# Evidence from Unique Swiss Tax Data on the Composition and Joint Distribution of Income and Wealth

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## 4.1 Introduction

Recent research on inequality has shifted its focus from income to wealth. With rising top income inequality, it comes as no surprise that wealth, which is already distributed more unequally than income, has become more concentrated too—especially at the top. Little is known, however, about the joint distribution of income and wealth at the individual level. Are those at the top of the income distribution also among the wealthiest or are these different groups? Furthermore, detailed evidence on the individual demographics as well as on the composition of income and wealth along their respective distributions is still limited.

In this chapter, I make several contributions to the growing literature on wealth inequality. The first contribution is a new, unique dataset, which I construct out of individual income and wealth tax data obtained from eight Swiss cantons. I harmonize these very detail-rich datasets and pool the data for 2010, the year covered in all cantonal datasets obtained. This is the first time, to my knowledge, that individual income and wealth tax

data from different cantons have been combined into one large harmonized dataset, representing about half the Swiss population of taxpayers. I show that this pooled dataset is representative of Switzerland as a whole along many dimensions, including the top of the income and wealth distributions and demographic characteristics.

Using these data allows me to study the distribution of income and wealth in more depth than has been possible in Switzerland so far. First, I show how the high concentration of wealth in Switzerland documented previously in Föllmi and Martínez (2017) plays out at lower points in the distribution: those in the bottom 30 percent have virtually zero or even negative net wealth. Due to the high incidence of debt in the bottom quintile of the distribution, the share of the bottom half of the population in total net wealth is negative, the bottom 60 percent own 1 percent of total net wealth. The Gini index for the net wealth distribution amounts to 0.80—almost double the Gini index for gross income, which is 0.41.

Second, I show individuals' characteristics within the different income and wealth percentile groups. This was not possible in prior research on top income and wealth shares in Switzerland, as it was based on aggregate tax statistics, where individual information is lost (Föllmi and Martínez 2017; Frey, Gorgas, and Schaltegger 2016; Schaltegger and Gorgas 2011). Other research that relied on detailed cantonal tax data did not cover more than one canton (examples include Martínez 2022; Brülhart et al. 2021; Gallusser and Krapf 2019; Moser 2019). This analysis reveals several important features. (1) Retirees are strongly overrepresented in the top decile of the wealth distribution. They make up more than half of the wealth-rich individuals, but only 23 percent of the population in my sample. (2) In the income distribution, retirees are overrepresented in the second quintile and among the top 1 percent. (3) Single women—many of whom are retirees—are less likely to be in the top decile of the income distribution than single men. However, single women are *more* likely to be found in the top decile of the total net wealth distribution than single men. Given the vast evidence on the gender wealth gap (e.g., Neelakantan and Chang 2010; Schneebaum et al. 2018; Sierminska, Brandolini, and Smeeding 2010), this finding is especially surprising. A possible explanation is that single women are much more likely to be retired than single men and hence belong to a population which is a priori more likely to be wealthy. In addition, since women have longer live-expectancy than men, single retired women are more likely to be widows which means they may have inherited wealth from their late husbands. Taken together, these features all point to the strong life-cycle patterns in wealth accumulation. Indeed, the pronounced age-wealth gradient is an important feature throughout the analysis of this chapter.

Third, I carve out the composition of income and wealth along their respective distributions and for different subgroups. I find that financial assets, including personal accounts, are the most important wealth compo-

nent for households below the median of the wealth distribution. Real estate wealth is held only by those in the upper half of the wealth distribution, even when looking at subgroups such as retirees. This is in line with the low home ownership rate of less than 40 percent—and very different from other countries, such as the US or Spain, where real estate is much more widespread. In Spain, for example, real estate amounts to 90 percent of total net wealth for individuals around the median (P40–P60) (Martínez-Toledano 2020).

While there are overall important differences in the composition along the distribution, age is the most influential factor for differences in the composition of income and wealth. Retirees along the whole wealth distribution have lower debt levels, very low shares in business and other movable assets, and real estate is distributed more evenly among retirees than among nonretirees—although it remains limited to those in the upper half of the wealth distribution. In contrast, gender differences in the composition of wealth are small.

Similarly, the composition of income reveals substantial heterogeneity along the distribution and between retirees and nonretirees. For the latter, labor income tends to be the most important income source, especially for the bottom 99 percent. Even those in the top 0.01 percent of the income distribution draw on average 35 percent of their income from labor, the remaining 65 percent is different forms of capital income. In addition, income composition varies by gender. Women draw a lower share of their income from labor, hence they rely more heavily than men on transfers or—at the very top—on capital incomes.

Finally, I shed light on the joint distribution of income and wealth. The overall correlation between someone's income and wealth rank is 0.32. However, this number masks substantial heterogeneity, as there is a strong tail dependence between the two distributions. Those who already are very rich therefore also derive the largest incomes. This is especially pronounced at the very top: 78 percent of those in the top 0.01 percent of the gross income distribution are in the top 0.1 percent of the net wealth distribution. At the same time, a considerable share of individuals across all income ranks are in the bottom quintile of the wealth distribution, that is, they have very low or even negative net wealth—even if they are in the top 10 percent of the income distribution. In contrast, those belonging to the top 10 percent of the wealth distribution have a low likelihood of having low incomes. Low-income wealth millionaires are therefore very rare, while about one out of six top earners can be considered wealth-poor. Overall, it is relatively unlikely to be in a higher wealth group compared to one's income group.

These findings can have important implications for life-cycle models as well as for optimal tax theory. If joint inequality of income and wealth is even larger than income or wealth inequality taken alone, optimal redistributive taxation may, for example, be more progressive. Similarly, understanding the composition of income and wealth is important to draw conclusions on the

incidence and the distributional effects of differential taxation of, such as labor and capital income, or financial assets and real estate. Understanding the joint distribution of income and wealth is further relevant for research on regional tax competition. Mobility of high earners in response to income taxes has been shown to be quite large (see Kleven et al. 2020 for an overview). Nevertheless, jurisdictions engaging in such tax competition for top earners may not break even in terms of income tax revenue (Agrawal and Foremny 2019; Agrawal, Foremny, and Martínez-Toledano 2020; Martínez 2022). However, if those top earners also increase the wealth and inheritance tax base, foregone income tax revenue may be compensated by revenue from taxes on wealth. Finally, my descriptive findings also have implications for macroeconomic policies: if low-income earners also have low wealth, it is harder for them to cope with shocks. Given that in many datasets it is possible to observe income but not wealth in detail, these are valuable insights for future research.

The remainder of this chapter is organized as follows. Section 4.2 embeds the chapter in the previous literature. Section 4.3 describes the dataset I compiled for this project. In sections 4.4 and 4.5 I present the results on the composition of wealth and income, respectively, followed by results on the joint distribution of income and wealth (section 4.6). Section 4.7 concludes.

## 4.2    Previous Research

There is a rapidly growing literature on wealth inequality, including, for example, Piketty, Yang, and Zucman (2019), Kopczuk and Saez (2004), and Saez and Zucman (2016). Data constraints are often a limiting factor for this research, as data on wealth is much less readily available than data on income. To estimate the wealth distribution, researchers have relied on surveys, bequest tax data, capital income tax data, or wealth tax data— although the latter is available in only a small number of countries: while 12 countries had net wealth taxes in 1990, there were only four OECD countries that still levied recurrent taxes on individuals' net wealth in 2017 (see OECD 2018 for an overview on wealth taxation). Since wealth is much more concentrated than income, many papers have put special focus on the evolution of top wealth shares. For Switzerland, Dell, Piketty, and Saez (2007) and Föllmi and Martínez (2017) have documented the evolution of top wealth shares over the past century until 2010. Based on aggregate wealth tax statistics, this research shows that wealth is highly concentrated in Switzerland, where the top 1 percent holds around 40 percent of total wealth. Föllmi and Martínez (2017) find that correcting for nontaxable pension wealth of the active population reduces this share, but that since the mid-1990s there is nevertheless an upward trend in top wealth shares.

While empirical research on income but also wealth inequality has made much progress, especially over the past two decades, research on the joint dis-

tribution of income and wealth remains scattered—mainly due to the lack of high-quality individual data covering both individual income and wealth distributions. Aiming at better measurement of "economic position" or "economic well-being," Wolfson (1979) made adjustments to the Canadian income distribution by (1) accounting for family size, (2) including imputed rent, and (3) including the annuity equivalent of net worth. More recent contributions include Aaberge, Atkinson, and Königs (2018), Chauvel et al. (2019), Jäntti, Sierminska, and Smeeding (2008), Kuhn, Schularick, and Steins (2020), Peichl and Pestel (2013), and Sierminska, Brandolini, and Smeeding (2007). Most papers, including this one, rely on nonparametric measures of the joint distribution. A notable exception is that by Jäntti, Sierminska, and Van Kerm (2015), which presents a new, parametric approach based on copula functions. The difficulty in this approach lies in accommodating the extensive mass at income and especially wealth zero, as the copula is not uniquely defined across mass points.[1]

All these previous papers base their analysis on surveys. Besides typically not covering the upper tail of the distributions very well, survey data excludes people living in institutions. This is especially problematic when studying the distribution of wealth, which is more concentrated among the elderly, who in turn are more likely to live in nursing homes and similar institutions. The recent paper by Gallusser and Krapf (2019) is the only other paper that I am aware of that studies the joint distribution of income and wealth based on administrative tax records. Being based on cantonal tax data, it is also the study most similar to mine. Nevertheless, our papers differ in several aspects. First, I combine data from several cantons to cover more than 50 percent of the population in Switzerland, while Gallusser and Krapf (2019) use data from the canton of Lucerne only. Second, their focus lies on new inequality measures combining annuitized wealth and annual labor income flows, while I present evidence on the association between income and wealth along several dimensions. Similar to their findings, I find a very strong tail dependence—especially at the top—and I further show that the strong tail dependence is driven by the top 1 percent within the top 1 percent.

## 4.3 A New Income and Wealth Tax Dataset for Switzerland

### 4.3.1 Cantonal Tax Data

Switzerland is a federal country with 26 states, called cantons. The federal government levies an annual personal and corporate income tax. On top of

1. Some recent papers go even further and include consumption inequality as a third dimension (e.g., Fisher et al. 2022; Linder and Schürz 2020; Ruiz 2011). While such a multidimensional approach is appropriate to measure well-being in an encompassing manner, the goal of the present chapter is to gain a deeper understanding of the complex relationship between income and wealth.

this tax, each canton levies income as well as wealth taxes on an annual basis for both individuals and corporations. The wealth and income tax bases are very broad and include all income earned and wealth held in and outside Switzerland. As a rather unique feature, Swiss tax data therefore contains detailed information on income and wealth for the whole population, including the upper tail of the distribution. What are not taxed, and therefore not recorded separately, are realized capital gains on personal assets.[2] Due to their large tax autonomy and in order to reduce administrative burdens, cantons collect the direct federal taxes on behalf of the federal government such that taxpayers file only one tax return each year. All personal taxes are residence based.

This institutional setting has important implications for the availability of tax data. Cantons enjoy large tax autonomy and are the owners of the data collected. They forward only a limited set of income variables to the Federal Tax Administration, including taxable and net income after itemized deductions. Income is therefore aggregated and the information on the different income sources (e.g., employment, self-employment, capital income, pensions, etc.) is lost. Most importantly, because the federal government does not levy a wealth tax, it has no individual-level information on wealth in its tax data. Cantons share only aggregate wealth statistics with the Federal Tax Administration. Hence while tax data available from the Federal Tax Administration, which cover the full population living in Switzerland, have been used in previous research on income and wealth inequality in Switzerland (including work on top income and wealth shares by Dell, Piketty, and Saez 2007, and Föllmi and Martínez 2017), they do not allow us to uncover the composition nor the joint distribution of income and wealth.

I obtained anonymized cantonal tax data based on taxpayer's tax returns from the following eight out of 26 cantons:[3] Aargau (AG), Bern (BE), Basel-Stadt (BS), Jura (JU), Luzern (LU), St. Gallen (SG), Obwalden (OW), and Zurich (ZH). Figure 4.1 shows the regional data coverage. I am able the cover most of the German-speaking areas and some French-speaking parts but unfortunately miss the Italian-speaking south of the country. These cantons cover 53 percent of the universe of regular taxpayers who had filed a tax return in 2010 according to federal income tax statistics. Since my dataset

2. Capital gains incurred on personal assets are taxed indirectly through the wealth tax. Since the wealth tax is based on assets' worth on December 31, capital gains—especially from financial assets—are therefore taxed even when not realized. Realized capital gains on business assets are taxed under corporate taxation.

3. To obtain the cantonal tax data, requests have to be made at each canton on a project-by-project basis. The application process as well as costs for data access vary widely across cantons, and ultimately not all cantons are willing to provide tax data for research purposes. For this project, data access was granted within the SNSF Grant 176458, "The Influence of Taxation on Wealth and Income Inequality." To facilitate the data application process and reduce costs, some of the data used here were approved as part of an earlier SNFS Grant, "Inequality in Income and Wealth in Switzerland from 1970 to 2010," and kindly made available for this research project. See http://inequalities.ch/ for details on that earlier project.

Share of Swiss taxpayers (percentage)

- 0.46
- 0.87
- 2.52
- 4.75
- 5.97
- 7.86
- 12.29
- 18.1
- No data

BS

JU    AG    ZH

SG

LU

BE    OW

Total coverage: 52.8%
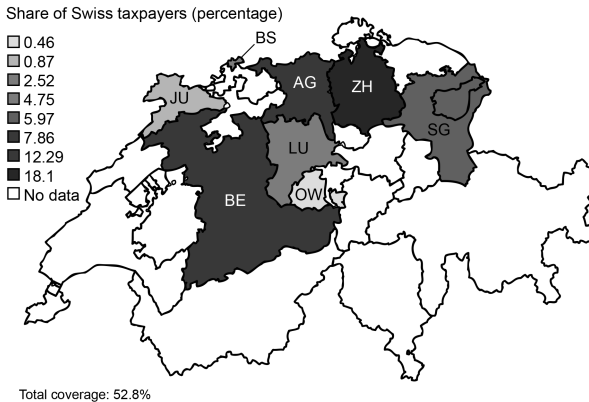
**Fig. 4.1    Cantons and tax units covered in the data**

*Notes:* The map shows the cantons for which data are available, along with the share of tax units covered by each canton. The shares of tax units are based on the number of regular taxpayers in federal income tax statistics of 2010. In contrast with regular population statistics, this metric takes into account that some groups, especially foreigners without permanent residence and employees at international organizations, do not file a tax return. Together, the data cover 53 percent of all taxpayers in Switzerland and roughly three-quarters of the population in German-speaking areas. French-speaking parts in my data include the whole canton of Jura (JU) and the western part of the canton of Bern (BE).

is based on filed tax returns, this is the relevant comparison. Note that true nonfiling is not an issue: filing is mandatory for all Swiss citizens and permanent residents. In case of nonfiling, the tax administration will file a tax return on the taxpayer's behalf in an unfavorable way (e.g., overestimating their income and disregarding deductions) and add a fine to the tax bill. These nonfilers' imputed tax returns are then included in the statistics. Due to the financial penalties involved (which increase with each year of nonfiling), their share is however extremely low. Nonpermanent residents and employees at international organizations as well as diplomats do not usually file a tax return and are hence excluded. Individuals employed at the many international organizations located in Switzerland as well as diplomats are tax-exempt. Nonpermanent residents are taxed at the source without filing a tax return—unless their annual income exceeds 120,000 CHF, in which case they can opt to file a tax return and are part of my data.

I combine these cantonal datasets into one, large, harmonized dataset. There are some important limitations. First, in the canton of Zurich the data does not contain the full population of taxpayers There, detailed cantonal tax data is available for only 45 out of 161 municipalities. These 45 municipalities include the large city of Zurich and cover roughly 60 percent of all taxpayers in the canton. According to the tax administration, this sample is representative of the canton as a whole. Unfortunately, no sampling weights were provided. Out of this sample, I obtained a 50 percent random sample

of all the taxpayers belonging to the bottom 95 percent of the gross income or net wealth distribution, and a 100 percent sample of those belonging to the top 5 percent of the income and/or wealth distribution. I use sampling weights to take this into account.

Second, each of the cantonal datasets covers different time periods, including the years 2000–2016. For all cantons except Zurich, the year 2010 is in the data. I merge cantonal data from 2010 to obtain a cross-section dataset covering the eight cantons described above. For the canton of Zurich, where data is available only in intervals of three years, I use data from 2011. I refer to this cross-sectional dataset as pooled tax data. Dynamic analyses, however, are still only possible using data for single cantons.

Third, some of the variables on income, wealth, and deductions differ in their level of detail across cantons. While the tax base is the same across cantons (defined in the 1990 Federal Tax Harmonization Act), the individual tax data differs across cantons due to differences in how tax returns are structured and what is recorded in the main taxpayer file. In each canton, I have access only to data that are recorded in the main tax file, and some cantons did not include all the variables due to privacy concerns. To ensure comparability, I harmonize the data across cantons. Sections 4.3.2 and 4.3.3 describe the variables I use in detail.

Fourth, in Switzerland married couples have to file jointly. Therefore, a tax file might represent one or two adults. I individualize the data, so every observation represents a single person. This leaves me with a total of 2,755,938 observations in 2010. While some income components could be attributed exactly to one of the spouses, this is not possible in every canton nor for every income component. Wealth components are always reported for the tax unit as a whole and cannot be attributed to one of the spouses. For married couples I therefore split all income and wealth components equally between spouses. Such equal division of resources is appropriate to depict the distribution—assuming that married couples share income and wealth even if they do not contribute to the same extent. Since this assumption is likely to be violated in reality, my analysis will slightly underestimate true individual income and wealth inequality.

### 4.3.2   Income Measures

I use gross income net of all mandatory contributions but not net of taxes. I differentiate between income from labor, capital, and transfers, and further break these components down into subcomponents. For some income categories, only net income is available, namely income from real estate. Below I explain all income components used in the analysis in detail.

- **Labor income** is the sum of income from employment and self-employment:
  - *Income from employment.* Tax filers declare gross income from employment net of the following contributions withheld by the

employer at the source: social security, disability, military, maternity, and unemployment insurance contributions as well as occupational pension contributions. Annual gross income is reported in a legal form issued by the employer which needs to be enclosed with the tax return.

- *Income from self-employment* includes profits from nonincorporated businesses, namely, sole proprietorship, partnerships, and limited partnerships. While legally mandatory only for businesses with turnover above 500,000 CHF, in practice also most small businesses conduct orderly—that is, double-entry—accounting. Even if a business keeps only simple accounting, expenditures need to be proven and in direct relation to the business. Losses can be carried forward seven years. Self-employment income is subject to social security, disability, military and maternity insurance contributions. Self-employed further have the option to voluntarily join an occupational pension fund. Contributions are deductible and wealth held in these funds is tax-free. To maintain equal treatment, all of the above require the self-employed to pay both the employee's and the employer's part of the contribution. As income from self-employment is commonly considered as mixed income (see, e.g., Martínez-Toledano 2020), I follow the literature and allocate 70 percent of these profits to income from self-employment and 30 percent to capital income.

- **Total capital income** includes all incomes from capital and real estate:
  - *Capital income* encompasses income from financial assets, namely interests and dividends, income from undistributed inheritances (Erbengemeinschaften), plus 30 percent of income from self-employment.
  - *Real estate income* consists of income from renting out real estate and imputed rent of home owners. Imputed rent is part of the income tax base of homeowners in Switzerland and is reported under real estate income in the tax return. Only in the tax data from ZH, OW, SG, and AG are imputed rents listed separately, allowing me to distinguish between net rental real estate income and imputed rents. Their amount is defined by the tax laws and specified by cantonal authorities. All real estate income is reported net of maintenance costs, which are tax deductible.

- **Total transfer income** is the sum from all transfers and pensions:
  - *Transfers* contain benefits from unemployment, accident, disability, and military insurances, as well as from child, family, maternity, and sickness allowances. They further include private transfers from other households, especially alimonies from ex-partners for the spouse and minor children.

    Means-tested benefits are excluded, as they are not taxable and hence are not declared. Since means-tested benefits depend on a variety of factors, including the household composition, living and

health conditions, and are determined on a case-by-case basis, I cannot impute these benefits with the data at hand. I therefore underestimate true income for low-income individuals.

– *Pensions.* This component summarizes all incomes stemming from pensions. It is available for all cantons except AG. In all other cantons, it can be further broken down into social security pensions and occupational and private pensions.

*Social security pensions.* Pensions from the public pension system, the first pillar in the Swiss pension system. All labor income is subject to contributions. Nonworking individuals pay contributions based on their wealth. Everyone is covered and pensions are capped.

*Occupational and private pensions.* Pensions from the second and third pillars of the Swiss pension system. The occupational pension system has some similarities with the US 401(k)s; the main differences are that (1) contributions are mandatory for employment income above CHF 23,940 (in 2010), (2) contribution rates are age-dependent, and (3) rates are set by the government. Private pensions pensions (the third pillar) stem from life insurances and private (usually tax-exempt) retirement saving accounts.

- **Other income** includes all other incomes which do not belong to any of the categories above. In particular, this category contains lump-sum settlements for recurrent benefits and, at least in some cantons, cash payouts at retirement from the second and third pillars of the pension system.

- **Gross income** is the sum of all the income components listed above. I use the term gross as it is income before taxes and before any tax-related deductions, even though some components, such as real estate income, are net of expenses and deductions.

### 4.3.3   Wealth Measures

As far as possible, I base my analysis on total net wealth. The data allow me to distinguish between financial assets, movable business assets, movable personal assets, real estate, and debt. Since wealth on retirement accounts from the mandatory occupational pension system (second pillar) and the voluntary tax-exempt saving scheme (pillar 3a) are not subject to taxation until they are either cashed in or transformed into a pension at retirement, I have to exclude these assets from the analysis. However, since voluntary contributions toward the second and third pillars are deductible from annual income up to thresholds fixed by the federal government, I see who makes such contributions.

**Financial assets** include securities, credit balances, cash on bank deposits, gold and other precious metals as well as the value of life insurance poli-

cies. Excluded are personal retirement savings accounts from the third pillar of the pension system, as they are tax-exempt. These savings can only be accessed after retirement or to purchase a private home. The same is true for wealth held within the occupational pension system (second pillar).

**Business assets** are movable assets held within nonincorporated businesses (sole proprietorship, partnerships, and limited partnerships). They include all movable business assets such as inventories, livestock, vehicles, machinery/furniture, equipment, and so on. Also, financial assets held within a business are included here.

As opposed to movable personal assets, movable business assets are not valued at market but at book value. Therefore, assets are discounted annually for depreciation such that they tend to be valued below market value. Furthermore, business assets are reported net of business debts in the main tax file. This implies that movable business assets are undervalued compared to personal assets. Real estate held within nonincorporated businesses is reported together with privately held real estate.

**Real estate wealth** includes all real estate, including private homes, secondary homes, land and property held within a business. In the majority of cantonal tax data it is not possible to further distinguish between these categories. Reported values are gross values excluding any debt. However, real estate is deliberately undervalued in Swiss tax data to avoid an excessive tax load on homeowners. Assessment methods vary by canton (except for real estate used for agriculture or forestry, which is valued uniformly in the whole country). Because individuals might own real estate in different cantons, tax authorities use so-called repartition values (Repartitionswerte) to rescale real estate valued by another canton. I use these values, published by the Federal Tax Administration, to adjust for different valuation practices across cantons.

In addition, assessments happen only approximately every decade. To account for developments in real estate prices over time, I further adjust real estate prices since the last valuation year using regional house price indices. These are collected by the real estate firm Wuest + Partner and published online by the Swiss National Bank. Unfortunately, this second adjustment is only possible in cantons that assess all properties in a given year. This is the case in BE, ZH, OW, BS, AG and JU. In LU and SG, real estate valuations are done on a rolling basis, where every year about 10 percent of all properties are reevaluated. Therefore, the development of real estate prices should at least partly be captured.

For ZH, AG, and SG I further have access to real estate information that enables me to distinguish between owner-occupied houses like main residences and vacation homes from other real estate–like properties for rent, business properties, and land.

**Movable assets.** This component includes motor vehicles, shares in undistributed inheritances, shares in nonlisted companies and other assets, such as jewelry and art, that do not fall into any other category. These assets are valued according to their insurance value, if possible. Nonlisted companies are valued at book value. Valuation of cars takes into account depreciation at rates stipulated by the tax authority.

**Debt.** In principle all types of debt are tax deductible. Debt therefore includes mortgages, but also personal loans, consumer credits, and other verifiable outstanding financial liability, including taxes owed. Unfortunately, it is not possible to distinguish the different types of debt in the data: in all the cantons, only the sum of all debt is recorded in the main tax file. It is therefore not possible to define the different asset categories net of debt. The descriptive analysis suggests that by far the largest component of debt is mortgages.

**Gross wealth** is the sum of financial assets, business assets, other movable assets and real estate wealth. Strictly speaking, this is not a true gross value, since business assets are net of debt. Because it is not possible to attribute reported debts to any corresponding gross asset in the data at hand, for some analyses I have to revert this admittedly imprecise definition of gross wealth.

**Net wealth.** Total net wealth is built by subtracting total debt from gross wealth. Since debt can be deducted at market value, but real estate tends to be undervalued (even though I try to account for this as well as possible), I may underestimate net wealth, especially for real estate owners.

### 4.3.4   Demographics

For all cantons, the data include the following demographics: marital status, number of dependent children, gender of the main taxpayer (in the case of married couples), age of the main taxpayer (although in BS only age categories are available). Other characteristics are available only for some cantons, namely age of the second taxpayer (ZH, BE, SG, JU) and gender of the second taxpayer (SG, BE, JU). In all other cantons, I define the gender of the second person in a married couple as the opposite of that of the main taxpayer. Because I cannot identify same-sex couples, I will assign a wrong gender to the second person in a same-sex couple. I estimate that in the cantons, where I have to impute gender in this way, 0.43 percent of couples were of the same gender in 2010. The measurement error is therefore small.

I further define dummy variables based on income streams to indicate whether someone is an employee, self-employed, or a retiree. Someone is an employee or self-employed, respectively, depending on what was their main source of labor income. The retiree dummy variable takes on the value of 1 if someone draws a social security pension and is allowed to retire according to their age. For men, early retirement is possible at age 63 and for women at age 62. I introduce the age cut because social security pensions include

disability pensions for nonretired individuals. In the cantons ZH, LU, OW, BS, and AG, where I do not know the age of the spouse, I impute their age based on the age structure of couples where the main taxpayer is between 55 and 80 years old in the canton of Bern. On average, the spouse is three years younger. This allows me to define retirement for individuals in all cantons except AG, where I lack information on pension income.

An alternative approach is to define retirement according to legal retirement (65 years for men, 64 years for women). With this approach, however, the missing age of the spouse is more problematic: there are either more missing observations, since age of the spouse is not available in LU, OW, BS, and AG, or I have to base the definition solely on the imputed age of these individuals. Nevertheless, most results are very similar for both definitions of retirement.

Finally, I create an indicator for home ownership. This variable takes on the value of 1 if someone has an imputed rent in their income tax base. This variable is defined only for the cantons of ZH, OW, BS, SG and AG.

### 4.3.5   Summary Statistics

Most of the analyses in this chapter are carried out by percentile groups. Below P90, these groups correspond to deciles, but then I use smaller fractions of the population within the top 10 percent. Earlier findings on top income groups suggest that there are considerable differences between the rich and the super-rich (e.g., Atkinson and Piketty 2007, 2010; Föllmi and Martínez 2017). I classify individuals into percentile groups based on the total gross income and the total net wealth distributions, respectively. Even subgroups—such as men and women or retirees and workers—are grouped into percentiles based on the total distribution and not based on the distribution within their respective subgroup. This allows for direct comparisons across groups, as the income and wealth thresholds remain unchanged.

Table 4.1 shows the income and wealth group thresholds, medians, and averages for each group. The reported income and wealth shares correspond well with the results in Föllmi and Martínez (2017) for Switzerland, suggesting that the sample is representative of Switzerland as a whole. Differences between the net and gross wealth distributions are largest at the tails of the distributions but are small overall. All inequality measures show that wealth is considerably more unequally distributed than income. The Gini index of the net wealth distribution reaches 0.8, almost twice as much as the Gini for gross income. While the bottom 80 percent earn just short of 55 percent of all income, the bottom 80 percent of the wealth distribution own less than 13 percent of total net wealth. Taken together, the bottom 50 percent of the wealth distribution have negative net worth, corresponding to 1.3 percent of total net wealth. Wealth is therefore heavily concentrated at the top.

Tables 4.2 and 4.3 further show population averages by gross income and net wealth percentile groups, respectively. Comparing the share of single

**Table 4.1    Income and wealth percentiles, 2010**

| Percentile group | Gross income (1,000 CHF) | | | | Net wealth (1,000 CHF) | | | | Gross wealth (1,000 CHF) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threshold | Mean | Median | Share % | Threshold | Mean | Median | Share % | Threshold | Mean | Median | Share % |
| P0–P20 | | 13 | 15 | 4.4 | | −35 | −1 | −3.0 | | 0 | 0 | 0.0 |
| P20–P30 | 27 | 31 | 31 | 5.2 | 0 | 2 | 2 | 0.1 | 4 | 8 | 8 | 0.2 |
| P30–P40 | 35 | 39 | 39 | 6.5 | 5 | 11 | 10 | 0.5 | 13 | 23 | 22 | 0.7 |
| P40–P50 | 42 | 46 | 46 | 7.7 | 17 | 27 | 26 | 1.1 | 35 | 57 | 55 | 1.7 |
| P50–P60 | 49 | 52 | 52 | 8.8 | 38 | 54 | 53 | 2.3 | 88 | 138 | 137 | 4.0 |
| P60–P70 | 56 | 60 | 60 | 10.0 | 73 | 99 | 98 | 4.2 | 191 | 239 | 239 | 6.9 |
| P70–P80 | 64 | 69 | 69 | 11.6 | 131 | 176 | 174 | 7.5 | 286 | 340 | 338 | 9.9 |
| P80–P90 | 75 | 85 | 84 | 14.2 | 231 | 324 | 315 | 13.8 | 403 | 508 | 498 | 14.8 |
| P90–P95 | 97 | 109 | 108 | 9.2 | 454 | 587 | 574 | 12.5 | 658 | 813 | 796 | 11.8 |
| P95–P99 | 126 | 163 | 153 | 11.0 | 776 | 1251 | 1124 | 21.4 | 1042 | 1636 | 1471 | 19.0 |
| P99–P99.5 | 252 | 292 | 289 | 2.5 | 2427 | 3060 | 2983 | 6.5 | 3120 | 3891 | 3810 | 5.7 |
| P99.5–P99.9 | 348 | 485 | 448 | 3.3 | 4030 | 6557 | 5838 | 11.2 | 5032 | 7980 | 7193 | 9.3 |
| P99.9–P99.99 | 821 | 1338 | 1109 | 2.0 | 12798 | 23436 | 19531 | 9.0 | 15274 | 26731 | 22325 | 7.0 |
| P99.99–P100 | 3566 | 21935 | 5979 | 3.7 | 64728 | 300250 | 109234 | 12.8 | 69597 | 310831 | 115143 | 9.0 |
| *Inequality measures* | | | | | | | | | | | | |
| Gini | 0.41 | | | | 0.80 | | | | 0.76 | | | |
| P90/P10 | 6.54 | | | | 1045275 | | | | 1357388 | | | |
| P90/P50 | 2.06 | | | | 9.31 | | | | 8.03 | | | |
| P75/P25 | 2.26 | | | | 24.29 | | | | 43.58 | | | |
| P10/P50 | 0.31 | | | | 0.00 | | | | 0.00 | | | |
| N (weighted) | 2,755,938 | | | | 2,755,938 | | | | 2,755,938 | | | |

*Notes*: The table contains the thresholds, mean, and median wealth and income, as well as income and wealth shares within each percentile group of the gross income, net wealth, and gross wealth distributions, respectively. Overall inequality measures and total number of observations are reported at the bottom of the table. Statistics are based on individual data, where wealth and income are split equally among married adults. Pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively. See online appendix figure A1 (http://www.nber.org/data-appendix/c14452/appendix.pdf) for a graphical representation of the percentile thresholds.

women and single men across both distributions shows that women are less likely than men to be found at the top of the income distribution, but more likely than men to be found at the top of the wealth distribution. This suggests that, in Switzerland, single women—many of whom are retired—are likely to be found at the lower end of the income distribution and / or at the upper end of the wealth distribution.

Twenty-three percent of all individuals in my data are retirees (i.e., drawing a pension and 62 years and older as described above). This corresponds well with total population statistics, according to which 21 percent of the adult population was aged 65 and older in 2010. Retirees are overrepresented at the bottom and at the very top of the income distribution. Within the wealth distribution, retirees are clearly concentrated at the top. They are more than twice as likely to be found within the top 10 percent of the wealth distribution than within the population as a whole.

Figure 4.2 further shows the composition of gender and retirees along both distributions. Especially women belonging to the top 10 percent of the wealth distribution are very likely to be retired. But also for men, the share of retirees increases further up in the wealth distribution. This is not true for income, where especially the distribution of retired women is bimodal: they are most likely to be found at the bottom or the very top of the distribution.

Looking at the probability of retirees to work (tables 4.2 and 4.3) reveals that retirees are more likely to continue working the higher up they are in either of the two distributions: while retirees who also earn some kind of labor income make up 4.2 percent of the total population, they represent almost one-fifth of those in the top 0.01 percent. This suggests that those who were doing well in life before retiring are also those most likely to continue working after retirement. At the same time, even though those at the bottom of the income and wealth distributions would benefit most from continuing to work from a resource perspective, they are least likely to do so. Likely explanations are worse health, lower education, and less attachment to the labor market before reaching retirement. Unfortunately, I lack the information on these characteristics.

The data further show that individuals within the top 40 percent of the income distribution are more likely than the average to contribute to tax-exempt, private, retirement accounts (third pillar). From those in the top 10 percent, excluding the top 1 percent, more than 65 percent contribute to these schemes. The picture is similar for the more regulated contributions to occupation pension schemes (second pillar). Here it is the top 1 percent who benefit most from such contributions. Contributions toward retirement accounts are spread more evenly across the wealth distribution. Especially contributions toward the third pillar are most likely in the range of P40–P95. This suggests that individuals who are building up wealth put part of it aside for retirement.

Finally, I look at the distribution of home ownership. An estimated

**Table 4.2**    Population averages by gross income percentile group, 2010

| | | P0–P20 | P20–P30 | P30–P40 | P40–P50 | P50–P60 | P60–P70 | P70–P80 | P80–P90 | P90–P95 | P95–P99 | P99–P99.5 | P99.5–P99.9 | P99.9–P99.99 | P99.99–P100 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Net wealth | | 53 | 117 | 130 | 126 | 126 | 141 | 173 | 242 | 359 | 672 | 1500 | 3480 | 13,475 | 231,281 | 225 |
| (1,000 CHF) | | (0.484) | (0.485) | (0.604) | (0.529) | (0.566) | (0.683) | (0.793) | (1.042) | (2.148) | (6.454) | (37.50) | (116.30) | (504.7) | (47730) | (4.512) |
| | N | 531,711 | 268,600 | 268,935 | 268,548 | 269,233 | 272,126 | 278,849 | 288,994 | 155,723 | 135,034 | 16,553 | 12,296 | 2,374 | 246 | 2,769,222 |
| Married | | 31.3 | 57.0 | 63.8 | 60.9 | 57.6 | 55.7 | 53.8 | 53.2 | 54.0 | 58.6 | 60.0 | 60.6 | 63.6 | 65.0 | 52.3 |
| (%) | | (0.064) | (0.095) | (0.093) | (0.094) | (0.095) | (0.095) | (0.094) | (0.093) | (0.126) | (0.134) | (0.381) | (0.441) | (0.99) | (3.05) | (0.030) |
| | N | 531,711 | 268,600 | 268,935 | 268,548 | 269,233 | 272,126 | 278,849 | 288,994 | 155,723 | 135,034 | 16,553 | 12,296 | 2,374 | 246 | 2,769,222 |
| Single female | | 36.6 | 28.7 | 24.0 | 25.2 | 24.0 | 23.0 | 23.3 | 22.2 | 19.0 | 14.6 | 12.4 | 12.8 | 13.4 | 15.6 | 25.8 |
| (%) | | (0.066) | (0.087) | (0.083) | (0.084) | (0.083) | (0.081) | (0.080) | (0.078) | (0.100) | (0.097) | (0.258) | (0.304) | (0.704) | (2.35) | (0.026) |
| | N | 529,787 | 267,224 | 267,509 | 267,322 | 268,223 | 271,074 | 277,795 | 287,724 | 154,623 | 133,578 | 16,361 | 12,144 | 2,336 | 238 | 2,755,938 |
| Single male | | 32.4 | 14.6 | 12.4 | 14.1 | 18.5 | 21.6 | 23.1 | 24.8 | 27.3 | 27.3 | 28.0 | 27.1 | 23.6 | 20.6 | 22.2 |
| (%) | | (0.064) | (0.068) | (0.064) | (0.067) | (0.075) | (0.079) | (0.080) | (0.080) | (0.113) | (0.122) | (0.351) | (0.403) | (0.879) | (2.63) | (0.025) |
| | N | 529,787 | 267,224 | 267,509 | 267,322 | 268,223 | 271,074 | 277,795 | 287,724 | 154,623 | 133,578 | 16,361 | 12,144 | 2,336 | 238 | 2,755,938 |
| With children | | 24.0 | 33.2 | 39.8 | 42.7 | 43.9 | 44.9 | 47.0 | 50.6 | 56.2 | 64.4 | 69.9 | 68.7 | 64.2 | 63.4 | 41.6 |
| (%) | | (0.059) | (0.091) | (0.094) | (0.095) | (0.096) | (0.095) | (0.094) | (0.093) | (0.126) | (0.130) | (0.356) | (0.418) | (0.984) | (3.08) | (0.030) |
| | N | 531,711 | 268,600 | 268,935 | 268,548 | 269,233 | 272,126 | 278,849 | 288,994 | 155,723 | 135,034 | 16,553 | 12,296 | 2,374 | 246 | 2,769,222 |
| Employees | | 44.5 | 40.8 | 52.6 | 65.5 | 74.1 | 78.3 | 80.3 | 81.4 | 80.7 | 75.4 | 66.6 | 62.3 | 61.5 | 52.3 | 64.5 |
| (%) | | (0.071) | (0.098) | (0.099) | (0.094) | (0.086) | (0.081) | (0.077) | (0.074) | (0.103) | (0.121) | (0.378) | (0.449) | (1.03) | (3.38) | (0.030) |
| | N | 495,508 | 253,519 | 253,956 | 254,697 | 256,738 | 259,840 | 266,386 | 274,872 | 147,246 | 126,820 | 15,587 | 11,653 | 2,236 | 220 | 2,619,278 |
| Self-employed | | 3.8 | 5.4 | 5.4 | 4.7 | 4.2 | 4.0 | 4.2 | 4.7 | 6.2 | 9.4 | 14.1 | 14.6 | 12.6 | 8.5 | 5.0 |
| (%) | | (0.035) | (0.054) | (0.054) | (0.051) | (0.047) | (0.046) | (0.046) | (0.047) | (0.071) | (0.090) | (0.303) | (0.354) | (0.751) | (2.03) | (0.016) |
| | N | 304,922 | 173,356 | 172,473 | 173,595 | 177,304 | 181,093 | 190,197 | 202,038 | 113,738 | 104,547 | 13,253 | 9,984 | 1,960 | 189 | 1,818,649 |
| Retirees | | 23.4 | 45.6 | 36.3 | 26.4 | 19.6 | 16.2 | 14.5 | 13.5 | 13.2 | 14.6 | 18.0 | 23.6 | 33.0 | 39.4 | 23.0 |
| (%) | | (0.060) | (0.102) | (0.099) | (0.090) | (0.081) | (0.075) | (0.071) | (0.067) | (0.090) | (0.101) | (0.313) | (0.400) | (1.02) | (3.29) | (0.027) |
| | N | 501,584 | 239,988 | 237,548 | 238,695 | 240,599 | 243,595 | 250,066 | 259,295 | 140,686 | 122,620 | 15,073 | 11,246 | 2,121 | 221 | 2,503,337 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working retirees (%) | 2.2 | 5.3 | 5.4 | 4.6 | 3.9 | 3.8 | 3.8 | 4.2 | 4.7 | 5.5 | 7.3 | 9.8 | 16.3 | 18.5 | 4.2 |
| | (0.030) | (0.062) | (0.063) | (0.059) | (0.054) | (0.053) | (0.052) | (0.052) | (0.072) | (0.078) | (0.243) | (0.317) | (0.883) | (3.00) | (0.017) |
| N | 237,774 | 131,703 | 127,993 | 127,577 | 129,223 | 130,648 | 137,302 | 147,002 | 86,327 | 85,379 | 11,538 | 8,798 | 1,753 | 168 | 1,363,185 |
| Savings pillar 3 (%) | 3.1 | 8.5 | 15.2 | 22.8 | 30.4 | 39.4 | 48.2 | 58.1 | 65.1 | 66.1 | 61.2 | 53.8 | 40.9 | 16.8 | 30.5 |
| | (0.025) | (0.055) | (0.071) | (0.083) | (0.091) | (0.096) | (0.097) | (0.094) | (0.124) | (0.133) | (0.390) | (0.462) | (1.04) | (2.53) | (0.028) |
| N | 495,508 | 253,519 | 253,956 | 254,697 | 256,738 | 259,840 | 266,386 | 274,872 | 147,246 | 126,820 | 15,587 | 11,653 | 2,236 | 220 | 2,619,278 |
| Savings pillar 2 (%) | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 2.2 | 3.0 | 5.1 | 8.8 | 14.7 | 20.8 | 20.5 | 18.9 | 7.3 | 3.5 |
| | (0.019) | (0.026) | (0.025) | (0.026) | (0.026) | (0.029) | (0.033) | (0.042) | (0.074) | (0.100) | (0.325) | (0.374) | (0.828) | (1.75) | (0.011) |
| N | 495,508 | 253,519 | 253,956 | 254,697 | 256,738 | 259,840 | 266,386 | 274,872 | 147,246 | 126,820 | 15,587 | 11,653 | 2,236 | 220 | 2,619,278 |
| Homeowners (%) | 7.1 | 18.7 | 23.5 | 26.2 | 28.4 | 32.4 | 36.8 | 43.2 | 50.1 | 56.8 | 61.1 | 66.7 | 69.5 | 71.7 | 30.1 |
| | (0.057) | (0.117) | (0.129) | (0.135) | (0.139) | (0.143) | (0.142) | (0.139) | (0.177) | (0.172) | (0.459) | (0.512) | (1.14) | (3.24) | (0.043) |
| N | 201,598 | 110,118 | 108,026 | 106,149 | 105,751 | 107,563 | 115,045 | 127,755 | 79,924 | 83,057 | 11,289 | 8,485 | 1,638 | 194 | 1,166,592 |
| Retired owners (%) | 3.8 | 13.1 | 14.3 | 12.4 | 10.6 | 9.9 | 9.7 | 9.7 | 9.9 | 10.2 | 11.8 | 16.4 | 21.1 | 23.2 | 9.9 |
| | (0.043) | (0.102) | (0.107) | (0.101) | (0.095) | (0.091) | (0.087) | (0.083) | (0.106) | (0.105) | (0.303) | (0.402) | (1.01) | (3.04) | (0.028) |
| N | 201,598 | 110,118 | 108,026 | 106,149 | 105,751 | 107,563 | 115,045 | 127,755 | 79,924 | 83,057 | 11,289 | 8,485 | 1,638 | 194 | 1,166,592 |

*Notes:* The table contains population averages within each gross income percentile group. Standard errors are reported in parentheses. Statistics are based on individual data, where wealth and income are split equally among married adults. Individuals are classified as married, single female, or single male. The dummy for children is defined irrespective of civil status. Employees are individuals whose income from employment is larger than income from self-employment. Self-employed are individuals whose income from self-employment is larger than income from employment. Retirees are defined as those drawing social security pensions and being above age 63 (m) or 62 (f), respectively. This variable is not defined in the canton of AG. Working retirees are defined as retirees (according to the aforementioned definition) who have individual labor income larger than zero. Hence their share is defined with respect to the total population, not with respect to the population of retirees. This variable is not defined in the cantons BE, BS, and AG. The two variables on savings toward pillar 3 (private pensions schemes) and pillar 2 (occupational pension schemes) indicate whether individuals claimed such deductions. "Homeowners" is a dummy variable which takes on the value of 1 if someone has an imputed rent in their income tax base. "Retired owners" indicates the share of the total population who are at the same time homeowners and retirees according to the definition above. These last two variables are defined only for the cantons of ZH, OW, BS, SG and AG.

Pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.

**Table 4.3**     **Population averages by net wealth percentile group, 2010**

| | | P0-P20 | P20-P30 | P30-P40 | P40-P50 | P50-P60 | P60-P70 | P70-P80 | P80-P90 | P90-P95 | P95-P99 | P99-P99.5 | P99.5-P99.9 | P99.9-P99.99 | P99.99-P100 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross income | | 50 | 35 | 44 | 51 | 57 | 61 | 65 | 69 | 80 | 110 | 190 | 332 | 1,074 | 17,386 | 61 |
| (1,000 CHF) | | (0.087) | (0.048) | (0.052) | (0.061) | (0.060) | (0.069) | (0.080) | (0.101) | (0.205) | (0.665) | (2.12) | (4.38) | (64.6) | (4837) | (0.425) |
| | N | 579,804 | 260,487 | 271,787 | 273,621 | 273,941 | 273,879 | 272,732 | 274,128 | 141,781 | 119,378 | 14,577 | 10,676 | 2,197 | 234 | 2,769,222 |
| Married | | 48.1 | 36.4 | 36.7 | 43.6 | 54.2 | 62.4 | 67.2 | 66.3 | 62.4 | 56.0 | 52.8 | 54.1 | 60.5 | 55.6 | 52.3 |
| (%) | | (0.066) | (0.094) | (0.092) | (0.095) | (0.095) | (0.093) | (0.090) | (0.090) | (0.129) | (0.144) | (0.414) | (0.482) | (1.04) | (3.26) | (0.030) |
| | N | 579,804 | 260,487 | 271,787 | 273,621 | 273,941 | 273,879 | 272,732 | 274,128 | 141,781 | 119,378 | 14,577 | 10,676 | 2,197 | 234 | 2,769,222 |
| Single female | | 24.1 | 34.1 | 34.3 | 31.4 | 25.5 | 21.0 | 18.7 | 20.0 | 22.6 | 27.0 | 29.7 | 27.8 | 23.3 | 29.3 | 25.8 |
| (%) | | (0.056) | (0.093) | (0.091) | (0.089) | (0.083) | (0.078) | (0.075) | (0.076) | (0.111) | (0.129) | (0.380) | (0.435) | (0.907) | (2.99) | (0.026) |
| | N | 575,608 | 259,403 | 270,851 | 272,655 | 272,945 | 272,807 | 271,658 | 273,008 | 140,967 | 118,533 | 14,477 | 10,622 | 2,172 | 232 | 2,755,938 |
| Single male | | 28.2 | 29.8 | 29.2 | 25.2 | 20.5 | 16.7 | 14.3 | 13.9 | 15.2 | 17.3 | 17.8 | 18.3 | 16.7 | 15.5 | 22.2 |
| (%) | | (0.059) | (0.090) | (0.087) | (0.083) | (0.077) | (0.071) | (0.067) | (0.066) | (0.096) | (0.110) | (0.318) | (0.375) | (0.800) | (2.38) | (0.025) |
| | N | 575,608 | 259,403 | 270,851 | 272,655 | 272,945 | 272,807 | 271,658 | 273,008 | 140,967 | 118,533 | 14,477 | 10,622 | 2,172 | 232 | 2,755,938 |
| with children | | 48.4 | 38.0 | 38.2 | 40.1 | 42.4 | 42.9 | 40.4 | 35.7 | 36.8 | 44.1 | 48.8 | 48.1 | 51.0 | 48.7 | 41.6 |
| (%) | | (0.066) | (0.095) | (0.093) | (0.094) | (0.094) | (0.095) | (0.094) | (0.091) | (0.128) | (0.144) | (0.414) | (0.484) | (1.07) | (3.27) | (0.030) |
| | N | 579,804 | 260,487 | 271,787 | 273,621 | 273,941 | 273,879 | 272,732 | 274,128 | 141,781 | 119,378 | 14,577 | 10,676 | 2,197 | 234 | 2,769,222 |
| Employed[1] | | 68.0 | 74.3 | 78.6 | 74.5 | 71.3 | 65.7 | 57.9 | 48.7 | 41.5 | 38.2 | 38.7 | 43.7 | 48.3 | 47.0 | 64.5 |
| (%) | | (0.064) | (0.089) | (0.081) | (0.086) | (0.089) | (0.093) | (0.097) | (0.097) | (0.134) | (0.145) | (0.418) | (0.501) | (1.12) | (3.68) | (0.030) |
| | N | 539,961 | 241,883 | 256,780 | 259,265 | 260,570 | 262,266 | 261,832 | 263,105 | 135,305 | 112,758 | 13,562 | 9,808 | 1,998 | 185 | 2,619,278 |
| Self-employed[2a] | | 4.7 | 2.3 | 2.9 | 3.5 | 4.2 | 5.3 | 6.3 | 7.3 | 8.1 | 8.5 | 8.8 | 7.9 | 8.5 | 6.1 | 5.0 |
| (%) | | (0.034) | (0.037) | (0.040) | (0.043) | (0.047) | (0.053) | (0.058) | (0.062) | (0.089) | (0.096) | (0.276) | (0.313) | (0.703) | (2.10) | (0.016) |
| | N | 387,453 | 165,636 | 177,761 | 181,393 | 182,149 | 178,286 | 173,323 | 175,325 | 94,037 | 83,625 | 10,501 | 7,458 | 1,571 | 131 | 1,818,649 |
| Retiree | | 7.6 | 9.8 | 11.0 | 16.3 | 20.2 | 25.9 | 33.7 | 44.1 | 52.6 | 58.0 | 59.3 | 55.3 | 51.3 | 53.3 | 23.0 |
| (%) | | (0.036) | (0.061) | (0.062) | (0.074) | (0.081) | (0.089) | (0.096) | (0.101) | (0.140) | (0.150) | (0.428) | (0.505) | (1.12) | (3.43) | (0.027) |
| | N | 526,410 | 240,574 | 252,283 | 250,814 | 246,387 | 243,968 | 241,540 | 242,026 | 126,356 | 107,925 | 13,186 | 9,680 | 1,976 | 212 | 2,503,337 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working retirees (%) | 1.8 | 1.2 | 1.5 | 2.1 | 3.2 | 4.6 | 6.2 | 8.2 | 10.2 | 12.3 | 13.6 | 14.5 | 17.0 | 19.5 | 4.2 |
| | (0.024) | (0.031) | (0.033) | (0.039) | (0.048) | (0.058) | (0.068) | (0.078) | (0.118) | (0.130) | (0.367) | (0.441) | (1.00) | (3.66) | (0.017) |
| N | 303,879 | 123,167 | 134,720 | 138,482 | 137,421 | 131,501 | 125,758 | 122,513 | 65,466 | 63,649 | 8,704 | 6,387 | 1,420 | 118 | 1,363,185 |
| Savings pillar 3 (%) | 22.7 | 12.4 | 22.2 | 30.9 | 39.5 | 43.1 | 42.0 | 37.4 | 33.1 | 29.6 | 26.4 | 26.1 | 22.2 | 9.2 | 30.5 |
| | (0.057) | (0.067) | (0.082) | (0.091) | (0.096) | (0.097) | (0.097) | (0.094) | (0.128) | (0.136) | (0.378) | (0.443) | (0.930) | (2.13) | (0.028) |
| N | 539,961 | 241,883 | 256,780 | 259,265 | 260,570 | 262,266 | 261,832 | 263,105 | 135,305 | 112,758 | 13,562 | 9,808 | 1,998 | 185 | 2,619,278 |
| Savings pillar 2 (%) | 2.0 | 1.4 | 1.6 | 2.1 | 2.6 | 3.8 | 5.0 | 6.2 | 7.3 | 8.8 | 9.0 | 9.6 | 9.2 | 5.9 | 3.5 |
| | (0.019) | (0.024) | (0.025) | (0.028) | (0.031) | (0.037) | (0.043) | (0.047) | (0.071) | (0.084) | (0.246) | (0.297) | (0.647) | (1.74) | (0.011) |
| N | 539,961 | 241,883 | 256,780 | 259,265 | 260,570 | 262,266 | 261,832 | 263,105 | 135,305 | 112,758 | 13,562 | 9,808 | 1,998 | 185 | 2,619,278 |
| Homeowners (%) | 28.3 | 3.8 | 8.1 | 14.3 | 22.7 | 32.6 | 43.8 | 53.2 | 60.5 | 61.9 | 64.1 | 66.0 | 67.9 | 67.1 | 30.1 |
| | (0.088) | (0.058) | (0.081) | (0.103) | (0.125) | (0.142) | (0.153) | (0.153) | (0.199) | (0.197) | (0.525) | (0.605) | (1.28) | (3.65) | (0.043) |
| N | 261,739 | 108,454 | 112,647 | 114,600 | 112,767 | 108,348 | 104,901 | 105,855 | 60,182 | 61,101 | 8,359 | 6,136 | 1,336 | 167 | 1,166,592 |
| Retired owners (%) | 3.3 | 0.4 | 1.0 | 2.1 | 4.0 | 8.0 | 15.1 | 24.0 | 33.3 | 37.5 | 38.2 | 35.5 | 32.7 | 32.3 | 9.9 |
| | (0.035) | (0.019) | (0.030) | (0.042) | (0.058) | (0.082) | (0.111) | (0.131) | (0.192) | (0.196) | (0.531) | (0.611) | (1.28) | (3.63) | (0.028) |
| N | 261,739 | 108,454 | 112,647 | 114,600 | 112,767 | 108,348 | 104,901 | 105,855 | 60,182 | 61,101 | 8,359 | 6,136 | 1,336 | 167 | 1,166,592 |

*Notes:* The table contains population averages within each net wealth percentile group. Statistics are based on individual data, where wealth and income are split equally among married adults. Individuals are classified as married, single female, or single male. The dummy for children is defined irrespective of civil status. Employees are individuals whose income from employment is larger than income from self-employment. Self-employed are individuals whose income from self-employment is larger than income from employment. Retirees are defined as those drawing social security pensions and being above age 63 (m) or 62 (w), respectively. This variable is not defined in the canton of AG. Working retirees are defined as retirees (according to the aforementioned definition) who have individual labor income larger than zero. Hence their share is defined with respect to the total population, not with respect to the population of retirees. This variable is not defined in the cantons BE, BS, and AG.

The two variables on savings toward pillar 3 (private pensions schemes) and pillar 2 (occupational pension schemes) indicate whether individuals claimed such deductions. "Homeowners" is a dummy variable which takes on the value of 1 if someone has an imputed rent in their income tax base. "Retired owners" indicates the share of the total population who are at the same time homeowners and retirees according to the definition above. These last two variables are defined only for the cantons of ZH, OW, BS, SG and AG.

Pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.
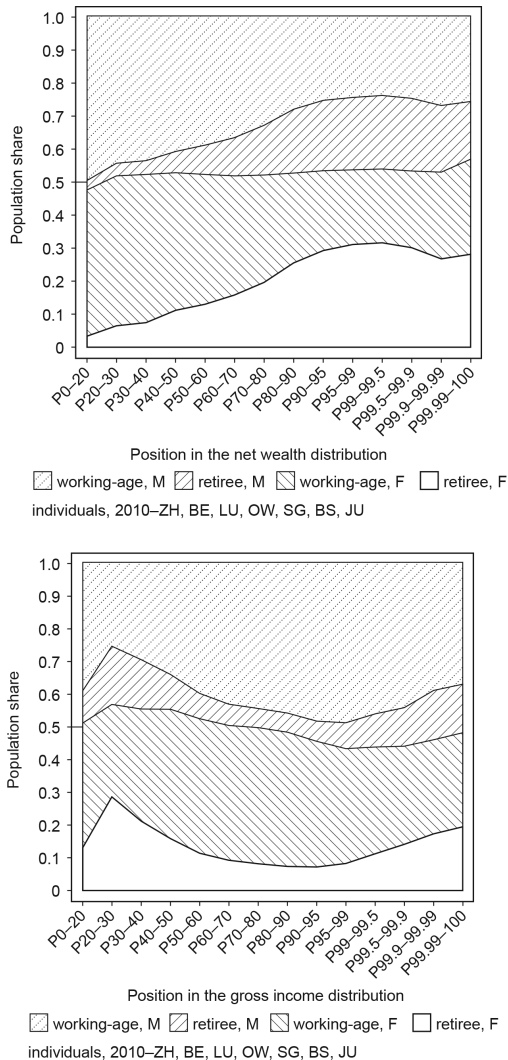
Population share

Position in the net wealth distribution

▨ working-age, M  ▧ retiree, M  ◹ working-age, F  ☐ retiree, F

individuals, 2010–ZH, BE, LU, OW, SG, BS, JU



Population share

Position in the gross income distribution

▨ working-age, M  ▧ retiree, M  ◹ working-age, F  ☐ retiree, F

individuals, 2010–ZH, BE, LU, OW, SG, BS, JU

**Fig. 4.2  Gender composition over the wealth (top) and income (bottom) distributions, 2010**

*Notes:* This figure shows the share of working-age and retired men and women, respectively, along the wealth and income distributions. Retirees are defined as those who draw social security pensions and are allowed to a retire according to their age (early retirement is possible at age 63 for men and at age 62 for women). In the cantons ZH, LU, OW, BS, and AG, where I do not know the ages of the spouses, I impute their ages based on the age structure of couples where the main taxpayer is between 55 and 80 years old in the canton of Bern. This allows me to define retirement for individuals in all cantons except AG, where I lack information on pension income. To enhance visibility in the upper part of the wealth distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. Both panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively. Wealth and income are split equally among married adults.

30 percent of individuals live in their own house or apartment. This is lower than the national home ownership rate of 36 percent in 2010, which can be explained by the fact that I can measure home ownership only in some cantons, including Basel City and Zurich. These are mainly urban areas, where home ownership is considerably lower than in the countryside (Basel City: 15 percent; Zurich: 29 percent).

An important factor in understanding the distributions of income and wealth is age. Figure 4.3 shows the age composition along both distributions. Age is monotonically increasing along the wealth distribution, such that wealth is getting older in the aggregate. This finding coincides with findings for the US in Saez and Zucman (2016). The picture is less clear for income. At the bottom one can find both the elderly and the young, while the middle-aged cohorts dominate in the range of P50–P99. Interestingly, at the very top of the income distribution the share of people beyond retirement age increases again. This corroborates the finding that the elderly are likely to be overrepresented in both tails of the income distribution.

## 4.4    The Composition of Wealth along the Distribution

Figure 4.4 shows the composition of total gross wealth along its distribution. The two major private wealth components are financial assets and real estate. For all wealth groups, financial assets are the most important wealth component, making up 30–90 percent of total gross wealth. Especially in the bottom half of the distribution, financial assets make up the largest asset type, followed by movable assets including cars. Since unincorporated business assets are only available net of debt, their share is very low and almost negligible compared to the US (Saez and Zucman 2016) or Spain (Martínez-Toledano 2020).[4]

When it comes to real estate, the distribution is very concentrated in the upper middle class. Those below the median of the gross wealth distribution own hardly any real estate, a finding that corresponds well with the low rate of home ownership in Switzerland and in my data. Results are qualitatively similar when looking at shares along the net wealth distribution, reported in online appendix figure A2 (http://www.nber.org/data-appendix/c14452/appendix.pdf): those below the median of the net wealth distribution on average hold less than 20 percent of their wealth in real estate. Even if real estate were still undervalued by 20 percent throughout my data, despite attempts to correct for undervaluation, the picture would hardly change. While I cannot compute assets net of debt, figure 4.4 reveals that debt

4. In addition, the Swiss legal system favors limited liability companies (LLC) over partnerships and sole proprietorship. Founding a limited liability company requires founding capital in the amount of merely 20,000 CHF. An LLC is much easier to set up than a corporation, provides more flexibility and capital requirements are much lower than for setting up a corporation. Yet an LLC offers more protection than a partnerships and sole proprietorship.
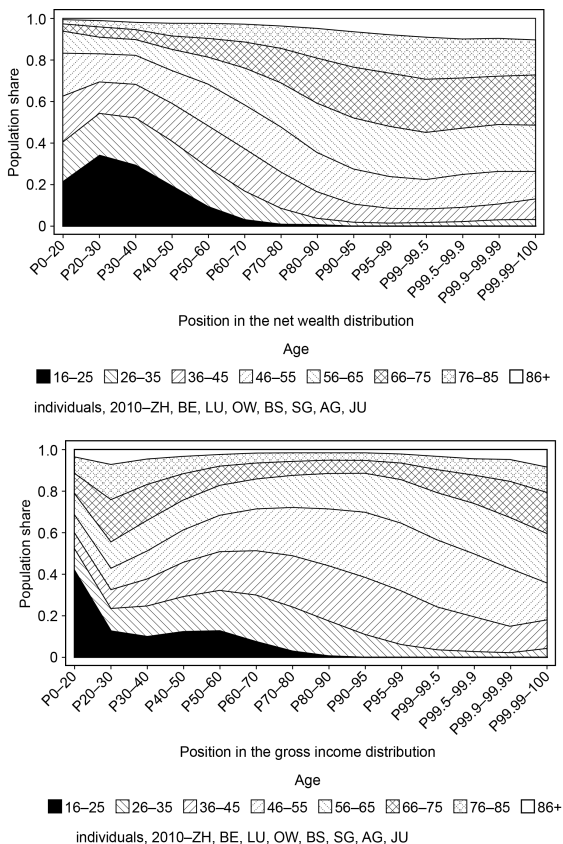
**Fig. 4.3   Age composition over the wealth (top) and income (bottom) distributions, 2010**

*Notes:* This figure shows the share of individuals in each wealth (4.3a) and income group (4.3b), respectively. I drop spouses from the cantons ZH, LU, OW, BS, and AG, as I do not know the ages of the spouses in these cantons. Spouses represent about 25 percent of individuals in each canton. To enhance visibility in the upper part of the wealth distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. Both panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively. Wealth and income are split equally among married adults.

strongly mirrors real estate shares in gross wealth. This is true overall and by age group (see online appendix figure A3). Indeed, roughly 90 percent of all private debt is mortgage debt according to national account statistics.[5]

Real estate therefore plays a much less important role in the portfolios of most Swiss taxpayers compared to other countries. A strikingly different case is Spain, a country with a home ownership rate of approximately 82 per-

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5. Because interest payments on debt can be deducted from taxable income and taxable wealth is always net of debt, it is common for homeowners to never fully pay off their mortgage.
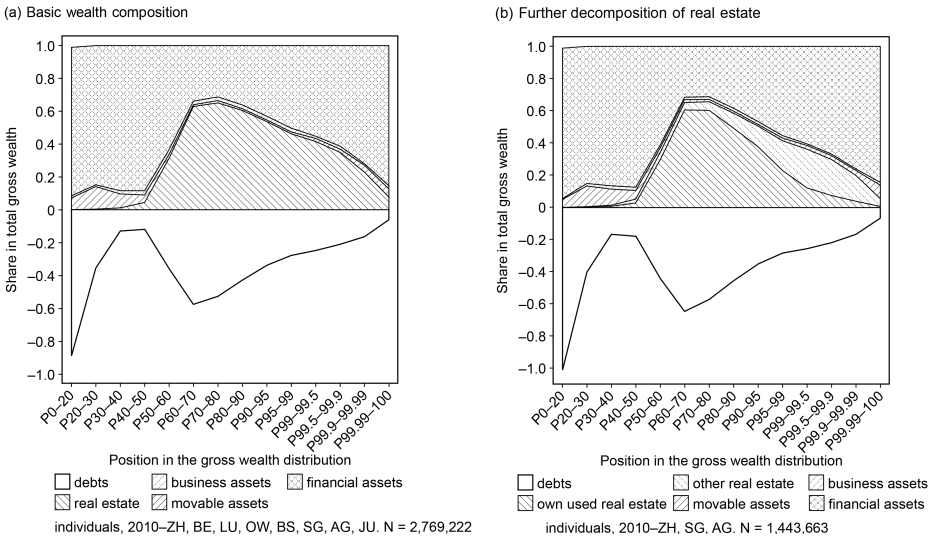
(a) Basic wealth composition

(b) Further decomposition of real estate

debts | business assets | financial assets
real estate | movable assets

individuals, 2010–ZH, BE, LU, OW, BS, SG, AG, JU. N = 2,769,222

debts | other real estate | business assets
own used real estate | movable assets | financial assets

individuals, 2010–ZH, SG, AG. N = 1,443,663

**Fig. 4.4    Wealth composition along the distribution in Switzerland, 2010**

*Notes:* This figure shows shares of wealth components in total gross wealth along the gross wealth distribution. Since debts cannot be linked directly to a single wealth component, debt is displayed as negative share in total gross wealth. A significant number of individuals in the lower part of the wealth distribution have no or hardly any assets, but they have debts, resulting in extremely large debt shares. Individual's debt shares were therefore truncated at 500 percent. Wealth is split equally among married adults. Figure 4.4a uses data on 2.77 million individuals from all eight available cantons. Figure 4.4b uses data on 1.44 million individuals from three large cantons (ZH, SG, AG), which allows further decomposition of real estate wealth into owner-used and other real estate. See section 4.3.3 for details on the wealth components. To enhance visibility in the upper part of the wealth distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. Both panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.

cent compared to 36 percent in Switzerland.[6] Martínez-Toledano (2020) shows that in Spain real estate amounts to 90 percent of total net wealth for individuals around the median (P40–P60).[7]

In three cantons I can further decompose real estate into owner occupied and other real estate. Figure 4.4b shows that other real estate—which includes properties for rent, business properties, and land, but excludes personally used real estate like a main residence or vacation home—is significant only above the fourth quintile, especially for those belonging to the P95–P99.9 wealth groups. Real estate is a viable option for relatively safe

6. Switzerland has the lowest home-ownership rate across all Europe, while Spain has the highest in Western Europe. Source: Federal Statistical Office (FSO), https://www .bwo.admin.ch/dam/bwo/de/dokumente/01_Wohnungsmarkt/16_Zahlen_und_Fakten /163_Wohneigentumsquote/wohneigentumsquotenschweiz-eu2008.pdf.download.pdf /wohneigentumsquotenschweiz-eu2008.pdf.

7. Martínez-Toledano (2020) uses net values while I have to rely on gross values.

investments for the wealthy, who may further use investments in real estate for diversification of their portfolio. The share of real estate investments has likely increased since 2010, due to the low and even negative interest rates prevailing in Switzerland since December 2014.

As I cannot attribute debt to the different asset categories, I plot debt as share of total gross wealth. For the P0–P20 group, debt shares become very large due to very small denominators.[8] I truncate individual debt shares at 500 percent to keep the graphs readable. Apart from the bottom, debt shares are largest at P60–P70. I find that debt is highly correlated with home ownership, implying that household debt it is strongly driven by mortgages.

Figure 4.5 shows how the wealth composition changes when looking at subgroups by employment status and gender. Percentile thresholds are held constant across graphs: they correspond to the percentiles of the total gross wealth distribution and I hold them constant over the whole analysis. This allows for direct comparisons across groups. The biggest difference arises between retirees and nonretirees, shown in figures 4.5a and 4.5b. At each gross wealth level, retirees have lower debt levels than nonretirees. This reflects the life-cycle pattern of real estate acquisition in younger years, and the reduction of mortgage debt as individuals age. I find that retirees' debt levels keep falling even after retirement, suggesting that the elderly keep saving during their 60s and 70s. At the same time, real estate is more evenly spread across the distribution in the case of retirees. Since the analysis is based on cross-section data, I cannot distinguish age from cohort effects here. Finally, business assets as well as movable assets like cars, which are concentrated at the bottom of the distribution, are less important among the retired population.

Differences between single men and women (not shown) can be attributed to the different likelihood of being retired for men and women: 33 percent of single women are retirees compared to only 17 percent of single men. That is why single women have on average less debt, less business assets, and less movable assets but more real estate than men. Taking into account retirement status, gender differences are small (figure 4.5c–f): women still tend to have slightly lower debt and less business assets (net of debt) than men. At the very top, working women tend to have more movable assets and retired women have more rented out real estate than men—at the expense of financial assets.

## 4.5    The Composition of Income along the Distribution

The composition of total gross income varies considerably along the distribution as shown in figure 4.6.[9] For the bottom 30 percent of the income

8. I attribute those roughly 10 percent of individuals with zero gross wealth one Swiss Franc of wealth to compute the debt shares, rather than dropping them.

9. Some individuals have negative incomes. For this part of the analysis, I drop observations with negative incomes, as it is not possible to represent these appropriately as shares. This leads
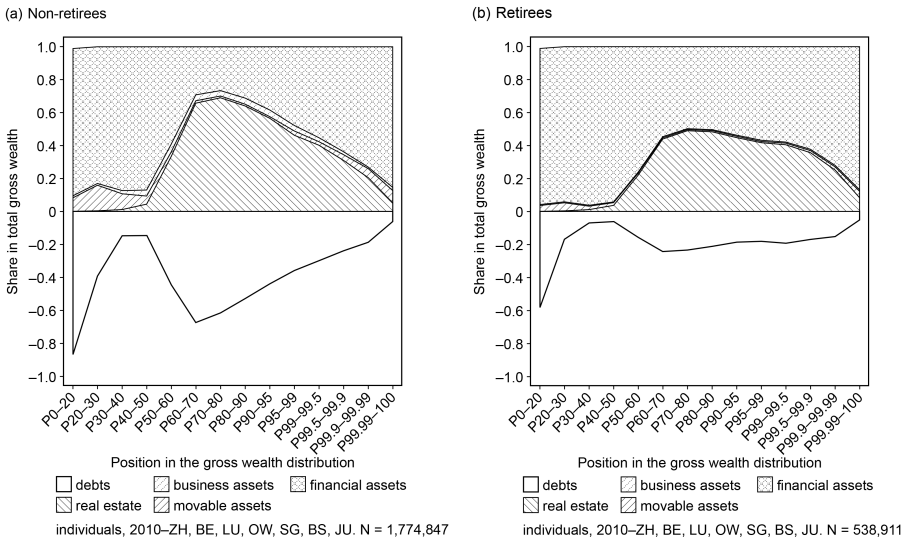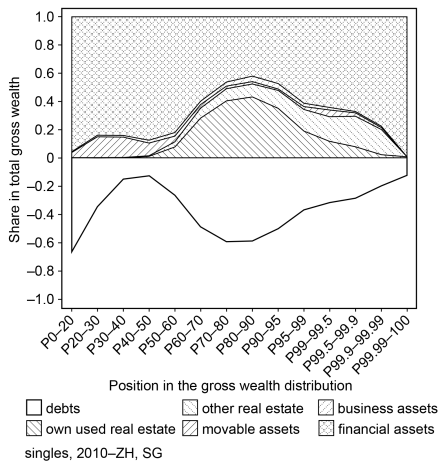
(a) Non-retirees

(b) Retirees

individuals, 2010–ZH, BE, LU, OW, SG, BS, JU. N = 1,774,847

individuals, 2010–ZH, BE, LU, OW, SG, BS, JU. N = 538,911

**Fig. 4.5    Wealth composition by employment status and gender in Switzerland, 2010**

*Notes:* This figure shows shares of wealth components in total gross wealth along the gross wealth distribution. Individual's debt shares were truncated at 500 percent. Wealth is split equally among married adults. In each panel, individuals are ranked according to the percentiles of the total gross wealth distribution for the entire population, hence wealth levels across panels are identical. Figure 4.5a shows the composition of gross wealth for nonretirees. The composition of wealth for retirees is displayed in figure 4.5b. Retirees are defined as those who draw social security pensions and are allowed to retire according to their age (early retirement is possible at age 63 for men and at age 62 for women). In the cantons ZH, LU, OW, BS, and AG, where I do not know the ages of the spouses, I impute their ages based on the age structure of couples where the main taxpayer is between 55 and 80 years old in the canton of Bern. This allows me to define retirement for individuals in all cantons except AG, where I lack information on pension income. Figures 4.5c–f further split the population by gender. For the main taxpayer, gender is reported in the individual tax data. In case of married individuals and in cantons where the gender of the spouse is not recorded, I assume the spouse is of opposite gender from the main taxpayer. See section 4.3.3 for details on the wealth components. To enhance visibility in the upper part of the distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. All panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively. Since not all cantonal data contain all variables, some panels rely on data from fewer cantons as indicated.

distribution, labor income is equally important as transfers. Together, they make up 90 percent of total gross income. Moving up the distribution, the importance of labor income increases at the expense of transfers. The remaining 10 percent are capital incomes, mostly imputed rents (see figure 4.6b). Within the top 10 percent, however, the composition changes considerably: not only transfer income, also the share of labor income declines

to a loss of 7.7 percent of observations. I recompute the income percentiles, yet they remain unchanged below P90 and only change slightly above.

(c) Men, non-retired



Position in the gross wealth distribution

☐ debts   ▧ other real estate   ▨ business assets
▧ own used real estate   ▨ movable assets   ▨ financial assets

singles, 2010–ZH, SG

(d) Women, non-retired



Position in the gross wealth distribution

☐ debts   ▧ other real estate   ▨ business assets
▧ own used real estate   ▨ movable assets   ▨ financial assets

singles, 2010–ZH, SG

(e) Men, retired



Position in the gross wealth distribution

☐ debts   ▧ other real estate   ▨ business assets
▧ own used real estate   ▨ movable assets   ▨ financial assets

singles, 2010–ZH, SG

(f) Women, retired



Position in the gross wealth distribution

☐ debts   ▧ other real estate   ▨ business assets
▧ own used real estate   ▨ movable assets   ▨ financial assets

singles, 2010–ZH, SG

**Fig. 4.5   (cont.)**

strongly. For those in the top 0.01 percent of the income distribution, labor income represents about one-fifth of their total income. Three-fifths can be attributed to capital income (including income from real estate, see figure 4.6b), and almost one-fifth are other incomes—typically one-time capital payments, including capital gains (or losses) from business liquidation in the event of definitive cessation of self-employment. Hence these incomes distinguish the richest 1 percent within the top 1 percent considerably from the rest.

Figure 4.6b further shows the subcomponents of each income component. Social security pensions are the most important type of transfer for

(a) Income composition



(b) Detailed income composition



**Fig. 4.6  Income distribution and its components in Swiss Cantons, 2010**

*Notes:* This figure shows shares of income components in total gross income along the gross income distribution. Income is split equally among married adults. Observations with negative incomes are dropped from this figure. Figure 4.6a uses 2.55 million individual observations from all eight available cantons. Figure 4.6b contains detailed information on income from pensions and real esta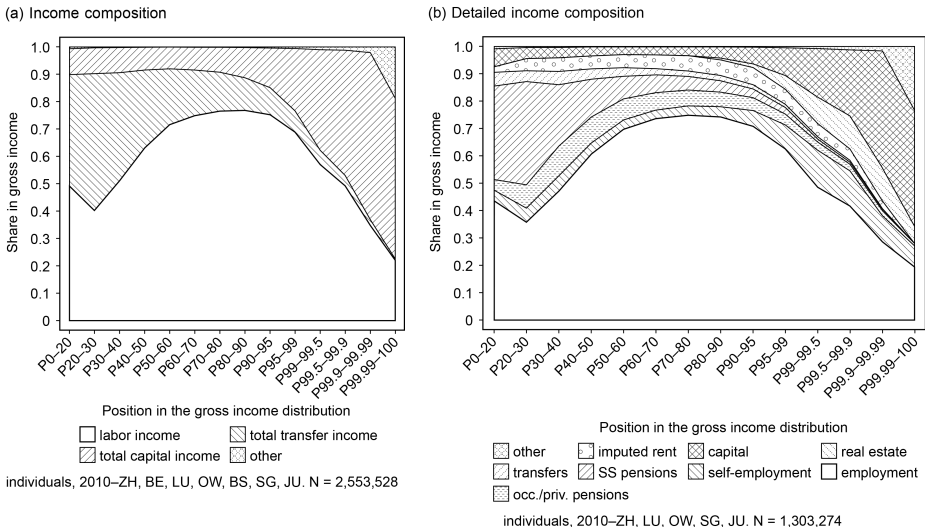te income for 1.30 million individuals. This information is not available for BE, BS, and AG. See section 4.3.2 for details on the income components. To enhance visibility in the upper part of the income distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. Both panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.

low-income individuals, indicating the high share of retirees at the bottom of the income distribution. For most individuals, capital income consists of imputed rents from home ownership. Rental income from real estate is only relevant for those within the top 10 percent of the income distribution. Also, the share of income from self-employment is largest within the top 10 percent. For the middle and upper parts of the distribution in the range of P40–P99, income from employment makes up more than 50 percent of all income. When adding income from self-employment, even the bottom 90 percent within the top 1 percent (P99–P99.9) earn more than half their income through work.

As before, I split the sample into different subgroups holding the percentile thresholds constant (figure 4.7). Again, the most important differences arise between nonretired individuals and retirees (figure 4.7a–b). Unsurprisingly, labor income is the most important source of income for the working-age population. On average, up to 90 percent of individuals' gross income comes from work. Yet again, the share of income from work declines further up in the distribution, especially from the top 5 percent and beyond. There,
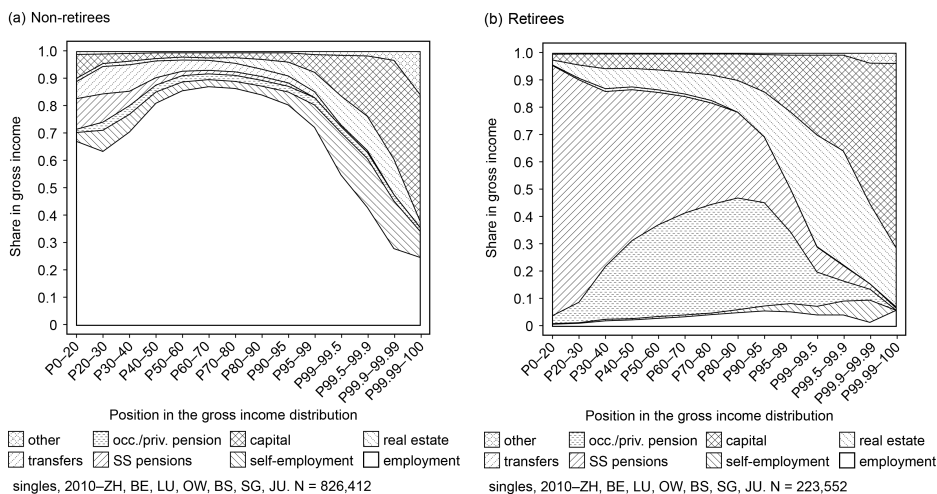
(a) Non-retirees

(b) Retirees



singles, 2010–ZH, BE, LU, OW, BS, SG, JU. N = 826,412

singles, 2010–ZH, BE, LU, OW, BS, SG, JU. N = 223,552

**Fig. 4.7    Income composition by employment status and gender in Switzerland, 2010**

*Notes:* This figure shows shares of income components in total gross income along the gross income distribution. Income is split equally among married adults. In each panel, individuals are ranked according to the percentiles of the total gross income distribution for the entire population, hence income levels across panels are identical. Figure 4.7a shows the composition of gross income for nonretirees. The composition of income for retirees is displayed in figure 4.7b. Retirees are defined as those who draw social security pensions and are allowed to retire according to their age (early retirement is possible at age 63 for men and at age 62 for women). In the cantons ZH, LU, OW, BS, and AG, where I do not know the ages of the spouses, I impute their ages based on the age structure of couples where the main taxpayer is between 55 and 80 years old in the canton of Bern. This allows me to define retirement for individuals in all cantons except AG, where I lack information on pension income. Figures 4.7c–f further split the population by gender. For the main taxpayer, gender is reported in the individual tax data. In case of married individuals and in cantons where gender of the spouse is not recorded, I assume the spouse is of opposite gender from the main taxpayer. See section 4.3.2 for details on the income components. To enhance visibility in the upper part of the distribution, percentile steps for the top 10 percent are displayed in smaller increments and the lowest 20 percent are summarized together. All panels use pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively. Since not all cantonal data contain all variables, some panels rely on data from fewer cantons as indicated.

incomes from capital, real estate, and other sources take over. Note, however, that on average about 35 percent of the income of individuals belonging to the top 0.01 percent still consists of labor income, mostly from employment. At the bottom end of the distribution, transfers including unemployment benefits and family allowances contribute to the income mix. For nonretirees, social security pensions refer to disability benefits, which are transformed into a social security pension at retirement.

For retirees, pensions replace labor income by and large. Moving up the income distribution, however, income from capital and real estate becomes relatively more important than for the working-age population. Together,

(c) Men, non-retired



Position in the gross income distribution

| other | occ./priv. pension | capital | real estate |
| transfers | SS pensions | self-employment | employment |

singles, 2010 - ZH, BE, LU, OW, BS, SG, JU

(d) Women, non-retired



Position in the gross income distribution

| other | occ./priv. pension | capital | real estate |
| transfers | SS pensions | self-employment | employment |

singles, 2010–ZH, BE, LU, OW, BS, SG, JU

(e) Men, retired



Position in the gross income distribution

| other | occ./priv. pension | capital | real esta |
| transfers | SS pensions | self-employment | employm |

singles, 2010–ZH, BE, LU, OW, BS, SG, JU

(f) Women, retired



Position in the gross income distribution

| other | occ./priv. pension | capital | real estate |
| transfers | SS pensions | self-employment | employment |

singles, 2010–ZH, BE, LU, OW, BS, SG, JU

**Fig. 4.7    (cont.)**

these two sources make up almost 90 percent of the income going to retirees belonging to the top 0.01 percent.

Interestingly, the share of income from employment, while small overall, increases as one moves up the distribution. In Switzerland it is therefore not those retirees who have low (pension) incomes who have the highest likelihood of continuing to work beyond retirement, but those who were successful in the labor market or their own business, respectively, and who can derive large incomes (in line with results in table 4.2). Online appendix figure A4 (http://www.nber.org/data-appendix/c14452/appendix.pdf) further shows the relative importance of transfers and labor income over the

distribution at different points over the life cycle, breaking up the income composition by age group.

Besides labor income, very wealthy retirees can draw large incomes from capital and real estate. The latter stems mainly from renting out properties and not from imputed rent. Since the share of real estate wealth does not differ that much between retirees and the working-age population, this suggests that the elderly derive larger incomes from their real estate than younger generations, and again that the correlation between the income and wealth distribution varies by age group.

There are some noteworthy differences by gender within the working-age and the retiree populations, respectively (figures 4.7c–d and 4.7e–f). First, nonretired women tend to draw a lower share of their income from labor than men, especially at the very top. Second, nonretired women in the middle of the distribution draw larger incomes from pensions (e.g., widhowhood or disability pensions) and especially from transfers (e.g., alimony, maternity or unemployment benefits) than their male counterparts. Third, among retirees, men are much more likely to earn income from work, especially those within the top 10 percent. Retired men belonging to the top 0.01 percent of the income distribution on average earn 20 percent of their total income from labor, a share that drops to almost zero for retired women in the same income class. Gender differences are very similar or even more pronounced when looking at singles only, whose individual income is not affected by splitting income equally among partners.

Taken together, these findings reflect gender differences in the Swiss labor market. Although the labor force participation of women is high in international comparison, 44 percent of women work part-time. In 2010, the hours-adjusted wage gap was 15.6 percent. Only 62 percent of this difference could be explained by observables like education, industry, or job characteristics[10]—an indicator that gender discrimination against women is present in the Swiss labor market. Since these gender differences were also present (and even more pronounced) in the past, they translate into gender differences among retirees, too.

## 4.6    Joint Distribution of Income and Wealth

Next, I turn to the joint distribution of income and wealth. Figure 4.8 shows the joint distribution matrix of income and wealth. Figure 4.8a looks at how each income group on the *y* axis is distributed over the net wealth distribution. There is a clear tail dependence between the two distributions, especially at the very top: 78 percent of those in the top 0.01 percent of the income distribution belong to the top 0.1 percent of the wealth distribution.

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10. Source: FSO, https://www.bfs.admin.ch/bfs/de/home/statistiken/arbeit-erwerb/loehne-erwerbseinkommen-arbeitskosten/lohnniveau-schweiz/lohnunterschied.html.
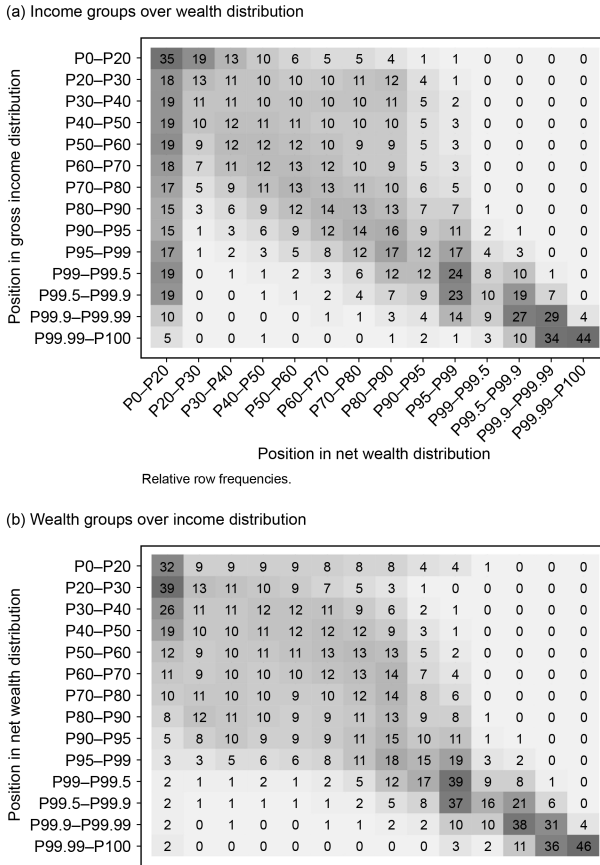
(a) Income groups over wealth distribution

| Position in gross income distribution | P0–P20 | P20–P30 | P30–P40 | P40–P50 | P50–P60 | P60–P70 | P70–P80 | P80–P90 | P90–P95 | P95–P99 | P99–P99.5 | P99.5–P99.9 | P99.9–P99.99 | P99.99–P100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P0–P20 | 35 | 19 | 13 | 10 | 6 | 5 | 5 | 4 | 1 | 1 | 0 | 0 | 0 | 0 |
| P20–P30 | 18 | 13 | 11 | 10 | 10 | 10 | 11 | 12 | 4 | 1 | 0 | 0 | 0 | 0 |
| P30–P40 | 19 | 11 | 11 | 10 | 10 | 10 | 10 | 11 | 5 | 2 | 0 | 0 | 0 | 0 |
| P40–P50 | 19 | 10 | 12 | 11 | 11 | 10 | 10 | 10 | 5 | 3 | 0 | 0 | 0 | 0 |
| P50–P60 | 19 | 9 | 12 | 12 | 12 | 10 | 9 | 9 | 5 | 3 | 0 | 0 | 0 | 0 |
| P60–P70 | 18 | 7 | 11 | 12 | 13 | 12 | 10 | 9 | 5 | 3 | 0 | 0 | 0 | 0 |
| P70–P80 | 17 | 5 | 9 | 11 | 13 | 13 | 11 | 10 | 6 | 5 | 0 | 0 | 0 | 0 |
| P80–P90 | 15 | 3 | 6 | 9 | 12 | 14 | 13 | 13 | 7 | 7 | 1 | 0 | 0 | 0 |
| P90–P95 | 15 | 1 | 3 | 6 | 9 | 12 | 14 | 16 | 9 | 11 | 2 | 1 | 0 | 0 |
| P95–P99 | 17 | 1 | 2 | 3 | 5 | 8 | 12 | 17 | 12 | 17 | 4 | 3 | 0 | 0 |
| P99–P99.5 | 19 | 0 | 1 | 1 | 2 | 3 | 6 | 12 | 12 | 24 | 8 | 10 | 1 | 0 |
| P99.5–P99.9 | 19 | 0 | 0 | 1 | 1 | 2 | 4 | 7 | 9 | 23 | 10 | 19 | 7 | 0 |
| P99.9–P99.99 | 10 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 4 | 14 | 9 | 27 | 29 | 4 |
| P99.99–P100 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 3 | 10 | 34 | 44 |

Position in net wealth distribution

Relative row frequencies.

(b) Wealth groups over income distribution

| Position in net wealth distribution | P0–P20 | P20–P30 | P30–P40 | P40–P50 | P50–P60 | P60–P70 | P70–P80 | P80–P90 | P90–P95 | P95–P99 | P99–P99.5 | P99.5–P99.9 | P99.9–P99.99 | P99.99–P100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P0–P20 | 32 | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 4 | 4 | 1 | 0 | 0 | 0 |
| P20–P30 | 39 | 13 | 11 | 10 | 9 | 7 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| P30–P40 | 26 | 11 | 11 | 12 | 12 | 11 | 9 | 6 | 2 | 1 | 0 | 0 | 0 | 0 |
| P40–P50 | 19 | 10 | 10 | 11 | 12 | 12 | 12 | 9 | 3 | 1 | 0 | 0 | 0 | 0 |
| P50–P60 | 12 | 9 | 10 | 11 | 11 | 13 | 13 | 13 | 5 | 2 | 0 | 0 | 0 | 0 |
| P60–P70 | 11 | 9 | 10 | 10 | 10 | 12 | 13 | 14 | 7 | 4 | 0 | 0 | 0 | 0 |
| P70–P80 | 10 | 11 | 10 | 10 | 9 | 10 | 12 | 14 | 8 | 6 | 0 | 0 | 0 | 0 |
| P80–P90 | 8 | 12 | 11 | 10 | 9 | 9 | 11 | 13 | 9 | 8 | 1 | 0 | 0 | 0 |
| P90–P95 | 5 | 8 | 10 | 9 | 9 | 9 | 11 | 15 | 10 | 11 | 1 | 1 | 0 | 0 |
| P95–P99 | 3 | 3 | 5 | 6 | 6 | 8 | 11 | 18 | 15 | 19 | 3 | 2 | 0 | 0 |
| P99–P99.5 | 2 | 1 | 1 | 2 | 1 | 2 | 5 | 12 | 17 | 39 | 9 | 8 | 1 | 0 |
| P99.5–P99.9 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 8 | 37 | 16 | 21 | 6 | 0 |
| P99.9–P99.99 | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 10 | 10 | 38 | 31 | 4 |
| P99.99–P100 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 11 | 36 | 46 |

**Fig. 4.8　Joint distribution matrix by income and wealth group**

*Notes:* This figure shows the joint distribution of individuals across the gross income and net wealth distributions. Figure 4.8a shows how income groups are distributed over the wealth distribution. For each income group on the *y* axis, the matrix shows the share of individuals from that group in each wealth group (relative row frequencies). Figure 4.8b shows how wealth groups are distributed over the income distribution. For each wealth group on the *y* axis, the matrix shows the share of individuals from that group in each income group (relative row frequencies). In both figures, the shares in each row sum to 100 percent (note that columns do not add to 100 percent). Analysis based on individual data, where wealth and income are split equally among married adults. Pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.

Interestingly, within all income groups there is a substantial part belonging to the *bottom* of the wealth distribution, where average and median net wealth are negative. Even among those belonging to the top 0.01 percent of the income distribution, 5 percent fall into this lowest category of wealth. The fact that more mass lies below the main diagonal suggests that an individual is relatively unlikely to be in a higher wealth group relative to their

income group. At the same time, a relatively large mass is concentrated near though below the main diagonal. Therefore, many individuals are likely to be near to their position in the income distribution within the wealth distribution. Given that in many data we observe income but not wealth, these findings are helpful when assumptions need to be made about individual's position in the wealth distribution—without necessarily knowing that position nor the corresponding wealth levels.

Figure 4.8b takes on the opposite perspective and looks at how each wealth group on the *y* axis is distributed over the gross income distribution. Again, the tail dependency is clearly visible: those at the top of the wealth distribution are very likely to be at the top of the income distribution and those with hardly any wealth are concentrated at the bottom of the income distribution. However, note that very few of those belonging to the top 10 percent of the wealth distribution have low incomes. This implies that only few people among the wealth-rich are income-poor—while the opposite is not true, as shown in figure 4.8a.

Taking a closer look at the top of both distributions, figure 4.9 shows how the P99–P99.9 and the top 0.01 percent of the wealth distribution are distributed over the income distribution and vice versa. The graph reveals how those belonging to the P99–P99.99 group—i.e., the bottom 99 percent within the top 1 percent—and the top 0.01 percent are substantially different: those belonging to the P99–P99.99 of the wealth distribution can be found over the whole income distribution, even though their share is highest among the top 10 percent of income earners, especially in the P95–P99 group. The top 0.01 percent of the wealthiest, in contrast, can only be found among the top 5 percent of income earners, and are mainly part of the top 0.1 percent of earners. The picture is similar when flipping the axes: the top 0.01 percent of income earners are almost exclusively found in the top 1 percent of wealth holders. The correlation between income and wealth therefore increases as one moves up along the tails.

Gender differences are small, which is partly mechanical, as I have to split wealth and income equally between spouses. Looking at singles only, however, reveals that compared to women, men tend to be higher up in the income distribution given their wealth rank. In the bottom nine deciles of the income distribution, women tend to be distributed more evenly across the wealth distribution than men and they are less likely to find themselves in the bottom quintile of the wealth distribution (i.e., the first column of figure 4.8a). Within the top 10 percent and especially within the top 1 percent, however, the association between income and wealth is even stronger for women than for men.

Finally, the strong age gradient in wealth also affects the joint distribution. The rank correlation remains relatively low for individuals below retirement age and almost doubles for individuals beyond age 65. The reason is because at all income levels retirees are on average considerably higher up

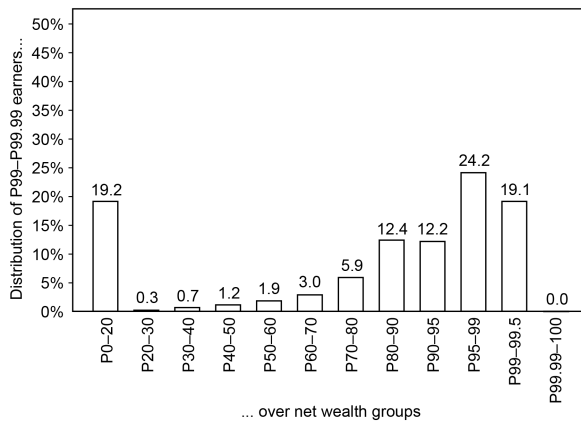(a) P99-P99.99 wealth
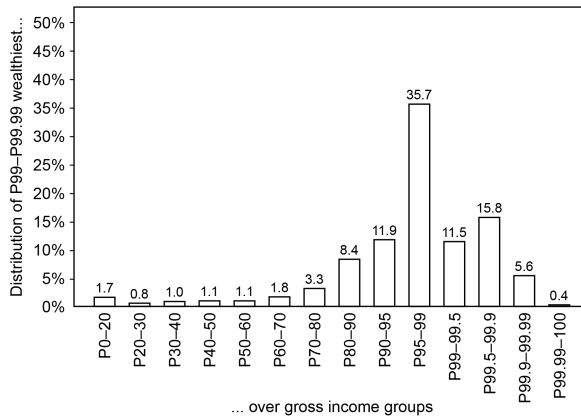


(b) P99-P99.99 income



**Fig. 4.9  Joint distribution of individuals in top 1 percent and top 0.01 percent wealth and income groups**

*Notes:* This figure shows the distribution of the top 1 percent and top 0.01 percent, respectively, of the gross income (net wealth) distribution over the net wealth (gross income) distribution. Figure 4.9a shows where those belonging to the P99–P99.99 of the wealth distribution are located in the income distribution (results are very similar for the P99–P99.9 fractile and the top 1 percent). Figure 4.9b shows where those belonging to the P99–P99.99 of the income distribution stand in the wealth distribution (results are very similar for the P99–P99.9 fractile and the top 1 percent). Figures 4.9c and 4.9d show the same relationships for the top 0.01 percent, i.e., the top 1 percent within the richest 1 percent. Analysis based on individual data, where wealth and income are split equally among married adults. Pooled tax data including the cantons BE, LU, OW, AG, SG, BS, and JU in the year 2010, and ZH in 2011, respectively.
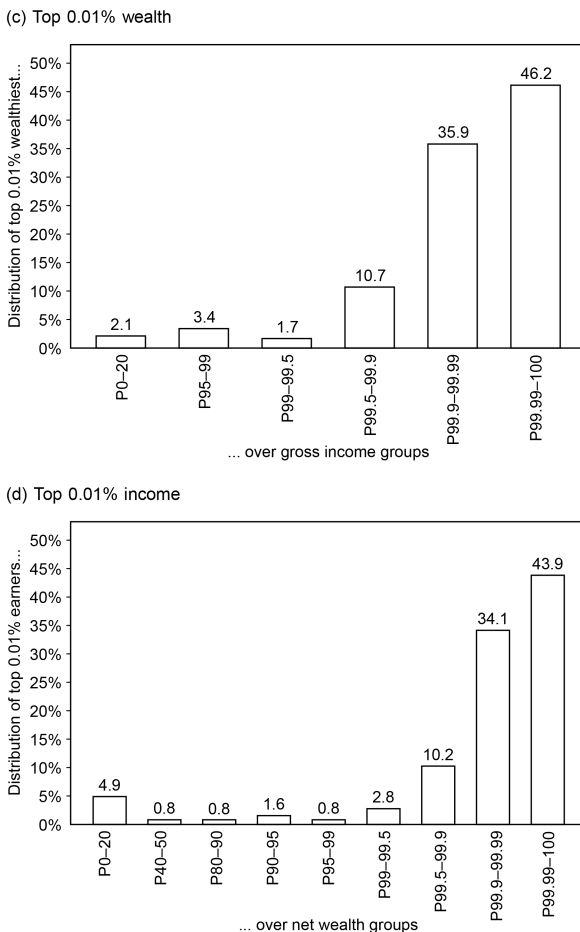
(c) Top 0.01% wealth



... over gross income groups

(d) Top 0.01% income



... over net wealth groups

**Fig. 4.9   (cont.)**

in the wealth distribution than nonretirees. The only exceptions are retirees in the bottom decile of the income distribution: they are just as likely to be wealth-poor as their nonretired counterparts, which in turn retains the tail dependency at the lower end of the distribution. As this is a static analysis for the year 2010, it is unfortunately not possible to disentangle age from cohort effects. It is quite possible that for younger cohorts the relationship between their income and wealth ranks will be different when they reach the same age range.

## 4.7   Conclusion

In this chapter, I construct a new dataset out of cantonal income and wealth tax data, which covers about half of the Swiss population of tax-

payers and is representative of Switzerland as a whole. This unique dataset allows me to obtain detailed evidence on the composition of wealth and income in Switzerland and on the joint distribution of income and wealth. The results can be summarized as follows.

First, I find that age has a very strong influence on the distribution of wealth among individuals. The older individuals are, the more likely they are to be wealthy. While this is to be expected intuitively, I show how pronounced this effect is. What is surprising is that this age effect continues well beyond retirement age. This strong age-wealth gradient in turn dominates many findings in this chapter: retirees are strongly overrepresented in the top decile of the wealth distribution, they have low debt and are more likely to hold real estate than younger cohorts.

Second, gender differences (taking age into account) are stronger in the distribution and composition of income than wealth. Women draw a lower share of their income from labor, hence they rely more heavily on transfers or—at the very top—on capital incomes than men. This reflects past and present gender differences in the Swiss labor market. Despite the high female labor force participation of 75 percent (in 2010; 80 percent in 2019), 60 percent of women work part-time (especially mothers). The wealth composition, in contrast, bears only very small gender differences once age is taken into account. However, this finding masks wealth differences in tax-exempt retirement accounts, which compound labor income differences between men and women.

Third, the distribution of real estate wealth along the wealth distribution sets Switzerland apart from other economies. On average, those in the bottom 50 percent of the distribution hardly hold any real estate wealth. This finding—which corresponds well with official statistics on home ownership, according to which less than 40 percent of the population are homeowners—has potential implications for the optimal design of wealth and property taxation. While there are in principle several different forms of wealth to tax, a typical distinction is made between (owner-used) real estate and other wealth when it comes to taxation.

Finally, I shed light on the joint distribution of income and wealth. The joint distribution of income and wealth reveals a strong tail dependence, especially at the top. As wealth is more concentrated than income, an individual is relatively unlikely to be in a higher wealth group relative to their income group. Through the strong age-wealth gradient, age also affects the joint distribution: at almost all income levels, retirees are in substantially higher wealth percentiles. Overall, I find that while a substantial share of top earners have very low wealth, those belonging to the top of the wealth distribution are very unlikely to have low incomes. Low-income wealth millionaires are therefore a rare phenomenon.

The new dataset and results presented here form part of the ongoing research project "The Influence of Taxation on Wealth and Income Inequality" (SNFS Grant 176458). This study shows the potential of this rich data-

set and sheds light on income and wealth in Switzerland. The goal of future research is to exploit the richness of this data to understand drivers of the observed patterns. Upon data availability, future analyses will also look at changes over time.

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