almost 30% (90s). This pattern may suggest an increase in labour market volatility for younger generations (possibly associated with the use of more flexible contractual forms) and or changes in the preferences of younger workers in recent decades, with a greater interest in meeting different employers.

Another dynamic dimension of intergenerational fairness in the labour market is the prospects for job loss and consequent unemployment of different groups of workers. We analyze this issue by calculating the probability of non-employment in a given year (and at the base, with the limitations already discussed) among all workers employed in the previous year. The results – presented in Figure 32 – show a trend of gradually reducing the probability of job loss over time, common to all generations, and consistent with the importance of human capital specific to the company. This pattern is clearer in the case of younger generations, particularly those born in the 1980s and 1990s, who are, however, starting with higher chances of job loss of around 40% or higher. These probabilities gradually decrease to the average value of the remaining generations, of about 15%.<sup>29</sup>

Figure 32  
Job loss



Notes: Probability of job loss by year and by generation (2017 euros). Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Individuals who did not work in the previous year are excluded. Individual data for 1990 and 2001 are not available - the 1991 and 2002 views are made with 1989 and 2000, respectively. Each of the eight generations defined by the year of

<sup>29</sup> As mentioned above, "non-employment" in the "Personnel Records" database does not necessarily mean unemployment, as it may correspond to employment in the public sector (despite the increasing coverage that resulted from the 2004 public administration reform), self-employment, emigration, or even inactivity.

birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

Sources: "Personnel Records" (1986-2018) and author's analysis.

Part of the dynamics described above – salary variations, change of employer, loss of employment – may be related to the change of profession throughout the career. We analyze this issue by comparing the profession of each individual with their profession in the previous year. The results – shown in Figure A16 – indicate a decreasing probability of changing profession over time, starting from very high values (greater than 50%) in the first years of the younger generations. (As in previous analyses, 1991, 1994 and 2002 are subject to statistical issues that cause an artificial increase in mobility.) One exception concerns the generation born in the 1990s, which has a stable or even growing trend of change of profession over the period available, notably between 2008 and 2018.

9.

# **RECESSIONS**

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Another relevant dimension of intergenerational fairness in the labour market is the sensitivity of the wages of workers of different generations to the conditions of the labour market itself. For example, a situation in which economic shocks (such as a recession or even a pandemic) largely affect, in a concentrated way, only a specific generation of the population, while the rest are not affected, can be seen as a negative situation in terms of intergenerational fairness. On the other hand, a situation in which the costs of shocks of this nature are divided proportionally by different generations will be more consistent with intergenerational fairness.

Our analysis of this issue is based, first, on the estimation of different econometric models of real wages for different generations and, secondly, on the analysis of the differentiated role or not that results in the level of the unemployment rate. In other words, we try to understand whether the unemployment rate applicable in each year in Portugal influences differently the salaries earned by the workers of each generation. Several studies for other countries suggest that younger people tend to be those whose salaries are most affected, more negatively, by contractions of the economic cycle.

In the first analysis – presented in Table 3 – we regressed the (logarithm of) the actual salary of each worker in each year in the unemployment rate of the respective year, in a linear control for the year, and in a fixed effect for each worker. Thus, the model estimates the differences between the salaries of the same individual over time (longitudinal analysis) according to the differences between the unemployment rates that occur in each of these years. This is important to avoid composition effects such as those already mentioned above, particularly when lower-wage workers are more likely to lose their jobs in periods of rising unemployment. A linear control for the year concerned allows to capture (linear) differences from year to year, such as those related to the productivity growth of the economy, because of technological improvements or other factors. Finally, we estimated a model (through simple regression analysis) separately for each generation and compared the magnitude of the estimated coefficient for the unemployment rate. The more negative this coefficient, the greater the effect of the unemployment rate on the reduction of the real value of wages.

Table 3  
**Wages and unemployment by generation,  
1986-2018**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Unempl</b>	-.006 (.004)	-.006 (.004)	-.015 (.002)***	-.013 (.003)***	-.012 (.004)***	-.006 (.003)**	-.005 (.002)***	-.018 (.003)***
<b>Year</b>	.004 (.001)	.010 (.001)	.013 (.0007)	.013 (.002)	.017 (.002)	.019 (.002)	.026 (.001)	.054 (.005)
<b>Obs.</b>	105612	594849	1721525	3856335	5738908	5853177	3032560	609520
<b>R<sup>2</sup></b>	.868	.845	.832	.786	.743	.704	.59	.574

Notes: The coefficients presented result from a regression of the logarithm of the total real salary of each worker (of each generation), in each year, in the unemployment rate of that year, in a linear control for the year, and in a fixed effect specific to each worker. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at the year level.

Sources: All individuals from the “Personnel Records” data set (1986-2018) and author's analyses.

The results indicate that, in almost all generations, unemployment has a negative effect on the real wages of the workers concerned. This relationship is also consistent with several similar studies for other countries. However, we have found significant differences – both in economic and statistical terms – for some generations. For example, we found that the generation born in the 1990s as well as the generations born in the 1940s, 50s and 60s are the ones with the highest sensitivity to the unemployment rate. Specifically, in the case of the first generation, the increase in the unemployment rate by one percentage point (from 7% to 8%, for example) translates into a decrease in the salary (total and real) of these workers by 1.5%. On the other hand, generations born in the 1970s and 1980s appear to have been better protected from (macro-) economic shocks, with effects of only -0.6%, or one third of the previous value. It should be noted that these last generations born in the 1970s and 1980s (unlike the others) would not have yet entered the labour market during the 1983 and 1994 crises and would also have made much of their transition to the labour market during the 2009 and 2012 crises. This situation will have protected these workers from the otherwise negative impacts on their wages, creating results that may not be consistent with intergenerational fairness.

We then repeat this analysis but looking only at the last 20 years, where the macroeconomic context was quite different from the previous period: low economic growth, low inflation, lack of exchange rate flexibility (following the number currency' and rising unemployment (until 2013)). This analysis allows us to consider the exposure of the same economic cycle to different generations, although observed at different ages (20 years, 30 years, etc.). When considering only this most recent period, namely the years 2002 to 2018, we found that the sensitivity to unemployment is largely only among the generation born in the 1990s, which begins its transition to the labour market precisely at the beginning of the crises of 2009 and 2012 – Table 7. Generations in the 1950s and 1960s, who were also more sensitive to the broader economic cycle of the previous analysis, now have a much smaller sensitivity of around a quarter or a fifth of the generation coefficient of the 1990s (coefficients of -0.4% or less compared to the coefficient of -1.8% for the generation of the 1990s).

The results above are also supported by complementary analyses that consider the role of inflation – Tables B4 and B5. Here too, the generations born between the 1940s and the 1960s were more battered, with effects between -1.2% and -2% on real wages for each percentage point of inflation (Table B4). On the other hand, the generation born in the 1990s has already been protected (the coefficient in this case is even positive), given the particularly low levels of inflation in the last two decades, after Portugal's support for the euro. These results – greater sensitivity of real wages of generations born in the 1950s, 60s and 90s – are generally robust to the simultaneous inclusion of unemployment and inflation variables (Table B5). Finally, when analyzing exclusively workers up to 35 years of age, regardless of their generation, we again find differences between generations with regard to sensitivity to unemployment – Table B6. Once again, the younger generation (born in the 1990s) appears to be the one that is being hit harder by unemployment, with a reduction in real wages of -1.8% for each additional point of the unemployment rate.

Table 4 also seeks to analyze more specifically the role of the situation of the economy in different generations considering not only the unemployment rate in each year (variable "Unemployment") but also the unemployment rate in the year in which the worker enters the labor market (variable "Unemp entry"). The real wage equation considered in this case thus includes both unemployment rates and also controls on the characteristics of workers (gender, age, and schooling) – replacing the fixed effects per worker which would otherwise prevent the analysis of the effect of unemployment on the year of entry into the labour market – and also fixed effects for each company and a linear check for the year to which each observation relates. Finally, we consider each of the last four generations separately and also the four generations together (in the latter case in the last column). We do not consider the older

generations because it is not possible to know precisely the year in which they entered the labour market and, therefore, it is not possible to attribute to these workers the unemployment rate corresponding to their years of entry.

Table 4  
**Wages, unemployment of the year and unemployment  
at entry into the labour market, by generation and full sample,  
1986-2018**

	Gen5 (1)	Gen6 (2)	Gen7 (3)	Gen8 (4)	Gen All (5)
<b>Unemploymt</b>	-0.010 (.004)***	-0.005 (.002)**	-0.003 (.001)**	-0.013 (.004)***	-0.007 (.002)***
<b>Unemp entry</b>	-0.002 (.002)	-0.006 (.002)***	-0.008 (.002)***	.006 (.005)	-0.011 (.002)***
<b>Woman</b>	-0.219 (.005)***	-0.169 (.005)***	-0.102 (.005)***	-0.063 (.003)***	-0.169 (.003)***
<b>Age</b>	.012 (.0007)***	.018 (.001)***	.022 (.002)***	.040 (.004)***	.016 (.0006)***
<b>Educ</b>	.052 (.001)***	.047 (.002)***	.034 (.002)***	.016 (.003)***	.047 (.0007)***
<b>Year</b>	.004 (.002)**	-0.002 (.002)	-0.003 (.001)**	-0.003 (.004)	-0.001 (.001)
<b>Obs.</b>	5745898	5838700	3020861	646141	1.54e+07
<b>R<sup>2</sup></b>	.653	.605	.489	.413	.565

Notes: The coefficients presented result from a regression of the logarithm of the total real salary of each worker (of each generation), in each year, in the unemployment rate of that year, in the unemployment rate of the first year in which the worker is observed in the database, in various dimensions for the characteristics of the workers, in fixed effects for each company, and a linear control for the year. Each of the four generations defined by the year of birth of the individual (1960-1969 - Ger5, 1970-79 - Ger6, 1980-89 - Ger7, and 1990-1999 - Ger8). 'GerAll' indicates the four generations together. Standard errors fixed for clustering at the year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

The results indicate that, in general, the unemployment rate in the year in which the worker enters the labor market has an impact as great or even greater than that of the unemployment rate each year. For example, considering the results that aggregate the four generations (last column of Table 3), the effect of the unemployment rate on entry is 1.1% while the effect of the unemployment rate in the year is 0.7%. These results also apply in the cases of generations of the 1970s and 1980s, although not in the case of generations of the 1960s and 1990s (and in the case of the latter, it can be difficult to differentiate unemployment from each year's unemployment in the year of entry). Overall, the results of this latest analysis underline the "scarring" effect of unemployment at the time of entry into the labour market of each worker, an effect that has also been documented in several other countries. This negative effect – in

which the higher the unemployment, the lower the (real) salary – lasts beyond the very year in which the entry into the labor market takes place. This effect may be due to several factors, including the non-accumulation of professional experience at a critical time in the individual's working life (the first years after the completion of the school year), and the weakening of professional and social networks. A negative "signal" effect may also be relevant with potential employers in the future, who consider workers who have not previously been able to employ themselves as less productive.

This result constitutes a **clear situation of intergenerational iniquity as factors that are outside the control of each generation when entering the labour market** (the economic cycle situation in this case) **end up having an influence on the results of that generation** – including throughout much of their subsequent working life. To this extent, **the results also underline the great importance of trying to smooth the (macro-) economic cycle by avoiding large fluctuations in the unemployment rate**. These fluctuations have not only short-term effects – particularly among workers looking for work in periods of higher unemployment – but also potentially even more significant long-term effects – for young workers entering the labour market in those periods.

# 10.

## **SOCIAL BENEFITS**

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**Social security or protection is one of the main dimensions of public policies with influence on the labor market and its levels of fairness.** In addition to old-age pensions, the possibility for workers to receive financial benefits that replace working income in situations of unemployment, sickness or (early) parenthood is an important way of reducing the risks to which all workers are subject. These benefits can constitute a significant net gain in well-being, in particular where their benefits (insurance via benefits received in the contingencies above) more than outweigh their costs (contributions from employers and workers).

On the other hand, social security can have a very significant intergenerational dimension. For example, the relationship between benefits and costs referred to above can be very different for workers of different ages. Some of these differences are natural and direct: for example, old-age pensions are only paid to older people while parental benefits are only paid to younger guests. On the other hand, access to these benefits can be changed over time, implying that different generations end up receiving unequal net benefits, even when considering the full life period of each generation.<sup>30</sup>

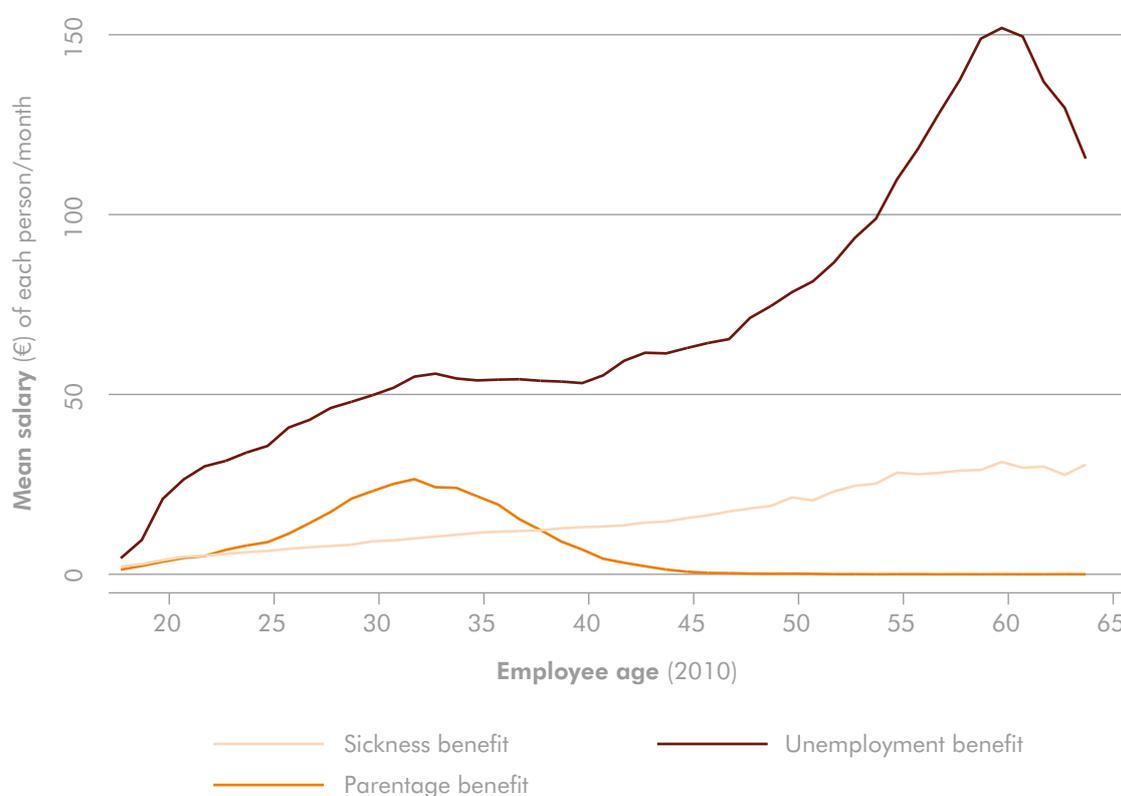
We empirically analyze this issue using a social security database with monthly information on all workers in Portugal from January 2000 to September 2010. This basis includes not only the records of remuneration for different types of work (employees, self-employed workers, members of statutory bodies, and domestic service workers) but also various social benefits during working life (unemployment benefit, sickness benefit, parenting allowance, and layoff allowance).

Given the complexity and richness of the data, we started our analysis using only the information for the month of September 2010. Figure 33 presents an analysis of this information, indicating the average amounts of three of the main social security subsidies to workers of different ages. The subsidies considered refer to the eventualities of illness, parenthood and unemployment. The analysis also considers all workers, including those who do not receive any allowance but who receive work pay (on behest of others or independently) in the reference month (September 2010). In other words, the statistics presented result from the division of total expenditure in each type of allowances for individuals of each year of age by the total number of individuals of that same age.

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<sup>30</sup> More generally, these costs may also include the possible negative effects of these benefits on the level of employment: for example, by burdening the labour factor and creating a differentiation between the salary paid by the employer and the salary received by the worker, these benefits can reduce the total amount of employment in the economy.

Figure 33  
Social benefits by age, 2010



Notes: Average levels of unemployment, sickness and parentage benefits by beneficiary's age in September 2010.

Sources: Registration of salaries and social benefits of the Institute of Informatics of Social Security, covering all employees and independents in Portugal, and analyses of the author.

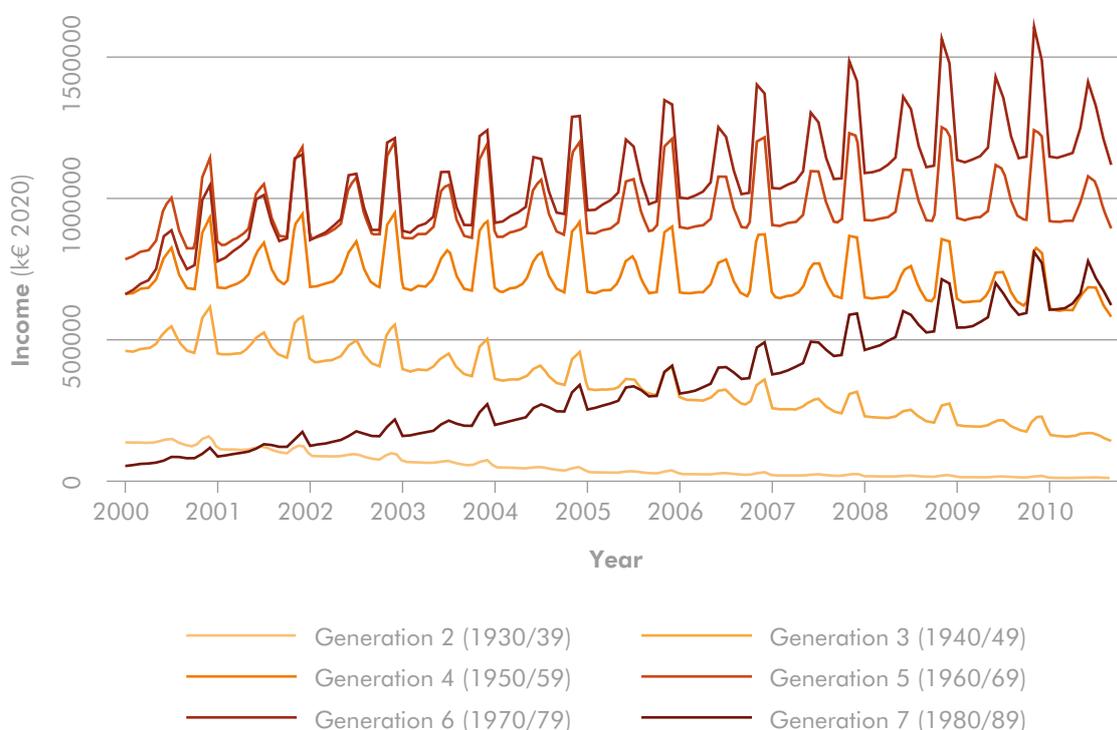
The results indicate that unemployment benefit is the most relevant benefit in terms of its value, reaching a maximum of €150 per month and individual for those aged 60. On the other hand, sickness and parenthood allowances are of similar importance to each other, although the former has an increasing value with age and the second reaches its highest value around 32 years. In both cases of sickness and parentage allowances, the maximum values are about 25 euros per individual and month.<sup>31</sup>

This initial analysis indicates that the expenditure of social protection in the three dimensions considered is concentrated among older individuals. This preliminary result can once again raise questions of inter-generational fairness, notably given the contrast between volumes and generally (much) higher unemployment rates among younger people - Figures A4 and 4 - and higher average unemployment benefit figures for older individuals.

<sup>31</sup> It should be noted that we are considering both men and women, and parental allowances are naturally much higher for women.

After this initial analysis focused on just one month, we now move on to a broader analysis, considering the entire period covered in the available database (2000-2010). Figure 34 shows the value of the total labor income obtained by each of the six generations considered here, in each month. Monthly values range from virtually zero (in the case of the generation of the 1930s when observed in 2010) to more than 1.5 billion euros (in the case of the generation of the 1970s when observed in 2010). The remaining generations have relatively stable values in their total incomes, with the exception of the generation of the 1980s, which entered the labor market fully during the decade analyzed. Note also the pronounced monthly seasonality of remuneration, related to the payment of holiday and Christmas allowances.

Figure 34  
Income, Social Security

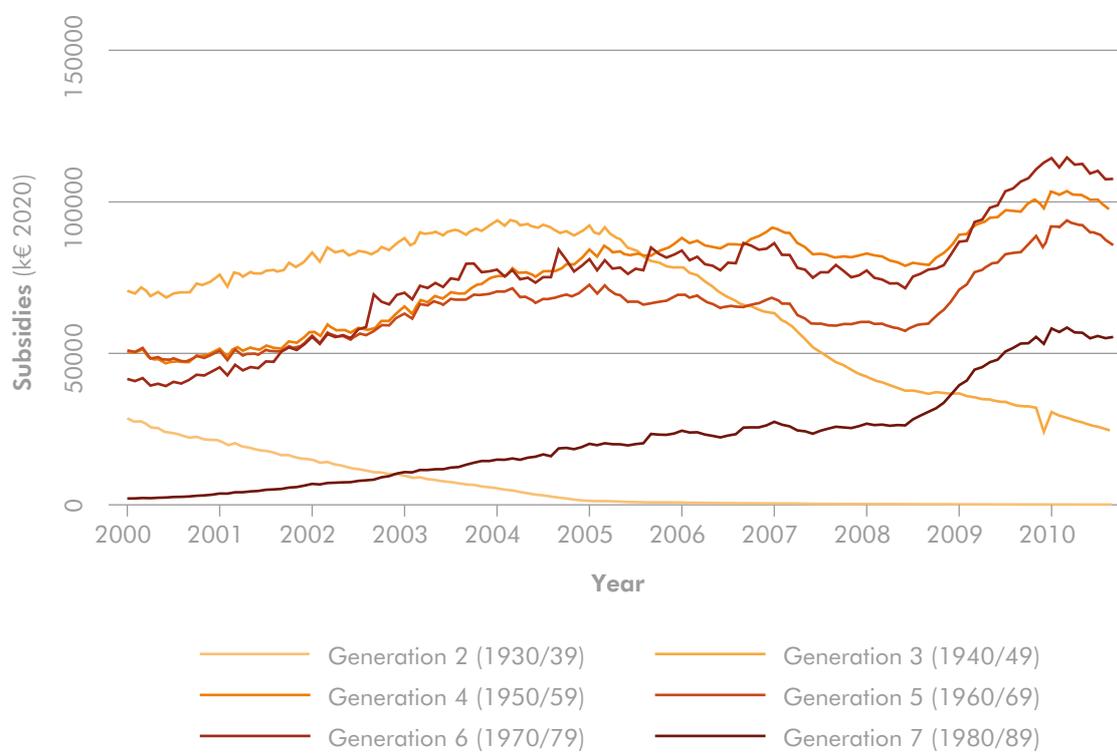


Notes: Total income declared by companies or workers with social security. Each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989).

Sources: All individuals with registration of remuneration or receipt of social benefits between January 2000 and September 2010 and author reviews.

Secondly, we present the monthly amount of social security subsidies paid to each generation - Figure 35. These figures range from virtually zero (for both the generation of the 1980s in 2000 and for the generation of the 1930s from 2005 onto 2005) and more than €100 million (for the generations of the 1950s and 1970s from 2009). Note the pronounced increase in these benefits for generations of the 1950s and beyond from the end of 2008, in line with the outbreak of the international financial crisis.

Figure 35  
**Subsidies, Social Security**

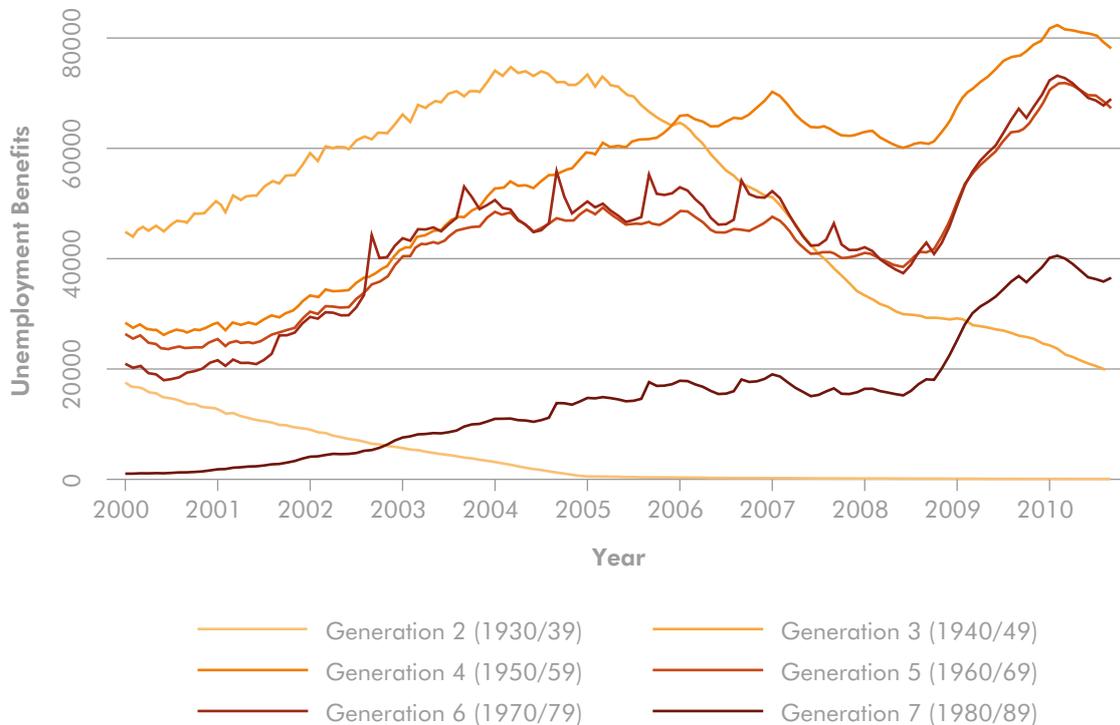


Notes: Total social security allowances. Each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989).

Sources: All individuals with registration of remuneration or receipt of social benefits between January 2000 and September 2010 and author reviews.

When we break down these total expenditures into its various components (unemployment, sickness, parenthood and layoff benefits), we find that the first is the most important and that it explains much of the variation over time, namely the growth from the end of 2008 - Figure 36. Unemployment benefits are up to €80 million per month for the generation of the 1950s in 2010, in particular in 2010. On the other hand, it should be noted that for the generation of the 1940s, the expenditure on unemployment benefits at its peak reaches a similar amount of more than €70 million in 2004, when the workers concerned were between 54 and 64 years old. These expenditure amounts are also approximately in line with the number of beneficiaries per generation and month - Figure A18.

Figure 36  
**Unemployment Benefits, Social Mon**

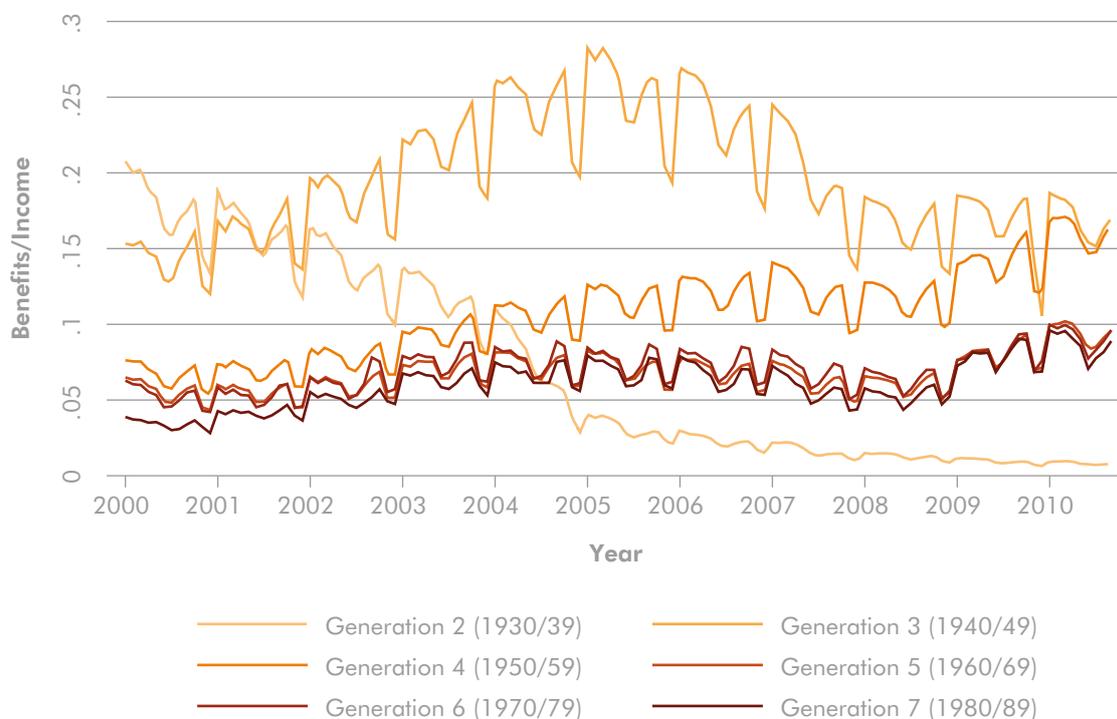


Notes: Unemployment benefits paid by social security each month to each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989).

Sources: All individuals with registration of remuneration or receipt of social benefits between January 2000 and September 2010 and author reviews.

Having analysed labour income and subsidies in isolation, we now consider the ratio between these two variables. This indicator allows us to know to what extent there is a similar proportionality between these two dimensions for the different generations over time. Figure 37 presents the results found, indicating pronounced differences between generations. In particular, we find subsidies for higher incomes for the generation of the 1940s (which are up to more than 25%) and lower ratios for the generation of the 1960s and later (with values below 10%). It should also be noted that the intermediate generation, born in the 1960s, has a tendency of convergence as it ages, moving from values similar to that of the younger generation to values similar to that of the older generation. These results are consistent with the initial evidence presented on top of a very widespread use of unemployment benefit among older workers, despite the greater fragility that younger workers tend to present at the level of their insertion in the labour market.

Figure 37  
**Ratio of Social Benefits/Income**



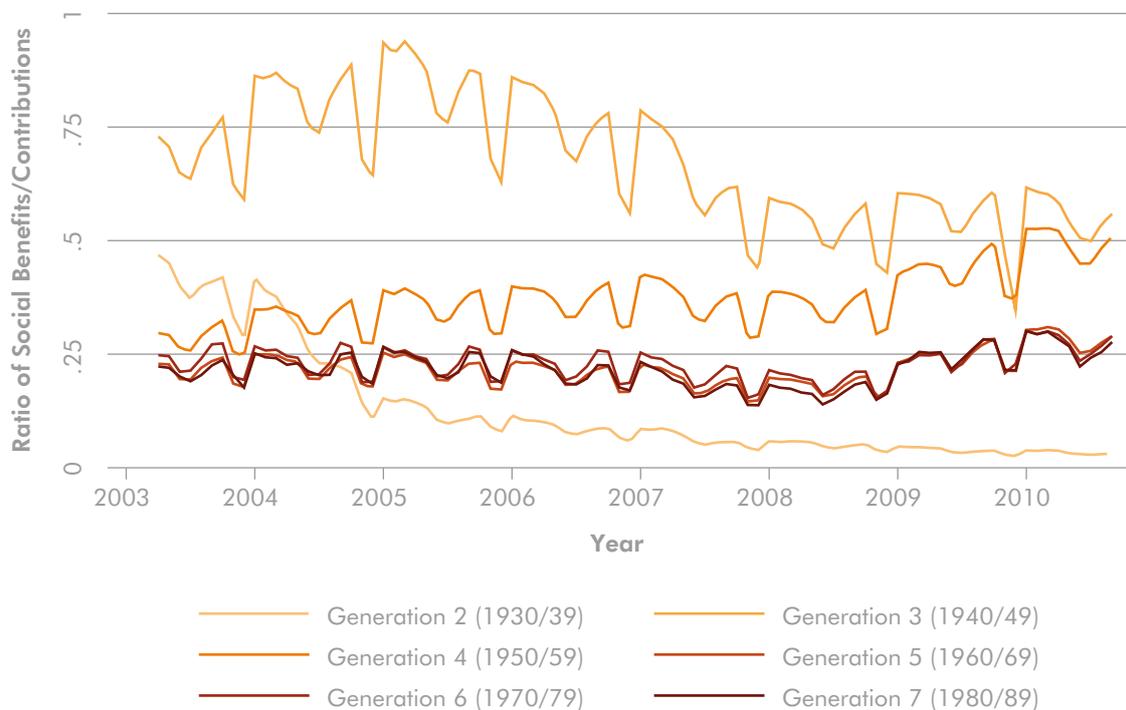
Notes: Ratio between the total social security allowances in each month each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989) and the income of that same generation and year.

Sources: All individuals with registration of remuneration or receipt of social benefits between January 2000 and September 2010 and author reviews.

We deepened the previous analysis in Figure 38, in which we consider the ratio of subsidies in relation to the value of contributions (not income). This approach directly contrasts what each generation is paying for social security with what each generation is receiving from social security.<sup>32</sup>

<sup>32</sup> In the general case where the contribution rate is the same for all individuals, this ratio is equal to the previous one multiplied by a factor. However, the rate of application is not always the same.

Figure 38  
**Ratio of Social Benefits/Contributions**



Notes: Ratio between the total social security allowances in each month each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989) and social security contributions of that same generation and year.

Sources: All individuals with registration of remuneration or receipt of social benefits between February 2003 and September 2010 and author reviews.

We see in this analysis that the generational differences already identified are confirmed and even highlighted with this new perspective. For example, the ratio of subsidies and contributions for the generation of the 1940s exceeds 80% - while this ratio for generations of the 1960s and later is almost always below 25%. In other words, older workers (born in the 1940s) received unemployment benefits (and, to a lesser extent, illness) in unemployment benefits (and, to a lesser extent, illness) more than 80% of the amount they contributed to social security through discounts on their remuneration. Less than 20% of these contributions could thus be used to pay for their pensions. This analysis illustrates the imbalances and even generational inequities in terms of social security with regard to benefits prior to the transition to inactivity.

We conclude this section with a decomposition of the two approaches above (ratios between subsidies and income or contributions) in the unemployment and sickness benefits strands. The results, aggregated by generation over the available period (the totality of the 2000s in the case of income and the last seven years of this decade in the case of contributions), are presented in Table 5.

Table 5  
Benefits and contributions

A. Benefits in relation to total labour income			
Generation	Total Benefits/ Contributions	Unemploymt benefits/ Contributions	Sickness benefits/ Contributions
1930/1939	11.8	7.0	4.7
1940/1949	19.2	14.7	4.5
1950/1959	10.5	7.5	3.0
1960/1969	6.7	4.4	1.8
1970/1979	7.0	4.1	1.3
1980/1989	6.5	4.4	1.0
B. Benefits in relation to total contributions			
Generation	Total Benefits/ Contributions	Unemploymt benefits/ Contributions	Sickness benefits/ Contributions
1930/1939	19.2	10.7	8.5
1940/1949	68.8	55.1	13.7
1950/1959	36.5	27.4	9.1
1960/1969	21.5	15.1	5.4
1970/1979	22.7	13.7	3.8
1980/1989	21.6	14.6	3.2

Notes: Ratio between the total social security allowances for each of the six generations defined by the year of birth of the individual (1930-1939, 1940-49, ..., 1980-1989) and the income or social security contributions of that same generation.

Sources: All individuals with registration of remuneration or receipt of social benefits between 2000 or 2003 and September 2010 and author reviews.

Consistent with the previous graphical analysis, we found large generational disparities regarding the relationship between subsidies received and income earned (or contributions paid) - Panels A and B of Table 5, respectively. In the first dimension, these values range from 19.2% to 6.5%; in the second, between 68.8% and 21.5%.

The last two columns of the table also break down the main results between the two most important types of subsidies (unemployment and the doening). Here we confirm the great importance of unemployment benefit, the value of which represents more than half (55.1%) of all contributions of the generation of the 1940s - and only 13.7% in the case of the generation of the 1970s.

These generational disparities in the use of social security subsidies (pre-retirement) result from a number of factors. Older workers will have, on average, longer contributory careers, thus enabling them to qualify almost all cases for access to unemployment benefits through compliance with the guarantee deadline (unlike many young workers). Older workers will also be entitled to higher amounts of the allowance itself and, above all, much longer allowance durations, in accordance with the legislation applicable during the 2010s examined here.<sup>33</sup>

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<sup>33</sup> An additional possibility is the use of unemployment benefit as a bridge to retirement, anticipated or not.

11.

# **DISCUSSION**

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Intergenerational fairness in the labour market in Portugal is a complex endeavour. However, such balance between different generations over the years in their opportunities and outcomes at work is clearly a key component for an in-depth understanding of intergenerational fairness.

**Being a young person in a more advanced decade has numerous potential benefits.** The most important examples will be those associated with access to new technologies (internet, mobile phone, health, etc.), more schooling, and more mobility (national and international). Possibly few young people in their 20s in the 2020s would choose to spend their youth in the past, for example in the 1960s, if this possibility were to arise. Would those that are older choose to relive their 20 years in the present or, alternatively, in the same decades in which they actually were young?<sup>34</sup>

Given the multiple labour market dimensions that are potentially relevant to characterize intergenerational fairness (unemployment, wages, qualifications, occupations, employment contract types, etc.), we chose to examine a broad set of these topics in this study. The findings were thus, without surprise, not always in the same direction. In view of this diverse set of results obtained, it may be difficult to conclude definitively in a specific sense as to the level of intergenerational fairness we have found. Furthermore, there is no clear comparison resulting from similar analyses for other countries. In any case, this study presents several innovative results for Portugal, which we sum up here. These results can be used to better understand this theme - but also to develop public policies that can contribute to increasing intergenerational fairness in the country.

A first result is the **heterogeneity and even dynamism of the labor market** that we have identified, with large variations in the number and profiles of workers of each generation over time (1986-2018). Contrary to what would be the case in static contexts, this pattern of significant change can already provide a favorable environment for the improvement of intergenerational fairness.

This aspect of accelerated change is particularly clear in the very pronounced **growth of the schooling of the new generations in relation to their predecessors.** However, this rapid improvement in schooling can be seen as putting previous generations at a disadvantage and creating problems at the level of intergenerational fairness. Another perspective is to consider that intergenerational iniquity results only from situations in which new generations face more difficult circumstances compared to the previous ones – which clearly did not happen in this case, from the perspective of schooling years.

A second result of our analyses refers to the increasingly **important role of women in the private sector employee labour market**, growing from only 20% in the generation born in the 1920s to almost 50% in the generation born in the 1990s. At the same time, the pay gap between women and men decreased from -40% to about -15% between the two generations. These developments can be seen as *significant gains* in intragenerational fairness but also have repercussions on intergenerational fairness: there are clear indicators of greater gender equality in younger generations, although there is still a significant pay gap.

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<sup>34</sup> In other words, the lack of access to these benefits by young people of previous generations does not necessarily entail symmetrical costs, since those benefits were not yet known. Somehow this may be a useful test to better understand intergenerational fairness.

The various wage-based views point to a strong convergence of these generations, particularly in base and median wages. For example, the four intermediate generations considered in the study (workers born between 1940 and 1979), who represent the overwhelming majority of the labour market in the period analyzed, all have median hourly wages of around seven euros. In other words, despite the great diversity of profiles, not only in age and professional experience, but also of schooling, workers of different generations and over the last years have very similar typical (median) salaries (despite intragenerational inequality).

This result of **great wage convergence** can be seen as consistent with intergenerational fairness, by establishing a limited differentiation of the salaries of workers with different profiles in terms of age, schooling, seniority, etc. In some way, these different factors balance and compensate each other, for example with the contribution of higher education of younger people cancelling out the contribution of the greater experience of older people.

On the other hand, this result may also follow from a high level of centralization of the wage formation process (namely through minimum wages, collective bargaining and extension ordinances), creating difficulties in the efficient allocation of workers between different companies and sectors of activity. In this context, more productive companies, typically those that develop new products and services, whose growth would be beneficial to the economy, may struggle to recruit workers from other companies. This slows down the reallocation process potentially promoted by the labour market and which is fundamental for sustainable economic growth. To the extent that most of the workers that could have been recruited in this reallocation drive would be younger workers, intergenerational fairness can also be impaired by wage centralisation.

The study also identifies some generational trends that may pose challenges to fairness in the labor market. For example, the **probability of changing employers in the early years in the labor market has increased from generation to generation. On the other hand, the probability of a change of occupation has decreased from generation to generation.** It is possible that the opposite cases (with less stability in the job but more stability in the occupation) would be more promising in terms of fairness. For example, with the acceleration of new technologies (automation, artificial intelligence) one might expect the probability of a change of profession to increase. Less stability in the occupation could already be expected for young people also because they have made fewer specific investments in a particular profession.

Another dimension that seems to be problematic in intergenerational fairness in Portugal is the **different prevalence of fixed-term employment contracts for workers of different generations.** This study identifies a very pronounced stability in the widespread use of these contracts among workers of the most recent generations. These contracts account for 70% of all 1990s generation employment contracts - while they account for a much lower value, although still high, of 40% among those born in the 1980s. By analyzing flows, we found that 80% of the transitions to employment for those born in the 1990s are based on fixed-term contracts – which compared with 70% or (much) less for older generation workers.

In our analysis of another database, we find results that suggest that **some social benefits may be being used disproportionately for some generations** and in a way that is at odds with social protection needs. This result applies particularly in the case of unemployment benefits, used to a large extent by older workers, despite higher unemployment rates among younger workers. This raises questions of intergenerational fairness, particularly among generations aged 50 or 60 in the 2000s (born in the 1940s or 1950s) and more recent generations (in particular those born in the 1970s or other more recent decades).

Finally, we find empirical evidence that suggests that **the business cycle has affected different generations in a different way**, with more negative impacts on the wages of workers born in the 1990s and less negative impacts on workers born in the 1970s and 1980s. These results can be explained by the situation of the economic cycle at the time each generation enters the labour market, a critical period at the level of the accumulation of professional experience and the determination of starting wages, and with influence in later periods.

This distinctive role of the economic cycle – in particular recessions – when each generation entered the labour market is a very relevant aspect of intergenerational fairness. Our results are consistent with analyses for other countries, identifying important effects of unemployment that the worker faces at the time he enters the labor market, effects that continue during the worker's career.

These analyses with individual data also indicate that **the education pay premium has been falling significantly for younger workers**, although not as pronounced when considering working-life pay. This last result suggests that **education not only increases the salary for those who work but also leads to an increased likelihood of finding work**. In any case, the fall in the returns to education may also result from other factors that inspire concerns about intergenerational fairness, such as a possible reduction in the quality of education or the link between the contents of the courses and the needs of companies.

In conclusion, in the context of these results summarized above, **what public policies can offer better prospects for promoting intergenerational fairness in the labour market?** This is a discussion which is presented here as a contribution to public debate - as well as encouraging future research work that complements the results of this study.<sup>35</sup>

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<sup>35</sup> It should be seen that demographic change, with the reduction in the number of young people as well as the significant levels of emigration among them, can set up the new generations as a less electorally relevant group. This situation can negatively affect intergenerational fairness in favor of younger people, which may in turn aggravate these demographic breaks.

**In this context, some suggestions are left here at the level of public policies, in a very synthetic way, underlining their potentially subjective character:**

**1.**

**Reduce the volatility of the macroeconomic cycle to the extent that may be possible, thus minimising the negative effects of recessions** on workers entering the labour market in such periods. More specific measures in this regard may include counter-cyclical fiscal policies, with budgetary surpluses in periods of growth and deficits in periods of macroeconomic contraction. Active labour market policies can also play an important role, particularly if they are targeted at young unemployed people who are otherwise at risk of prolonged economic "scars".

**2.**

**Correct possible imbalances between generations or between age groups** as to social security contributions and benefits, in particular in the area of unemployment benefits, by seeking to avoid their use as a "bridge" between employment and retirement (anticipated or not) and, where appropriate, considering its extension among younger workers.

**3.**

**Promoting the wider use of fixed-term** ("permanent" contracts), not necessarily by introducing additional restrictions on fixed-term contracts (which may play an important role for temporary employment needs of enterprises) but above all by minimising the legal risk associated with the termination of permanent contracts for workers' ("subjective") causes.

**4.**

**Counter the reduction of the economic impact of education on younger generations,** as is apparent from some of the analyses, by improving the quality of that education, by better adjusting the contents of the different courses to the needs of businesses, and by strengthening the labour market information system. Measures of this nature could improve the alignment between demand and labour supply, particularly among the most skilled, leading to an increased impact of education on wages – as well as improvements in business performance.

**5.**

**Consider adjustments to wage determination mechanisms** (including the analysis of the potential relevance of collusion practices in the labour market), allowing greater differentiation between companies and sectors with different levels of productivity and facilitating the reallocation of workers (particularly younger ones) to new, more productive and better-paid activities.

# 12.

## **EPILOGUE:**

INTERGENERATIONAL  
FAIRNESS AT WORK  
IN THE CONTEXT  
OF THE PANDEMIC

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The pandemic and the recession that followed is having significant effects on the labour market: the number of unemployed increased by around 100,000 between February and December 2020, reaching a total of 375,000 people. On the other hand, the number of workers covered by the “layoff” mechanism (short-time work scheme) amounts to more than 1.3 million workers at the end of 2020.

Many of these workers, namely in restaurants, hotels, retail trade and events management, may become unemployed as the layoff scheme is suspended. **It is difficult to foresee a return to a pre-2020 outcome without a significant increase in unemployment.** Note that the OECD forecasts involve potentially high unemployment over a long period.

Given the main results of the study, **it is foreseeable that this crisis will not be equitable in intergenerational terms**, as its negative impacts will largely affect younger generations. The hiring of new workers, in particular those who completed their school year in the 2019/20 school year or other workers with non-renewed fixed-term contracts, will have been affected negatively. These individuals may experience increased work difficulties not only now but also over the next few years.

On the other hand, it is important to keep in mind the structural dimension of the challenge, as certain sectors are most affected, as well as certain occupations – such as those in which remote work is less feasible. Some companies in a situation of greater fragility, from various sectors, with workers of different generations, may not be able to resume their activities fully, after several months closed or faced several restrictions on their activity. These aspects make the shock less concentrated in younger generations but still highlight the great challenge that the pandemic shock puts to intergenerational fairness at work in Portugal.

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# APPENDIX

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## DATABASES

The main database used in this study is the "Personnel Records" ("Quadros de Pessoal"). The law states that all Portuguese companies with at least one employee have to send an annual set of extensive information to the Ministry of Labor both about the company itself and on each of its employees. This information includes the salaries of each worker, as well as various other characteristics (age, education, gender, date of employment, type of employment contract – from 2002 - profession, etc.). The information also includes a unique and unique identifier for each worker, which allows to follow the individual from year to year even if he changes company. The "Personnel Records" also includes extensive information about the company and its establishments, including also identifiers for them. In its broader versions, as in that analysed in this study, the basis includes more than 80 million observations, each corresponding to one worker in a year.

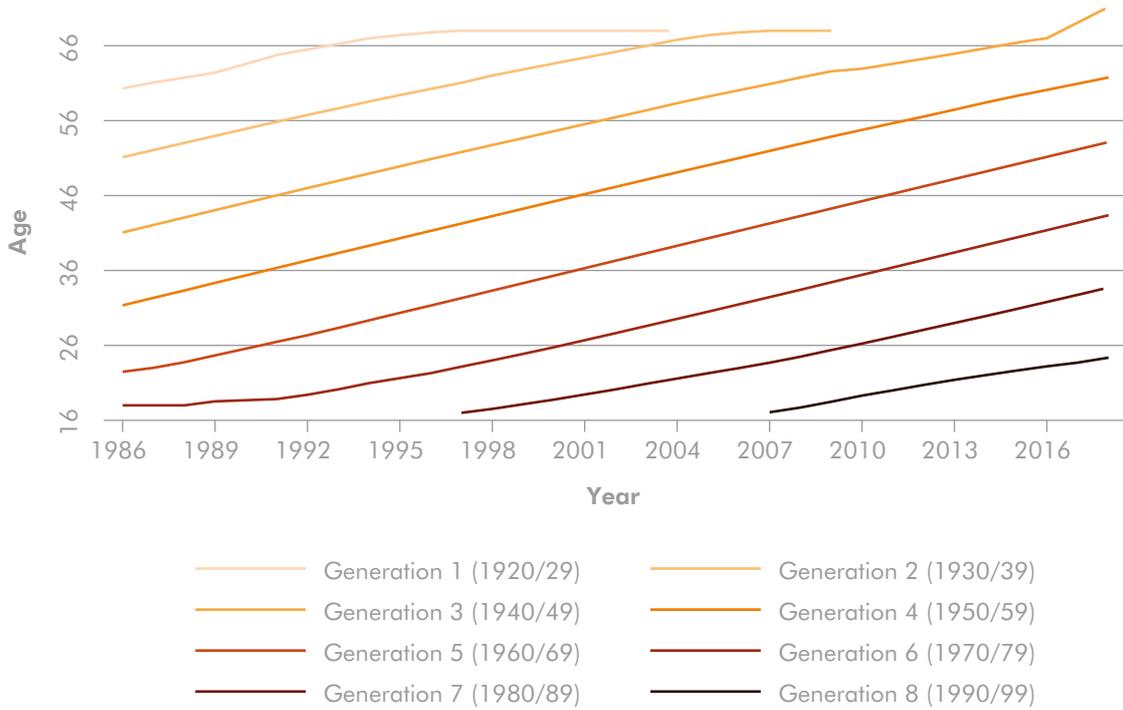
In any event, some limitations of the basis should be taken into account, in particular at the level of a longitudinal analysis as broad as that conducted in this study. These limitations include: the lack of data on workers in 1990 and 2001; the breakdown of submissions by companies at the time of the entry into force of the Single Report in 2010; the change of the reference month from March to October in 1994; changing profession codes in 1995 and 2010; and the gradual increase in workers with private employment contracts in the public sector, notably since the 2004 reform.

The second database used in this study is the monthly register of remuneration (and their contributions) to social security in Portugal. This database includes individual information of all registered workers, on beplay, in self-employed work, members of statutory bodies and still domestic service workers, and refers to the period between January 2000 and September 2010. This database also includes information on social benefits paid by social security, in each month, to each individual, for social security as a subsidy of unemployment, subsidy of doenca and subsidy of parenthood.

Finally, we also analyzed the Inquerito to Emprego database for the period between the first quarter of 2011 and the third quarter of 2020. This quarterly database focuses on a representative sample of about 40,000 individuals in Portugal, including employees, unemployed and inactive of all ages.

# FIGURES

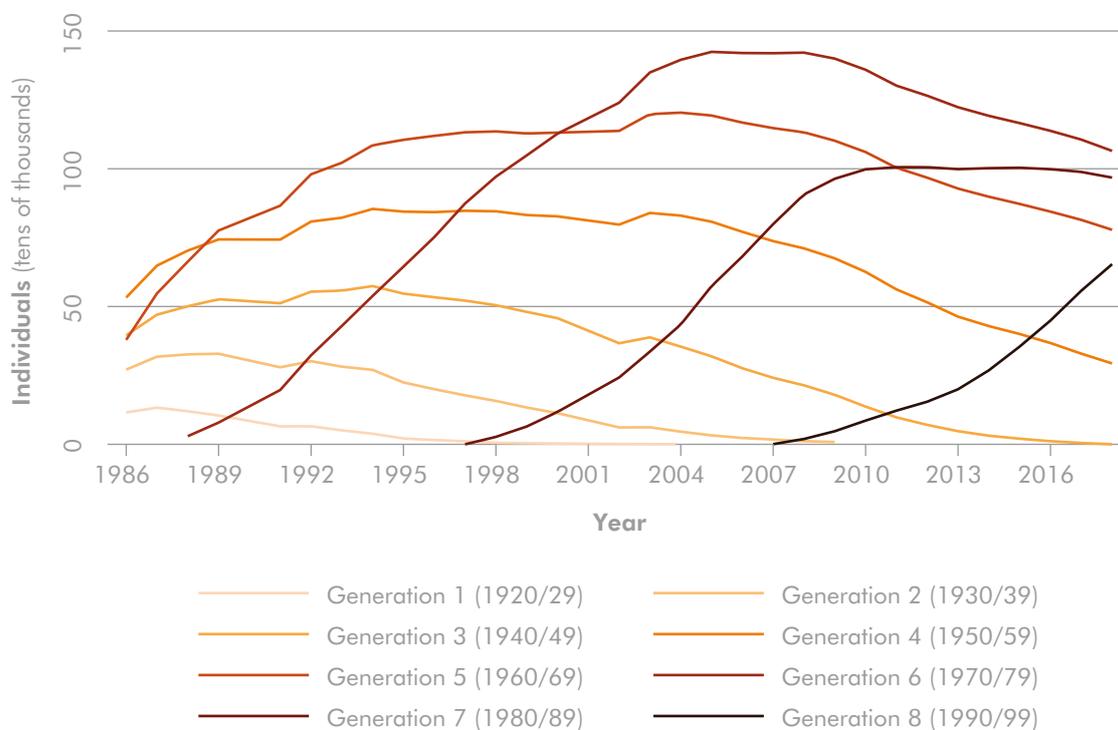
Figure A1  
Average age of workers



Notes: Average age of workers per year and per generation. Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

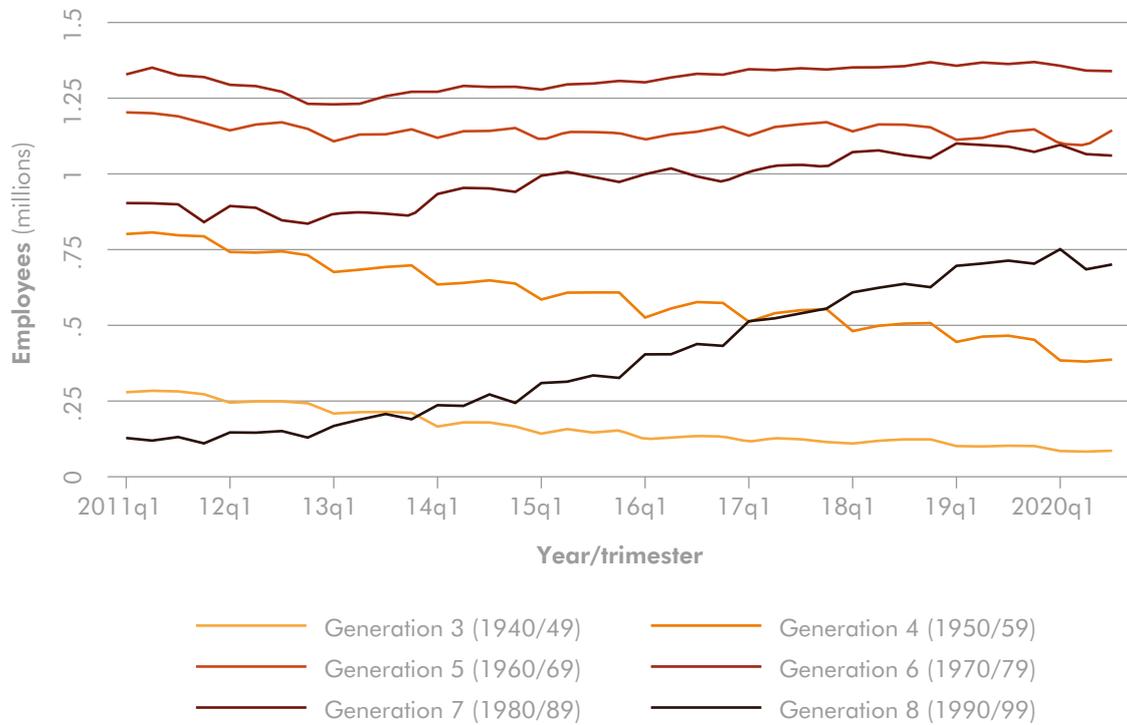
Figure A2  
**Number of individuals**



Notes: Number of individuals (in tens of thousands) per year and per generation. Each individual is considered to work as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each individual is also in other years between 18 and 68 years of age after the first observation in which they work at the base and before the last observation in which they work on the base. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

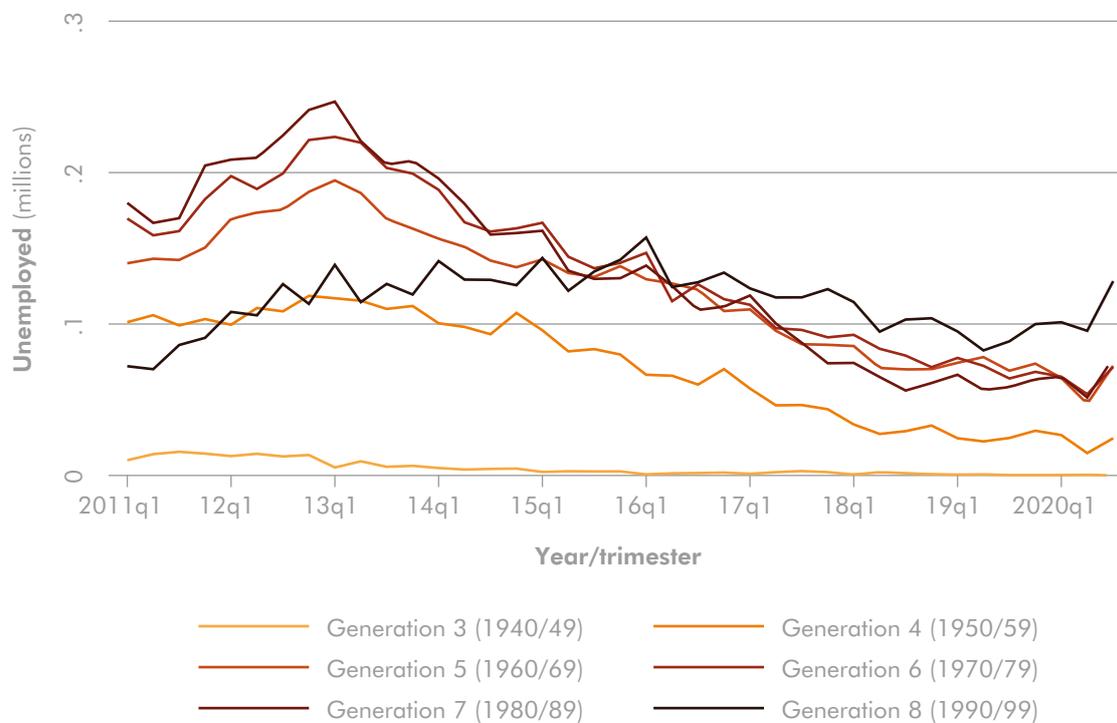
Sources: "Personnel Records" (1986-2018) and author's analysis.

Figure A3  
**Number of employees  
(Inquérito ao Emprego)**



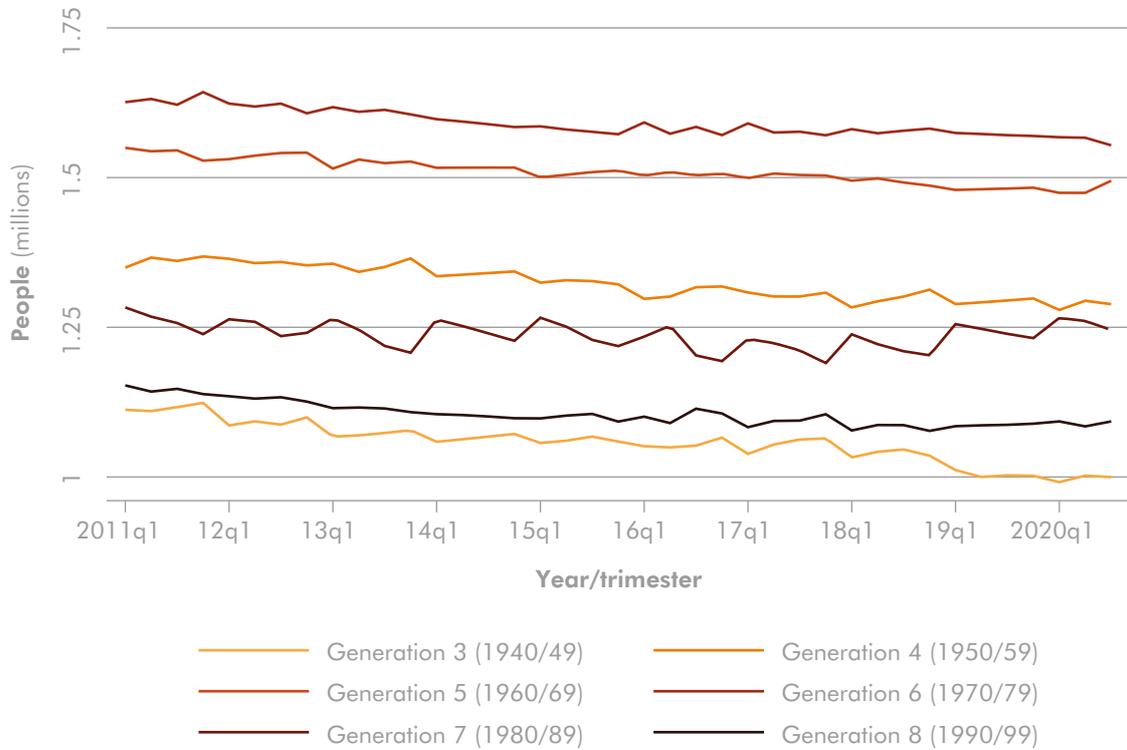
Sources: Inquerito ao Emprego (2011q1-2020q3) and author's analyses.

Figure A4  
**Number of unemployed  
(Inquérito ao Emprego)**



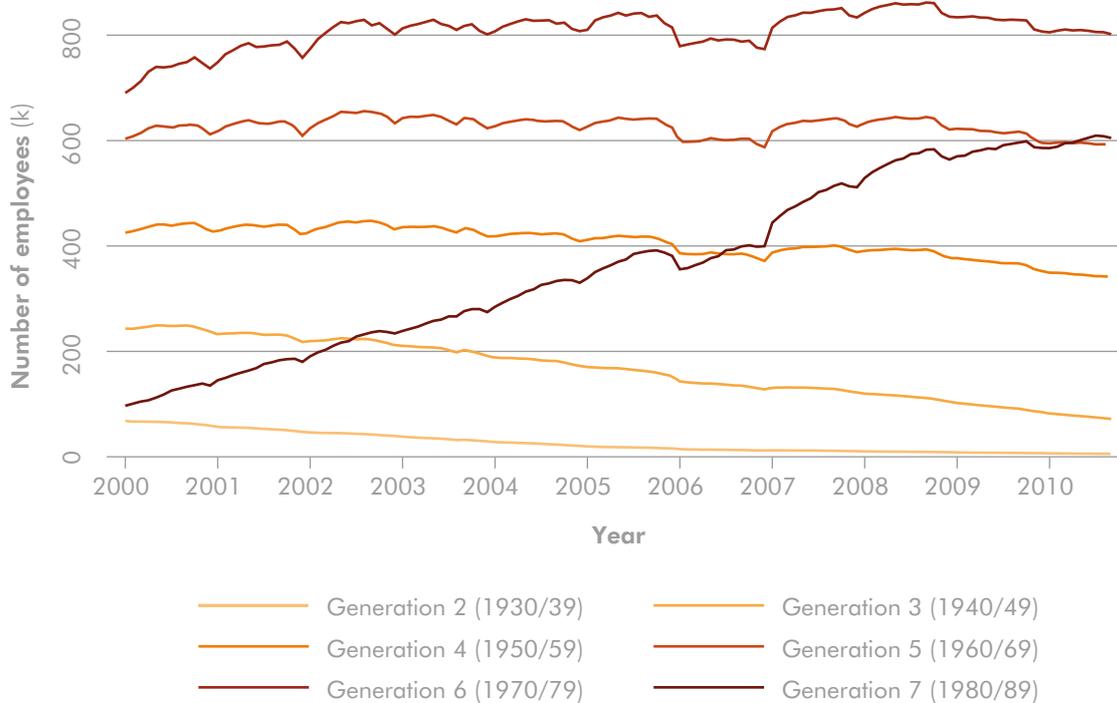
Sources: Inquerito ao Emprego (2011q1-2020q3) and author's analyses.

Figure A5  
**Number of individuals  
(Labour Force Survey)**



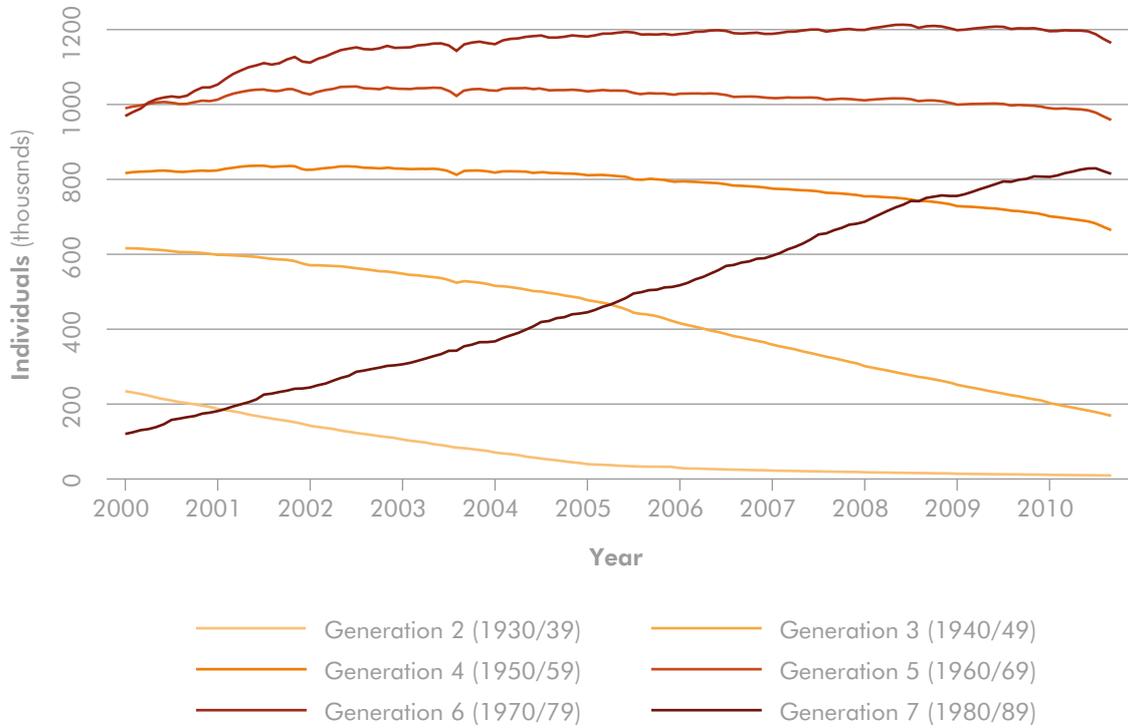
Sources: Labour Force Survey (2011q1-2020q3) and author analyses.

Figure A6  
**Number of employees  
 (Social Security)**



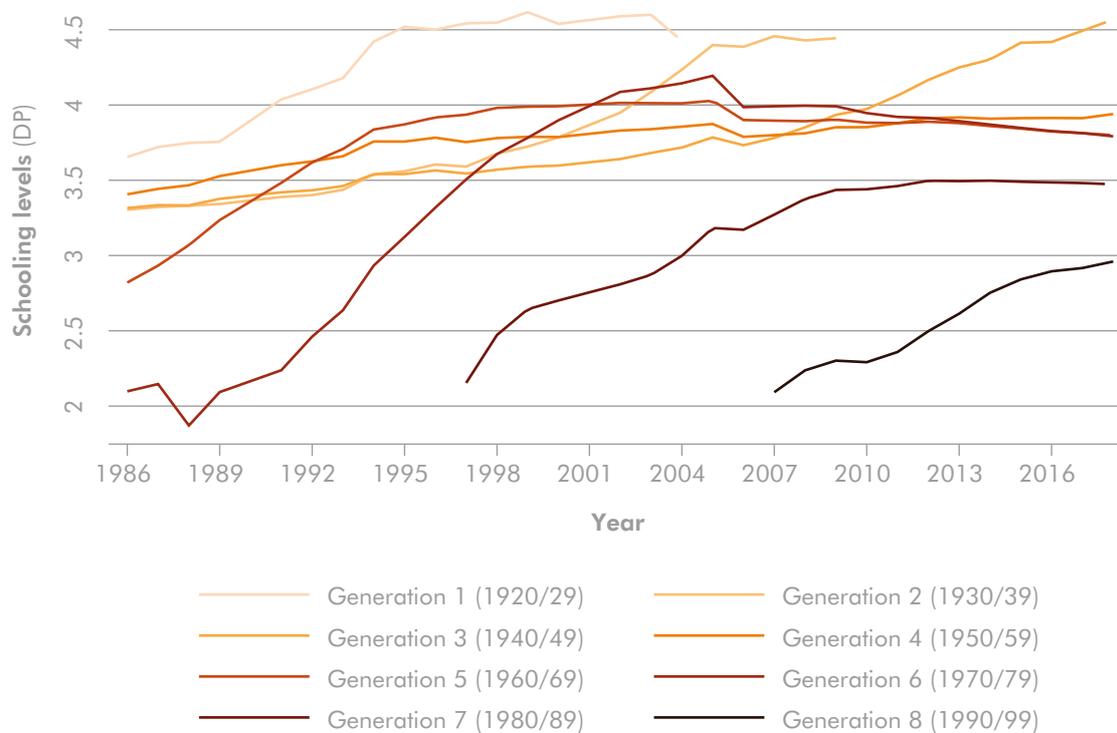
Sources: All monthly social security database registrations (2000-2010) and author reviews.

Figure A7  
**Number of individuals  
(Social Security)**



Sources: All monthly social security database registrations (2000-2010) and author reviews.

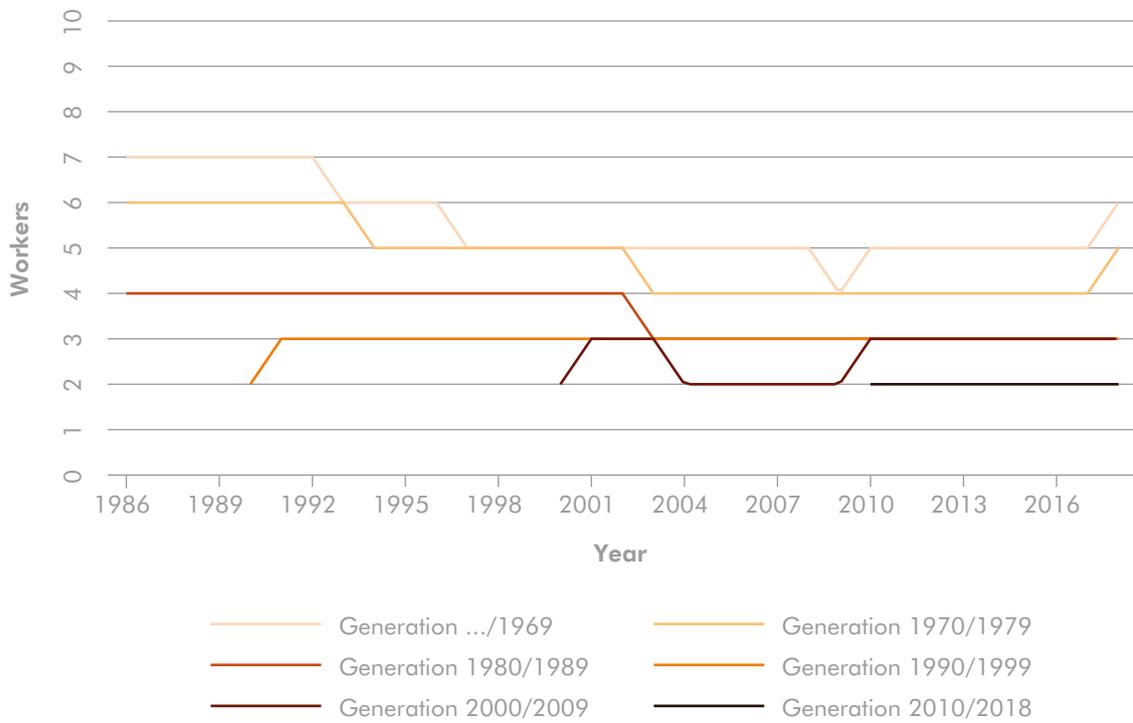
Figure A8  
**Dispersion of schooling levels**



Notes: Dispersion of schooling levels by year and by generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

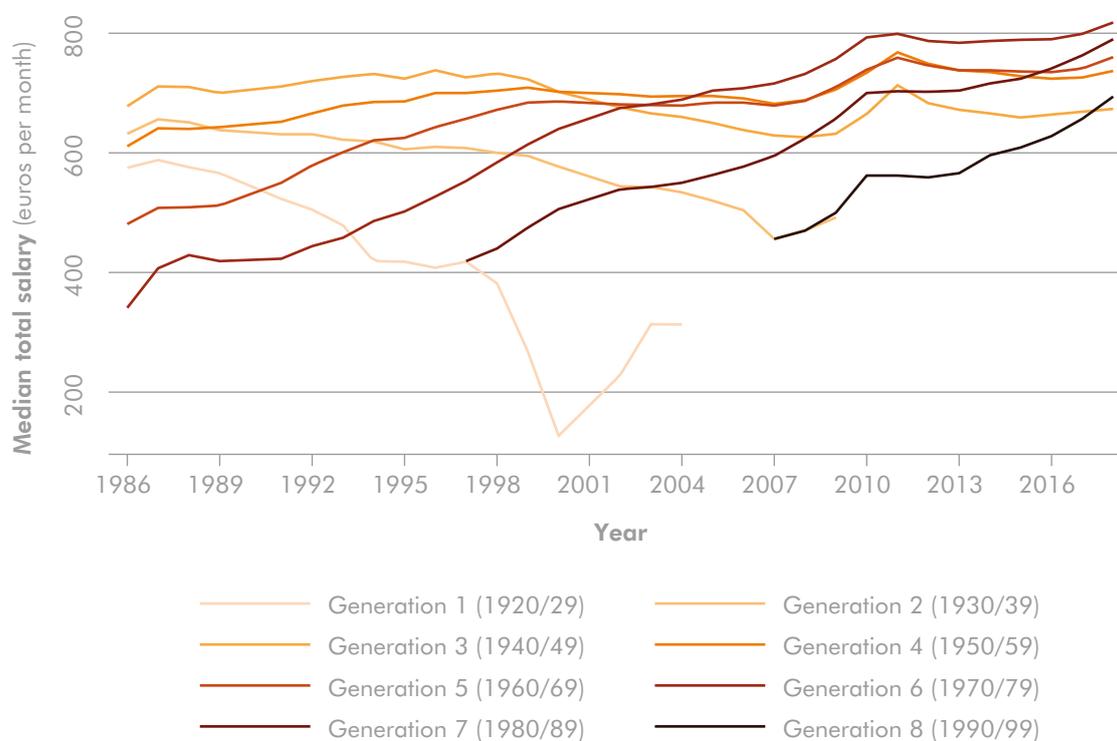
Figure A9  
**Number of median workers**



Notes: Each of the six generations defined by the company's constitution year (until 1969, 1970-79, 1980-89, 1990-99, 2000-2009, 2010-2018).

Sources: All companies of the "Personnel Records" (1986-2018) and author's analyses.

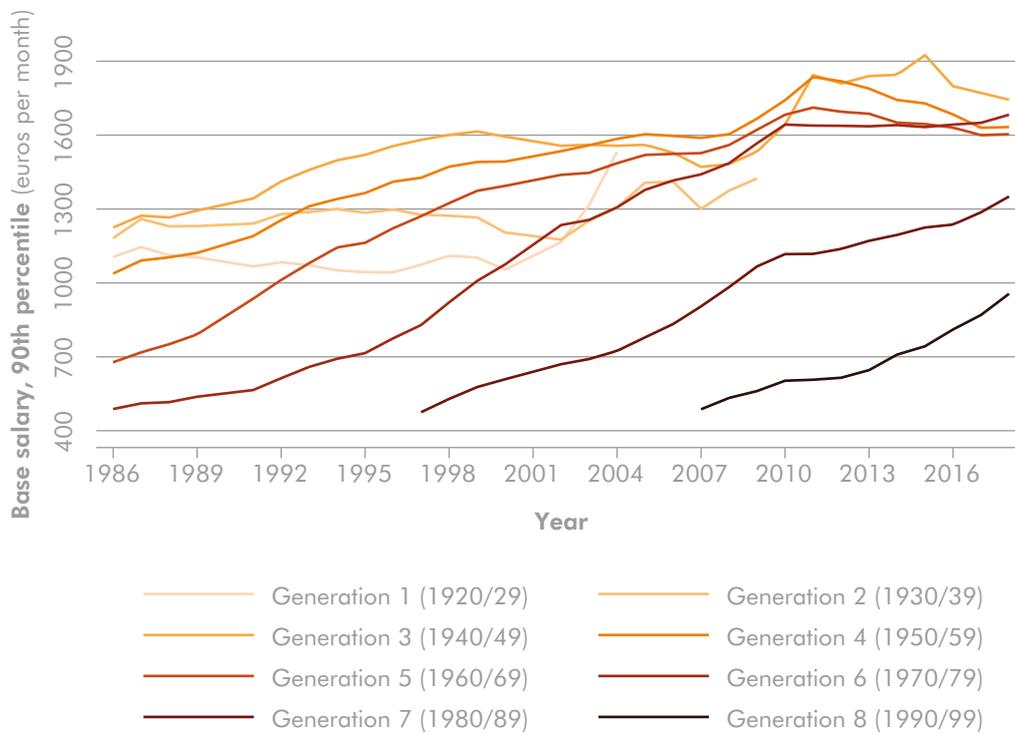
Figure A10  
**Median total salary**



Notes: Average real total salary per year and per generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

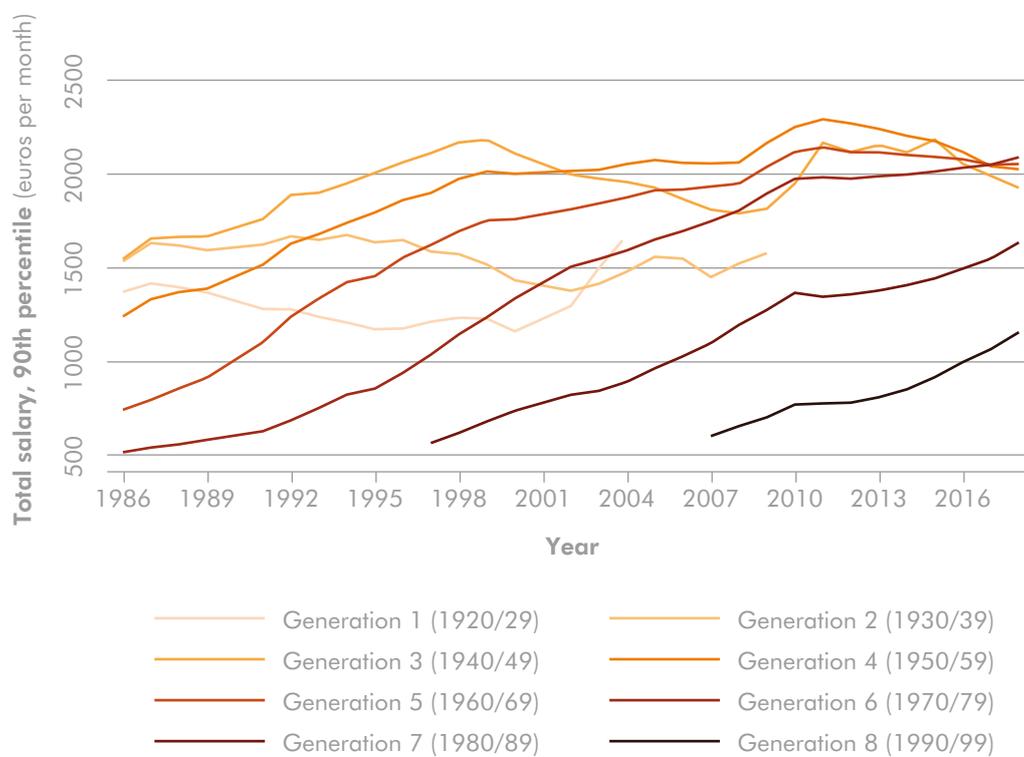
Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Figure A10\*  
**Base salary, 90<sup>th</sup> percentile, by generation and year**



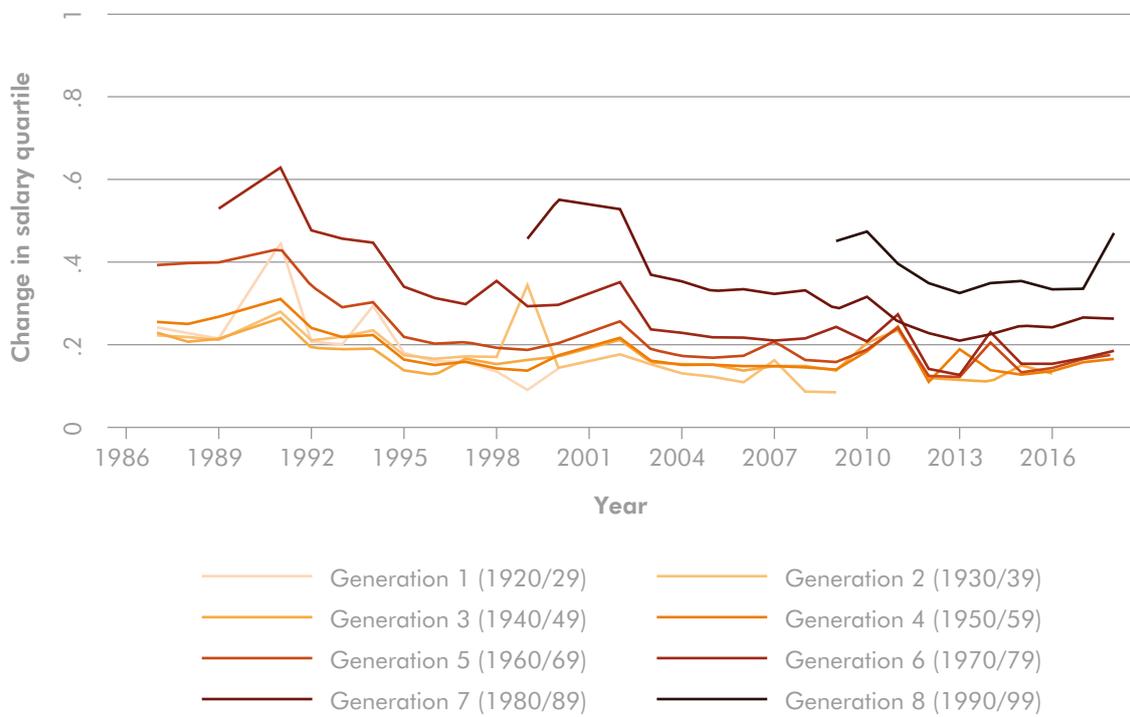
Sources: All the employees from Personnel Records (1986-2018); author's analyses.

Figure A10\*\*  
**Total salary, 90<sup>th</sup> percentile, by generation and year**



Sources: All the employees from Personnel Records (1986-2018); author's analyses.

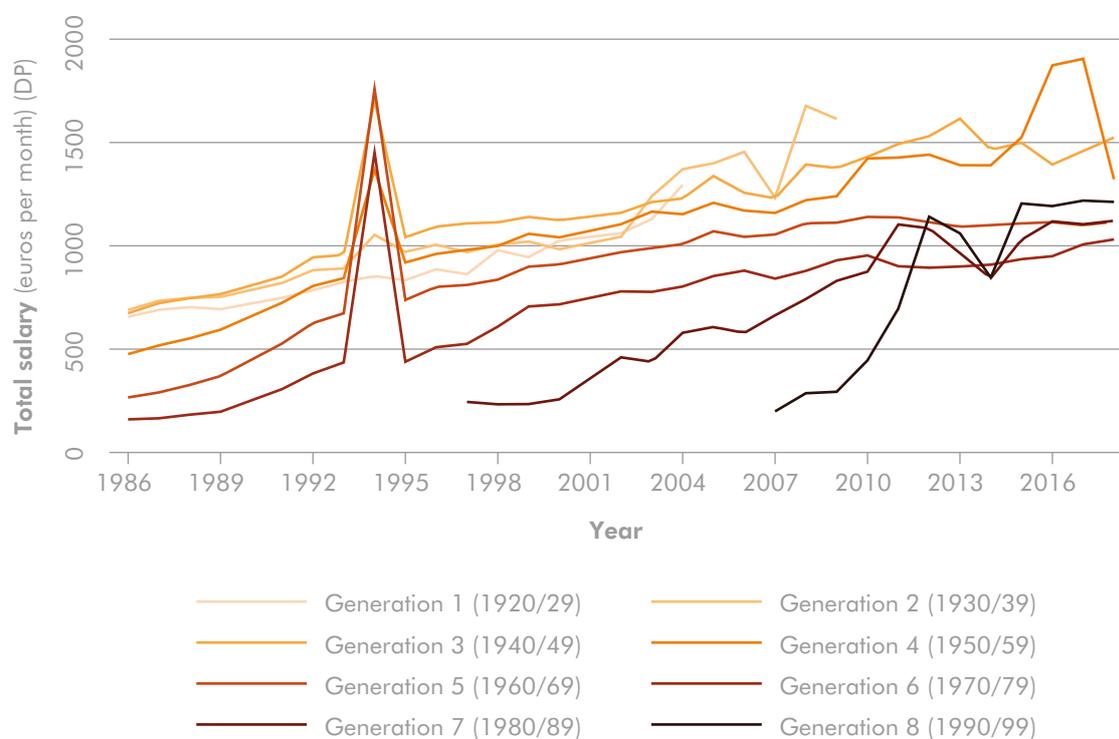
Figure A11  
**Intra-generation wage mobility**



Notes: Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

Sources: "Personnel Records" (1986-2018) and author's analysis.

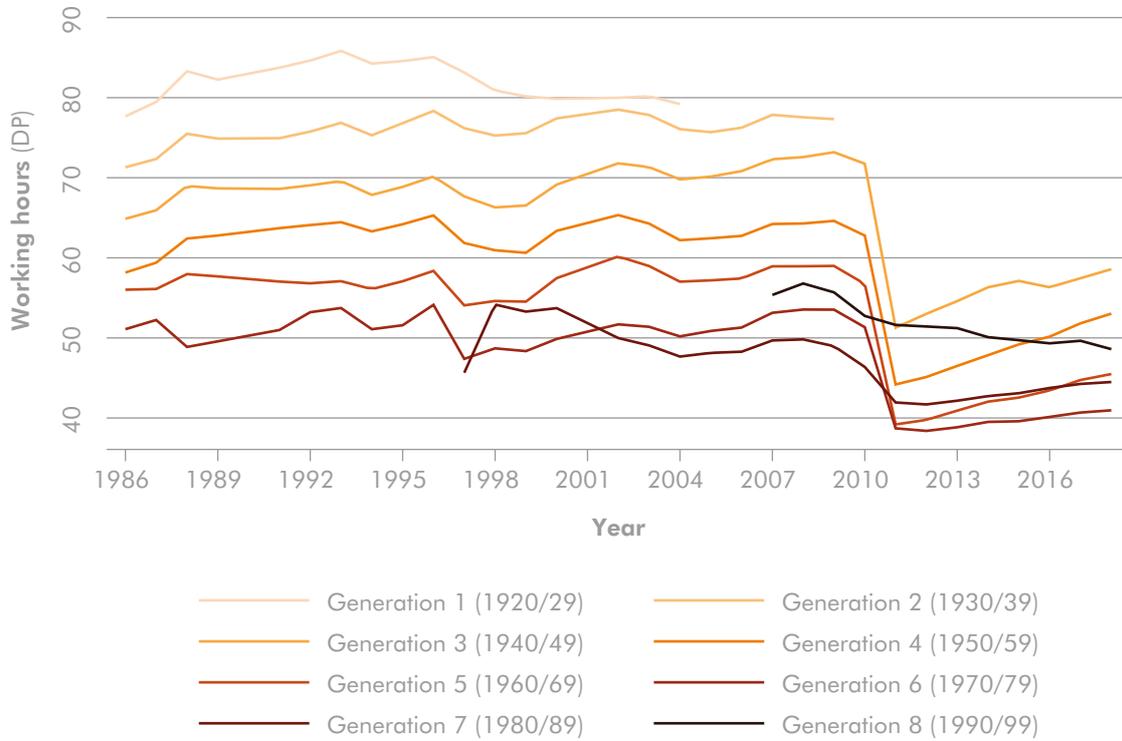
Figure A12  
**Total salary dispersion**



Notes: Dispersion of total salary per year and per generation. Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

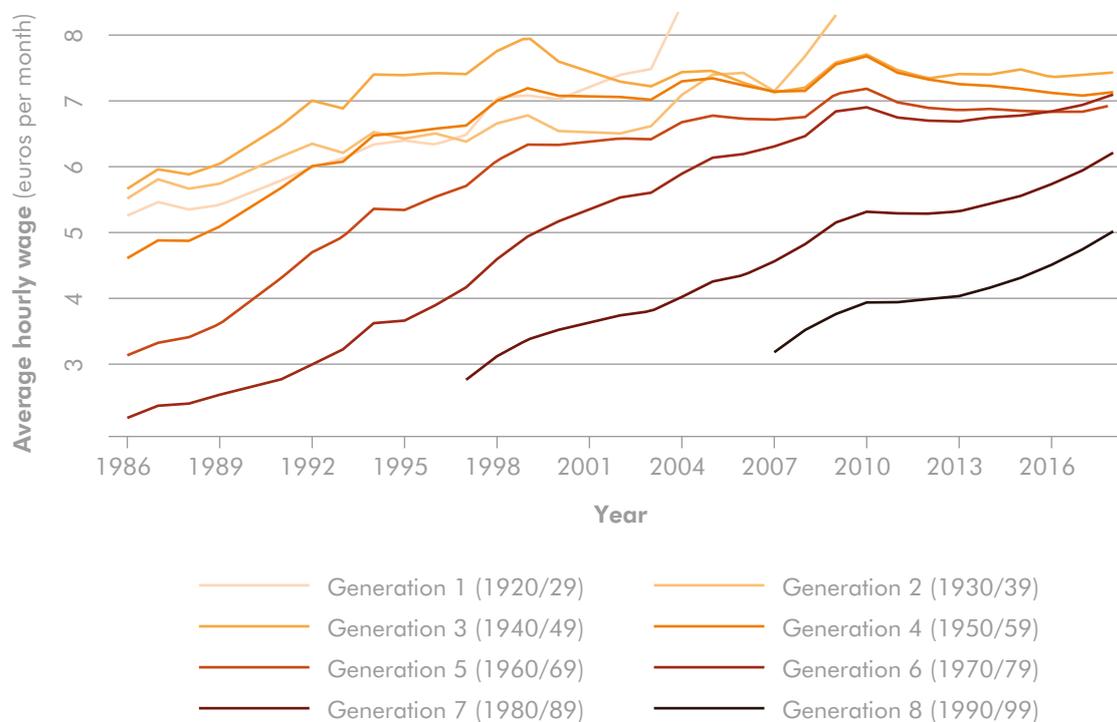
Figure A13  
**Dispersion of working hours**



Notes: Dispersion of hours worked per year and per generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

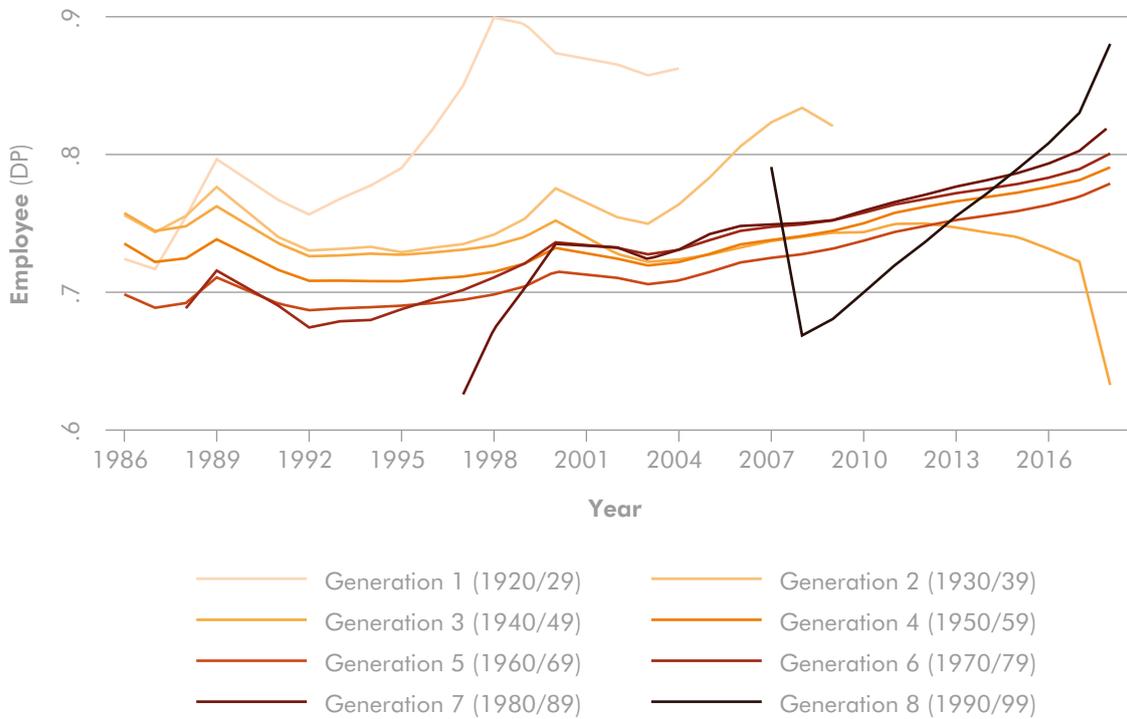
Figure A14  
Average hourly wage



Notes: Average total total hourly wage per year and per generation (2017 euros). Each individual is considered only if they work as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

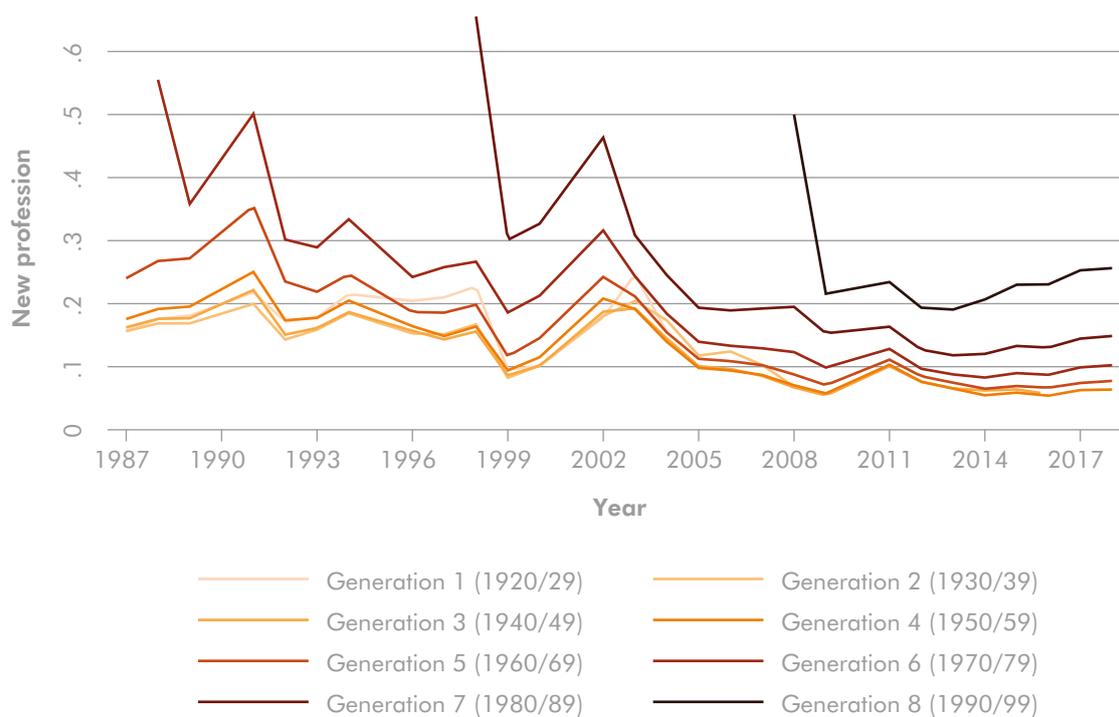
Figure A15  
**Percentage of years in employment**



Notes: Percentage of total years with employment per year and per generation. Each individual is considered only if they work as a worker on behest of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses

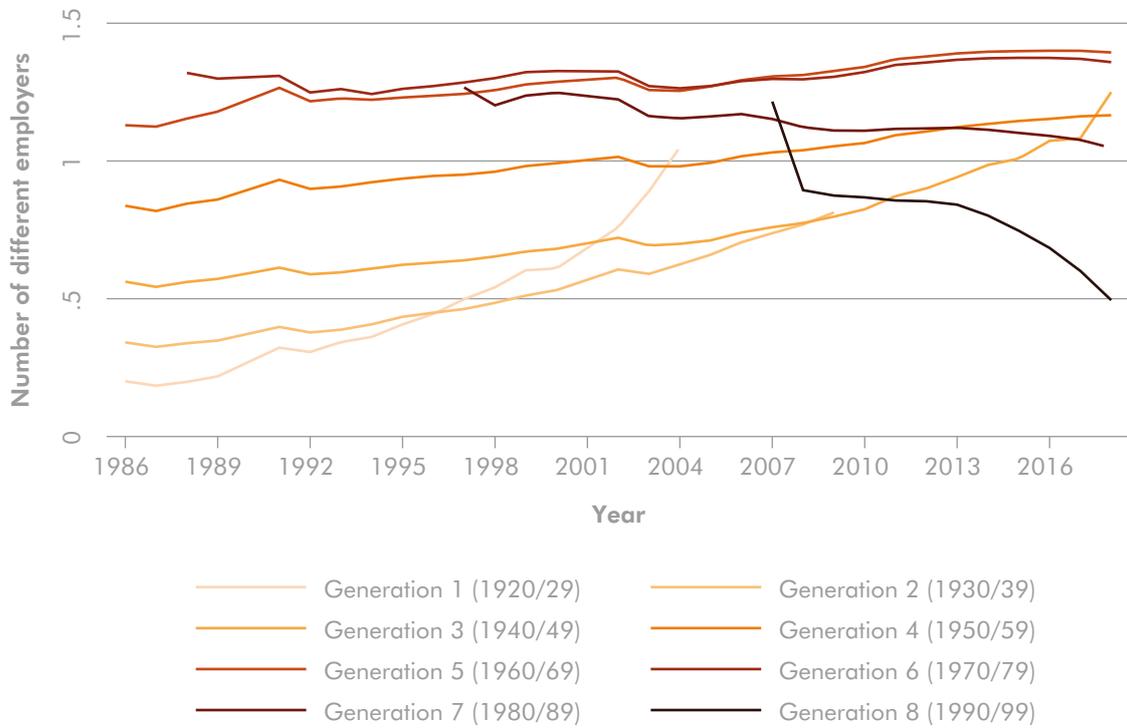
Figure A16  
Change of profession



Notes: Probability of change of profession by year and by generation (2017 euros). Each individual is considered only if he or she works as an employee in October of the respective year (March up to 1993 inclusive). Individuals who do not work in the year and the previous year are excluded. Results from 1995 and 2010 are interpolated since the professions code changes in those years. Profession defined in three digits (about 250 different professions per year in the three different classifications of professions). Individual data for 1990 and 2001 are not available - the 1991 and 2002 views are made with 1989 and 2000, respectively. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Sample of 33% of individuals present at least one year in the period 1986-2018.

Sources: "Personnel Records" (1986-2018) and author's analysis.

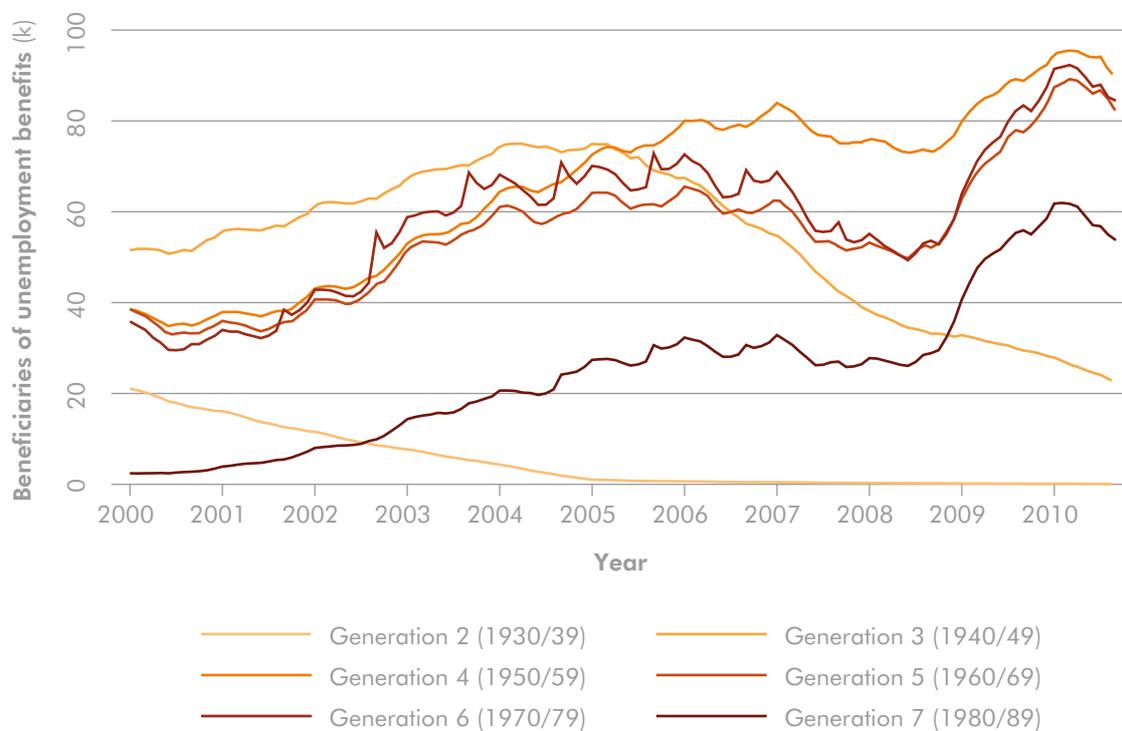
Figure A17  
**Number of different employers**



Notes: Dispersion of schooling levels by year and by generation. Each individual is considered only if they work as a worker on behalf of another person in October of the respective year (March up to 1993 inclusive). Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999).

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Figure A18  
**Beneficiaries of unemployment benefits (Social Security)**



# TABLES

Table B1  
**Profitability of education,  
 1986-2018 (additional controls)**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Educ</b>	.078 (.0004)	.090 (.0002)	.097 (.0001)	.092 (.00008)	.087 (.00006)	.076 (.00005)	.058 (.00009)	.041 (.0003)
<b>Woman</b>	-.341 (.004)	-.417 (.002)	-.405 (.0009)	-.335 (.0006)	-.299 (.0004)	-.235 (.0004)	-.177 (.0006)	-.155 (.001)
<b>Age</b>	.266 (.020)	.117 (.003)	.116 (.0008)	.076 (.0003)	.067 (.0002)	.076 (.0003)	.088 (.0007)	.121 (.005)
<b>Age<sup>2</sup></b>	-.002 (.0002)	-.001 (.00002)	-.001 (0)	-.0007 (0)	-.0007 (0)	-.0008 (0)	-.001 (0)	-.001 (.0001)
<b>Year</b>	.003 (.0008)	.007 (.0003)	.002 (.0002)	-.012 (.0001)	-.008 (.00008)	-.014 (.00008)	-.014 (.0001)	.004 (.0004)
<b>Obs.</b>	123132	631142	1782443	3942185	5839215	5937420	3087891	678733
<b>R<sup>2</sup></b>	.24	.288	.338	.334	.352	.32	.207	.124

Notes: The coefficients presented result from a return of the logarithm of the actual total salary of each worker (of each generation) in each year in schooling, gender, age and age squared and a linear control for the year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Table B2  
**Profitability of education, total income per individual,  
 1986-2018 (additional controls)**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Educ</b>	.091 (.0008)	.097 (.0005)	.099 (.0004)	.092 (.0003)	.103 (.0003)	.099 (.0002)	.094 (.0003)	.063 (.0004)
<b>Woman</b>	-.364 (.007)	-.467 (.004)	-.439 (.003)	-.284 (.002)	-.203 (.002)	-.182 (.002)	-.176 (.002)	-.162 (.002)
<b>Age</b>	-1.227 (.036)	-.628 (.007)	-.302 (.003)	-.173 (.001)	-.068 (.001)	.165 (.001)	.206 (.002)	.536 (.006)
<b>Age<sup>2</sup></b>	.009 (.0003)	.005 (.00006)	.003 (.00003)	.002 (.00002)	.0009 (1.00e-05)	-.003 (.00002)	-.004 (.00004)	-.011 (.0001)
<b>Year</b>	-.070 (.002)	-.079 (.0008)	-.061 (.0005)	-.071 (.0004)	-.044 (.0004)	-.039 (.0003)	-.096 (.0003)	-.211 (.0004)
<b>Obs.</b>	132408	424826	819758	1326928	1776986	1918129	1337258	679319
<b>R<sup>2</sup></b>	.18	.241	.236	.169	.121	.112	.184	.297

Notes: The coefficients presented result from a return of the logarithm of the sum of the total real wages of each worker over the years in which the individual (of each generation) worked in the following variables: schooling, gender, age and age squared and a linear control for the year. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Table B3  
**Wages and unemployment by generation,  
 2002-2018**

	Gen2 (1)	Gen3 (2)	Gen4 (3)	Gen5 (4)	Gen6 (5)	Gen7 (6)	Gen8 (7)
<b>Unemp</b>	-.005 (.004)	-.009 (.004)**	-.003 (.001)***	-.004 (.001)***	-.003 (.001)**	-.005 (.002)***	-.018 (.003)***
<b>Year</b>	-.016 (.001)***	.0002 (.004)	.0008 (.0008)	.004 (.0008)***	.012 (.0009)***	.026 (.001)***	.054 (.005)***
<b>Obs.</b>	36914	442880	1923904	3473985	4561508	2988634	609520
<b>R<sup>2</sup></b>	.918	.888	.848	.813	.745	.592	.574

Notes: The coefficients presented result from a return of the logarithm of the actual total salary of each worker (of each generation) in each year in the unemployment rate of that year, in a linear control for the year, and a fixed effect specific to each worker. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals of the "Personnel Records" (2002-2018) and author's analyses.

Table B4  
**Wages and inflation by generation,  
 1986-2018**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Infl</b>	-.004 (.002)**	-.010 (.002)***	-.012 (.002)***	-.017 (.002)***	-.020 (.003)***	-.009 (.006)	.001 (.007)	.021 (.009)**
<b>Year</b>	.003 (.002)	.004 (.002)	.006 (.001)	.005 (.001)	.008 (.001)	.015 (.002)	.025 (.002)	.070 (.005)
<b>Obs. R<sup>2</sup></b>	105612 .868	594849 .846	1721525 .831	3856335 .787	5738908 .745	5853177 .704	3032560 .589	609520 .571

Notes: The coefficients presented result from a return of the logarithm of the actual total salary of each worker (of each generation) in each year at the inflation rate of that year, in a linear control for the year, and in a fixed effect specific to each worker. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Table B5  
**Wages, unemployment and inflation by generation,  
 1986-2018**

	Gen1 (1)	Gen2 (2)	Gen3 (3)	Gen4 (4)	Gen5 (5)	Gen6 (6)	Gen7 (7)	Gen8 (8)
<b>Some</b>	-.011 (.001)***	-.015 (.003)***	-.015 (.001)***	-.010 (.002)***	-.010 (.003)***	-.006 (.003)**	-.005 (.002)***	-.017 (.003)***
<b>Infl</b>	-.008 (.001)***	-.016 (.002)***	-.011 (.001)***	-.014 (.002)***	-.019 (.003)***	-.009 (.006)	0 (.007)	.010 (.004)***
<b>Year</b>	-.002 (.002)	-.0003 (.002)	.007 (.0006)	.008 (.002)	.011 (.002)	.017 (.002)	.026 (.002)	.056 (.005)
<b>Obs. R<sup>2</sup></b>	105612 .868	594849 .847	1721525 .832	3856335 .788	5738908 .746	5853177 .704	3032560 .59	609520 .574

Notes: The coefficients presented result from a return of the logarithm of the actual total salary of each worker (of each generation) in each year in the unemployment and inflation rates of that year, in a linear control for the year, and in a fixed effect specific to each worker. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) and author's analyses.

Table B6  
**Wages and unemployment by generation,  
workers up to 35 years, 1986-2018**

	Gen4 (1)	Gen5 (2)	Gen6 (3)	Gen7 (4)	Gen8 (5)
<b>Unemp</b>	-.003 (.005)	-.004 (.003)	-.016 (.002)***	-.006 (.001)***	-.018 (.003)***
<b>Year</b>	.029 (.002)***	.036 (.001)***	.034 (.001)***	.028 (.002)***	.054 (.005)***
<b>Obs.</b>	516012	2086154	3620942	2874944	609520
<b>R<sup>2</sup></b>	.826	.754	.715	.588	.574

Notes: The coefficients presented result from a return of the logarithm of the actual total salary of each worker (of each generation) in each year in the unemployment rate of that year, in a linear control for the year, and a fixed effect specific to each worker. Each of the eight generations defined by the year of birth of the individual (1920-1929, 1930-39, ..., 1990-1999). Standard errors fixed for clustering at year level.

Sources: All individuals from the "Personnel Records" data set (1986-2018) with up to 35 years of age in the year considered in the sample and author's analyses.





