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Did Belgium withstand the storm of rising inequalities? Income Inequality in Belgium, 1985-2021*

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Abstract

Belgium exhibits a rather constant level of income inequality during the last decades, contrary to Germany, the United States, and some Nordic countries, which all faced substantial increases in inequality. We use the available surveys from 1985 to 2020 to describe the evolution of income inequality by means of the Gini index. Earnings inequality has slightly decreased in the last two decades, at least if one takes into account the impact of the substantial increase in employment of especially older and female persons. Though the education gap in earnings is widening, the rapid increase in (mostly female) education may have a dampening effect on earnings inequality. The income surveys largely underestimate financial capital incomes. Moreover, they, by definition, do not cover undistributed profits of the corporate sector. When correcting for this, it turns out that pre-tax factor income inequality increased substantially between 2009 and 2016. The redistributive role of the welfare state through taxes has increased, while redistribution through the social security system exhibited a more irregular course. While there has been an increase in assortative matching in the last two decades, its impact on the evolution of income inequality is unclear.

JEL Classification: D31, D33, D63.

Keywords: Income Inequality, Capital income, Undistributed profits, Distributional National Accounts, Belgium.

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I. Introduction

Assal et al. (2023) provide an overview of existing evidence on income inequalities in Belgium. Most studies agree that the Gini of equivalised household disposable income has declined somewhat since 2004. There is less unanimity about the evolution of the top income shares based on fiscal register data of taxable income. The variable population in the tax databases, due to non-filers and changes in legal regulations and administrative practices, is one of the major issues (Decoster et al., 2017). While the evolution of pre-tax factor income —that is income from labour, capital, and self-employment before taxes— inequality is less stable, and critically depends on who is included in the calculation of the statistics, there is certainly no evidence that there has been a substantial rise in factor income inequality during the last two decades. The share of labour income in GDP is lower now than at the end of the seventies and the early eighties of the previous century. While highly volatile during the last two decades, the labour income share is not further declining though. Among high-income countries, Belgium belongs (together with for example France) to the group of countries with a rather constant level of income inequality during the last decades, contrary to Germany, the United States, and the Nordic countries (especially Denmark, Sweden, and Finland), who all faced substantial increases in inequality.[1] Moreover, income inequality in Belgium seems to be rather low compared to other rich countries.

In the present contribution we investigate in detail whether Belgium indeed withstood the storm of rising income inequalities faced by some other high-income countries. After a brief description of the data in Section II, we focus in Section III on gross earnings (income from employees and self-employed before taxes are subtracted). We investigate the evolution of the gender and education gap in earnings and their contribution to earnings inequality. We devote special attention to the impact of the number of persons with zero incomes, on the evolution of earnings inequality. This leads to the hypothesis that increasing employment rates may have contributed to the declining trend of earnings inequality during the first two decades of the 21st century observed in our data. It remains an open question whether this increase in employment rate has impacted inequality figures of other OECD countries too.[2] But even if we concentrate on the working population, there is no evidence of rising earnings inequality according to the Gini index.

[1] Both, Eurostat (https://ec.europa.eu/eurostat/web/income-and-living-conditions, based on the EU-SILC surveys) and OECD (Income Inequality Database; https://www.oecd.org/social/income-distribution-database.htm) provide extensive statistics on income inequality for their member countries. While Eurostat focuses on disposable income, the OECD database also contains material on factor income and gross income (factor income plus gross replacement income, such as unemployment benefits and pensions). The World Inequality Database (WID, https://wid.world/wid-world/) collects Distributional National Accounts for as many countries as possible, and as far back in time as possible. With respect to inequality measures, they focus on income shares of different income groups, though they also provide Gini indices for some income series. As a part of the Institute of Fiscal Studies Deaton Review on Inequalities, harmonised reports on a set of income inequality statistics for 17 high-income countries were compiled (see https://ifs.org.uk/inequality/country-studies/).

[2] Usually inequality statistics for gross income are calculated for the working population only. Such statistics provide then information on both, the differences in hours worked, and the difference in renumeration of different types of labour activity.

We further scrutinise this conclusion on the basis of three popular arguments in the literature. First, it has been argued that rising income inequalities are to a large extent driven by capital income inequality. In Section IV, we investigate the contribution of capital income to factor income inequality. In the surveys we use, financial capital income captures only a small fraction of (financial) capital income in the National Accounts, contrary to employee's income who are fairly well covered. This is partly due to underreporting and unrepresentativeness of the sample, but also because part of financial capital income (undistributed profits of the corporate sector) is not intended to be captured by surveys on household incomes. There is however a tendency in Belgian society to incorporate economic activities and to keep and enjoy the profits and benefits they generate within the corporate entity. Using Distributional National Accounts methods (Blanchet et al., 2021) to allocate the entire Net National Income to the population and analyse the inequality of the resulting income distribution, we find that between 2009 and 2016, Belgium indeed faced a period of rising income inequality.

Second, we move from factor income to disposable income. In Section V, we describe the redistributive impact of both the social security system and taxes. Although there is a tendency to increased redistribution through the tax system, the inequality of disposable income turns out to evolve largely in parallel with that of gross factor income inequality. We conjecture that the increase in redistribution through taxes is not in the first place a consequence of policy changes, but mainly of changes in the composition of the population.

Finally, it has been claimed that the increasing tendency of assortative mating in terms of education levels has contributed to the increase in overall individual income inequality (see for example Greenwood et al., 2014, for the US). In Section VI we confirm that the number of couples with equal education levels is rising in the last two decades in Belgium. Couples with two lowly educated partners are becoming rarer, and those with two highly educated partners are occurring more frequently. This is in the first place a consequence of the rise in education, especially among females. There are the last years even slightly more highly educated women than men in the last years. However, we argue that the impact on income inequality of this evolution is ambiguous.

II. Data

We use three micro-datasets on living circumstances: the *Socio-Economic Panel* (SEP) organised in 1985, 1988 (telephonic survey), 1992, and 1997; the *European Community Household Panel* (ECHP) covering the years 1994-2001; and the *EU-Statistics on Income and Living Conditions* (EU-SILC), a follow-up of the ECHP, started in 2004, and still organised yearly up to date. The most recent survey we use in this article is the one from 2021. These data also served as a basis for the compilation of the Belgian country study of the IFS Deaton Review on Inequalities (Capéau et al., 2023a). For reasons we describe below, we do however concentrate on a partly different segment of the population than in that study: the population aged 20 to 64 for earnings inequality (Section III), and the whole adult population (aged 20+) for pre-tax factor income and disposable

income (Sections IV to VI).[3] All our statistics are calculated for the population of individuals, not households.

Differences in methodologies between surveys and, possibly, imperfections in the construction of the sample weights for the ECHP, lead to quite large differences in results for the same statistic drawn from different surveys for overlapping years. We are therefore reluctant to draw time trends by connecting results from different surveys, and hence, in the figures below, we will not connect observations stemming from different surveys.

For ECHP and EU-SILC, income information applies to the (full) year preceding the survey year. For SEP it applies to the month preceding the moment of the interview. The years in the Figures below refer to the income year, not the survey year. For SEP and ECHP, gross incomes, that is incomes inclusive of taxes and, when applicable, employee social security contributions, are reconstructed from answers on net incomes in the questionnaire using micro-simulation techniques. Up to income year 2017 (EU-SILC 2018), EU-SILC data on gross incomes stem from respondents' answers on survey questions. From 2019 onwards (incomes 2018) EU-SILC obtains data on gross incomes from employment, pensions, and social security benefits through tax registers. We highlight this break by not connecting the 2017 and 2018 points in the figures based on this information. Nominal amounts are converted in real terms of 2019 using the standard Consumer Price Index.

The results in Sections IV and V stem from rescaling the survey information so that income aggregates at the population level equal the amounts of the corresponding National Accounts concepts. This methodology is explained in Capéau et al. (2023b).

III. Earnings inequality of the population aged 20 to 64 years

In this section, we relate earnings inequality as measured by the Gini coefficient with a number of sociodemographic evolutions of people aged 20 to 64 years. Earnings are defined as the sum of gross income from employment and self-employment.[4] Individuals with negative earnings are excluded from the calculations, but zeroes are included.

General trend

Figure 1 shows the evolution of the Gini index of earnings between 1985 and 2020. During the periods 1985-1997 (SEP) and 1993-2000 (ECHP), we see a quite irregular course of the Gini index. The observation of 1988 for the SEP is an outlier and might be untrustworthy. Apart from that, the Gini is somewhat lower for the two observations stemming from the SEP in the nineties of the previous century (1992 and 1997), than in 1985. The Gini index drawn from the ECHP-data is

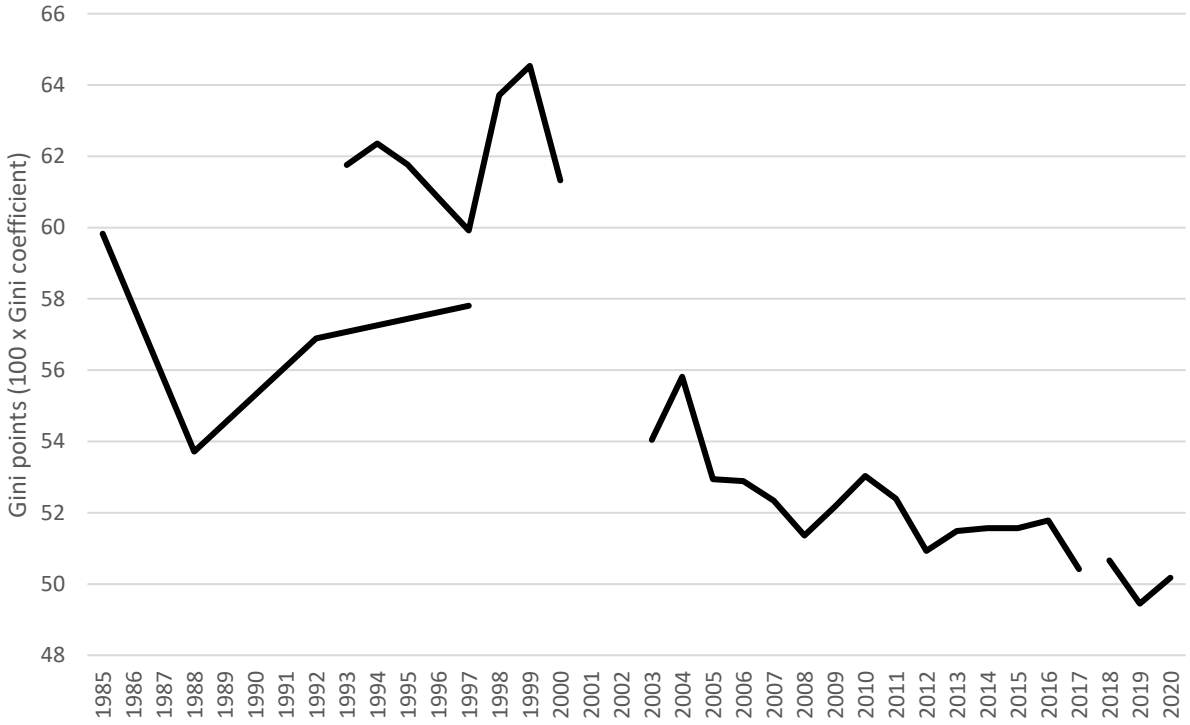
[3] The Deaton Review Country studies focus mainly on the population aged 25-60.

[4] Gross income of employees is cash income, including end-of-year premia, holiday payments, and employees' social security contributions. It does not include employers' social security contributions and in kind benefits (e.g. financial advantages linked to having a company car). For self-employed, gross income is defined as the surplus of turnover over costs to exploit their business and to execute their economic activities.

systematically higher than the one drawn from SEP-surveys. In 1997, where we have information from both surveys, the Gini according to the ECHP is more than two Gini points higher (59.9) than the one stemming from the SEP survey (57.8). According to the ECHP data, there is also no clear trend in the Gini for the nineties. It jumps around between 60 and 65 Gini points.[5]

For the SILC years we discover a downward trend from 54 Gini points in 2003 to 51 in 2008, followed by a bump in the period 2008-2012 (covering the Great Recession) starting from 51 Gini points in 2008, rising to 53 in 2010, and falling down again to somewhat less than 51 points in 2012. From 2012 to 2016 there is a slight increase from less than 51 to almost 52 Gini points, after which the downward trend resumes. In 2018-2019 the downward trend continues, but it seems to be stopped during the first COVID-year, potentially driven by the containment measures during that period, which caused massive temporary unemployment and a lockdown of many businesses. During these months the affected persons received zero earnings.

Figure 1 Evolution of the Gini index of earnings (population aged 20 to 64 years, zero earnings included)



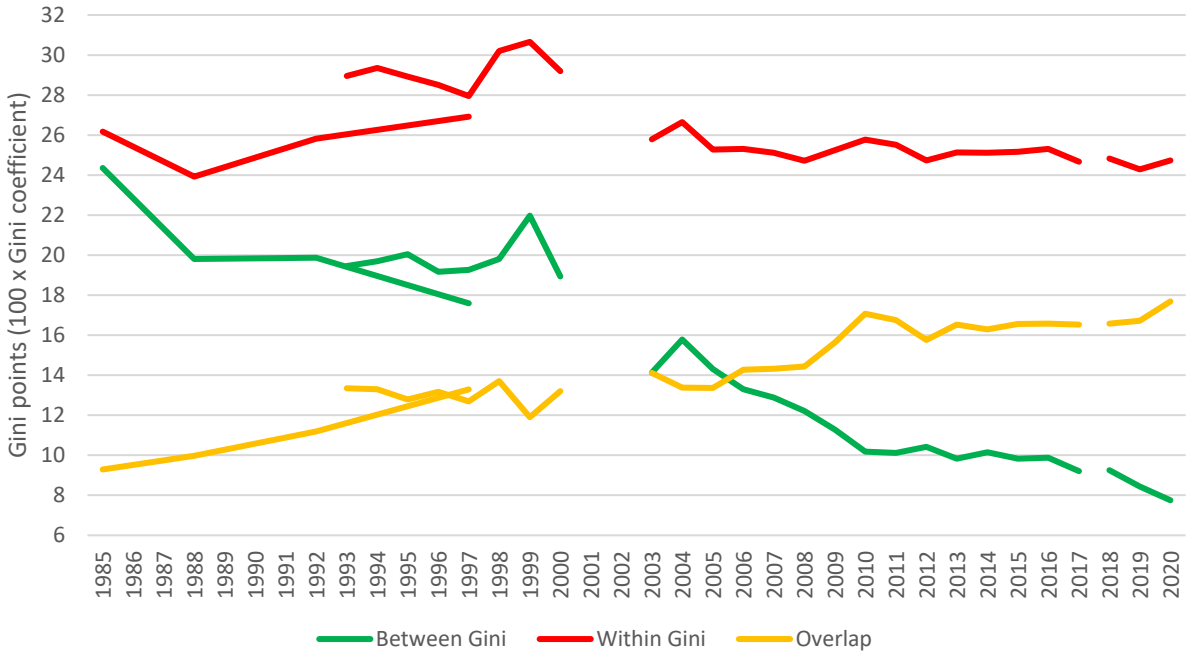
Note: Earnings are defined as gross income of employees and self-employed. For employees gross income is cash income of employees (including social security contributions of employees). For self-employed gross income is defined as the surplus of turnover over costs to exploit their business and to execute their economic activities. Negative earnings are excluded. Zero earnings are included.
Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021). Incomes apply to a year earlier than the survey year for ECHP and SILC. The horizontal axis refers to those income years.

[5] The values for 1998 and 1999 are affected by outliers at the top. Also the values for EU-SILC incomes of 2004 and 2010 seem to plagued by outliers.

The role of gender and education

In Figure 2 and Figure 3, we decompose the overall Gini of earnings by gender and education level.[6] The decomposition of the Gini by subgroups consists of three values adding up to the overall Gini displayed in Figure 1 (Lambert and Aronson, 1993).[7] The first component (in green in the figures below) consists of the between group inequality and reflects the population weighted Gini coefficient of the mean earning levels of the groups. It thus equals the Gini if there were no within group inequality, and therefore, members of a group would all earn the mean income of their group. The second component (in red in the figures below) is a weighted sum of the within group Gini coefficients of each of the subgroups, with the weights being equal to the product of the income share and the population share of the groups. The third component (in yellow in the figures below) is the overlap term. It reflects the part of inequality due to some members of a poorer group being richer than poorer individuals in a richer group, with a higher mean. This term is zero if there are no overlap between the income distributions of the different groups.

Figure 2 Gini index of earnings, decomposition by sex (population aged 20 to 64, zero earnings included)



Note: Earnings are defined in the note to Figure 1. The between component (green) is the population weighted Gini of the means of the subgroups. The within component (red) is the weighted average of the Gini of each of the subgroups, with weights equal to the product of the income share and the population share of the groups. The overlap term (yellow) reflects the part of inequality ascribed to the overlap between each of the groups' income distributions. The three terms add up to the overall Gini coefficients reported in Figure 1.

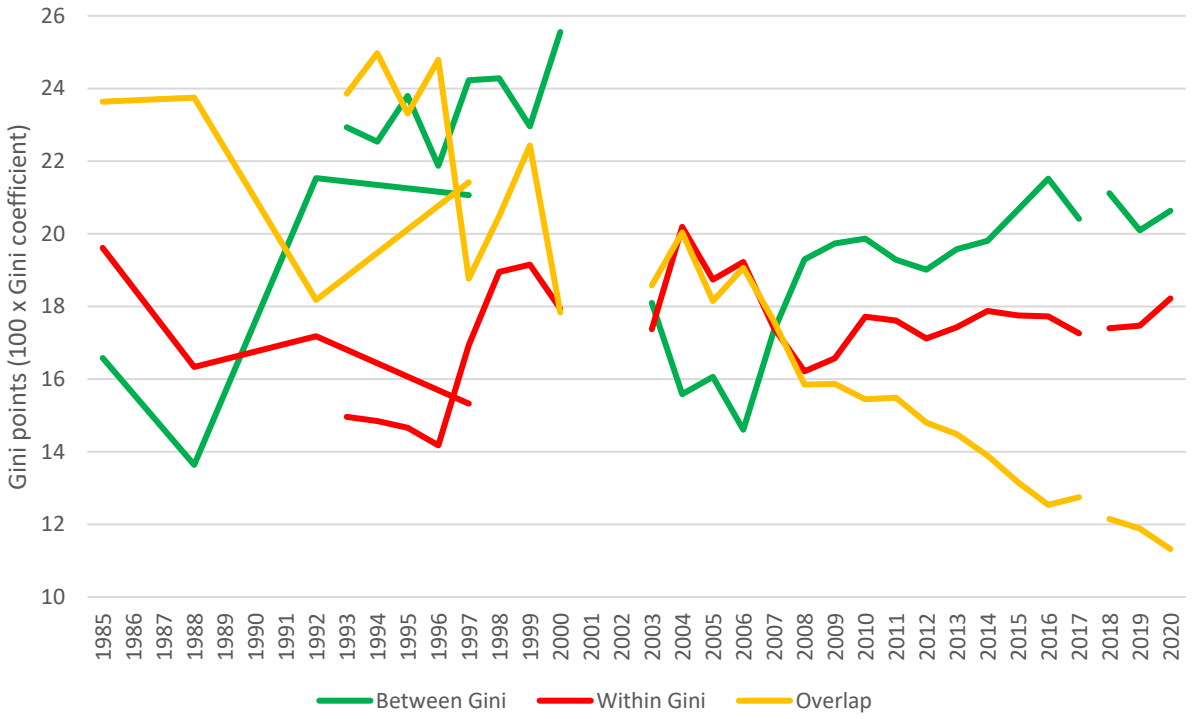
[6] For the education level we use the following split: Low is less than secondary education (ISCED 0-2); Middle (ISCED 3-4) applies to people having finished secondary school (12-18 years), including those who have obtained a post-secondary non-tertiary education degree; High education level corresponds to ISCED levels 5-8 (tertiary education completed, including short cycle tertiary education). For the decomposition, we included also a group for which the education level is unknown, as this group is for some observation years non-negligible.

[7] More detail on the decomposition of the Gini coefficient by subgroup components is provided in Appendix I.

Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021). Incomes apply to a year earlier than the survey year for ECHP and SILC.

From Figure 2 one learns that the between gender earnings inequality is decreasing over time. The share of females within the population aged 20 to 64 years, has remained rather constant over the same period: its lowest value during the observation period is 49.7% in 1994, and the highest one, 50.9% in 1992. Therefore, the decreasing trend of the between group inequality (green line in Figure 2) reveals that average earnings of males and females have been converging during the last four decades. Reversely, the overlap term is increasing: from less than 10 Gini points in 1985, which is only about one sixth of the overall Gini at that time, to almost 18 Gini points in 2020, which is about 40% of the Gini in that year. Relatively more people are situated in the overlap of the gender earnings distributions: from slightly less than 70% in 1985 to over 83% in 2017, and even more than 88% in the last three years (2018-2020). The inequality among the people belonging to the overlap of the earnings distributions of both genders has, however, not risen. So, we can conclude that the gender earnings distributions have been converging to each other.

Figure 3 Gini index of earnings, decomposition by education (population aged 20 to 64, zero earnings included)



Note: Earnings are defined in the note to Figure 1. The between component (green) is the population weighted Gini of the means of the subgroups. The within component (red) is the weighted average of the Gini of each of the subgroups, with weights equal to the product of the income share and the population share of the groups. The overlap term (yellow) reflects the part of inequality ascribed to the overlap between each of the groups' income distributions. The three terms add up to the overall Gini coefficients reported in Figure 1.
Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021). Incomes apply to a year earlier than the survey year for ECHP and SILC.

The reverse picture is obtained for the decomposition of earnings inequality by education level (Figure 3). The between group inequality (green line) is increasing, while the overlap term is decreasing. Some caution is needed when interpreting the rise of the between term. Indeed, the composition of the population aged 20 to 64 years by education level has changed considerably over the course of the four decades under consideration (1985-2021). While the gap between the mean earnings of the highly versus middle and lowly educated has increased somewhat over time (see Figure 12 in Appendix II), the major change is in the composition of the population by education level (see Figure 13 in Appendix II).

Until the mid of the nineties of the previous century, the largest group consisted of the lowly educated, even though, according to the SEP-data, their share was steadily declining from 51% in 1985 to 38% in 1997. From 1998 onwards the lowly educated group becomes the smallest group, and as of 2005 the highly educated group is the largest one. The share of highly educated continues to increase after 2010, while that of the middle educated levels off at about 36 to 38%. This combination of change in population shares and the evolution of mean earnings of education groups has an ambiguous effect on the evolution of the between group inequality. The overlap term is decreasing. So, not only the mean earnings of different education groups are widening, but the entire earnings distributions of the three education groups are growing apart over time.[8]

The employment rate and the inequality among earners

In the present section, we look at the influence of both the employment rate and the income inequality among positive income earners, on the overall inequality reported in Figure 1. In our calculations of the Gini indices reported in Figure 1, we have included zero incomes. In such a case, the switch from zero to positive income due to finding a job or starting a business, lowers inequality if that additional income falls in the lower half of the earnings distribution.[9] A factor that may have contributed to the declining earnings inequality observed in Figure 1, is therefore the evolution of the employment rate. Figure 4 reports the evolution of the employment rate for the population aged 20 to 64 years, in three age classes (20-24 in red, 25-59 in yellow, 60-64 in green) for males (dashed lines) and females (dotted lines), and overall (full lines; black for all three age classes together). Figure 14 in Appendix II shows a similar picture for a shorter time period, based on data from the Labour Force Survey.

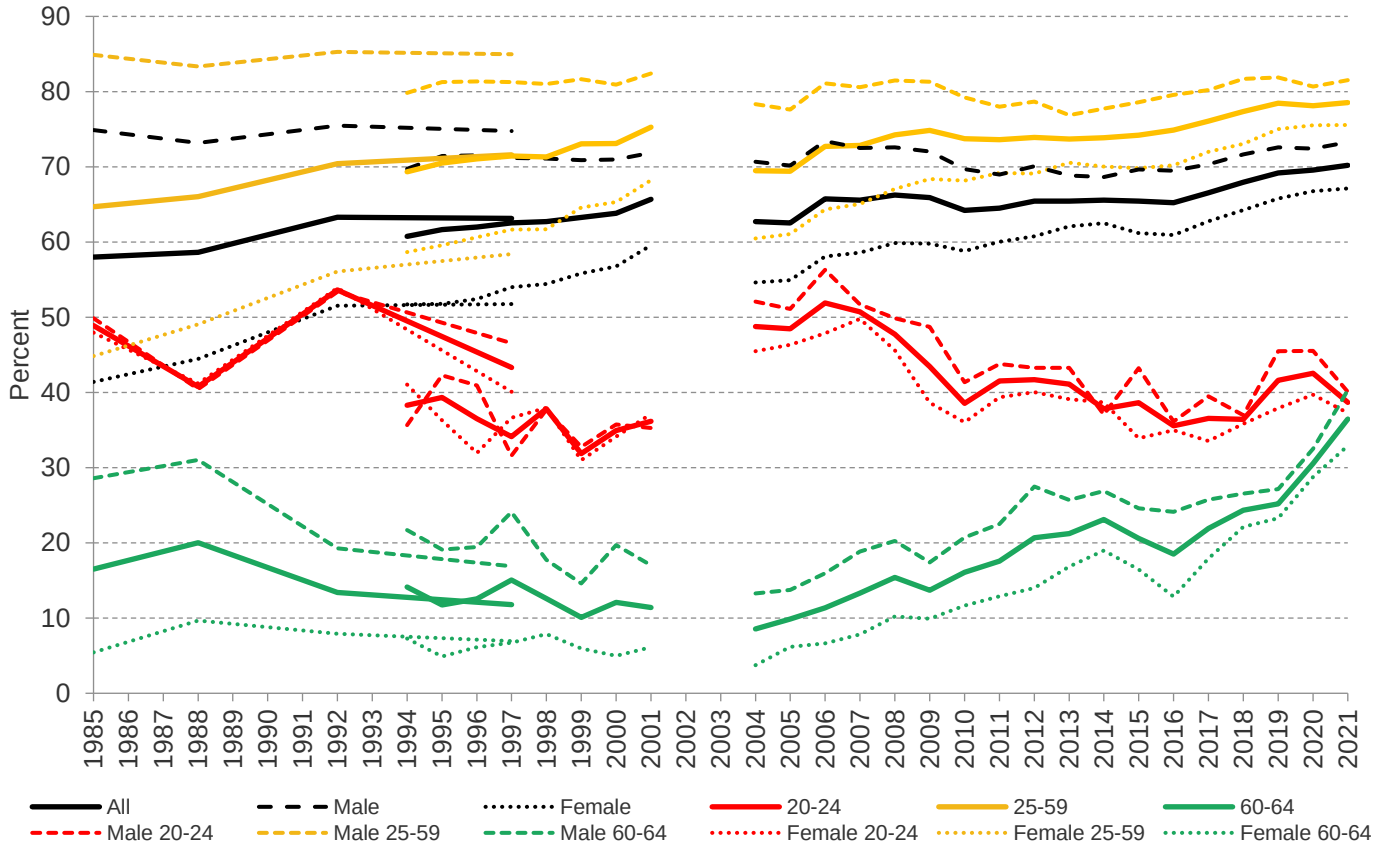
The most salient feature of this evolution is the increase in employment of people aged 60 to 64 years during the first two decades of this century, both for males (from 14% in 2004 to 40% in 2021) and females (from less than 4% in 2004 to 33% in 2021). The gradual increase of the legal pension age of females from 60 years in 1996 to 65 years (the same as for men) in 2009 is a factor that has contributed to this evolution. In addition, the system of a conventional early leavers scheme, which allowed certain categories of older persons that were fired, to enjoy a higher unemployment benefit, without obligation to actively look for a new job, was gradually restricted.

[8] The overlap and between term do not necessarily have to evolve in different directions. The means of the groups' income distributions can grow apart, but still their overlaps can become larger and/or more densely populated, and the inequality among persons in the overlap belonging to different groups might increase.

[9] This is explained in Appendix I.

For example, the condition to actively look for a new job was reintroduced in that system. The increase in male employment among people aged 25 to 59 years is moderate and started only in 2013, when it reached an absolute minimum of less than 77%. The employment rate of females aged 25 to 59 years rose from 2004 to 2021 by about 15 percentage points.

Figure 4 Employment rate by sex and age class (population aged 20 to 64)



Note: A person is considered to be employed if she declares to be self-employed or an employee at the moment of the survey.

Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021).

The increase in the employment rate among persons aged 25 to 64 years, is mirrored by a substantial decrease in employment among people aged 20 to 24 years, both for males and females, reflecting a lengthening of education spells. However, the share of this group in the population is decreasing (see Figure 15 of Appendix II). This is also the case for people aged 25 to 59 years from 2006 onwards. The combination of all these evolutions results in an overall increase in the employment rate with more than ten percentage points over the last 35 years (from 58% in 1985 to over 70% in 2021). Noteworthy is that the COVID crisis is barely noticeable in these employment figures. It should be mentioned that a large part of the affected workers in Belgium could benefit from a temporary unemployment system. Persons who fall under this scheme retain their contract with their current employer and have the right to be re-engaged after the unemployment spell. They, therefore, might have responded to be employed or at work during that period, while they were not always actually working. Overall, we can conclude that the

increase in the employment figures might have contributed to explaining the downward trend in earnings inequality among people aged 20 to 64 years during the first two decades of this century.

We now turn to the evolution of inequalities among those with positive earnings. Roughly speaking, earnings are a combination of the amount of time spent to work and the renumeration per unit of time.[10] We will not investigate this decomposition further in this paper, and concentrate on the difference in the evolution of inequality of earnings when considering the whole population of persons aged 20 to 64 years versus those with positive earnings only. Figure 5 repeats the evolution of the Gini coefficient reported in Figure 1 (black line), and adds the Gini coefficient of earnings when taking into account only those with positive earnings (grey line). It is no surprise that inequality drops when excluding the zeros (the grey line is below the black one). Indeed, this is an analytical property that the Gini shares with many other inequality measures.

How large the drop will be, depends on the number of zeroes that are dropped. For a given population, a change in the employment rate is reflected in a change in the relative size of the sub-population with zero incomes. Therefore, changes in the employment rate may partly explain differences in tendencies between the grey and black line. For example, we observe that the declining tendency of overall earnings inequality between 2003 and 2017 is much less outspoken when considering only positive earnings. That is, indeed, the period when the overall rise in employment (Figure 4) may have had an impact on the overall earnings inequality. The fact that rising employment did not coincide with an increase in earnings inequality of the working population, suggests that the earnings of the newly active fit well into the previous distribution of earnings.

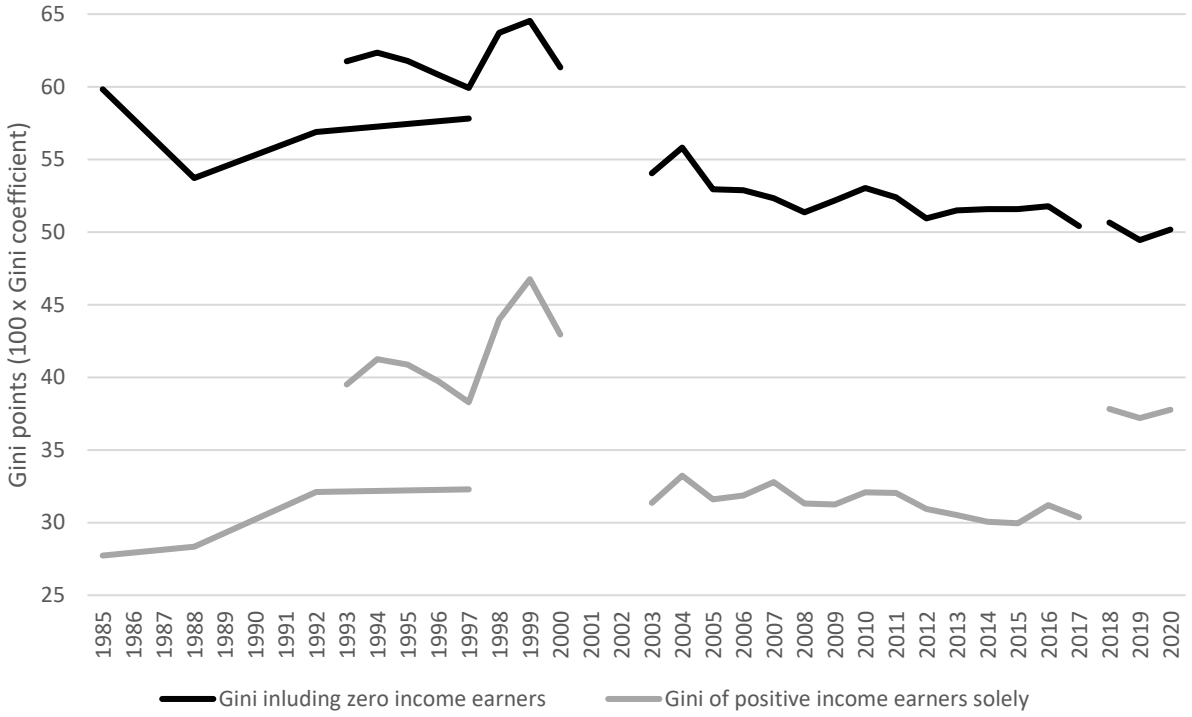
With the exception of 1985 and 2007, the peaks and troughs in the evolution of inequality among those with positive earnings are reflected in the overall inequality of earnings. The increase in inequality of positive earnings between 2005 and 2007, and the fall from 2011 to 2015, disappear when including zeroes, where we see a small decline between 2005 and 2007, and a more outspoken increase from 2012 to 2015. There are, however, no obvious explanations for these short term deviations.

A salient feature of Figure 5, is the upward jump in inequality of positive earnings from 2017 to 2018 (grey line). This is the year of the transition by SILC from collecting incomes through the questionnaire, to tax register data, at least for the employees, who form the bulk of earners. A closer look at the data reveals that tax register data contain a bunch of small earnings (incomes from student jobs, people starting to become active on the labour market during the previous year, or people who have only worked during a small part of the year) which are apparently largely underreported in surveys. Adding a these small incomes to the income distribution has, indeed, an upward impact on the Gini coefficient and several other inequality measures. A similar upward jump between 2017 and 2018 is not observed for the black line, which is the one which includes zeroes. The use of administrative data since 2017 decreased the proportion of zero earners

[10] This is only an approximate decomposition, as some parts of employees' renumeration may not (solely) depend on the time invested into work. Furthermore, in Belgium, white collars and civil servants under a regular contract are paid a fixed amount per month, while blue collars are renumerated per hour. Also, the earnings of self-employed do not only depend on time spent on the job, but also on the capital equipment of the business they run.

significantly.[11] This has a decreasing impact on the Gini, and this downward effect is acerbated when the newly registered positive incomes belong largely to the lower end of the income distribution.

Figure 5 Gini index of earnings: positive income earners versus all persons aged 20 to 64 years



Note: Earnings are defined in the note to Figure 1. Negative earnings are excluded. The black line repeats Figure 1 and refers to the Gini including zero earnings, while the grey line only includes persons who report positive earnings. Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021). Incomes apply to a year earlier than the survey year for ECHP and SILC. The horizontal axis refers to those income years.

A common critique on the use of surveys for assessing income inequality is their underestimation of top incomes, due to item and unit nonresponse and/or underreporting of high incomes (see amongst others Carranza et al. (2023) for a recent contribution to the subject, and the literature cited therein).[12] For Belgium, the research on the impact of a top income correction on the evolution of income distribution is in its infancy. Decoster et al. (2017) enumerate some issues to take care of, propose some solutions and give a first preliminary analysis. Some first indications let us expect that such a correction would maybe change the level of inequality but will not drastically revert the evolution of the earnings inequality as compared to the image that we sketched above. This is partly confirmed by a more detailed analysis of the transition to collecting

[11] The proportion of zero earners drops from almost 30% in the years preceding 2018 to around 20% since 2018. This drop is not only the consequence of a more complete assessment of low earnings, but also reflects a real increase in the employment rate from 2017 to 2021. From 2017 to 2018 the employment rate rose by 1.5 percentage points.

[12] Recent research on the SILC in Belgium at the occasion of the transition to collecting part of the incomes through tax register data, revealed that in terms of large income groups, the SILC-sample underrepresents the bottom quintile of the fiscal income data (Delclite, 2020).

the incomes of employees through tax register data. We indeed observe a fatter right tail of the earnings distribution in the years 2018-2020, where tax register data are used, compared to previous versions of the survey. This contributed, however, far less to the upward jump in inequality of the positive earnings distribution (grey line in Figure 5) than the inclusion of the small positive earnings obtained from tax register data. This might indicate that either Belgium escaped the tendency of excessive renumerations of top managers, or that this has had little impact on inequality as measured by the Gini. A final explanation is that these renumerations are not recorded as earnings.

Summary on earnings inequality

We conclude from our analysis that overall earnings inequality showed a declining tendency in the last two decades in Belgium when including zero earners in the calculation of the statistics. This tendency hides a lot of underlying opposing forces. While the sex earnings gap has decreased over time, that of education has increased. But at the same time much more people are now at the upper end of the education distribution than in the past. We suggested that the rise in employment rates over the last decades might have played a role in the explanation of the decreasing inequality trend, though we could not give conclusive evidence for this hypothesis. We found no evidence that the evolution of top incomes would have effected earnings inequality the last years.

IV Inequality of pre-tax factor income among the adult population

Another factor that is often put forward in the literature on rising income inequalities, is the effect of capital income. In the present section we first add the survey evidence on capital income to the distributional picture sketched above based on earnings alone. We call this sum of earnings and capital income 'pre-tax factor income'. However, according to the survey information, the share of capital income in this pre-tax factor income is very small. Moreover, financial capital income poorly covers the corresponding item in the National Accounts. Therefore, we complete the picture by reporting results of rescaling the survey evidence so that aggregates of the components of pre-tax factor income equal National Account figures.

Adding capital income based on survey data

The blue line in Figure 6 displays the Gini inequality of capital income, as constructed from the survey information, and for the same population as in the previous sections (people aged 20 to 64 years).[13] Capital income comprises income from private pensions, income from property (rents) and income from financial capital (interests and dividends). The yellow line includes also imputed rents for owner-occupied houses (only available since 1995).

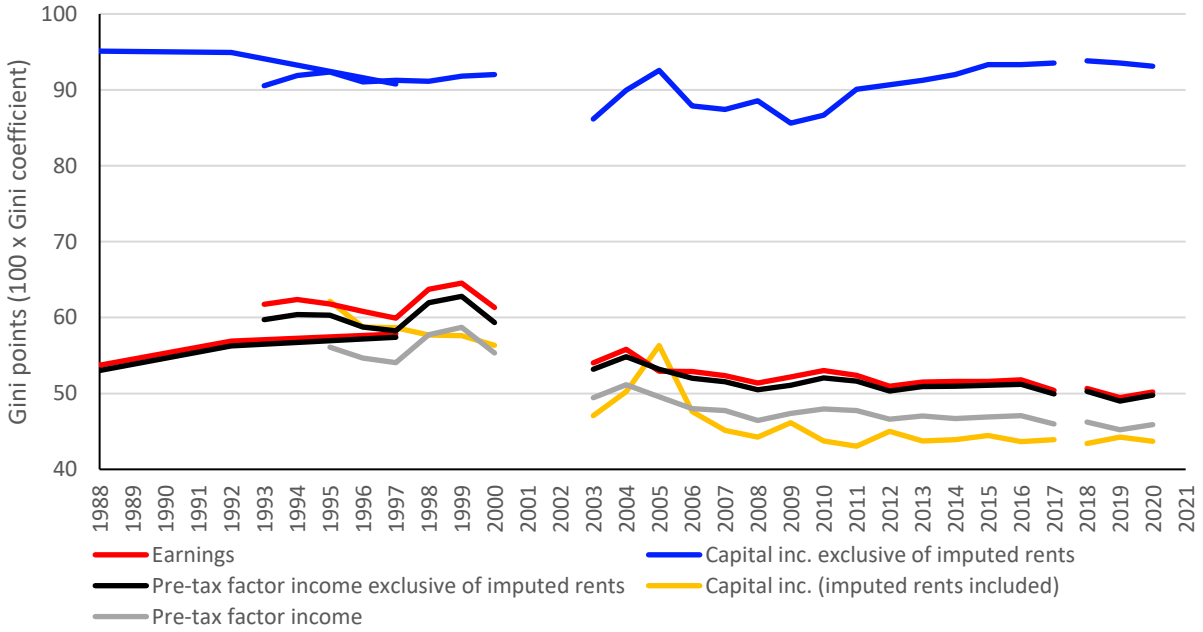
With Gini's hovering around or above 90 points, capital income turns out to be extremely unequally distributed, at least if one does not include imputed rents for owner-occupied houses

[13] We only have information on capital income as of 1988.

and real estate property that is not rented. When including the latter, capital income is less unequally distributed than earnings. In both cases (including imputed rents or not), adding capital income to earnings leads to (slightly) lower inequality levels. This might be surprising, especially for the case where only capital income without including imputed rents is added to earnings, given the extremely unequal distribution of capital income. Notice, however, that the blue line in Figure 6 does not give any information on how sizeable capital income is in the total of pre-tax factor income, nor on how capital income is spread across the earnings distribution. Therefore, no a priori conclusions can be drawn from the inequality of the capital income distribution on the degree of inequality of the sum of earnings and capital income.

The pattern of the evolution of inequality of earnings plus capital income, that is, pre-tax factor income, is almost completely determined by that of earnings inequality, including the downward trends in the first two decades of this century, highlighted already in Figure 1 above. The explanation for this last observation is straightforward: in the surveys, capital income without imputed rents covers only a small fraction of total pre-tax factor income (earnings plus capital income): less than 5% for the SILC and SEP years, between 5 and 10% for the ECHP surveys.[14] This small fraction contrasts with what one finds in economy-wide data sources like National Accounts.

Figure 6 Gini index of pre-tax factor income (earnings plus capital income) for the population aged 20 to 64 years



Note: The earnings inequality (red line) refers to the sum of employee incomes and self-employment and corresponds to the inequality displayed in Figure 1. The blue line shows the Gini of the sum of private pension incomes, income from property (rents) and income from financial capital (dividends and interests). The yellow line also includes imputed rents. The black line shows the Gini after adding capital income without imputed rents to earnings and the grey line includes imputed rents into the income. Observations with negative income sources are

[14] This is without taking into consideration two exceptions: the figure of 16.7% for SEP 1997 which seems to be an outlier, and 6.1% for SILC income year 2005 (survey 2006).

not included in the calculations.
Source: own calculations based on SEP (1988-1997), ECHP (1994-2001), and SILC (2004-2021).

When aggregating up the survey figures to nationwide aggregates, it indeed turns out that financial capital income (interests and dividends) in the ECHP surveys covers only between 20 and 30% of corresponding National Accounts (NA) aggregates. For most of the SILC years this is even less than 20%.[15] In addition, part of (financial) capital income consists of undistributed profits of corporations for which there is no counterpart in the surveys. On the other hand, aggregate imputed rents in the survey overestimate the National Accounts figures.[16]

There is also a substantial change over the last decades, both, in the composition of capital income and in the composition of Net National Income, and the survey information does not appropriately keep track of this evolution.[17] To shed some light on this evolution, Figure 16 in Appendix II reports the cumulative growth of the different components of Net National Income (NNI) from 1995 to 2021. The cumulative growth of total capital income during the last 25 years was lower than that of NNI. But this growth of total capital income results from opposing trends when decomposed in its different elements. Interests income imploded, and its share in national income almost vanished. Also the share of net imputed and real rents (property income) in national income decreased, as their growth rate is below the one of national income. This is mainly due to an increase of the depreciation of fixed capital. On the contrary, the growth of income from dividends was much larger than average growth of net national income. It even overtook growth of the compensation of employees, despite downward swings during the implosion of the dot.com bubble (2001-02), the Great Recession (2008-2009) and the COVID-shock. Even more striking is the growing importance of undistributed profits: they more than doubled from 1995 to 2021, compared to a 48% increase in net national income over the entire period. This might reflect a growing tendency in Belgian society to incorporate economic activities and to keep and enjoy the profits and benefits they generate within the corporate entity.

Given that income from dividends is hardly covered by the income surveys we use, and that undistributed profits are, by definition, not covered by household surveys, the sole use of this kind of survey information is in fact a nonstarter to assess the impact of capital income on inequality. In order to cure the defects of survey information, we followed the proposal of the World Inequality Lab (https://inequalitylab.world/en/) to construct Distributional National Accounts (DINA), to which we turn now.

[15] We refer the reader to Table D.17 of Capéau et al. (2023b) for more information on the coverage rate of several income components with respect to National Account figures.
[16] Note that the National Accounts figures we refer to are net of depreciation (which stands for consumption of fixed capital), while the survey figures do not take this depreciation into account, certainly not at the same rate as in the National Accounts. Consumption of fixed capital in the National Accounts substantially rose during the last decades.
[17] Net National Income is Gross Domestic Product after subtraction of consumption of fixed capital (transition from gross to net, not to be confused with the gross and net terminology that refers to including or excluding taxes) plus the balance of factor incomes from abroad and factor incomes paid to non-residents (transition from a domestic production to a national income perspective).

Pre-tax factor income inequality using DINA

The main principle of DINA is to construct a distribution of the components of Net National Income over the population. The distributional information for such an undertaking stems from surveys and/or administrative datasets (Blanchet et al., 2021, and Piketty et al., 2018). We used the distributional information from the ECHP (1996-2001) and SILC (2004-2021) surveys for our implementation. More precisely, for each of the four components of NNI, compensation of employees, mixed income (self-employed), financial capital income, and property income, we identified the closest equivalents in the survey, and grossed these data up (or scaled them down) such that the totals of these adjusted incomes equal the corresponding National Accounts aggregates. As capital income not only accrues to households with individuals aged 20 to 64 years, we extend our population of investigation to all persons aged 20 or more (called adults in the sequel). To keep our analysis at the individual level, we split the total of incomes of all adult household members equally among these adult household members, that is the people aged 20 or older.[18] Details can be found in Capéau et al. (2023b).

We thus obtain income distributions for the period 1995-2020 for the following four components of Net National Income:

1. compensation of employees (labour),
2. self-employment income (mixed income in the NA),
3. income from financial capital (including dividends, interests, undistributed profits from the corporate sector, and some other minor categories), and
4. property income.

Our fifth series is the sum of these four income components and equals Net National Income. We call it, in line with the international literature on DINA, pre-tax factor income. The four income components are inclusive of taxes, and where it applies, social security contributions (both of employer and employees for the compensation of employees). Capital income components are net in the sense that, where applicable, consumption of fixed capital (depreciation) has been subtracted.

To use distributional information from the surveys to spread out the national account aggregates across households and individuals, we identify the corresponding income variables in the surveys as follows:

1. gross salaries of employees (before taxes are subtracted, and including the monetary value for company cars and social security contributions of employees and employers),
2. income from business activities of self-employed people (revenues minus costs and a deduction for consumption of fixed capital),
3. gross income from financial assets (dividends, interests received, and private pensions), and
4. imputed and real rents minus a deduction for the consumption of fixed capital.

[18] Consequently, figures on inequality of the compensation of employees and mixed incomes in this subsection are not comparable with those in the previous subsection and in Section III, where we assigned earnings to the individuals reporting the income, and only considered people aged 20 to 64 years old.

Except for financial income, the distributional information in the survey is left unchanged.[19] Yet, since the rescaling rates are different for each component of pre-tax factor income, the distribution of the sum of the four factor components of the survey variables differs substantially from the distribution of pre-tax factor income in DINA. For example, imputed and real rents are actually scaled down, while the grossing-up of income from financial assets is much more substantial than that of incomes of the self-employed.

The results of this rescaling operation are reported in Figure 7 and Figure 8. Figure 7 shows the Gini coefficients of the pre-tax factor income distribution for both the survey variable (the line with square markers) and the rescaled figures (the line with circle markers). Overall, the level of inequality of the rescaled figures is higher than that of the survey. Surprisingly, the survey-data based figures during the SILC-survey period now exhibit an U-shaped pattern starting in 2004. We did not observe such an U-shape in Figure 6 (grey line), where, at most, one can see that the decreasing tendency levels off after 2008, and there is a much milder upheaval in inequality between 2012 and 2015.[20] The turning point, at which the decrease of inequality is stopped and inequality starts increasing, is around 2008-2009. More importantly, the rise in inequality up to 2016 is far more outspoken in the DINA-series (from 52.3 in 2009 to 57.2 in 2016, or almost 5 Gini points), than in the survey only series (from 51.2 in 2009 to 52.9 in 2015, or only 1.7 Gini points). This is largely due to a strong rise in undistributed profits in 2014 and 2015 (see Figure 16 in Appendix II).

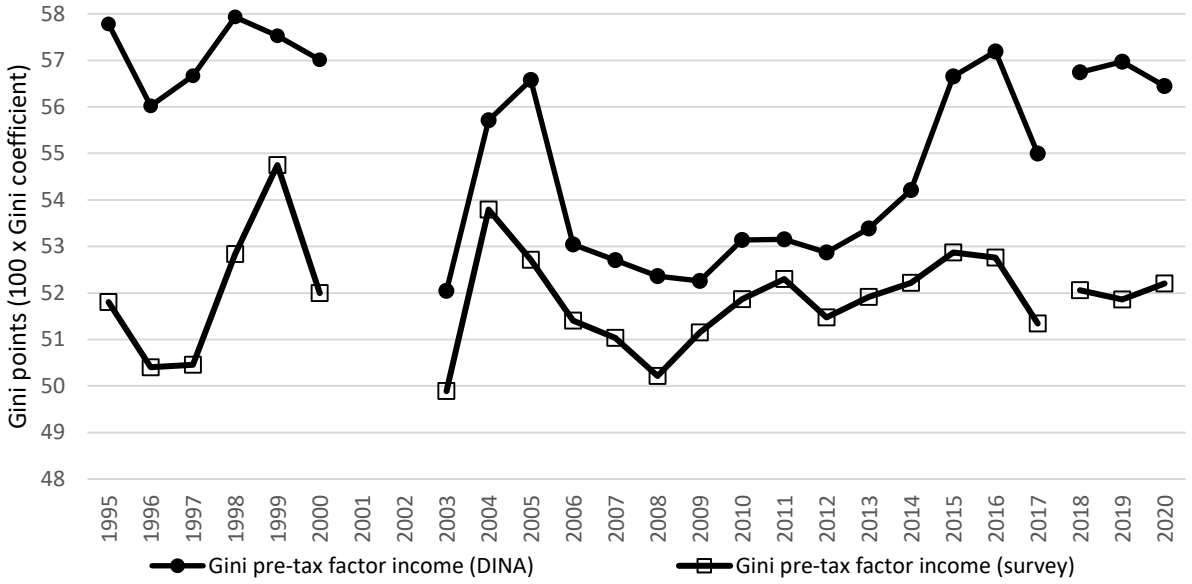
We now investigate the contribution of each of the four income sources to overall pre-tax factor income inequality, and how it differs when we use survey data only, or rescale them to national accounts levels. We use the Lerman and Yitzhaki (1985) decomposition, which expresses the contribution of each income source as a percentage of the pre-tax factor income Gini.[21] According to this decomposition, the contribution of an income source depends on two factors: the share of that source of income in the total pre-tax factor income, and the degree to which relatively low (high) incomes from that particular source are accruing to people who are ranked relatively lowly (highly) in the overall income distribution.

[19] For income from financial assets, some parts of the macro-aggregate are divided based on different underlying variables in the surveys (see Capéau et al., 2023b, for details).

[20] There are some differences between the data underlying the grey line in Figure 6 and the black line with square markers in Figure 7. We already mentioned the population (20–64 vs. 20+) and the individual assignment versus the equal split of earnings. When we do similar computations for the population aged 20+ as for the grey line in Figure 6 (which only covers the population aged 20–64) and switch to equal split of earnings and private pensions (such as in Figure 7) instead of using individual assignment (like in Figure 6), keeping all other things constant, we obtain a firmer and almost continuous increase of the Gini of pre-tax total factor income from 2008 to 2015 by 2.2 Gini points instead of 1.3 Gini points. We leave other differences between the data underlying Figure 6 andFigure 7undocumented here.

[21] The principles of this decomposition are explained in Appendix I.

Figure 7 Gini index of pre-tax factor income: DINA versus survey (population aged 20+)

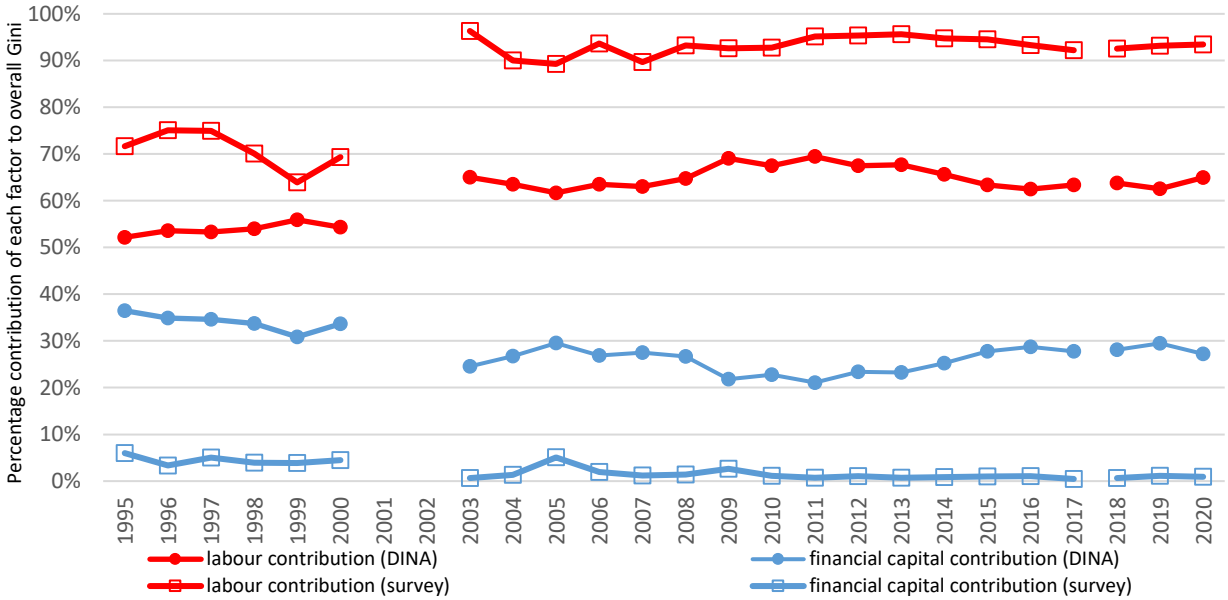


Note: Overall Gini index of pre-tax factor income according to DINA (black line with circles) and its survey counterpart (black line with square markers). Incomes are equally split across household members aged 20 or more.

As mentioned before, for employee incomes, self-employment incomes, and property income, inequality is identical for the survey variable and the rescaled variable. The difference between the contribution of those three income sources to overall inequality according to the survey and according to the rescaled data then only depends on two factors. First, the share of the component in total income, which is obviously affected by the differential rescaling of the income components. Second, the correlation between the income component and the rank in the distribution of total income. As the rescaling operation might affect the rank of persons in the total income distribution, this correlation might differ before and after the rescaling. For income from financial capital, we linked the different survey components with different elements of the national accounts. This affected inequality of financial income after the rescaling operation when compared with the survey inequality of financial income. This additional effect comes on top of the change in the share of the income component and the re-ranking effect, described for the other three income components.

Figure 8 shows the relative contribution of the two components of factor income which contribute most to overall pre-tax factor income inequality: compensation of employees in red and income from financial capital in blue. The lines with square markers apply to the survey variables, while the ones with circle markers apply to the rescaled variables. In order to interpret the contribution of the factor components to overall inequality correctly, it is worthwhile to signal that the benchmark of no contribution to inequality is attained when that component is perfectly equally distributed (Shorrocks, 1982). If persons ranked higher in the total income distribution obtain also higher incomes from a factor, that factor will positively contribute to inequality.

Figure 8 Pre-tax factor income decomposition: percentage contribution to overall Gini (population aged 20+)



Note: The lines give the relative contribution of the labour (red) and financial capital (blue) income distribution to the overall pre-tax factor income Gini coefficient according to the Lerman and Yitzhaki decomposition (1985) explained in Appendix I. The figures represent the percentage contribution of an income source to the overall Gini. The lines with square markers apply to the survey variables, while the ones with circle markers apply to the grossed-up variables.

First, not surprisingly, the contribution of financial capital income increases substantially: from less than 6% in the survey data to between 20% and 30% after the rescaling operation. The inclusion of undistributed profits, and, to a lesser extent, the rise in dividends, are the driving forces of this evolution. Second, we observe a substantial 8 percentage points rise in the contribution of financial capital income during the period 2011 to 2016: from 21% in 2011 to almost 29% in 2016. This corresponds roughly to the period where we discovered a substantial increase in overall inequality after rescaling the survey information.

The increase in the importance of financial capital income for overall pre-tax factor income inequality is in the first place at the expense of the contribution of labour income (the red line with the circle markers is far below the one with square markers). Still, in levels, labour income continues to contribute most to pre-tax factor inequality, simply because of its larger share in total pre-tax factor income. Note, however, that in the period 2011–2016, rising inequality in income from financial capital has been an important explanatory factor for the overall increase in pre-tax factor income inequality.

When relying only on survey data, self-employment income is the second most important source of pre-tax factor income inequality. The DINA-operation even increases its contribution, but, still, it is surpassed by the larger contribution of financial capital income. The contribution of self-employment to pre-tax factor income inequality has been rather stable during the last two

decades and equals somewhat less than 10%. Property income, which includes imputed rents for owner-occupiers, plays a negligible role in the Gini of pre-tax factor income inequality.[22]

Summary on pre-tax factor income inequality

We conclude that income from financial capital does play an important role in the overall inequality of pre-tax factor income. Unfortunately, the information on financial capital income in surveys is rather rough, and only covers a small part of the corresponding aggregate in the National Accounts. After trying to correct for that defect, we observe that pre-tax factor income inequality rose substantially between 2009 and 2016, a finding that was not obvious when relying solely on the information in the surveys. A more in depth analysis of the contribution of the different income sources to pre-tax factor income inequality learns that it is the increasing inequality of financial capital incomes, where higher financial capital incomes tend to go more and more to those with higher overall pre-tax factor income, which is the driving force behind this increase in pre-tax factor income inequality between 2011 and 2016. But even after the DINA-rescaling, the contribution of the compensation of employees to overall inequality remains between 60% and 70%.[23]

V Redistributive efforts of the welfare state

Belgium has an extensive welfare state and many services are either publicly financed or substantially subsidised (e.g. education). In the present section, we do not account for the distributive effect of the use of tax revenues to provide public goods.[24] We only pay attention to the redistributive effects of the tax and benefits side of the welfare system, including the social security system. We stick to the DINA dataset (1995-2020), which we discussed in the previous section, and thus our discussion applies to the population of individuals aged 20 or more. We calculate two additional income concepts. The first is obtained by subtracting from the pre-tax factor income, analysed in the previous section, social security contributions, and adding earnings related social security benefits (public pensions, unemployment benefits, and sickness and invalidity benefits). Other benefits such as child allowances and social assistance are not included. The income thus obtained, is called the pre-tax post-replacement income in the DINA terminology. The second income concept is disposable income, which is obtained from pre-tax post-replacement income by deducting all taxes (income taxes and indirect taxes) and adding

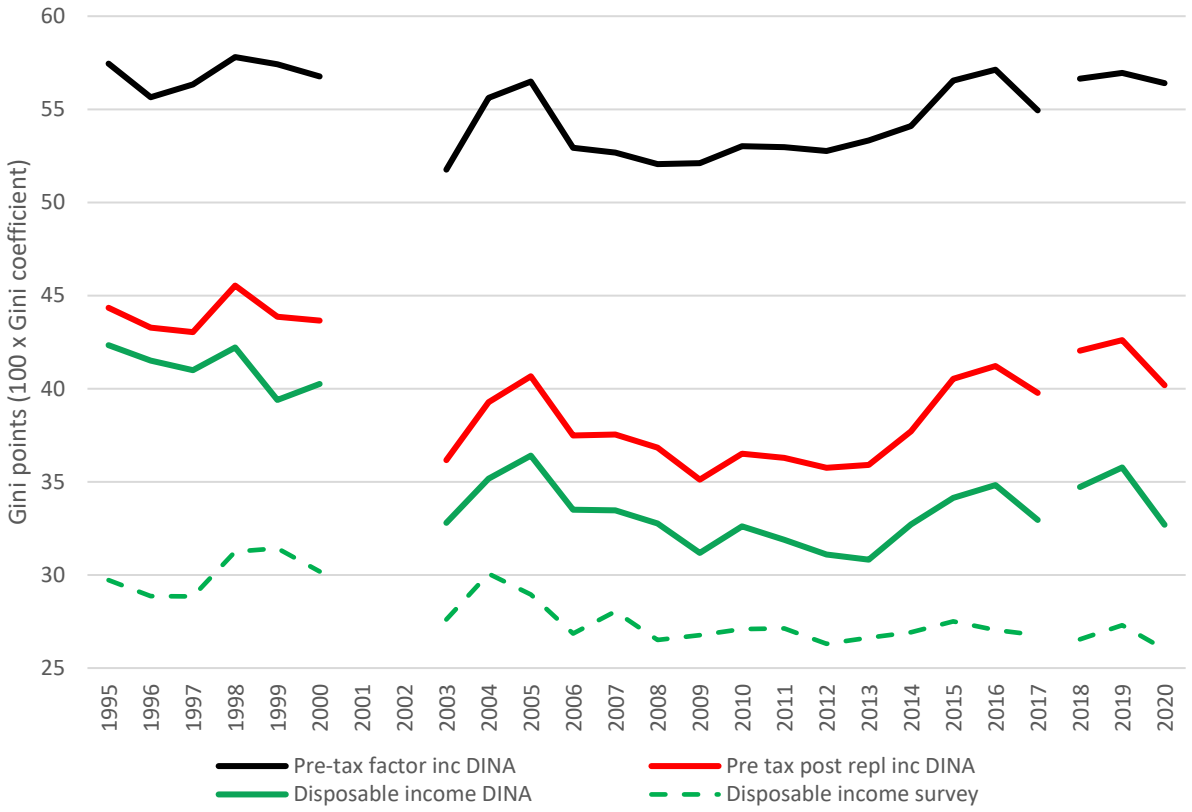
[22] According to the survey information, property incomes did contribute 4 to 7% to the pre-tax factor income Gini during the period 1995–2000, but this contribution drops to less than one percent after the rescaling to national aggregates. The fact that in Belgium ownership of the own dwelling is wide spread may be an explanation for this observation.

[23] When we would have used the Shorrocks (1982) decomposition, based on the contribution of the covariance between income from a particular source and total income, in the variance of total income, financial capital income would have contributed most to gross income inequality for almost all years. Therefore, such cardinal interpretations of inequality decompositions should be made with caution.

[24] The data we dispose of do not allow easily to assess differential access to those public goods. Some first attempts to quantify inequality in access to public goods show that this issue should not be neglected (Verbist and Förster, 2020, Castanheira and Mariani, 2024).

remaining benefits (social assistance, child allowances, ….). Similarly as in the previous section, incomes of all household members are added and split equally among the household members aged 20 or more. Contrary to pre-tax factor income and pre-tax post replacement income, disposable income does not aggregate up to NNI.

Figure 9 Gini index pre-tax factor income, pre-tax post-replacement income, and disposable income (pop. 20+)



Note: Pre-tax post replacement income subtracts social security contributions from pre-tax factor income and adds earnings related social security benefits. Disposable income subtracts taxes from pre-tax post replacement income and adds non-earnings related benefits, such as child allowances and social assistance. Incomes are equally split among household members aged 20 or more. The dashed green line refers to the Gini of the disposable income as registered in the survey.

Figure 9 shows the Gini index for the three income concepts. The black line corresponds to the black line with circle markers of Figure 7.[25] Unsurprisingly, the pre-tax post-replacement income and disposable income are more equally distributed than the pre-tax factor income. The drop in inequality from pre-tax factor income to pre-tax post-replacement income is more substantial than the additional decline from pre-tax post-replacement income to disposable income. For the sake of comparison, we also report the Gini coefficient of disposable when using survey data only (dashed green line in Figure 9). Contrary to the disposable income concept derived from the DINA,

[25] Small differences are due to the exclusion of negatives from the calculations, which is done at the level of factor components for the calculations in Figure 7, while it is at the aggregate income levels for Figure 9. The difference is substantial (2 Gini points) for the year 2003, where there are a significant number of observations with negative financial capital income in the DINA dataset. Otherwise, the difference is less than half a Gini point.

the survey equivalent does not contain imputed rents for owner-occupiers, nor undistributed profits from the corporate sector, but it includes indirect taxes.

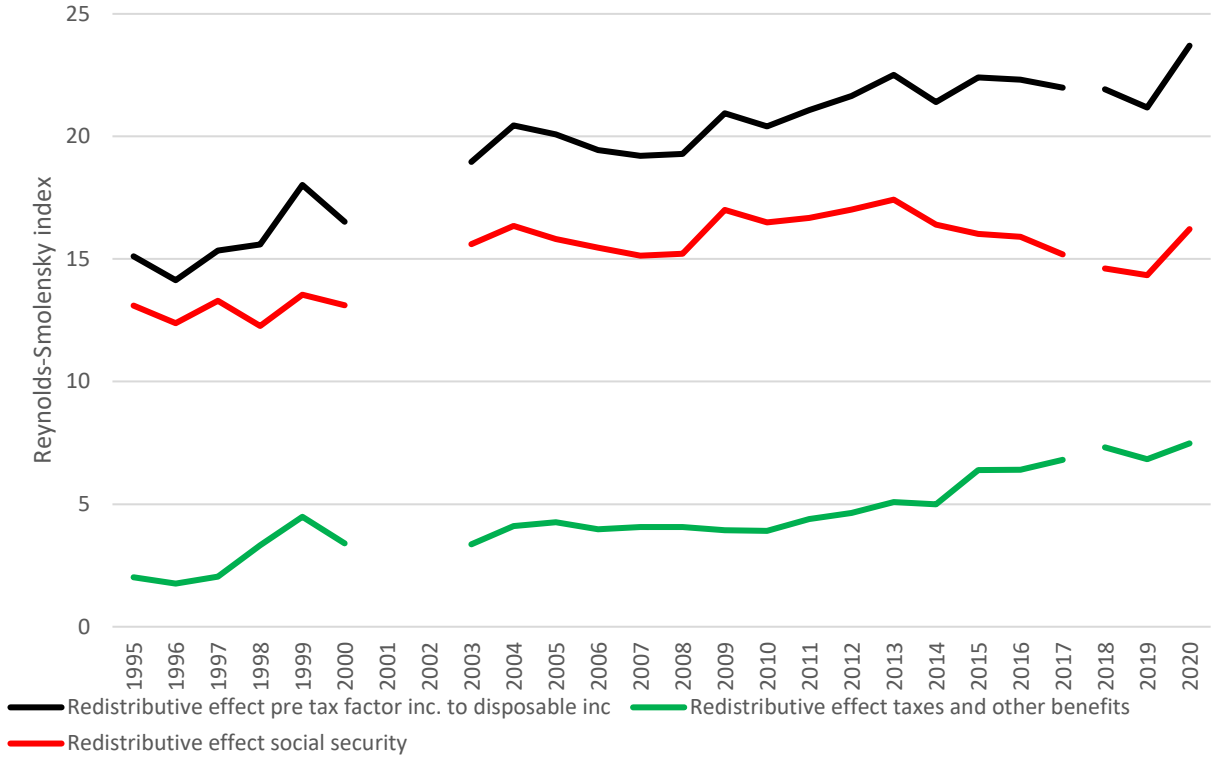
At first sight, the evolution in inequality of both pre-tax post-replacement income and disposable income, follows that of pre-tax factor income in the sense that, starting in 2004, some U-shaped pattern of first declining inequality and then increasing inequality appears. Yet, the turning point at which inequality starts to increase falls later for both post-tax and redistribution income concepts. Certainly for disposable income the difference is substantial: inequality only starts rising in 2014, compared to 2009-2010 for pre-tax factor income. Notice that the survey disposable income Gini exhibits only a mild increase in inequality between 2012 and 2015. Again, the poor coverage of financial capital income in the surveys, and the inclusion of undistributed profits in the DINA concept are the main reasons.

In order to inspect that observation more closely, Figure 10 displays the difference in the Gini coefficients of pre-tax factor income and pre-tax post-replacement income (red line) and the difference between pre-tax post-replacement income and disposable income (green line). The black line is the sum of both and is therefore equal to the difference in the Gini coefficients of pre-tax factor income and disposable income. The difference in Gini's between two income distributions (e.g. pre- and post-tax) is also known as the Reynolds-Smolensky index.[26]

Our first observation is that the additional redistributive effect of taxes and not social insurance related benefits shows an increasing trend (green line in Figure 10). For the period 2014-2020 this seems to be in contradiction with Decoster et al. (2018) who find a decline in the redistributive effect in 2020 when compared to 2014, which they accredit to an income tax reform which did not affect much the progressivity of the system but caused a drop in the average tax rate of more than two percentage points. However, their exercise is of a different nature than the present one. They study the impact of different social policies and tax systems by applying them on the same underlying primary income distribution. In this paper though, the redistributive effect is the result of a mix of changes in policies, changes in the primary (in our case: pre-tax factor) income distribution, and demographic evolutions. The increase in the employment rate may, also here, be an explanatory factor. While it has potentially a decreasing effect on earnings inequality, when including the zero earners, it might increase the redistributive effect of taxes as the incomes and, therefore, the average tax rate of employed people are on average higher than those of, for example, the unemployed.

[26] The Reynolds-Smolensky index can be decomposed into three components: the contribution of the average tax rate, the progressivity of the tax system (the extent to which tax payments are more concentrated among the richer people), and a re-ranking effect. The latter is a downward correction on the first two effects. Some authors do not include that downward correction in their calculation of the redistributive effect (see e.g. Blasco et al., 2023).

Figure 10 Redistributive effect of social security and taxes (population aged 20 and more)



Note: The Reynolds-Smolensky index is the difference in Gini points between two distributions.

The evolution of the redistributive effect of the social insurance related contributions and benefits is much more irregular (red line in Figure 10). We notice an upward jump in 2009 (the year following the financial crisis) and in the first COVID year 2020. The latter is almost surely a consequence of the massive use of the temporary unemployment scheme for workers during the COVID-related lockdowns.[27] For the former, the explanation is less obvious. In 2005 a structural mechanism was installed that fixes a two-yearly budget to make welfare adjustments to replacement incomes.[28] Which benefits are affected, is subject to a discretionary decision by the social partners (unions and employer representatives). The mechanism became effective as of 2007. Given the evolution of the redistributive effect of the social insurance related benefits (and contributions) after 2010, which first went up till 2013 (from 16.5 in 2010 to 17.4 in 2013), and then declined to 14.3 in 2019, there is, at first sight, little evidence that this mechanism had a persistent influence on inequality. However, a detailed analysis of exactly which benefits have been adjusted is needed in order to make more conclusive statements. Another factor that may

[27] In Belgium the system of temporary unemployment is a scheme that allows businesses who face temporary difficulties to employ all their contractually engaged workers, to put (part of) them on the dole without breaking the contract. This system was used to guarantee an income and job security for the employees of businesses who had to go in lock down during the COVID-period, or bore indirectly the consequences of the lockdowns. About 1.2 million out 4 million employees benefited from this system in April 2020. Moreover, the replacement rate of the unemployment benefit of the people under this regime was increased from 65 to 70% of their previous wage (with a cap), and they received some additional premia.

[28] These are increases of the benefits on top of the inflation adjustments, which are legally guaranteed in Belgium.

have had an impact, is the more rapid decrease of unemployment benefits, effective as of November 2012. Unemployment benefits start to decline already after the third month (before six months) and decline more rapidly than before.

Summary of the redistributive effects of taxes and benefits

We conclude that the redistributive effect of taxes and benefits changed considerably during the last three decades. Nevertheless also the evolution of inequality of incomes after the intervention of the social insurance mechanism, as well as that of disposable income, roughly follow the same U-shaped pattern of the inequality of pre-tax factor incomes. More specifically, the in the previous section highlighted increase in pre-tax factor income inequality between 2009 and 2016, after adding and grossing-up capital income, is partly reflected in pre-tax post-replacement and disposable income inequality. It seems to have been somewhat mitigated by taxes and benefits during the periods 2009-2013, but between 2013 and 2016 the Gini of both, pre-tax post-replacement income and disposable income, rose with four to five Gini points. It is at this stage unclear whether the changes in the redistributive effect are due to policy changes or rather a consequence of the extent to which the redistributive effect of the existing policies in vigour is impacted by the changes in the distribution and composition of the primary pre-tax factor incomes.

VI Couples and the role of assortative matching

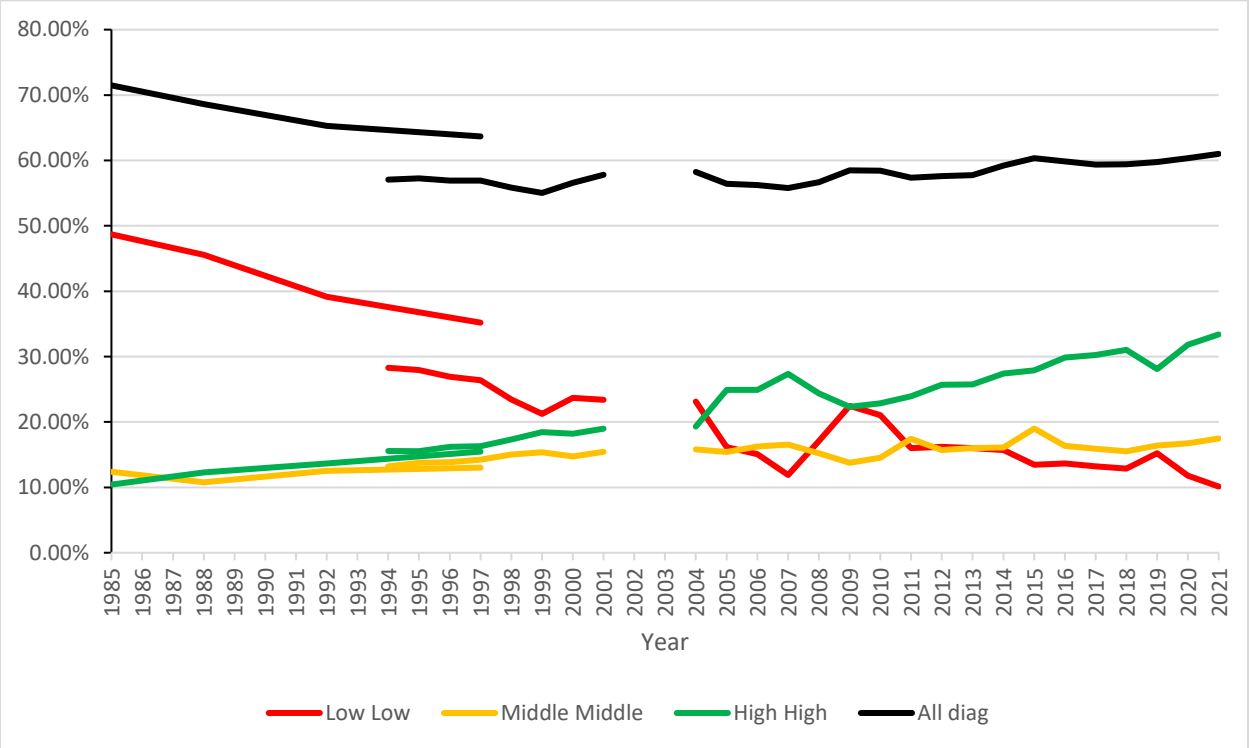
In Section III we considered all earnings as individual income. That implies that we neglected that people live in households, and the impacts thereof on their labour market choice and how they share individually earned income. Also in Sections IV and V we neglected within household inequality, since we considered all within household income on a per capita basis (among the population aged 20+). There is by now a large literature on the sharing of economic resources within the household (see Browning, Chiappori, and Weiss, 2014, for an overview). Obviously, this resource sharing and potential economies of scale within the household have implications for the assessment of overall inequality in society (Chiappori and Meghir, 2015).

Lise and Seitz (2011) find, for example, that the rise in consumption inequality in the UK during the last three decades of the previous century was a result of a decline in within household inequality and an increase of inequality between households. They ascribe this evolution to the increase in assortative matching of couples with respect to education. While in the early years of their observation period (1968-2001) marriages between highly educated men and lowly or middle educated women were much more common, by the end of the observation period, marriages among equally educated partners had become dominant. The impact of changes in the assortative mating behaviour of couples on income inequality has got increasing attention recently (see e.g. Chiappori, Costa-Dias, Crossman, and Meghir, 2020 for the UK).

Our data do not allow to investigate within household inequality. We give instead a picture of the assortative mating patterns in terms of education during the last 35 years. Together with the impact of education on earning inequality described in Section III, this allows to make some reflections on the evolution of between household inequalities.

Figure 11 shows the evolution of the relative number of couples whose partners have an equal education level (black line), and breaks this number down into couples in which both partners are lowly (red), middle (yellow), and highly (green) educated. The overall pattern of couples with equal education is U-shaped. It declines sharply between 1985 and 1997, and is more or less constant during the second half of the nineties of previous century. It starts increasing again at the beginning of the 21st century. This overall evolution is composed of a decline in the number of couples in which both partners are lowly educated, and an increase in the number of couples in which both partners are highly educated. This is not unexpected, given the evolution of the education levels of the population sketched in Figure 13 of the Appendix. The group of highly educated people is increasing sharply at the expense of those who attain only a lower education level.

Figure 11 Percentage of partners with equal education level among the population aged 20+



Note: The split of education levels in Low, Middle, and High, is explained in the note to Figure 3. The black line gives the percentage of couples with equal education level. It is the sum of the three other lines which represent, respectively, the percentage of couples with both partners lowly educated (red), middle educated (yellow), and highly educated (green).
Source own calculations based on SEP (1988-1997), ECHP (1994-2001), and SILC (2004-2021).

Therefore, the evolution shown in Figure 11 is to a large extent driven by the change in education levels of the overall population. Consequently, those figures do not give direct evidence of changes in partner choice behaviour over time and the potential differential rewards of assortative meeting over time (see Chiappori, Costa Dia, and Meghir, 2020) underlying such choices. In almost all years, partners with equal education occur more frequently than what would be obtained if they were randomly matched. This might indicate that there are economic

advantages from mating with a partner with equal education. But, it is not obvious whether this deviation from random matching has increased over time.
In Section III, we showed that the between education earnings inequality in Belgium is rising over time. Therefore, given the observed rise in assortative mating, we could conjecture that between household inequality would also rise during the last two decades. But in Section III we already warned that this rise in between group inequality not only results from divergences in means, but is also driven by the change in the number of people belonging to those different education groups. As more and more people become highly educated, there might be a turning point where the divergence of the mean incomes of different groups will no longer exert an upward pressure on the between education component of earnings inequality.

Summary on assortative matching

We found no evidence in our data that the actual evolution of assortative mating patterns is a result of behavioural change. The increase of assortative mating patterns during the last two decades is to a large extent driven by the evolution of the education level in the population. Since the earnings distributions of different education groups are growing apart, we can derive that between household inequality is on the rise too. But given that the widening of the education gap in earnings is not only a consequence of divergent mean earnings between groups, but also depends on the change in the number of people belonging to the different education groups, it is possible that a further increase in the education level of the population lowers between household inequality in the future, even if mean earnings of different education groups continue to diverge.

VII Conclusion

The answer given in this paper to the question “whether Belgium withstood the storm of rising inequalities” deviates from the answer one mostly gets when relying exclusively on the disposable income concept revealed by household surveys. Indeed, the Gini of disposable income obtained from these household surveys shows a steady decline over the last decades. But if we not only consider disposable income (i.e. income after taxes and transfers), but also look at pre-tax factor income, and especially if we adjust that income for income components such as capital income, which might be poorly recorded or even invisible in the survey information, then we get a different picture.

To study inequality in income before taxes and redistribution take place, we started with an analysis of earnings inequality. We found that during the last two decades of this century earnings inequality (income of employees and self-employed) in Belgium, as measured by the Gini, decreased. We claimed that this decrease in earnings inequality is partly due to rising employment figures. This was based on our finding that the evolution of earnings inequality is different when one includes zero earnings in the calculation of inequality statistics, compared to the results excluding these zero incomes. It is not unreasonable to interpret part of the change in the proportion of zero earnings to changing employment rates. But also among the positive income earners, inequality in earnings did not rise in the last two decades. Several factors exert

opposing pressures on overall earnings inequality: the gender gap in earnings is decreasing, while the inequality in earnings between education levels is increasing. However, more people, especially females, obtain a higher level of education, so that in the longer run this trend my revert, even if the mean earnings per education level continue to grow apart. We also found no evidence that excessive remunerations of top managers had an impact on earnings inequality in Belgium.

To obtain a picture of inequality of total pre-tax income, one has to add-up earnings with capital income. Inequality of financial capital income as revealed in surveys increased significantly since the financial crisis of 2009-2010. Adding this capital income registered in surveys, turns the declining pattern of earnings inequality into a U-shaped curve: decreasing inequality up to 2008, and an increase since then. Moreover, financial capital income from surveys only covers a small part of financial capital income in the National Accounts. And there are good reasons also to consider undistributed profits of the corporate sector as part of the income people enjoy. The latter has been on the rise in the last years and grew much faster than the compensation of employees.

Grossing up financial capital income (and other income components) in the surveys to National Accounts levels affects our assessment of income inequality considerably. First, the level of inequality is higher than before the correction with the DINA-methodology. Second, the U-shape of inequality evolution in pre-tax factor income becomes even more pronounced. After the decline in inequality up to 2009, the Gini of pre-tax factor income rose by five points between 2009 and 2016.

Inequality of disposable income follows a similar U-shaped pattern as that of pre-tax factor income, be it that the turning point when inequality starts to rise is found later in time. During the subperiod when pre-tax factor income became more unequal, and the decline in inequality of disposable income still continued, the redistributive impact of the tax system had to increase. We observe an increasing tendency of the redistributive effect of taxes and non-social insurance related benefits throughout the last 35 years. For the period 2014-2020, we conjecture that this is not in the first place a consequence of changes in the income tax system (though they have been substantial), but are also impacted by changes in the income composition. Here again, the increase in the employment rate may have mechanically contributed to an increase in the redistributive effect of taxes.

According to Lise and Seitz (2011), the increase in assortative mating raised consumption inequality in the UK. In Belgium, the evolution of the number of partners with equal education (more couples with both partners highly educated and fewer with both partners lowly educated) seems to be in the first place a mechanical consequence of the changing pattern of education among the population, rather than a change in behaviour caused by changes in financial rewards from assortative mating. Given that the earnings gap between education groups is widening, we may expect that between household inequality is on the rise too. Nevertheless the increase in the education level of the population, and especially of females, may entail that a similar concentration of highly educated couples will decrease within household inequality on the longer term.

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Appendix I Methodology

Inequality measurement according to the Gini

We base our assessment of inequality on one inequality measure, the Gini coefficient. The reason is that the Gini coefficient possesses some properties that can shed some light on particular evolutions of inequality which may remain hidden by measures that concentrate on one particular aspect of the distribution. Top income shares e.g. (re)gained a lot of attention in the economic inequality literature since the research project on compiling historical series of this measure on the basis of tax register data for a wide set of countries (Atkinson and Piketty, 2005). But these top shares remain unaffected by (dis)equalising transfers among incomes at the bottom and in the middle of the distribution. Gini indices can also incorporate zero incomes while that is not the case for Atkinson indices with high inequality aversion.

There are many ways to define the Gini index (Yitzhaki, 1998). The one most useful for our analysis in the paper is the following:

$$G(\mathbf{y}) = \frac{2}{n^2 \mu} \sum_{i=1}^{n} \left(i - \frac{n+1}{2} \right) y_{(\mathbf{y};i)}, \tag{1}$$

where $\mathbf{y}$ is an income distribution, that is a vector of n nonnegative elements, $y_{(\mathbf{y};i)}$ is the $i-$lowest income in $\mathbf{y}$, and μ is its mean. The weight $\left(i - \frac{n+1}{2} \right)$ is negative for incomes in the lower half of the distribution. Consequently, if an income distribution has (no more than 50%) zero incomes, and one of the zero incomes is replaced by an income lower than the (positive) median of the original distribution, the Gini coefficient will decrease.

Gini decomposition by subgroups

The contribution of inequality within and among different subgroups to overall inequality according to the Gini, consists of three parts: a between group component, a within group component, and an overlap term. The between group component consists of the inequality that would be obtained if all group members would obtain the mean income of their respective groups. The within group component is a weighted average of the inequality within each group. In case the poorest person in any richer group (that is, with higher mean income) has higher income than richest in the closest poorer group, the within group and between group inequality would add up to overall inequality. Otherwise, we say that the group distributions overlap. The overlap term in the Gini decomposition by subgroups captures the contribution to overall inequality of the inequality in income among members of different subgroups who belong to the overlapping parts of the group distributions. Decomposable inequality measures such as the Generalised Entropy Class (Cowell, 1980) do not subsume this last effect into a separate component. The divergent evolution of the between group and overlap term may however prove useful for understanding better the overall course of inequality.

Formally, for a partitioning of an income distribution $\mathbf{y}$ into M subgroups, such that $\mathbf{y} = (\mathbf{y}_A, \mathbf{y}_B, \ldots, \mathbf{y}_G, \ldots, \mathbf{y}_M)$, this decomposition reads as (Lambert and Aronson, 1993):

$$G(\mathbf{y}_A,\mathbf{y}_B,\ldots,\mathbf{y}_G,\ldots,\mathbf{y}_M) = \underbrace{G(\boldsymbol{\mu}_A,\boldsymbol{\mu}_B,\ldots,\boldsymbol{\mu}_G,\ldots,\boldsymbol{\mu}_M)}_{\text{between group inequality}} + \underbrace{\sum_{G=A}^{M} p_G s_G G(\mathbf{y}_G)}_{\text{within group inequality}} + \underbrace{O}_{\text{overlap term}}, \quad (2)$$

where $\mathbf{y}_G$ is the income distribution of group G, $\boldsymbol{\mu}_G$ is an income distribution where all members of group G obtain the mean income of distribution $\mathbf{y}_G$, p_G is the population share of group G, and s_G the share of income mass accruing to group G members in the overall income in society. The Gini group decomposition is used in the main text to illustrate the contribution of differences in earnings among gender and education groups to the course of overall inequality.

Gini decomposition by factor components

Suppose income is composed of different sources, e.g. income from labour, self-employment and capital, and one is after the contribution of each of these components to overall income inequality. So, let the overall income distribution be written down as the sum of its income sources: $\mathbf{y} = \sum_{k=1}^{m} \mathbf{y}^k$, where the i–th element of vector $\mathbf{y}^k$ is the part of income of person i stemming from source k. By $y^k_{(\mathbf{y};i)}$, we denote the income of the i–poorest person in the overall distribution $\mathbf{y}$, stemming from source k. Equation (1), can now be rewritten as:

$$G(\mathbf{y}) = \sum_{k=1}^{m} \frac{\mu^k}{\mu} \sum_{i=1}^{n} \frac{2}{n^2} \left(i - \frac{n+1}{2} \right) \frac{y^k_{(\mathbf{y};i)}}{\mu^k}, \quad (3)$$

It is then natural to define the relative contribution of the k–th income source to overall inequality to be equal to (Lerman and Yitzhaki, 1985):

$$C^k(\mathbf{y},\mathbf{y}^k) = \left(G(\mathbf{y})\right)^{-1} \frac{\mu^k}{\mu} \frac{2}{n^2} \sum_{i=1}^{n} \left(i - \frac{n+1}{2} \right) \frac{y^k_{(\mathbf{y};i)}}{\mu^k}, \quad (4)$$

where μ^k is the mean of the source k income distribution $\mathbf{y}^k$, and μ is the mean of income distribution $\mathbf{y}$.

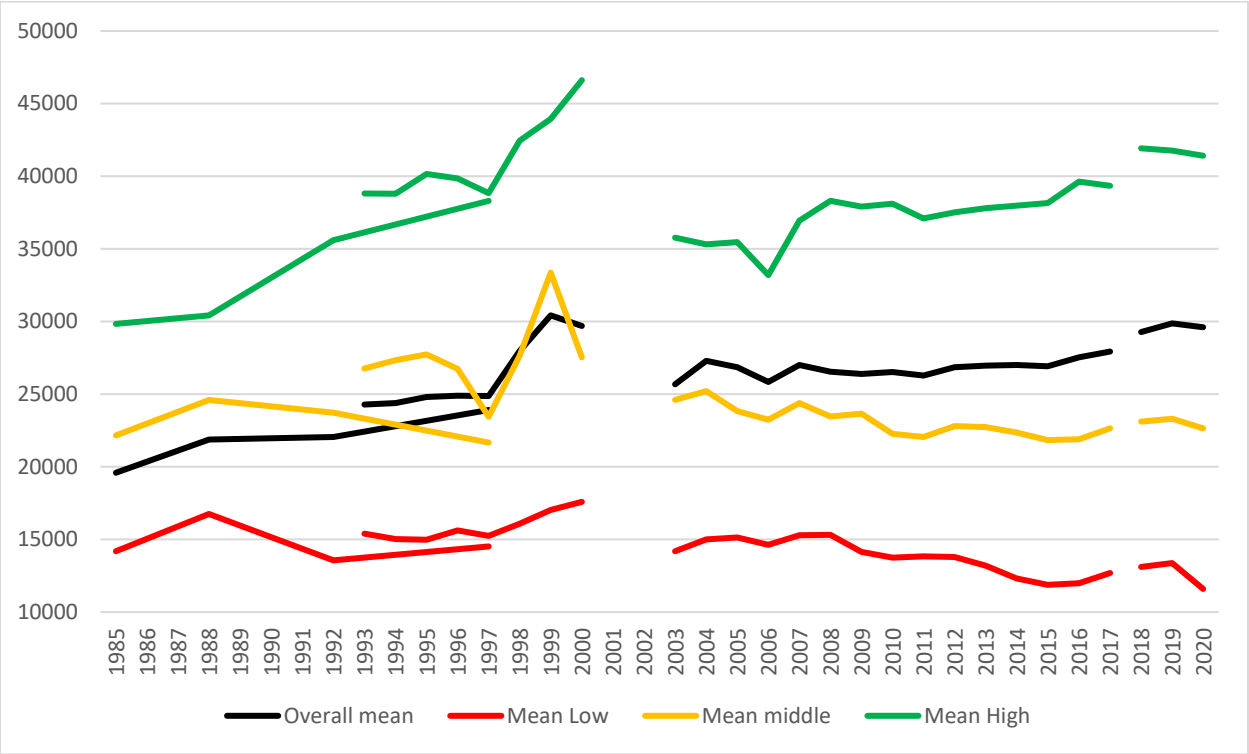
The fraction of the means in Equation (4), $\frac{\mu^k}{\mu}$, equals the income share of income source k in total income. The term $\frac{2}{n^2} \sum_{i=1}^{n} \left(i - \frac{n+1}{2} \right) \frac{y^k_{(\mathbf{y};i)}}{\mu^k}$ differs from an ordinary Gini coefficient of the income distribution of factor k, $\mathbf{y}^k$, in that it uses the rank weights of the overall income distribution, $\mathbf{y}$, instead of those of the source k income distribution, $\mathbf{y}^k$. Sometimes, it is also called the pseudo-Gini (Shorrocks, 1982).

The proposed decomposition is only possible for inequality measures that can be written as a weighted sum of incomes, which is for example also the case of the Generalised Entropy class,

but not for the Atkinson class of inequality measures. The benchmark of zero contribution of an income source k to overall inequality is when incomes from that source are equally distributed. A negative contribution is only obtained when the incomes of that source are negatively correlated with the income ranks in the overall distribution.

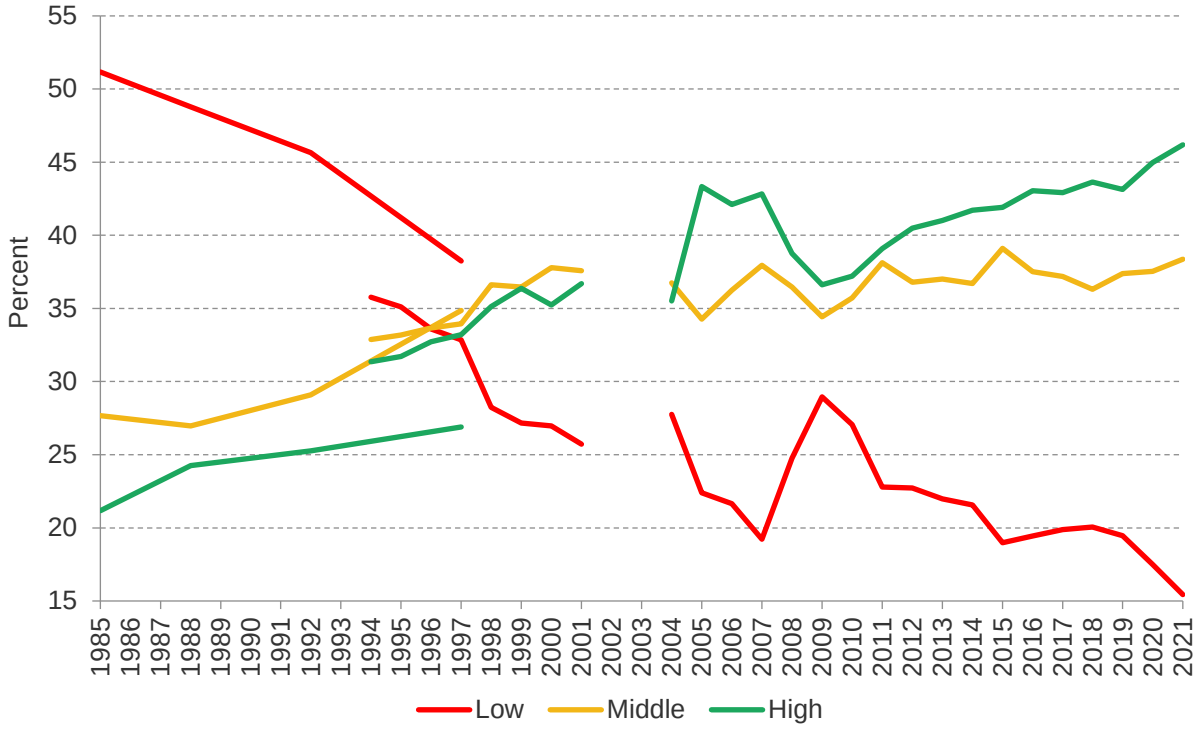
Appendix II Additional empirical material

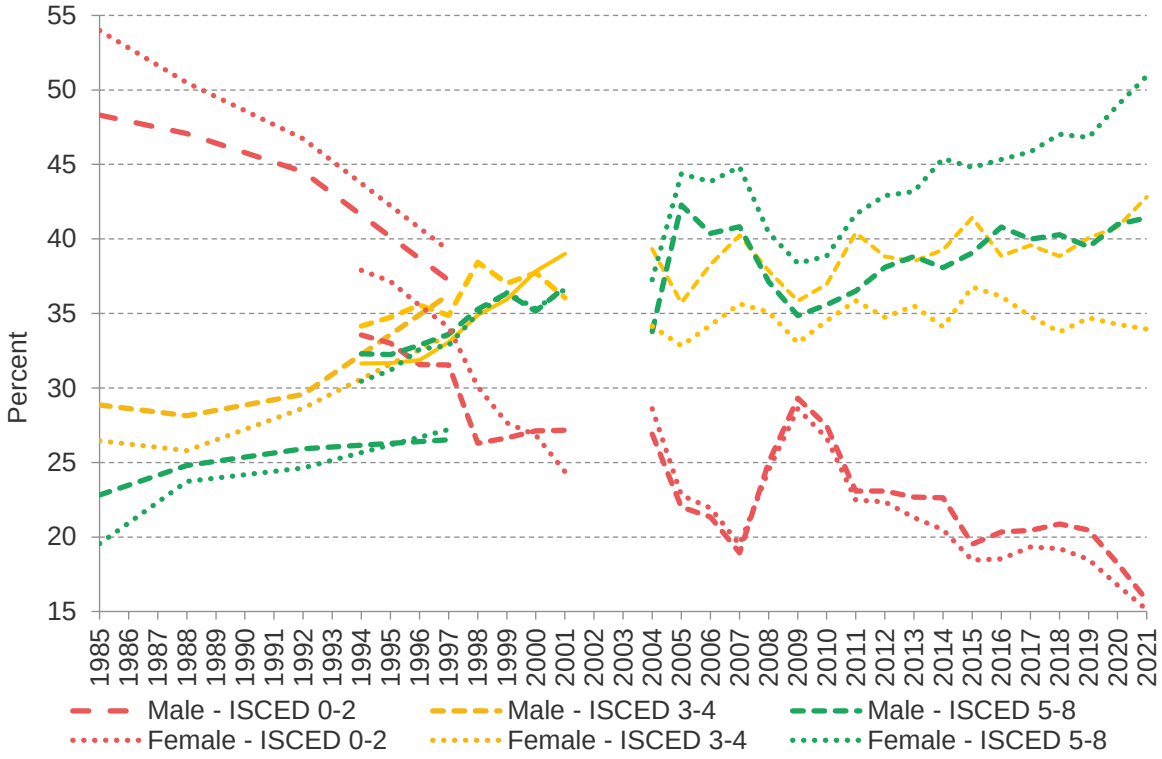
Figure 12 Mean earnings by education level of the population aged 20-64 years (yearly, 2019 euros)



Note: Low is less than secondary education (ISCED 0-2); Middle (ISCED 3-4) applies to people having finished secondary school (12-18 years), including those who have in obtained a post-secondary non-tertiary education degree; High education level corresponds to ISECD levels 5-8 (tertiary education completed, including short cycle tertiary education). Observations with zero earnings are included, while negatives have been excluded. In the overall mean, observations for which the education level is unknown are included.
Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021).

Figure 13 Education level of the population aged 20-64 years

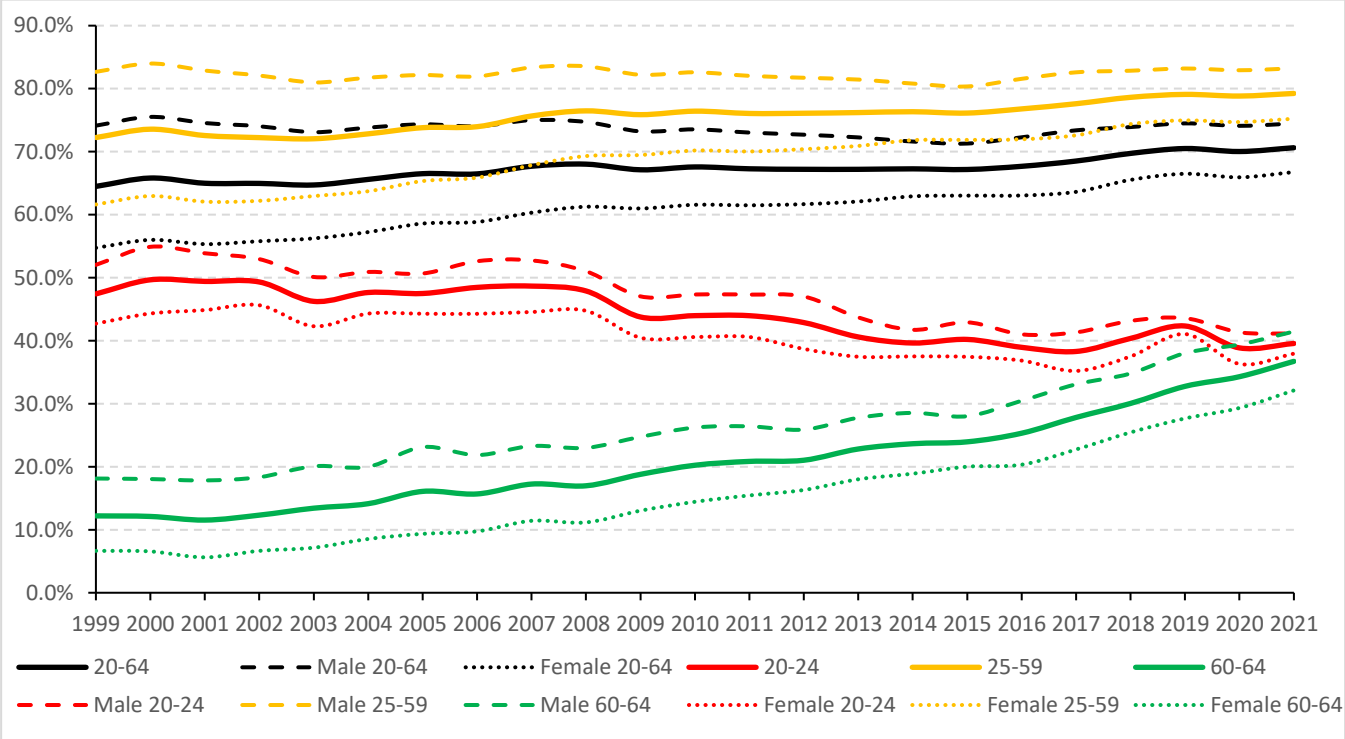




Note: Low is less than secondary education (ISCED 0-2); Middle (ISCED 3-4) applies to people having finished secondary school (12-18 years), including those who have in obtained a post-secondary non-tertiary education degree; High education level corresponds to ISECD levels 5-8 (tertiary education completed, including short cycle

tertiary education).
Source: own calculations based on SEP (1985-1997), ECHP (1994-2001), and SILC (2004-2021).

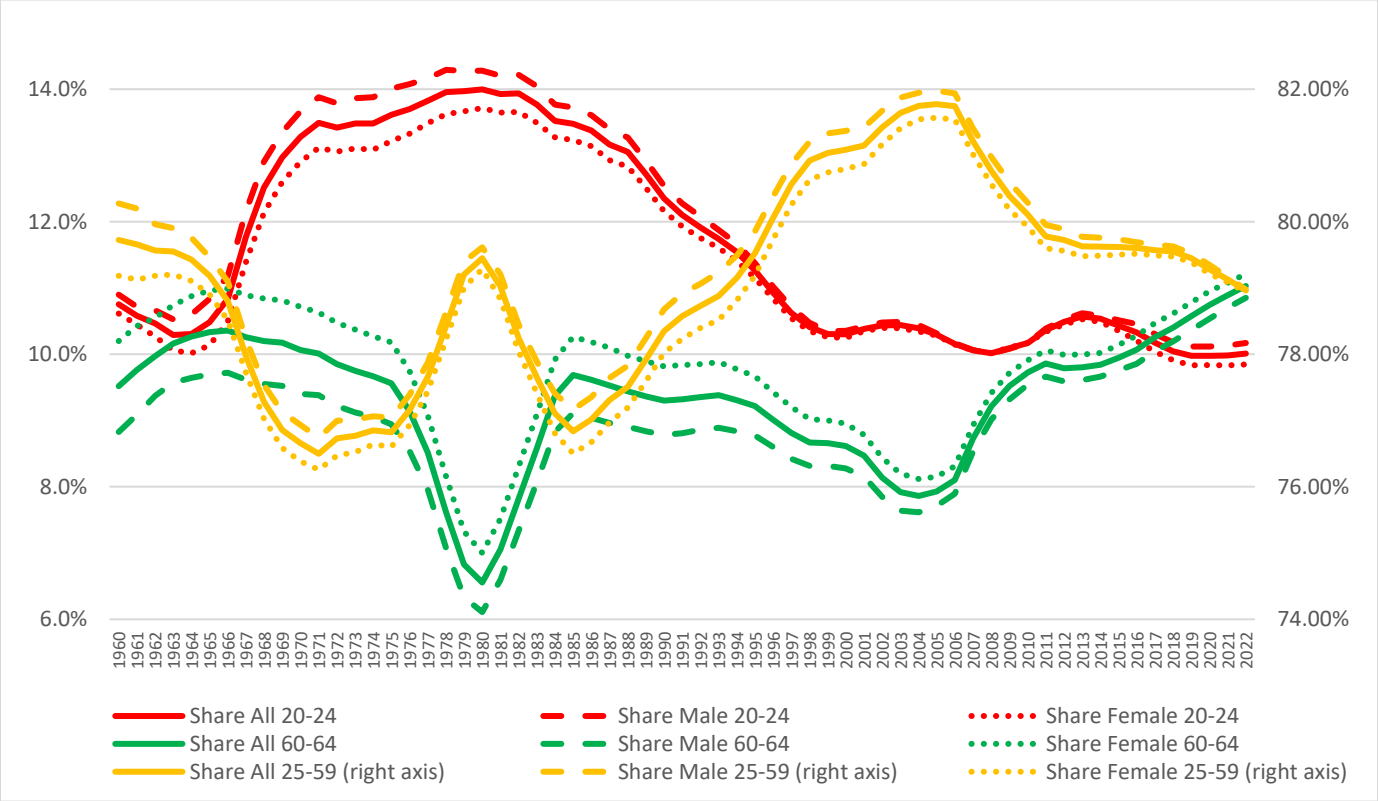
Figure 14 Employment rate according to LFS



Note: Labour Force Survey 199-2021. Downloaded from Statbel: https://statbel.fgov.be/nl/themas/werk-opleiding/arbeidsmarkt/werkgelegenheid-en-werkloosheid/plus. Persons in temporary unemployment are registered as working till 2020. As of 2021 those who are more than three months in temporary unemployment are not anymore considered as working. There are other breaks in the series due to changes in the survey methodology which we leave here undocumented.

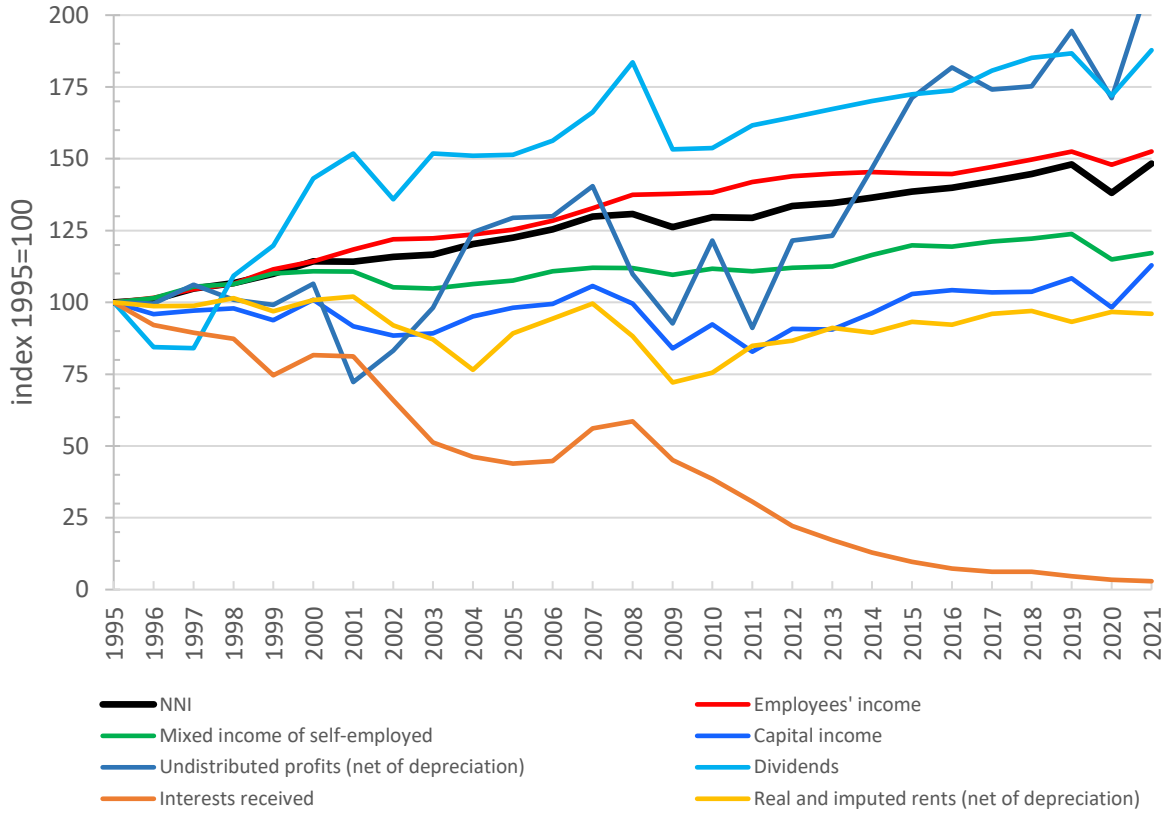
The demographic evolution reported in Figure 15 may obfuscate the overall increasing trend in employment (black line of Figure 14): the proportion of people aged 25-59 is decreasing counterbalanced by a higher share of people aged 60-64 from 2003 on, while this group has still a lower level of employment.

Figure 15 Evolution population shares people aged 20-64



Note: Eurostat, Population on 1 January by age and sex [DEMO_PJAN__custom_7116724]. Downloaded from https://ec.europa.eu/eurostat/databrowser/product/page/DEMO_PJAN__custom_7116724.

Figure 16 Cumulative growth of components of Net National Income



Note: based on download of the National Accounts from NBB.Stat on Febr. 28th 2023. Variables in levels are deflated with the GDP-deflator with base year 2015. Capital income includes dividends, interests received minus interest paid, real and imputed rents, undistributed profits, and some other less important categories of financial capital income.