Does Income Risk Affect the Wealth Distribution?*

Matthias Krapf†

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Abstract

A substantial literature considers insurance against greater income risk among high-income earners a driver of the unequal distribution of wealth. Using detailed tax data from a Swiss canton, I examine this mechanism empirically. While I confirm that measures of income risk vary along the income distribution, I find little evidence for a systematic link between income risk and wealth accumulation. Taxpayers with negative net wealth are of particular importance in the accumulation process. They tend to have high incomes initially and experience large gains in wealth and income subsequently.

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†University of Basel and CESifo. Email: matthias.krapf@unibas.ch.

1 Introduction

The rise in both wealth inequality (Piketty, 2014; Piketty and Zucman, 2014; Saez and Zucman, 2016) and income inequality (Atkinson, Piketty and Saez, 2011) since around 1980 has spurred new interest in the relationship between wealth and income distributions. A central finding of this literature is that wealth is more unequally distributed than labor earnings and income, as first documented by Pareto (1896). There is, however, ongoing debate about the relationship between wealth and income distributions.

The theoretical literature on wealth accumulation, surveyed in De Nardi (2016) and Benhabib and Bisin (2018), broadly relies upon two different types of mechanisms to replicate the long tail of the wealth distribution. The first, which goes back to Bewley (1977) and led to a class of model referred to as Bewley-Aiyagari-Huggett, links wealth inequality to income inequality and argues that high-income individuals accumulate wealth to insure against earnings risk, which tends to be more pronounced for top earners (Castañeda, Díaz-Giménez and Ríos-Rull, 2003). The second type of mechanism is largely independent of the income distribution. According to models from this literature, the wealth of individuals at the top of the wealth distributions tends to grow at a higher rate than the wealth of individuals at the bottom, either because of high and heterogeneous returns to capital (Fagereng, Guiso, Malacrino and Pistaferri, 2020), because the wealthy have a preference for higher saving rates (Benhabib, Bisin and Luo, 2019) or because they are more likely to receive bequests (De Nardi, 2004).

In this paper, I empirically assess these potential mechanisms behind the wealth accumulation process using tax data from Bern, Switzerland's second largest canton, that include information on both wealth and income over the years 2001 to 2015. Switzerland is different from the US in that, while top wealth is as concentrated in Switzerland as in the US, incomes are distributed much more equally in Switzerland than in the US. According to the Federal Reserve's Survey of Consumer Finances, the wealth share of the top 1 percent has increased from 36.3 percent in 2013 to 38.6 percent in 2016, whereas the income share of the top 1 percent has increased from 20.3 percent in 2013 to 23.8 percent in 2016.[1] In Bern, I report wealth shares for the top 1 percent of 36.3 percent in 2001 and

[1] See https://www.federalreserve.gov/publications/files/scf17.pdf.

35.1 percent in 2015 percent, and income shares for the top 1 percent of 7.9 percent in 2001 and 8 percent in 2015.[2]

I make three main contributions. First, while the properties of income risk have been revisited multiple times in recent years as administrative sources became more accessible, this is the first paper to study how income risk covaries with wealth data from administrative sources. Using data from the U.S. Social Security Administration, Guvenen, Karahan, Ozkan and Song (2021) in a path-breaking study examine how earnings risk, i.e. higher-order moments of earnings growth, varies across the earnings distribution. The presence of information on wealth in my data allows me to extend their analysis in several directions. I compute measures of growth and risk of both wealth and income, and examine how these vary both along the distributions of wealth and income.

As a second contribution, the paper provides new insights on the determinants of wealth accumulation and the long Pareto tail of the wealth distribution and its dynamics. In connection with the recent literature on heterogeneity of returns to wealth (Bach, Calvet and Sodini, 2020; Fagereng, Guiso, Malacrino and Pistaferri, 2020), my empirical description of wealth and income covariation may help discipline quantitative models of consumption and wealth accumulation.[3] Simulations in previous work show that a capital accumulation process based on the earnings risk patterns in Guvenen et al. can help generate a realistic wealth distribution. My empirical analysis, however, finds little evidence for a link between income risk and wealth accumulation.

Third, I show that wealth and income dynamics for negative-net wealth households are of particular importance. The existing literature has largely ignored the distributional properties of wealth below zero or below some positive minimum wealth threshold, either because of data limitations or because it used a "reflection barrier" to guarantee a stationary Pareto distribution (Wold and Whittle, 1957). I document a change in the sign of the correlation between net wealth and net income, which is positive for positive net wealth,

[2]This is below the national Swiss average, where the top 1% share rose from approximately 10% to 11% over the first decade of the century.

[3]Fagereng et al. (2020), who use Norwegian data, argue that an individual permanent component accounts for 60 percent of the variation in returns that is explained by the distribution of financial assets. Using data from Sweden, however, Bach et al. (2020) argue that higher returns achieved by wealthy households entirely compensate for higher risk exposure. The findings of the two papers are consistent for the top 5 percent of the wealth distribution. In contrast to these two papers, I am able to link changes in wealth to the income distribution.

but negative for negative net wealth. Negative net wealth, furthermore, displays a positive association with income.[4] This finding suggests that negative net wealth individuals are likely to be investors who, on average, enjoy high returns.

The focus of my empirical analysis will be on testing the predictions of Bewley-Aiyagari-Huggett models that wealth growth tends to be associated with income risk, i.e. with higher order moments of income growth. If people accumulate wealth because they anticipate highly dispersed income growth, one would expect wealth growth to be positively correlated with the second moment of the income growth distribution. If people accumulate wealth to insure against negative income growth, one would expect wealth growth to be negatively correlated with the skewness of the income growth distribution. If, finally, people accumulate wealth to insure against extreme changes in their income, one would expect wealth growth to be positively correlated with the kurtosis of the income growth distribution. Using measures of income risk suggested by the recent literature, I find little evidence for a link between wealth growth and income risk.

This paper is organized as follows. In Section 2, I review the existing literature and its implications. Section 3 describes the data and the institutional background in Switzerland. Section 4 describes the joint distributions of net wealth and net income in levels. In Section 5, I develop and describe the growth and risk measures for both wealth and income. Section 6 examines determinants of wealth accumulation with a focus on factors that vary along the income distribution. Section 7 concludes.

2 Literature

Causality between income and wealth runs in both directions. Greater wealth tends to be associated with more capital income and higher income allows to accumulate more wealth. To get closer to an experimental ideal, a literature has emerged that estimates consumption and savings responses to exogenous shocks to (unearned) income and wealth. Johnson, Parker and Souleles (2006) or Agarwal and Qian (2014), for example, take ad-

[4]The empirical literature on the joint distribution of wealth and income is still sparse. Kuhn and Rios-Rull (2016) present evidence that a substantial share of negative-net wealth individuals have high incomes in the US based on data from the Survey of Consumer Finances. Foellmi and Martínez (2017a) discuss the correlation of wealth and income at the top of the distributions based on data for the Swiss canton of Obwalden. Gallusser and Krapf (2022) provide a more detailed analysis for the canton of Lucerne.

vantage of unexpected fiscal transfers to households or changes in tax rates, Cesarini, Lindqvist, Notowidigdo and Östling (2017) and Golosov, Graber, Mogstad and Novgorodsky (2021) examine lotteries winners, and Berger, Guerrieri, Lorenzoni and Vavra (2018) use house price fluctuations. The settings exploited in this quasi-experimental literature are, however, still too narrow to be informative about the mechanisms behind overall wealth inequality.

The theoretical literature on the mechanisms behind increasing wealth inequality is divided into two strands. The first relates the wealth distribution to the income distribution and has, in particular, focused on the effect of labor-market shocks and uninsurable income risk on wealth accumulation. This literature argues that individuals at the top of the income distribution face greater income risk, where income risk is defined as second- and higher-order moments of income growth. In the most common version of this type of models, referred to as Bewley-Aiyagari-Huggett after its pioneers (Bewley, 1977; Huggett, 1993; Aiyagari, 1994), economic agents accumulate wealth to insure against volatility of income growth.

Subsequent contributions extend this reasoning to third and fourth moments of the distribution of income growth. Lise (2013), for example, suggests that individuals accumulate more wealth when they expect large changes in their income to be more likely negative than positive. Negatively skewed income growth will then result in a very unequal wealth distribution. Castañeda et al. (2003) propose a similar mechanism if income changes are larger in expectation when they happen, holding the standard deviation constant. Income risk that displays high kurtosis will then induce high wealth inequality.

The second literature has focused on determinants of wealth accumulation that are not related to income, but vary along the wealth distribution. These include bequests (De Nardi, 2004), preferences for savings (Benhabib, Bisin and Luo, 2019; Fagereng, Holm, Moll and Natvik, 2019), and financial returns and portfolio choice (Fagereng, Guiso and Pistaferri, 2018; Gabaix, Lasry, Lions and Moll, 2016; Fagereng, Guiso, Malacrino and Pistaferri, 2020). Saving rates have been related to capital income risk as in Benhabib et al. (2019) or to impatience and heterogeneous preferences for thrift (Krusell and Smith Jr., 1998).

The theorems by Grey (1994) and Kesten (1973), reviewed in Benhabib and Bisin

(2018) and in Fagereng et al. (2020), imply that the tail of the wealth distribution is determined by either the tail of the income distribution or by return heterogeneity, but not by both. A careful reading of the literature suggests that the set of explanations that are not related to income may be more useful to induce a substantially more skewed distribution for wealth than for income. First, there is stronger empirical evidence in favor of return heterogeneity and asset prices affecting the wealth distribution. Based on the Survey of Consumer Finances, Kuhn, Schularick and Steins (2020) show that household portfolio composition, in particular the share invested in real estate, is an important determinant of wealth. Second, there is a fundamental difference between the two theoretical approaches. The literature that builds on income risk involves additive shocks to the wealth accumulation process, whereas the literature that abstracts from income focuses on multiplicative shocks that are arguably more powerful. Stachurski and Toda (2019) show theoretically that, under standard assumptions, Bewley-Aiyagari-Huggett models are not able to generate a wealth distribution that is characterized by a fatter tail than the income distribution.

To implement tests of Bewley-Aiyagari-Huggett type models, I will examine how wealth growth and risk as well as income growth and risk, vary along the income distribution. This analysis combines the "income mobility profiles" by Van Kerm (2009) for growth with the work by Guvenen et al. (2021) for risk measures. Following Guvenen et al. (2021) and De Nardi, Fella and Paz-Pardo (2020), I will use the observed variation across individuals within a given wealth or income percentile as a proxy for the risk faced by the average individual in this percentile. To assess the second set of mechanisms, which do not relate the wealth distribution to income risk, I will look at variation in wealth and income growth and risk along the wealth distribution.

3 Data and institutional background

My data set covers the universe of tax returns in the canton of Bern over the years 2001-2015. Swiss law requires all permanent residents of Switzerland of age 18 and older to file a tax return. Minors must also declare their taxes if they are employed. In total, this data set includes 9.51 million observations. All wealth and income variables used in this paper are measured before taxes. Besides wealth and income, I also make use of information on age and marital status because married couples are treated as one taxpayer and may display different patterns. Of all individuals in my data, I use all those that appear in three consecutive years and then, again, three years later, and whose marital status does not change over that period.[5]

To measure household wealth, I use the variable *Reinvermögen* (net wealth), which equals gross wealth minus household debt. Gross wealth includes everything a taxpayer owns evaluated at market prices except household inventory. Real estate values are assessed by cantonal officers. While most wealth is self-reported and the banking secret is still in place within Switzerland, there is a 35-percent withholding tax on income from dividends and interest. This withholding tax is higher than the wealth and income taxes people have to pay on their financial assets and their return and is returned upon their declaration. Taxable wealth can be obtained by subtracting family deductions from net wealth. My entire analysis, however, uses net wealth before family deductions. One shortcoming of my data is that they do not provide detailed information on wealth composition. In particular, I do not observe how much wealth is real estate and housing wealth. The only separate component of wealth that is available to me is financial assets (*Wertschriftenvermögen*).

Income is defined more broadly in Switzerland, as not only labor earnings but also income from other sources such as capital income (interest and dividends but not capital gains), pensions and other transfer payments, is subject to income taxation.[6] The tax returns data I have access to, however, list the income components that come from dependent employment and from self-employment separately. This allows me to do robustness checks with labor earnings only. The variable I use in most of the paper is, however, *Reineinkommen*, which consists of all income net of interest and mortgage payments, health expenditure and expenditure related to income realization.[7] To obtain taxable income, one would, again, have to subtract family deductions. The definitions of net wealth

[5] Brülhart, Gruber, Krapf and Schmidheiny (2022) and Roller and Schmidheiny (2017) work with the same data set to evaluate wealth tax policies and to estimate the effect of income taxation on local mobility. See also the appendix in Brülhart et al. (2022) for detailed information on this data set.

[6] Foellmi and Martínez (2017b) complement their analysis with social security data, which allows comparing labor earnings with taxable income. See Appendix C for a comparison with labor earnings from tax data.

[7] Statistics on disposable income in Switzerland, which is closely related but not the same as *Reineinkommen* are available at https://www.efd.admin.ch/dam/efd/de/das-efd/gesetzgebung/berichte/bericht-wohlstand.pdf.download.pdf/bericht-verteilung-wohlstands.pdf.

and net income have not changed over time.

This setting allows me to include retired people, who tend to be among the wealthiest individuals, in my analysis. The Swiss pension system consists of three pillars, a publicly financed pay-as-you-go scheme, a mandatory capital accumulation scheme, and optional yearly capital contributions (capped at 6,768 CHF in 2015). All pension wealth is tax exempt and not observable in my data. I expect, however, no bias from pension wealth because pension wealth cannot be used as insurance against income shocks before retirement. Moreover, Burgherr (2022) finds no statistically significant relationship between pension capital contributions and accumulation of taxable wealth. When entering retirement, Swiss taxpayers face the decision whether to annuitize or cash out their pension wealth. At the interest rates and of the rate that converts pension wealth into annuities that were in place during my observation period, retirees were less likely to cash out their pension wealth than to annuitize (Bütler and Teppa, 2007). According to official statistics, 46% of all new retirees in 2020 chose to annuitize all their pension wealth and 34% chose to cash out entirely, while the remaining 20% chose a combination.[8] If they cash out, taxable wealth can increase substantially when entering retirement. If retirees annuitize, these will be subject to income taxation. The statutory pension age in Switzerland is 65 for men and was lifted from 63 to 64 for women during my sample period in 2005.

4 Descriptive analysis in levels

I begin with a description of the univariate distributions of income and wealth in the canton of Bern. Figure 1 visualizes the net wealth and income distributions between CHF -100,000 and CHF 100 million.[9] 14 percent of all taxpayers have negative net wealth and 8 percent report zero net wealth. Net income is negative for 5 percent of all taxpayers and positive for all others. Mean net wealth is CHF 237,500 (median CHF 32,400) over all taxpayers and CHF 332,600 (median CHF 83,700) over those with positive net wealth only. Mean net income is CHF 54,700 (median CHF 45,900) over all taxpayers and CHF 58,700 (median CHF 48,200) over those with positive net incomes only. In this section,

[8]See https://www.bfs.admin.ch/bfs/de/home/statistiken/soziale-sicherheit/berichterstattung-altersvorsorge/neurentenstatistik.html.

[9]I thank David Gallusser who developed this visualization.

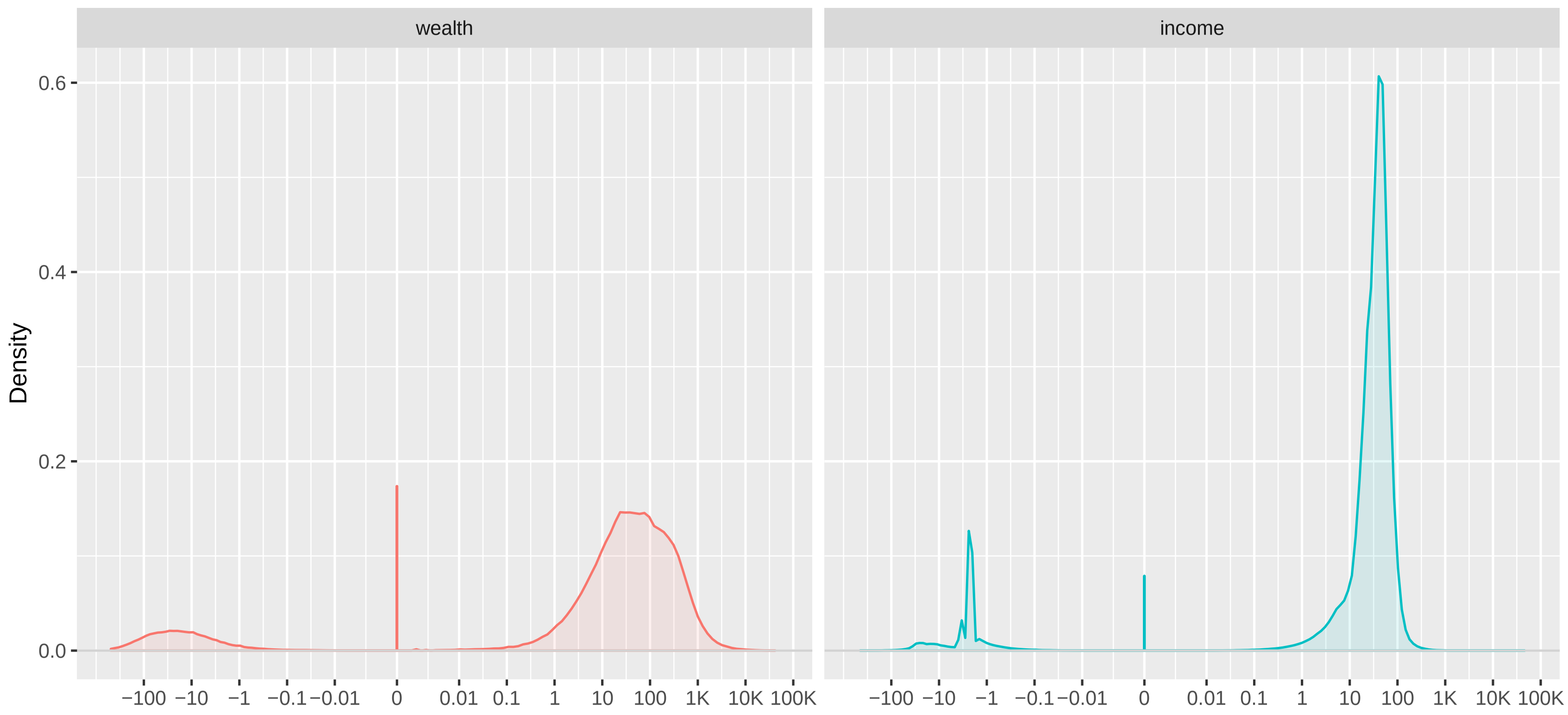

Figure 1: Local polynomial density estimates of marginal wealth and income distributions for singles. X-axes, scaled by inverse hyperbolic sine transformation, indicate wealth and income in 1,000 CHF.

I provide statistics for all taxpayers, which includes a small number that are minors, to present the overall picture, whereas in later sections, in which I distinguish between age groups, I focus on people of age 20 and older.

For comparison with other studies, in Appendix C I will also present results for taxpayers aged 26-55 with positive wealth and with income from labor earnings above a certain threshold. Guvenen et al. (2021) use one quarter of full-time work at half the legal minimum wage ($1,885 in 2010), as a cutoff. While in Switzerland, there is no nationwide legal minimum wage, 4 out of 26 cantons have introduced cantonal minimum wages in recent years starting with Neuchâtel in 2017 at CHF 20. I use Neuchâtel's minimum wage to derive an income threshold of CHF 5,200 (40 hours per week for 13 weeks at half times CHF 20). CHF 5,200 corresponded to the 7.7th percentile of labor earnings among taxpayers aged 26-55.

Table 1 reports income shares and wealth shares for different segments of the distribution in Bern for all years I have data for. I show two versions of wealth shares. In the first, I leave negative net wealth negative as reported in the data, and in the second, I set negative wealth to zero, as is common in many official statistics. The wealth shares at the top of the distribution are slightly smaller if I replace negative wealth with zero, because these negative outcomes reduce total wealth in the denominator. The difference between shares with and without negative wealth is, however, small. More importantly, if I do not replace negative net wealth with zero, the wealth share of the bottom 50 percent is negative.

The top income shares in Table 1 are slightly lower than the top income shares for the entire country reported, for example, in Foellmi and Martínez (2017b), whereas the top wealth shares are in line with the numbers for the entire country. Table 1, thus, confirms that top wealth shares in Switzerland are similar to top wealth shares in the US, whereas incomes are distributed more equally in Switzerland than in the US, where the top 10 percent income share equals around 40 percent.

Following the methodology in Guvenen et al. (2021), I construct measures of recent wealth and recent income. Recent wealth for year t, for example, is an average of a measure of wealth in the two preceding years $t - s$ with $s = 1, 2$, corrected for age. Recent income accordingly is an average measure of income with similar corrections.

Table 1: EVOLUTION OF TOP WEALTH SHARES AND TOP INCOME SHARES IN BERN.

percentiles	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	All wealth including negative wealth														
0-50	-3.11	-3.35	-3.42	-3.51	-3.30	-3.18	-2.82	-3.04	-3.07	-3.12	-3.15	-3.11	-3.06	-3.04	-3.11
50-90	29.91	32.29	31.71	31.31	30.08	29.84	27.73	28.23	29.05	29.32	29.97	29.74	29.47	29.50	30.90
90-99	36.95	39.68	39.22	39.17	38.49	38.21	35.34	34.85	35.75	35.78	36.35	36.15	35.84	35.72	37.15
99-99.9	17.37	17.70	17.86	17.89	18.23	18.38	17.24	16.25	16.86	16.99	16.72	17.14	17.36	17.48	18.24
99.9-100	18.88	13.68	14.63	15.15	16.50	16.76	22.51	23.72	21.41	21.02	20.11	20.07	20.38	20.35	16.83
	Negative wealth set to zero														
0-50	1.10	1.15	1.13	1.07	1.01	1.08	1.07	1.14	1.24	1.28	1.32	1.34	1.34	1.38	1.45
50-90	28.70	30.88	30.32	29.92	28.82	28.61	28.69	27.08	27.84	28.07	28.67	28.46	28.21	28.23	29.53
90-99	35.44	37.95	37.50	37.43	36.88	36.63	34.01	33.43	34.26	34.26	34.77	34.59	34.31	34.19	35.50
99-99.9	16.66	16.93	17.07	17.09	17.47	17.62	16.59	15.59	16.16	16.26	15.99	16.40	16.62	16.73	17.43
99.9-100	18.11	13.08	13.99	14.48	15.81	16.07	21.65	22.76	20.51	20.12	19.24	19.20	19.51	19.47	16.09
	All incomes including negative income														
0-50	19.55	19.44	19.39	19.35	19.07	19.37	20.15	21.05	21.33	21.63	22.05	22.26	22.42	22.49	22.63
50-90	50.19	50.30	50.01	50.43	50.26	50.03	49.44	49.13	48.61	48.27	48.27	48.13	48.15	47.98	48.03
90-99	22.39	22.42	22.35	22.60	22.63	22.59	22.25	22.00	21.78	21.67	21.60	21.51	21.44	21.27	21.30
99-99.9	5.38	5.31	5.31	5.30	5.29	5.35	5.35	5.31	5.28	5.30	5.29	5.28	5.24	5.22	5.27
99.9-100	2.49	2.53	2.94	2.31	2.75	2.65	2.81	2.52	2.99	3.12	2.79	2.83	2.73	3.05	2.77

Notes: All numbers in this table are based on comprehensive tax data. The underlying calculations did not involve distributional assumptions.

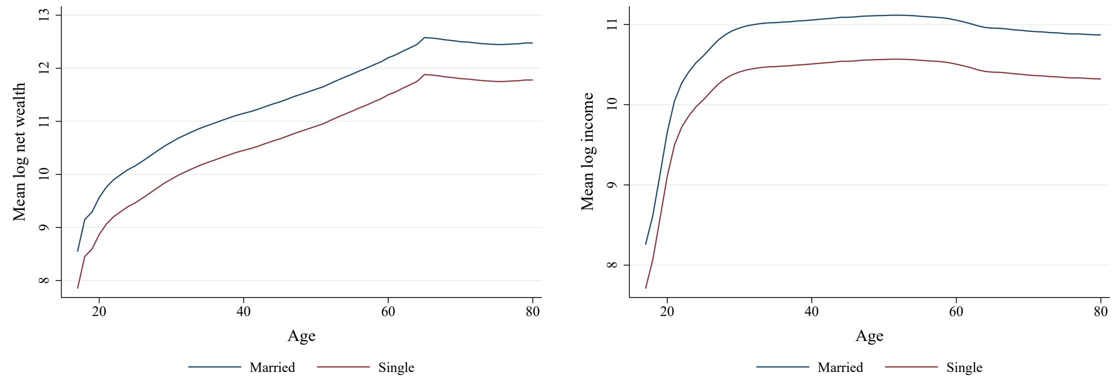

Figure 2: Log wealth and log income over age by marital status.

Recent wealth and income of an individual j of age h are then defined as

$$\bar{y}^o_{j,t-1} = \frac{\sum_{s=1}^{2} y^o_{j,t-s,h-s}}{\sum_{s=1}^{2} \exp(d^o_{h-s})}, \tag{1}$$

where $o = w, i$ indicates whether y^o refers to wealth or income. The variables d^o_h used to correct for age are dummy coefficients resulting from regressions of log wealth and log income on age dummies, marital status and year dummies as controls.

In the following, I will group individuals by recent wealth, recent income and by age to assess how income and wealth dynamics evolve over the life cycle and across the wealth and income distributions. This approach, which follows Guvenen et al. (2021), builds on the assumption that people form expectations over the income risk that they will face between any year and three years later based on their position in the income distribution in the preceding two years.

Since Swiss tax authorities treat married couples as one entity, I will focus on singles in the main part of my analysis and show patterns for married couples in the appendix.

Figure 2 shows how log net wealth and log net incomes evolve over the life cycle. The two graphs plot mean fitted values for the dependent variables over age and, hence, are only based on positive values of net wealth and net income. The small kink in log wealth at around age 65 is likely related to some people cashing out their pension wealth when entering retirement as mentioned above in Section 3. Log income reaches its maximum at age 51.

Using these measures of recent income and recent wealth, which are conditional on

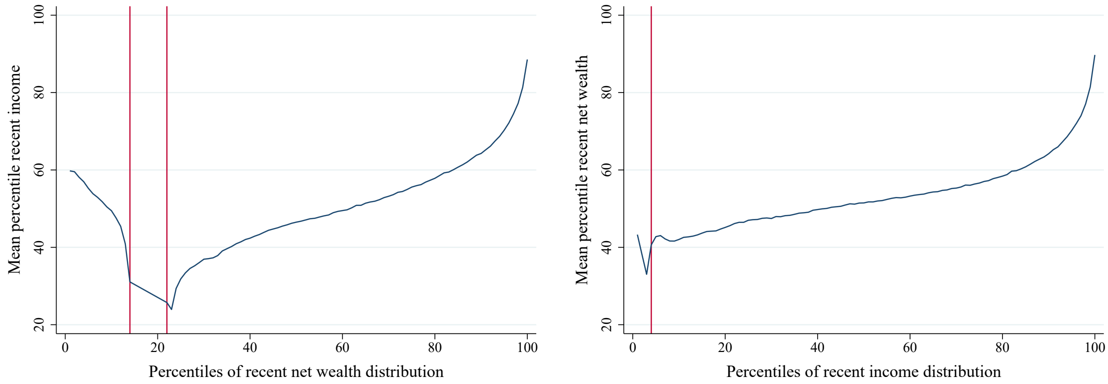

Figure 3: Contemporaneous correlation of percentiles of recent wealth and recent income as defined in equation (1) in pooled data. The graph on the left-hand side is a binned scatter plot showing mean percentile of recent income for each percentile of recent wealth with the dots connected by a line. The graph on the right-hand side is a binned scatter plot showing mean percentile of recent wealth for each percentile of recent income. The vertical red lines (respectively the space between them) indicate zero recent wealth and zero recent income.

age and marital status, I will next provide some descriptive statistics on the joint distribution of wealth and income in the canton of Bern. Figure 3 visualizes the contemporaneous correlation between recent wealth and recent income. The left-hand panel displays mean recent income percentiles for each recent wealth percentile in the data. All recent wealth to the left of the first vertical line is negative, all recent wealth to the right of the second vertical line is positive. Recent wealth and recent income are positively correlated for positive recent wealth. This correlation is highest for very small and very high positive recent wealth. The correlation between recent wealth and recent income, however, changes its sign and becomes negative for negative recent wealth.[10] This confirms a finding in Kuhn and Rios-Rull (2016) (see Table 8 of their paper), who document a large group of high-income, negative-wealth households in the Survey of Consumer Finances. Mean recent income at the bottom of the recent wealth distribution is in the 60th percentile, which is

[10]Negative net wealth might be related to housing wealth and high mortgages, which I cannot verify given my data. Note that negative net wealth taxpayers do not have high income from self-employment as one might expect if they were entrepreneurs with non-incorporated firms. In principle, net wealth of high-income households could be negative because the banking secret, which is still in place in Switzerland, may allow taxpayers in Bern to underreport their wealth. There is, however, little incentive to underreport wealth if it is below the taxable wealth threshold, which increased over my sample period from 92,000 to 97,000 CHF. While the location of this taxable wealth threshold in the net wealth distribution in Figure 3 varies with age and family deductions, about a third of taxpayers in Bern have wealth that is above the threshold (Brülhart et al., 2022). If anything, tax evasion would provide a rationale for a discontinuity at this taxable wealth threshold and not at zero net wealth.

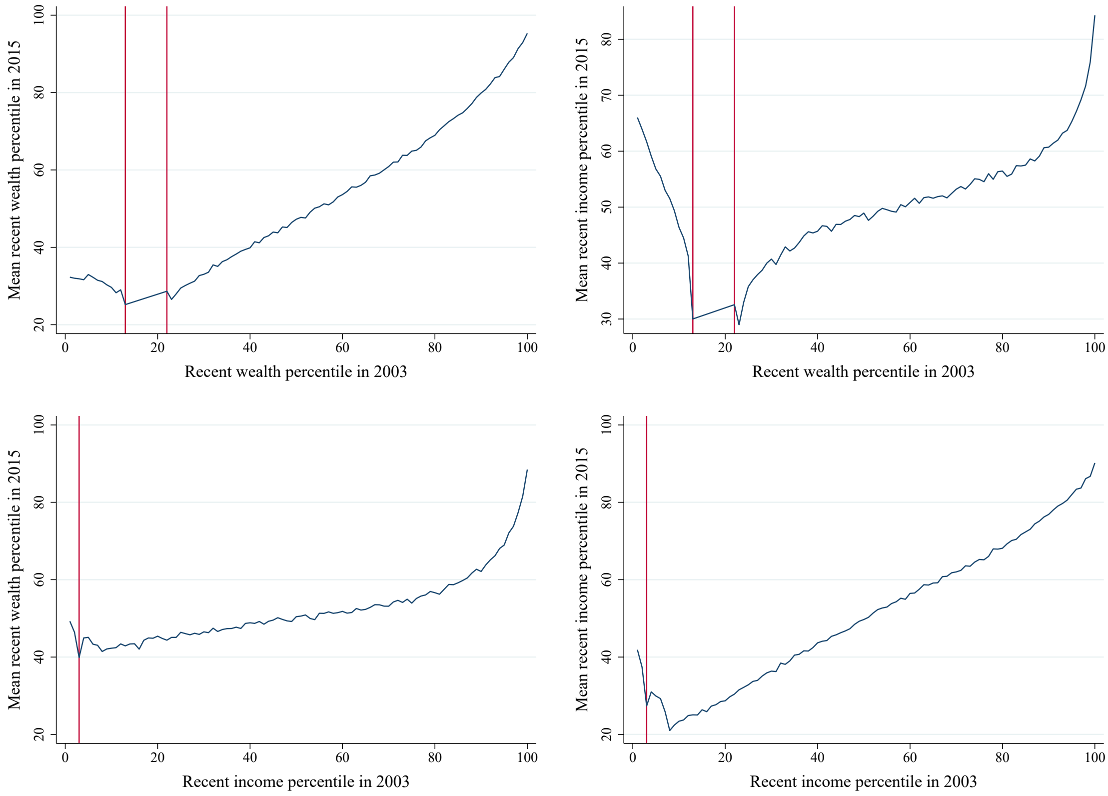

Figure 4: Mobility across recent wealth and income percentiles between 2003 and 2015. Each of the four graphs is a binned scatter plot showing mean percentile of either recent wealth or recent income in 2015 as indicated on the y-axis for each percentile of either recent wealth of recent income in 2003 as indicated on the x-axis. The vertical red lines (respectively the space between them) indicate zero recent wealth and zero recent income.

equivalent to recent income of the taxpayers in the 84th recent wealth percentile. This indicates that taxpayers with negative net wealth are not necessarily poor in a narrow sense.[11]

Figure 4 extends this analysis and compares the distributions of recent wealth and recent income in 2003 (based on net wealth in 2001 and 2002) on the x-axes to the corresponding outcomes 12 years later in 2015 (based on net wealth in 2013 and 2014) on the y-axes. The graphs in the upper left panel and in the lower right panel show that a taxpayer's positions in the wealth and income distributions are highly persistent with some mean reversion. Individuals at the top of the income distribution fell by about ten percentiles on average over twelve years, whereas individuals at the top of the wealth

[11]The graph on the right-hand side of Figure 3 shows no clear pattern of average for very low incomes. Related work by Halvorsen and Thoresen (2021), however, shows that a large share of the wealth tax burden in Norway falls on low-income people.

distribution fell behind about half that much on average. As discussed above, the wealth and income distributions in Bern were relatively stable over the period 2001-2015, and stationary distributions of wealth and income are necessarily characterized by mean reversion (Champernowne, 1953).

The graphs in the upper panel of Figure 4 indicate high growth of wealth and income among negative net wealth individuals over time. The graph in the upper left panel shows that recent wealth in 2015 is slightly negatively correlated with negative recent wealth in 2003. This suggests that taxpayers with the most negative net wealth have experienced the largest increases in wealth over the subsequent 12 years. If we look at the correlation between recent wealth in 2003 and recent income in 2015 in the upper right panel, we find that taxpayers in the first percentile of the recent wealth distribution in 2003 are, on average, in the 66th percentile of the recent income distribution in 2015. This is equivalent to the mean recent income percentile of the 95th percentile of the recent wealth distribution in 2003 and, thus, even higher in the recent income distribution than in the contemporaneous graph displayed in Figure 3. The initially high incomes of negative net wealth individuals increase even more over time, on average.[12]

5 Growth: construction and descriptive statistics

5.1 Measurement

I define wealth growth and income growth as 3-year changes in log wealth and log income, where I correct for the same age dummies as in recent wealth and income. Figure 5 shows the distributions of wealth growth, income growth and earnings growth (log changes in earnings from dependent employment and from self-employment) over positive outcomes. Wealth growth in the panel at the top with a standard deviation of 0.9 is more dispersed than income growth (S.D.=0.68) and earnings growth is even less dispersed (S.D.=0.4). While, at first sight, this result may come as a surprise because of wealth's nature as

[12] One possible explanation for this observation is that people with large investments in 2003 ended up with zero net wealth later on because they defaulted on their debt and went bankrupt. Note, however, that this does not fit the increase in incomes of negative net wealth individuals. According to an alternative explanation, taxpayers with negative net wealth in 2003 had assets that they did not report in 2003 but declared in 2015. While there was, however, a crackdown offshore on wealth held in Swiss bank accounts, the legal situation remained unchanged for residents of Switzerland.

a stock, it is very intuitive given that asset prices fluctuate and that a larger variety of margins of adjustment exist for wealth than, especially, for labor earnings.

To obtain measures that are not only defined over positive outcomes, I distinguish between cases, in which at least one outcome is zero or negative, or becomes zero or negative. I hence define wealth growth and income growth as

$$\begin{aligned} \triangle \ln y^o_{j,t} \quad = \quad & \left(\mathcal{I}_{\{y^o_{j,t+3}>0\}} - \mathcal{I}_{\{y^o_{j,t+3}<0\}}\right) \cdot \ln(|y^o_{j,t+3}|) \\ & - \left(\mathcal{I}_{\{y^o_{j,t}>0\}} - \mathcal{I}_{\{y^o_{j,t}<0\}}\right) \cdot \ln(|y^o_{j,t}|) - \triangle d^o_h, \end{aligned} \tag{2}$$

where the indicator function $\mathcal{I}$ equals one if the argument in curly brackets is true and zero otherwise, and $\triangle d^o_h = d^o_{h+3} - d^o_h$ is the 3-year difference between the age dummies from equation (1).

This specification allows for negative outcomes by using the absolute value of negative wealth and income. It then treats reductions in absolute negative net wealth and income the same as corresponding increases in positive net wealth and income. If, for example, net wealth y^w_j changes from CHF -2,000 in t to CHF -1,000 in $t+3$, wealth growth will, conditional on age dummies being the same, be the same as if it increases from CHF 1,000 in t to CHF 2,000 in $t+3$.

I need to make simplifying assumptions in cases where outcomes change from negative to positive outcomes or vice versa, or where outcomes are zero. If either $y^o_{j,t}$ or the $y^o_{j,t+3}$ was zero, I replace it with either 1 or -1 to be able to apply log transformation. If net wealth or net income change form negative to positive or vice versa, I add up the change between the negative value and CHF -1 and the change between CHF 1 and the positive value, thus ignoring the discontinuity of the function in equation (2) between -1 and 1. Note that this S-shaped log-transformation makes changes between small numbers more prominent.

5.2 Correction for correlated wealth and income distributions

In the following, when examining how the distributional characteristics of wealth and income growth vary along the distribution of recent wealth, I will not take recent income as given in my data. Instead, I will normalize both relevant outcomes wealth y^w_j and in-

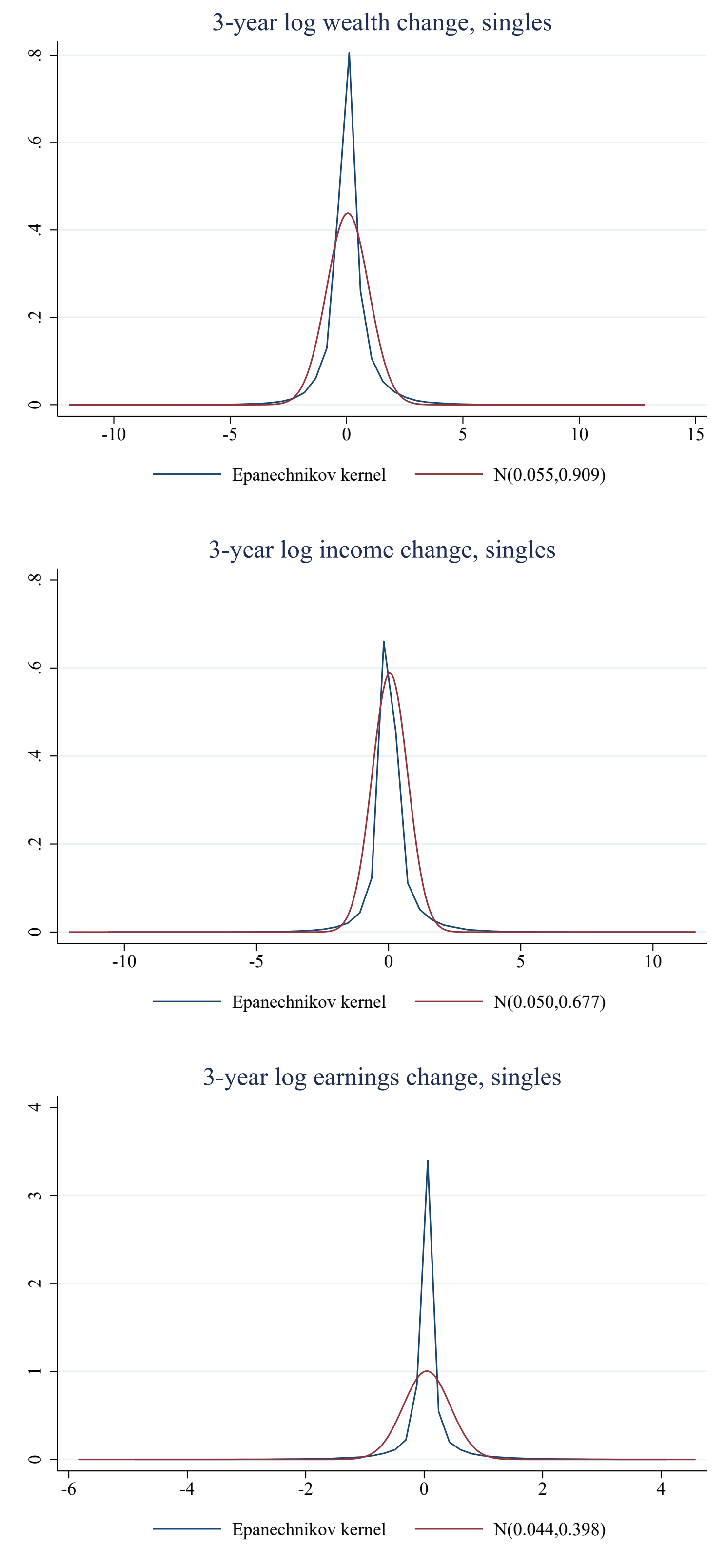

Figure 5: Wealth, income and earnings growth with corresponding normal distributions.

come y_j^i for each individual in my data in a way such that they correspond to outcomes for an individual at the 50th percentile of the recent income distribution. Similarly, when looking at variation along the distribution of recent income, I will apply a similar transformation that moves each individual in my data to the 50th percentile of the recent wealth distribution.

The reason for this transformation is the close association between recent wealth and recent income documented above in Section 4. In the observational data available to me, I cannot randomize recent income along the recent wealth distribution and vice versa. Therefore, when comparing individuals at different locations in the recent wealth distribution, we need to keep in mind that their recent income will, on average, be different as well.

Technically, the transformation I apply to correct distributions is similar to how I correct for age in equation 1. It is equivalent to using residuals after regressions on percentiles of the respective distributions. I regress the growth measures $\triangle \ln y_j^o$, $o = w, i$ on year dummies, marriage dummies and dummies indicating percentiles in either the recent wealth or recent income distributions. I then extract the resulting dummy coefficients, subtract them from the respective growth and risk measures used as dependent variables and add the dummy for the 50th percentile of the corresponding distribution. This procedure results in four measures $\triangle \ln \hat{y}_j^{o,o}$, $o = w, i$, where $\triangle \ln \hat{y}_j^{w,w}$ is wealth growth assuming a taxpayer is in the 50th percentile of the recent wealth distribution, $\triangle \ln \hat{y}_j^{w,i}$ is wealth growth assuming a taxpayer is in the 50th percentile of the recent income distribution, $\triangle \ln \hat{y}_j^{i,w}$ is income growth assuming a taxpayer is in the 50th percentile of the recent wealth distribution and $\triangle \ln \hat{y}_j^{i,i}$ is income growth assuming a taxpayer is in the 50th percentile of the recent income distribution.

In the following Section 6.1, I will examine, for example, how wealth growth varies across the recent income distribution using $\triangle \ln \hat{y}_j^{w,w}$ rather than $\triangle \ln y_j^w$, thus holding recent wealth constant. In Appendices A and B, however, I will provide outputs that allow to compare results with and without the correction.

6 The effect of risk on accumulation

6.1 Moments of wealth and income growth across the distributions

In this section, I graphically inspect patterns of moments one through four of wealth and income growth along the wealth and income distributions. This graphical examination builds on Guvenen et al. (2021) who show corresponding income risk patterns for those 25-55 years old using U.S. data. Focusing on such a narrow age group might provide a biased picture of overall wealth accumulation. I only drop individuals below age 20 although they also have to file tax returns if they are employed. Given that Switzerland has a vocational education and training (VET) system (Girsberger, Koomen and Krapf, 2022), a majority of 20-year olds have typically already finished their education.

I divide the taxpayers in my data into four age groups, 20-34, 35-49, 50-64, as well as 65 and older, and then examine each of these age groups separately (Gallusser and Krapf, 2022). A special focus in this paper is on the oldest age group, who are less likely to be employed, but may be more likely to save or dissave than members of other age groups. They are also more likely to appear in tax data in Switzerland than in other countries because of Switzerland's broad definition of the tax base. As I will show, these two groups display patterns that are of particular interest. In the following Section 6.2, I will then look for consistent patterns in the distribution of income risk across the income distribution that may affect wealth growth. I focus on single taxpayers because joint taxation does not allow me to construct individual level patterns for married taxpayers.

Figure 6, which shows mean wealth and income growth by recent wealth and income percentiles, suggests that both wealth and income tend to revert to the mean. This mean reversion is less pronounced among older age groups as shown in the upper-left and lower-right panels. Wealth and income both increase most strongly for individuals for whom they were initially negative. The youngest may actually not be most likely to accumulate wealth, and the oldest not most likely to dissave. In line with recent findings by Fagereng et al. (2019) for Norway, there is a slight positive association between initial wealth and wealth growth for positive wealth. The graph in the upper right panel shows that, conditional on recent wealth being positive, income growth is negatively related to position in the wealth distribution for taxpayers in the youngest age group, but positively

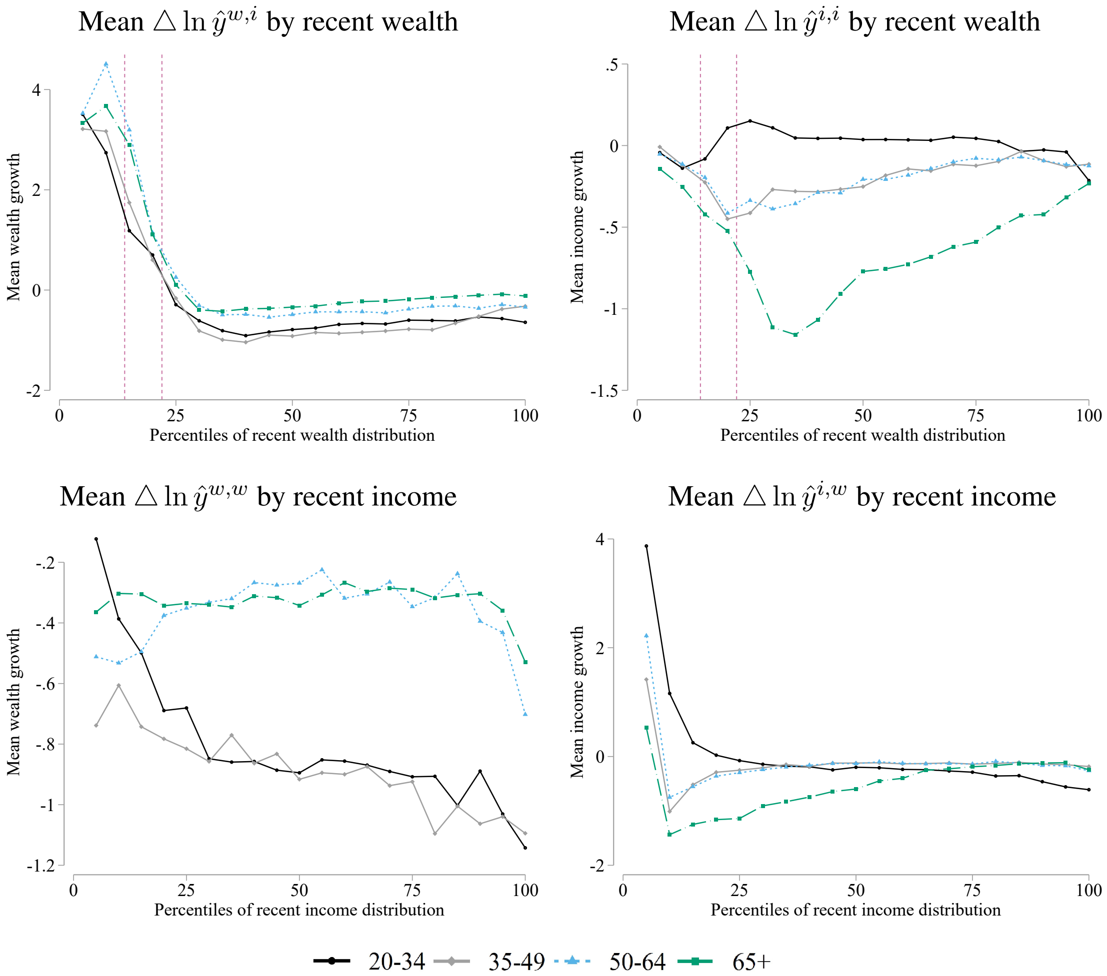

Figure 6: Mean wealth and income growth by age group as well as by ventiles of the recent wealth and income distributions. Wealth and income growth are the (absolute) log difference between outcomes in a given year and three years later as defined in equation 2. Recent wealth and income are age-corrected means of wealth and income over the preceding two years as defined in equation 1.

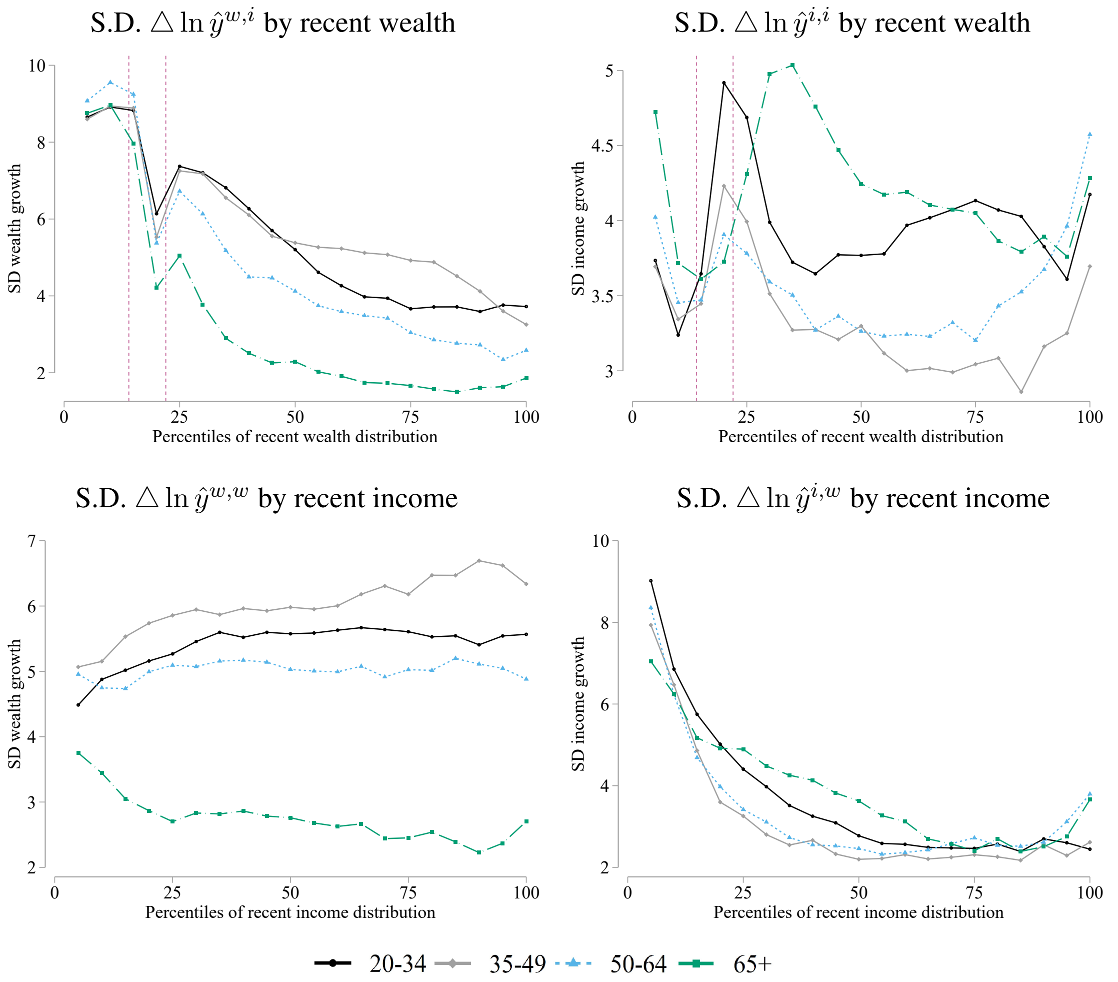

Figure 7: Standard deviation of wealth and income growth by age group as well as by ventiles of the recent wealth and income distributions. Standard deviation as a measure of risk quantifies the dispersion of wealth and income growth within age group and within ventiles of the recent wealth and income distributions.

for taxpayers in the oldest age group. For the younger age groups, wealth growth tends to slightly decrease along the recent income distribution.[13]

Figures 7, 8 and 9 show that standard deviation, skewness, and kurtosis of wealth and income growth vary by age and recent wealth or income percentile. Standard deviation of wealth growth decreases for the two older age groups and is more pronounced for those with negative wealth. Standard deviation of income growth displays a U-shaped pattern, with the increase in standard deviation for higher percentiles being sharpest for

[13] This is in contrast to the pattern that emerges if non-positive wealth is truncated and if we only consider labor earnings above CHF 5,200 per year in Appendix C. Here, wealth growth increases steeply in the position in the recent earnings distribution, see the third panel from the top on the left-hand side of Figure C.1.

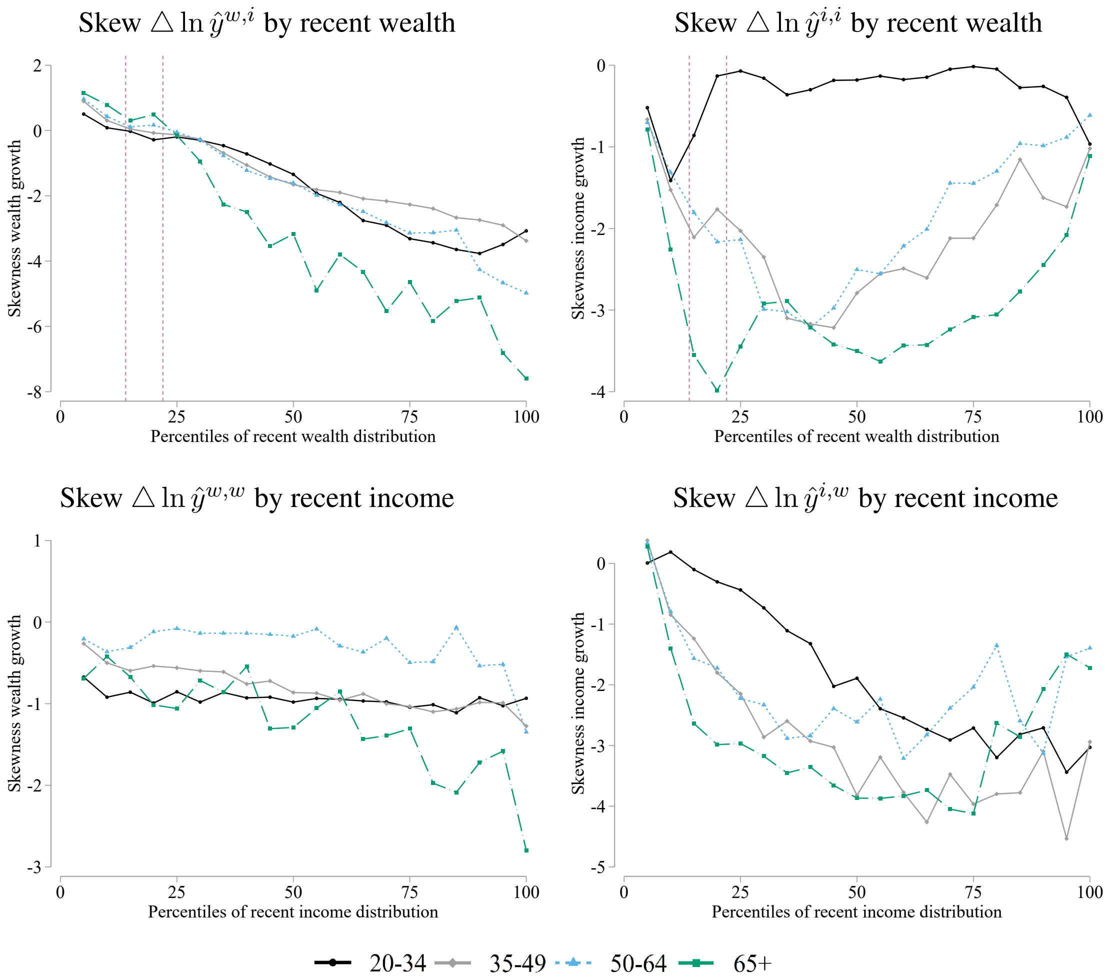

Figure 8: Skewness of wealth and income growth by age group as well as by ventiles of the recent wealth and income distributions. Skewness as a measure of risk quantifies the symmetry of changes in wealth and income within age group and within ventiles of the recent wealth and income distributions.

the oldest age groups. Skewness of wealth and income growth is negative. Skewness of income growth follows a U-shaped pattern over recent income. Kurtosis of wealth growth increases over the recent wealth distribution, particularly for the oldest age group, and kurtosis of income growth follows an inverse U-shaped pattern. Kurtosis of wealth growth also increases over recent income percentiles for the oldest age group.

Appendix A presents corresponding figures for the uncorrected growth measures $\triangle \ln y_j^w$ which are fairly similar. Appendix B shows corresponding graphs for married couples. Again, the general patterns are the same, although there are differences in details. Appendix C repeats the analysis using the more traditional measures labor earnings and positive wealth (Guvenen et al., 2021).

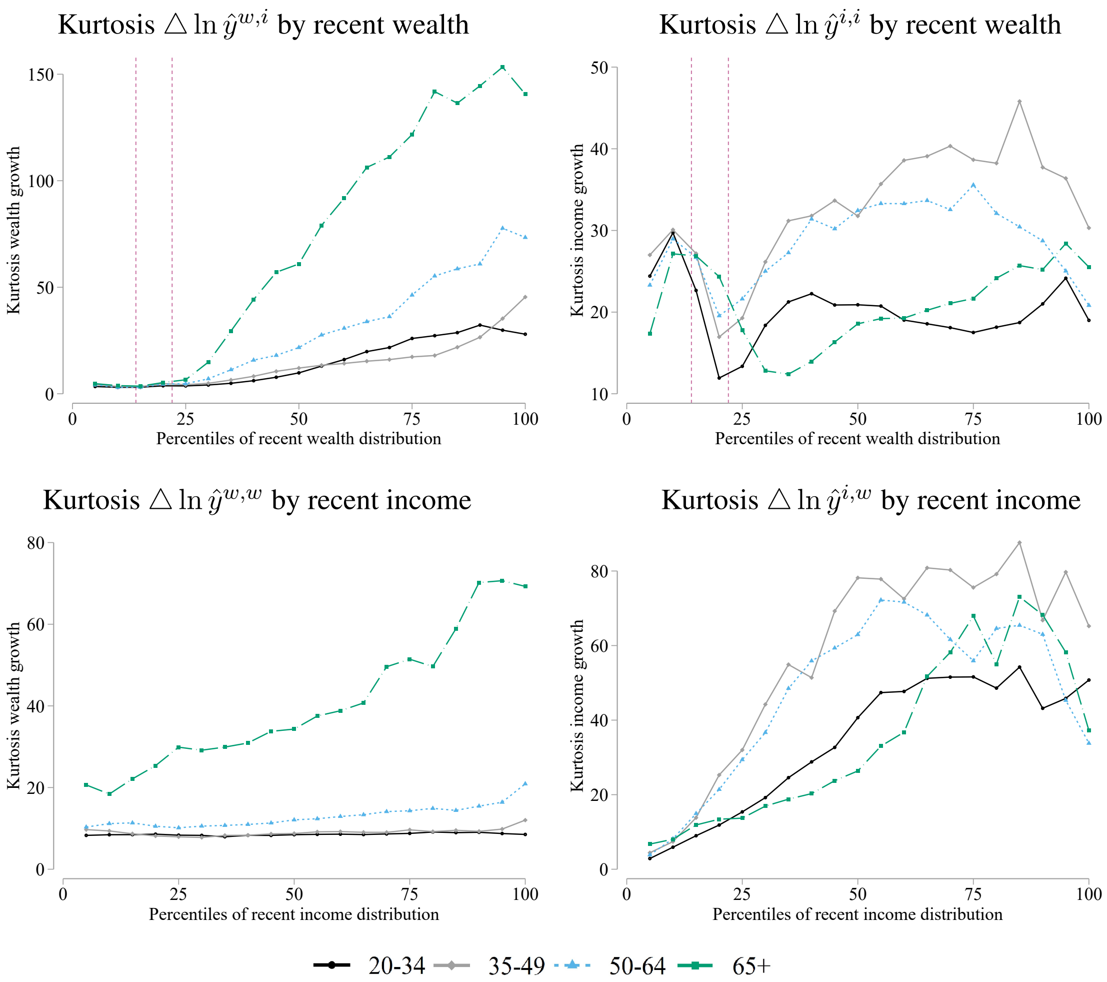

Figure 9: Kurtosis of wealth and income growth by age group as well as by ventiles of the recent wealth and income distributions. Kurtosis as a measure of risk quantifies the concentration in the in the tails of changes in wealth and income within age group and within ventiles of the recent wealth and income distributions.

The distributions of the income risk measures over recent income in the lower-right panels of Figures 7-9 confirm findings by Guvenen et al. (2021). In the following section 6.2, I will examine whether these measures of income risk are actually related to wealth growth as suggested by the Bewley-Aiyagari-Huggett models discussed in Sections 1 and 2.

6.2 Wealth growth by wealth risk and income risk

Section 6.1 showed that income risk and wealth accumulation vary along the distributions of wealth and income and across age groups. But are individuals in age groups and parts of the distribution with the highest exposure to income risk also most likely to accumulate wealth? To answer this question, I will now first link the information from the previous section by age group and percentile of the distributions and then merge the age group and percentile-specific measures of risk to the individual data.

Figure 10 displays how mean wealth growth of the youngest age group on the y-axes co-varies with higher-order moments of income growth of the same age group on the x-axes. Mean wealth growth per recent income percentile among the young in my sample is positively correlated with the standard deviation and with skewness of income risk per recent income percentile, but negatively correlated with the kurtosis of income risk per recent income percentile. These signs on skewness and kurtosis are the opposite of what one would expect if the young did accumulate wealth as insurance again tail income risk. No clear patterns emerge by recent wealth percentiles. The graphs on the right-hand side, however, confirm that individuals with negative recent wealth are more likely to accumulate wealth.[14]

One interpretation that emerges from the systematic ordering in the three graphs on the left-hand side in Figure 10 may help make sense of these patterns: The income-poor display high standard deviation, high (less negative) skewness, and low kurtosis. The opposite is true for the income-rich. Therefore, the graph suggests that poorer individuals, who have a very dispersed but symmetric distribution of income, do not accumulate a lot of wealth or debt when they are young. High-income individuals, on the other hand, who have a very concentrated, asymmetric, and leptokurtic income distribution, anticipate that

[14]Corresponding graphs for older age groups yield less clear pictures.

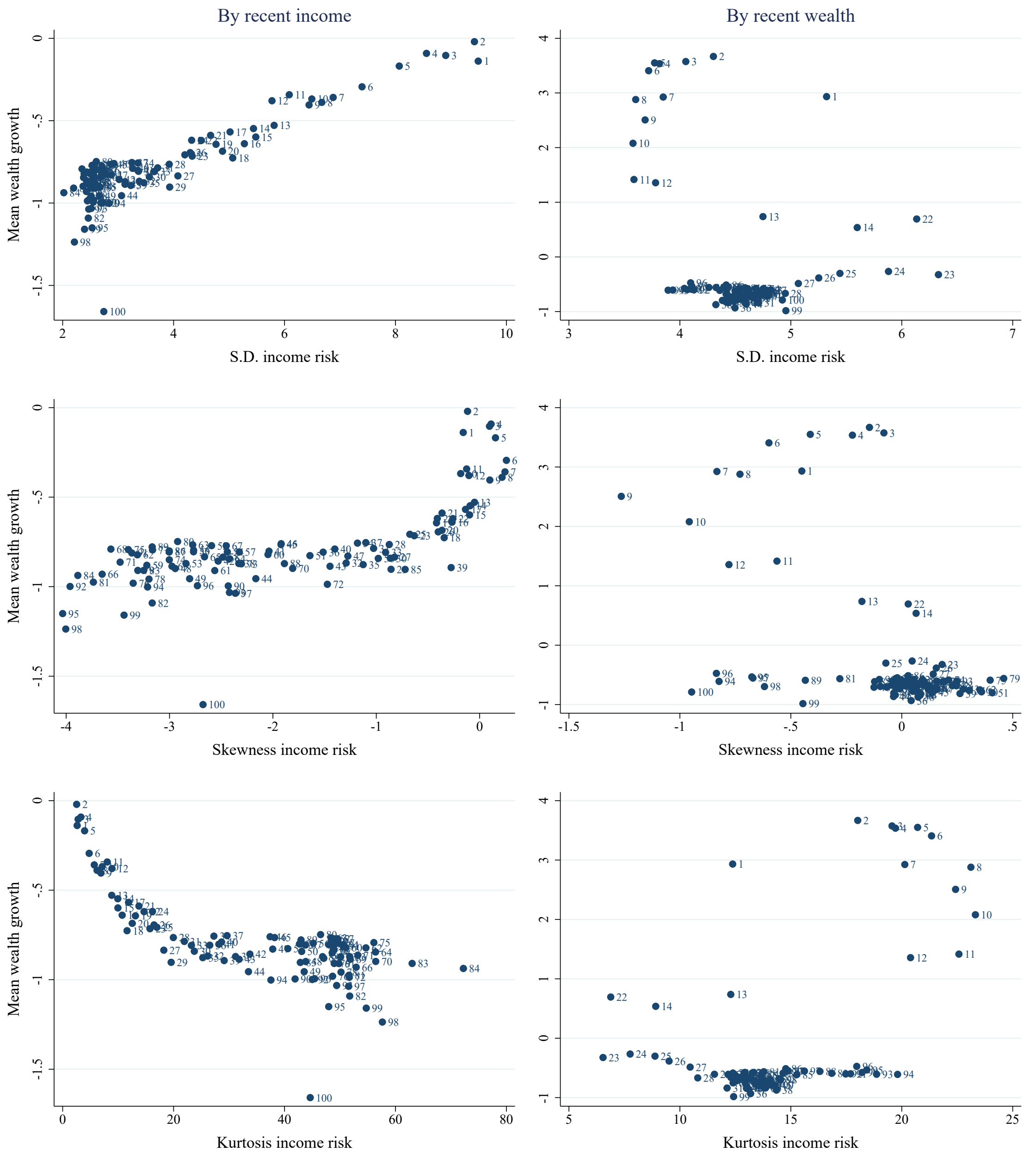

Figure 10: Mean wealth growth and higher moments income risk for age 20-34, by recent wealth and recent income percentile respectively. All observations in this figure are the same as in Section 6.1 above. The numbers next to each observation in these graphs indicate recent wealth and recent income percentiles. The left-hand side panels use moments calculated by recent income percentile, the right-hand side panels use moments calculated by recent wealth panels.

their income profile will likely be steep, and borrow against it. Housing wealth may play a key role for the borrowing of the high-income individuals (see also Gallusser and Krapf, 2022).

To examine how the moments of the income risk distribution map into wealth growth in more detail, I turn to the individual data. I merge the empirical moments of the income risk distribution that an individual may expect to face, conditional on their position in the recent income distribution, and examine how this is related to wealth accumulation. More specifically, I will run regressions of individual wealth growth on moments of the income risk distribution by recent income percentile

$$\begin{aligned}\Delta \ln \hat{y}_{jtp}^{w,w} \quad = \quad & \alpha + \beta_1 \cdot mn_p^{ir} + \beta_2 \cdot sd_p^{ir} + \beta_3 \cdot sk_p^{ir} + \beta_4 \cdot ku_p^{ir} + \beta_5 \cdot mn_p^{wr} + \beta_6 \cdot sd_p^{wr} \\ & + \beta_7 \cdot sk_p^{wr} + \beta_8 \cdot ku_p^{wr} + \gamma \cdot married_{jt} + \delta \cdot age_{jt} + \lambda_t + \varepsilon_{jt},\end{aligned}$$

where $\Delta \ln \hat{y}_{jtp}^{w,w}$ is the 3-year change in log wealth of individual i in year t and percentile p of the recent wealth distribution, mn, sd, sk and ku are the percentile-specific first through fourth moments of income growth ir and wealth growth wr, $married$ is a marriage dummy, age is a vector of age dummies and λ_t is a year fixed effect. I do not include individual fixed effects because my analysis builds on a literature that studies wealth and income distributions, which also typically do not account for individual-specific patterns in other periods.

Table 2 shows the resulting output. I include specifications that do not control for higher-order moments of the wealth risk distribution, which substantially affect the interpretation. I normalize all growth and risk measures by their standard deviations, which only substantially affects the coefficients on kurtosis. I will focus on the qualitative aspects of my regression results.

There emerges a pattern, where taxpayers in recent income percentiles with more positive income shocks also tend to accumulate more wealth. This effect is not always statistically significant, though. For the oldest age group, I observe that higher dispersion in income risk tends to be associated with higher wealth growth.

The coefficients on skewness and kurtosis of income risk give an idea whether the mechanisms outlined in Guvenen et al. (2021) hold in my data. In the majority of specifi-

Table 2: WEALTH GROWTH PATTERNS BY RISK MOMENTS BY PERCENTILES RECENT INCOME IN INDIVIDUAL DATA.

	20-34		35-49		50-64		65+	
Mean inc growth by inc	0.132***	0.033*	0.018	0.008	0.075***	0.039***	0.037***	0.008
	(0.022)	(0.019)	(0.016)	(0.006)	(0.015)	(0.015)	(0.009)	(0.007)
S.D inc risk by inc	-0.036	-0.056*	0.026	-0.041***	-0.073***	-0.042**	0.084***	0.043***
	(0.038)	(0.029)	(0.016)	(0.014)	(0.023)	(0.018)	(0.011)	(0.009)
Skewn. inc risk by inc	0.028	0.023	0.005	-0.010	0.003	-0.009	-0.003	-0.006*
	(0.029)	(0.017)	(0.016)	(0.009)	(0.011)	(0.006)	(0.005)	(0.004)
Kurt. inc risk by inc	-0.209***	-0.017	-0.100***	-0.062***	0.009	0.001	0.059***	0.040***
	(0.040)	(0.035)	(0.019)	(0.012)	(0.018)	(0.012)	(0.008)	(0.005)
S.D wealth risk by inc		-0.825***		-0.005		0.020*		0.070***
		(0.087)		(0.013)		(0.011)		(0.011)
Skewn. wlth risk by inc		0.150***		0.188***		0.105***		0.047***
		(0.018)		(0.011)		(0.009)		(0.004)
Kurt. wlth risk by inc		0.015		0.091***		0.004		0.057***
		(0.063)		(0.011)		(0.007)		(0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	898,512		1,126,503		1,107,876		1,042,394	
R^2	0.0051	0.0057	0.0011	0.0012	0.0014	0.0017	0.0009	0.0011

Notes: Wealth growth as a function of income risk moments and wealth risk moments by recent income percentiles. Growth and risk measures normalized by their standard deviations. Other controls include age and year dummies as well as a dummy indicator for marital status. Standard errors clustered at recent income percentiles. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

cations, I do not find a connection between income risk and wealth growth. Only for the oldest age group are the signs on skewness and kurtosis of income risk as expected, and the evidence for an effect of kurtosis appears to be stronger. High kurtosis of income risk may, hence, lead to high wealth growth among older, but not among younger age groups.

Table 3 repeats the same analysis as before, but this time all moments of the recent wealth and recent income distributions are calculated conditional on recent wealth percentiles. I distinguish whether recent wealth was negative or positive, and always include controls for percentile-specific moments of the wealth risk distribution. The estimates in this table confirm that there is little evidence in my data that wealth accumulation is related to the tails of the income growth distribution. The signs, magnitudes and levels of statistical significance on the skewness and kurtosis of income risk vary substantially across age groups and positive and negative recent wealth samples. The coefficients in Tables 2 and 3 remain unchanged if I include moments by recent wealth percentiles and by recent income percentiles in the same regression.[15]

My data do not yield clear conclusions on the literature that relates rising wealth concentration to differences in returns to financial assets (Fagereng et al., 2020; Bach et al., 2020), bequests (De Nardi, 2004) or saving rates (Benhabib and Bisin, 2018) across the wealth distribution. Individuals who started out with negative net wealth achieve the highest increases in wealth. Among individuals with positive wealth, Figure 6 shows a very slight upward trend in mean wealth growth for recent wealth above around the 30th percentile. Note that this does not hold for the youngest age group and neither if I only consider positive recent wealth as shown in Appendix Figure C.1.

7 Conclusion and discussion

In this paper, I study how income risk covaries with wealth from administrative data. My analysis of the determinants of accumulation may help inform the theoretical literature on the accumulation and distribution of wealth. I find little evidence that people accumulate wealth to insure against income risk.

[15] Appendix D show results of regressions of income growth on percentile-specific expected moments of the wealth risk distribution. No clear patterns emerge from the results in Tables D.1 and D.2.

Table 3: WEALTH GROWTH PATTERNS BY RISK MOMENTS BY PERCENTILES RECENT WEALTH IN INDIVIDUAL DATA.

	20-34		35-49		50-64		65+	
	RW ≤ 0	> 0	≤ 0	> 0	≤ 0	> 0	≤ 0	> 0
Mean inc growth by wlth	-0.210	0.086***	0.098	0.079	-0.184	0.083**	0.011	0.069***
	(0.131)	(0.029)	(0.218)	(0.061)	(0.353)	(0.034)	(0.154)	(0.015)
S.D inc risk by wlth	-0.271	0.332***	0.549	0.222**	0.872***	0.110	-0.453***	-0.066
	(0.261)	(0.052)	(0.355)	(0.104)	(0.247)	(0.086)	(0.109)	(0.072)
Skewn. inc risk by wlth	-0.255	0.021	0.103	0.012	0.078	0.003	0.088**	0.028
	(0.247)	(0.026)	(0.284)	(0.025)	(0.265)	(0.014)	(0.039)	(0.018)
Kurt. inc risk by wlth	0.625*	-0.041	0.928	-0.085**	0.948***	-0.110***	-0.827***	-0.013
	(0.295)	(0.065)	(0.607)	(0.066)	(0.300)	(0.041)	(0.166)	(0.047)
S.D wealth risk by wlth	-2.011***	-0.366***	-0.323	-0.521***	0.819	0.173***	0.960***	0.144
	(0.456)	(0.074)	(0.422)	(0.051)	(0.468)	(0.040)	(0.178)	(0.113)
Skewn. wlth risk by wlth	4.567***	0.862***	3.044***	0.367***	4.243***	0.124***	3.626**	0.051***
	(1.019)	(0.088)	(0.515)	(0.053)	(0.628)	(0.035)	(1.694)	(0.014)
Kurt. wlth risk by wlth	-15.948***	0.686***	-16.534***	0.063*	-44.339***	0.107***	-43.456**	0.113***
	(5.369)	(0.061)	(3.225)	(0.034)	(6.927)	(0.029)	(16.839)	(0.028)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179,827	718,685	293,339	833,164	205,719	902,157	62,020	980,374
R^2	0.0180	0.0121	0.0154	0.0047	0.0386	0.0029	0.0315	0.0019

Notes: Wealth growth as a function of income risk moments and wealth risk moments by recent wealth percentiles. Growth and risk measures normalized by their standard deviations. Other controls include age and year dummies as well as a dummy indicator for marital status. Standard errors clustered at recent wealth percentiles. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

I show that there are important differences between individuals with negative net wealth and with positive net wealth. Individuals with negative net wealth tend to have high incomes, on average. The correlation between wealth and income is positive for positive net wealth, but negative for negative net wealth. Most importantly, individuals with negative net wealth subsequently experience large gains in wealth and income, on average. These findings suggest that high-income individuals anticipate steep income increases and borrow against those. Future research may want to look into mechanisms behind this process in more detail, ideally using data that allow examining the role of housing wealth.

My results may be relevant for discussions of the introduction of a wealth tax. First, a wealth tax would miss out on high-income people with negative net wealth, who tend to experience large gains in both wealth and income in subsequent periods. Second, my observation that wealth growth is more dispersed than income growth and earnings growth may help understand why the elasticity of taxable wealth is large and may even exceed the elasticity of taxable income (Zoutman, 2015; Brülhart, Gruber, Krapf and Schmidheiny, 2022; Jakobsen, Jakobsen, Kleven and Zucman, 2020; Durán-Cabré, Esteller-Moré and Mas-Montserrat, 2019).

Finally, my results have implications for theories of optimal wealth taxation. Jakobsen et al. (2020), for example, develop a model, which assumes that the rich, who would have to pay wealth taxes, are mostly older people who are likely interested in residual wealth, whereas the precautionary motive is assumed to be of second order. The empirical results in this paper, however, suggest that, if anyone, it is older generations that care about tail income risk. Time horizon may thus affect savings differently than is generally thought.[16]

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[16]One potential reason why the young care less about expected tail income risk, may be that the income they receive over the subsequent three years is a smaller fraction of their expected remaining life-time income, and they may expect that income in later periods may make up for adverse shocks over the subsequent three years.

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A Uncorrected distributions

The figures in this Section are analogous to Figures 6 to 9, but do not hold growth constant at the 50th recent income percentile when examining variation across the recent wealth distribution, and do not hold growth constant at the 50th recent wealth percentile when examining variation across the recent income distribution.

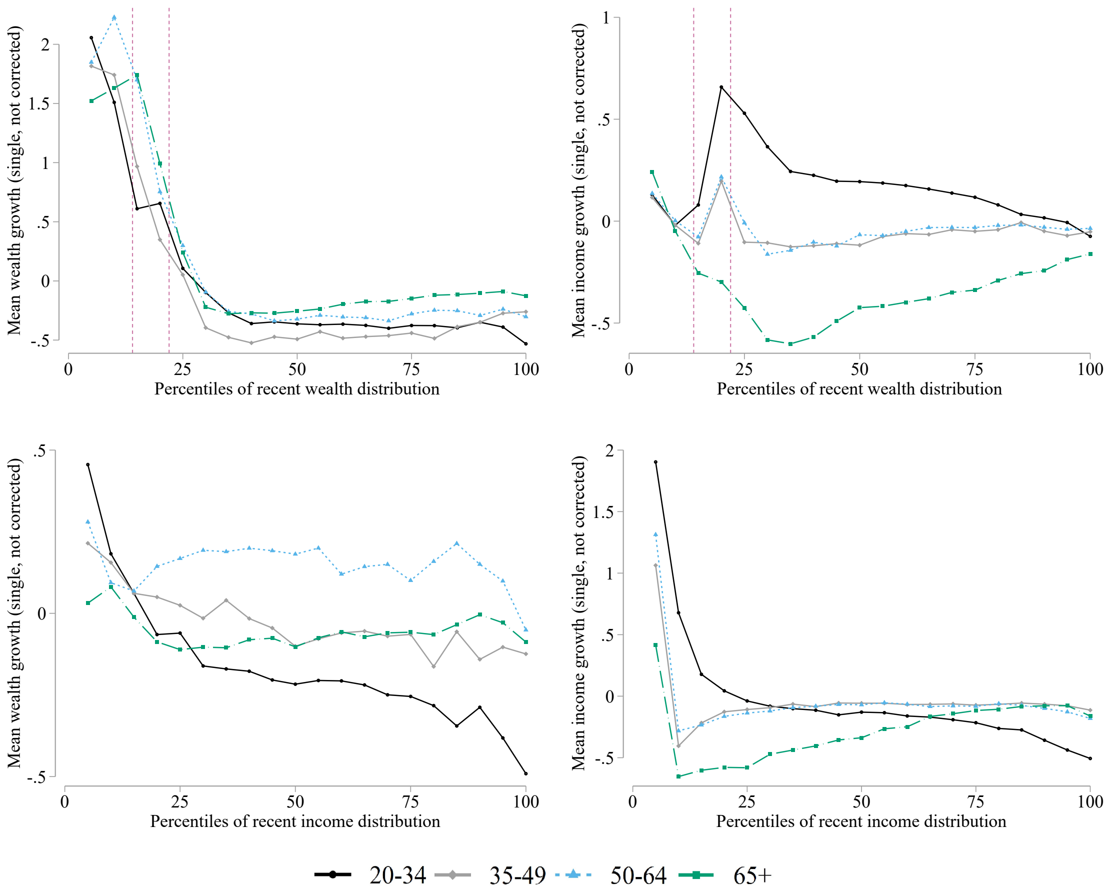

Figure A.1: Mean wealth and income growth without correction.

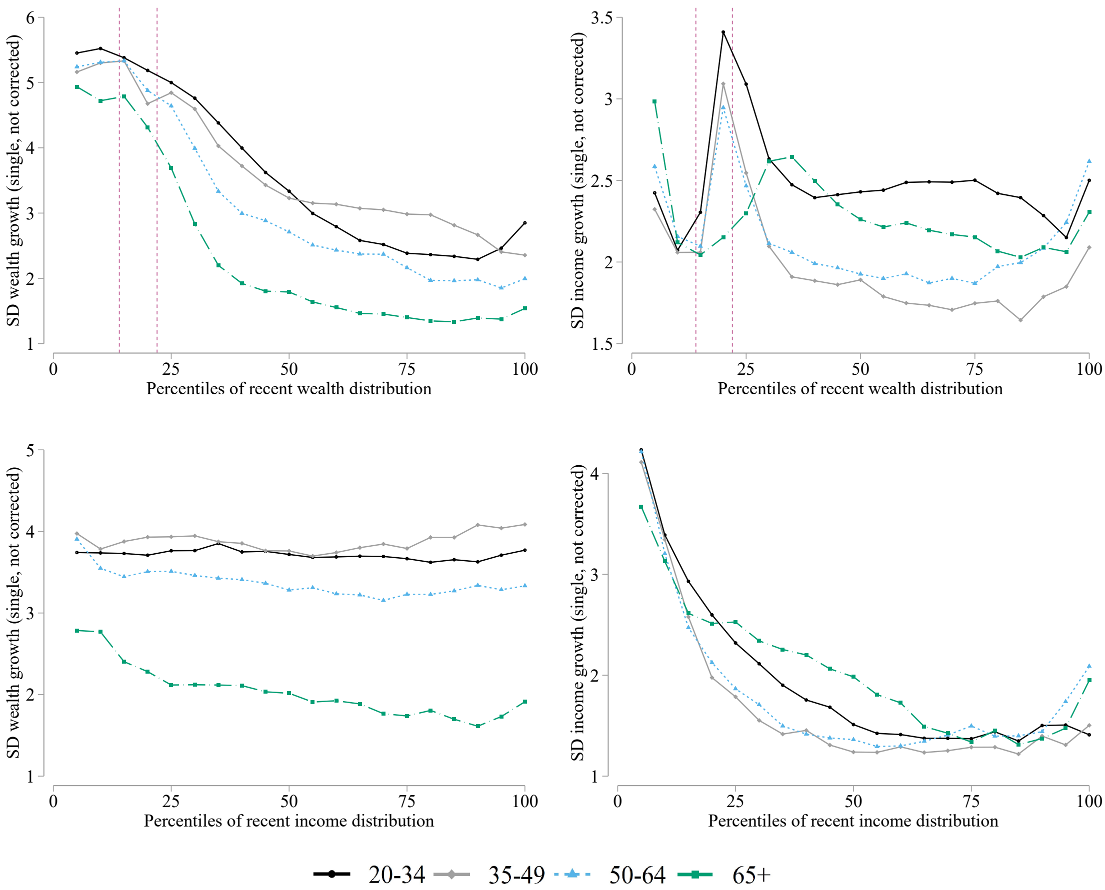

Figure A.2: S.D. wealth and income growth without correction.

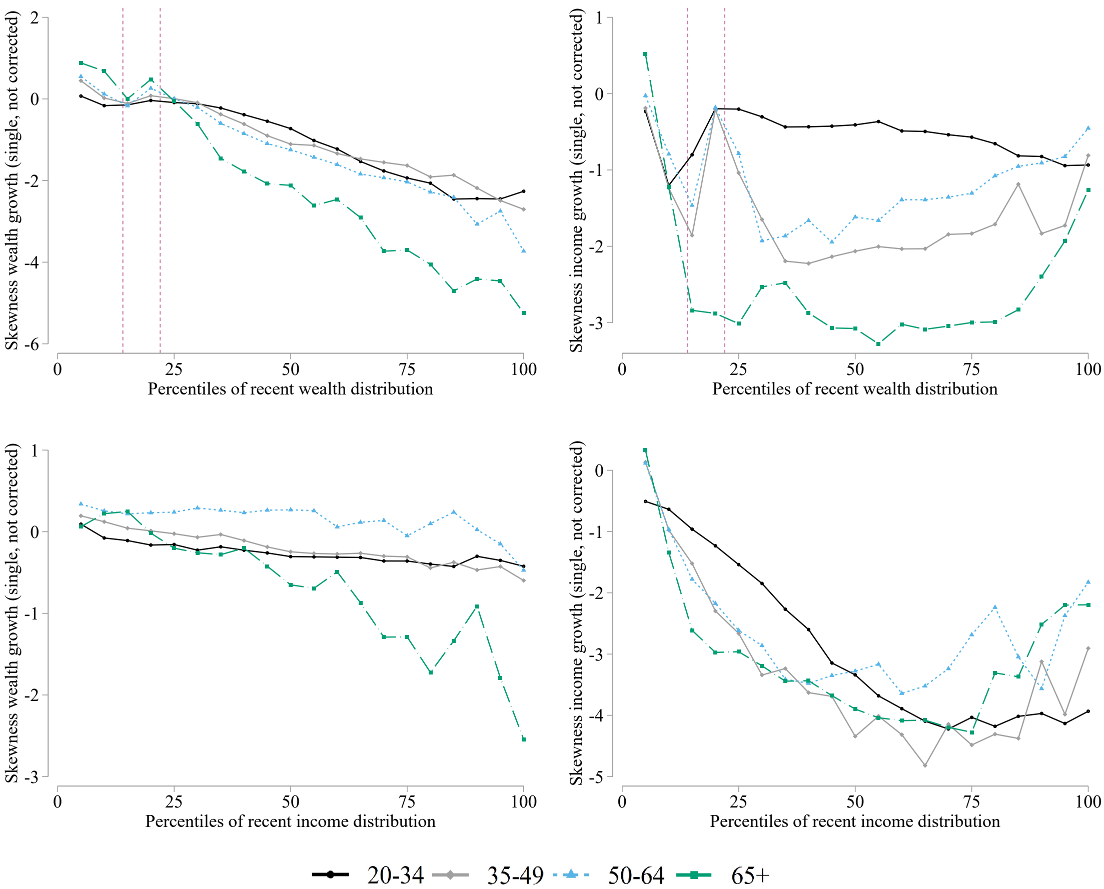

Figure A.3: Skewness wealth and income growth without correction.

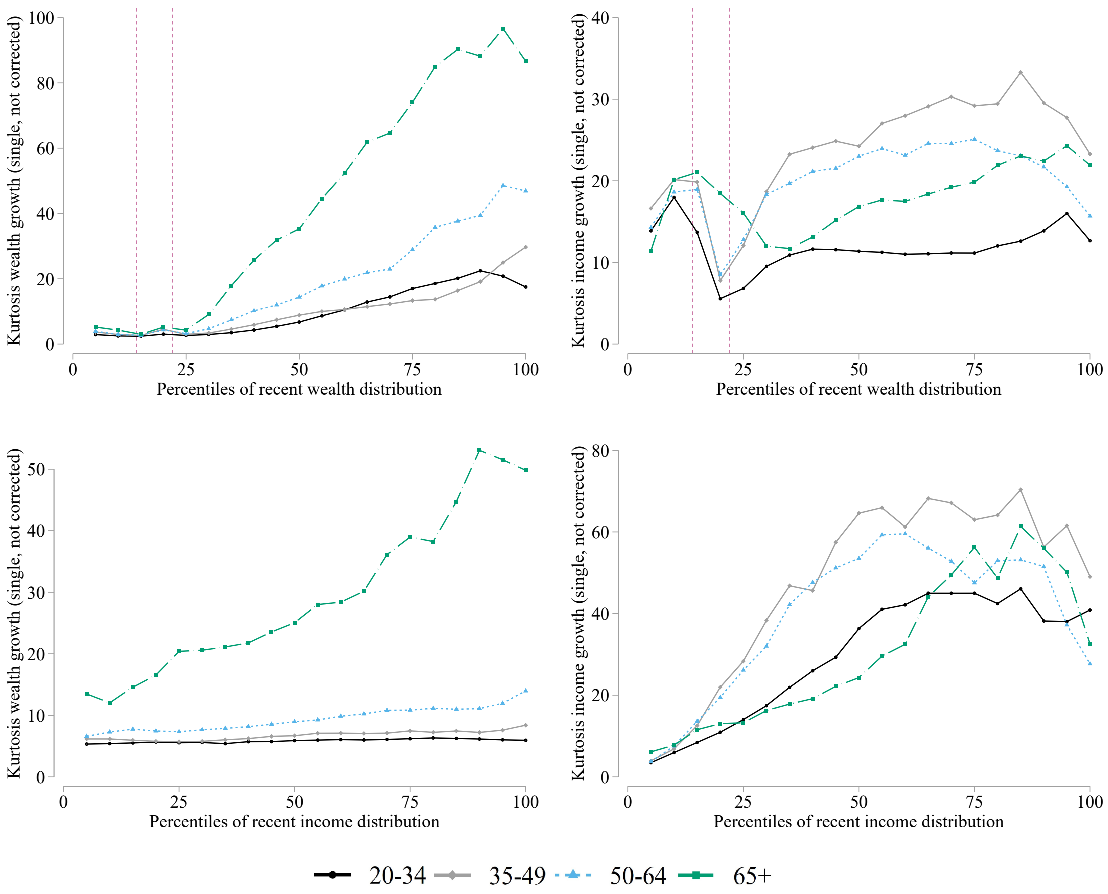

Figure A.4: Kurtosis wealth and income growth without correction.

B Moment distributions for married couples

The figures in this Section are analogous to Figures 6 to 9, but display patterns for married households rather than for singles. Left-hand side panels are not corrected for location in the recent income distribution (when examining variation across the recent wealth distribution) and for location in the recent wealth distribution (when examining variation across the recent income distribution), whereas right-hand side panels hold these constant at 50th percentiles.

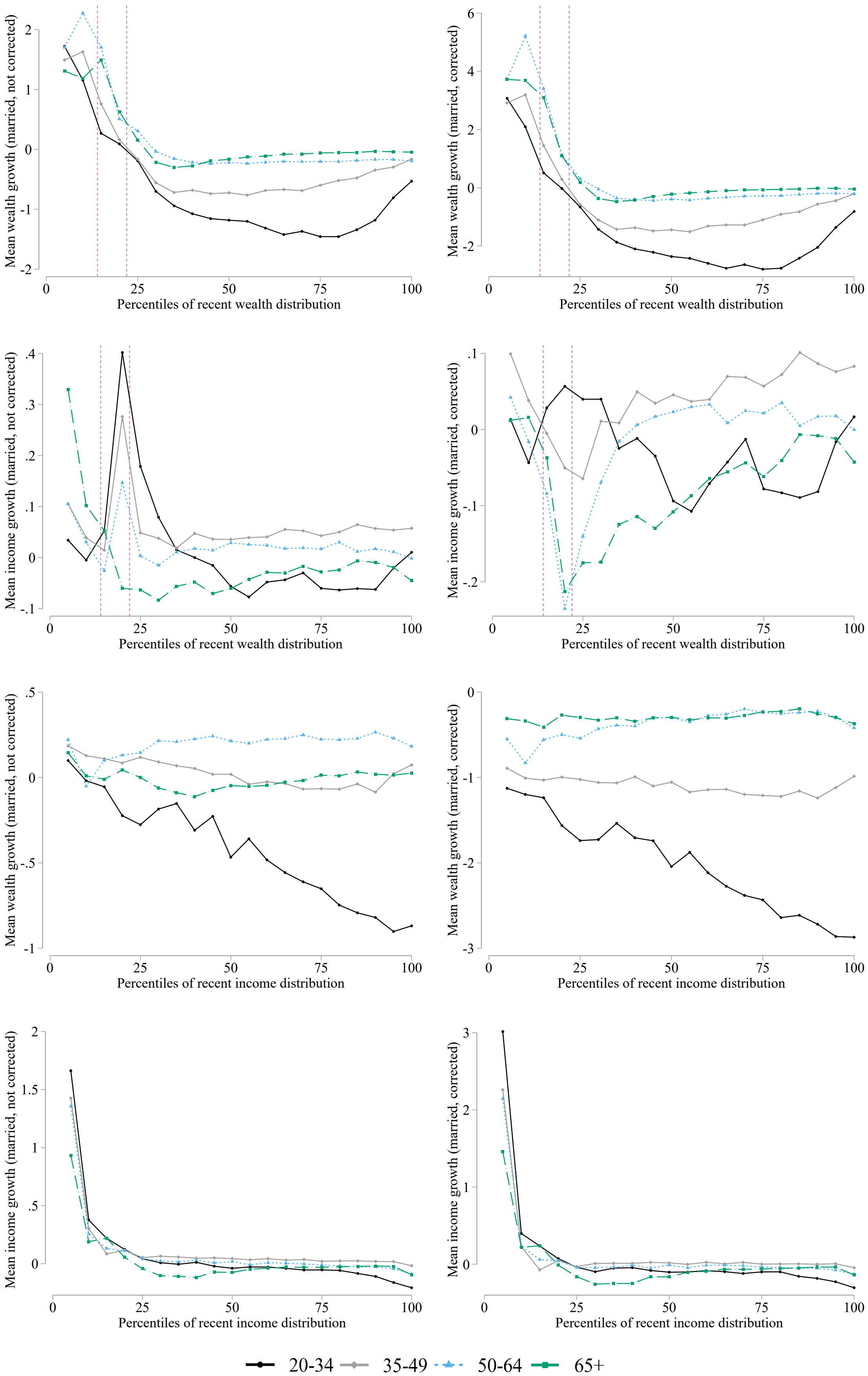

Figure B.1: Mean wealth and income growth, married, without and with correction.

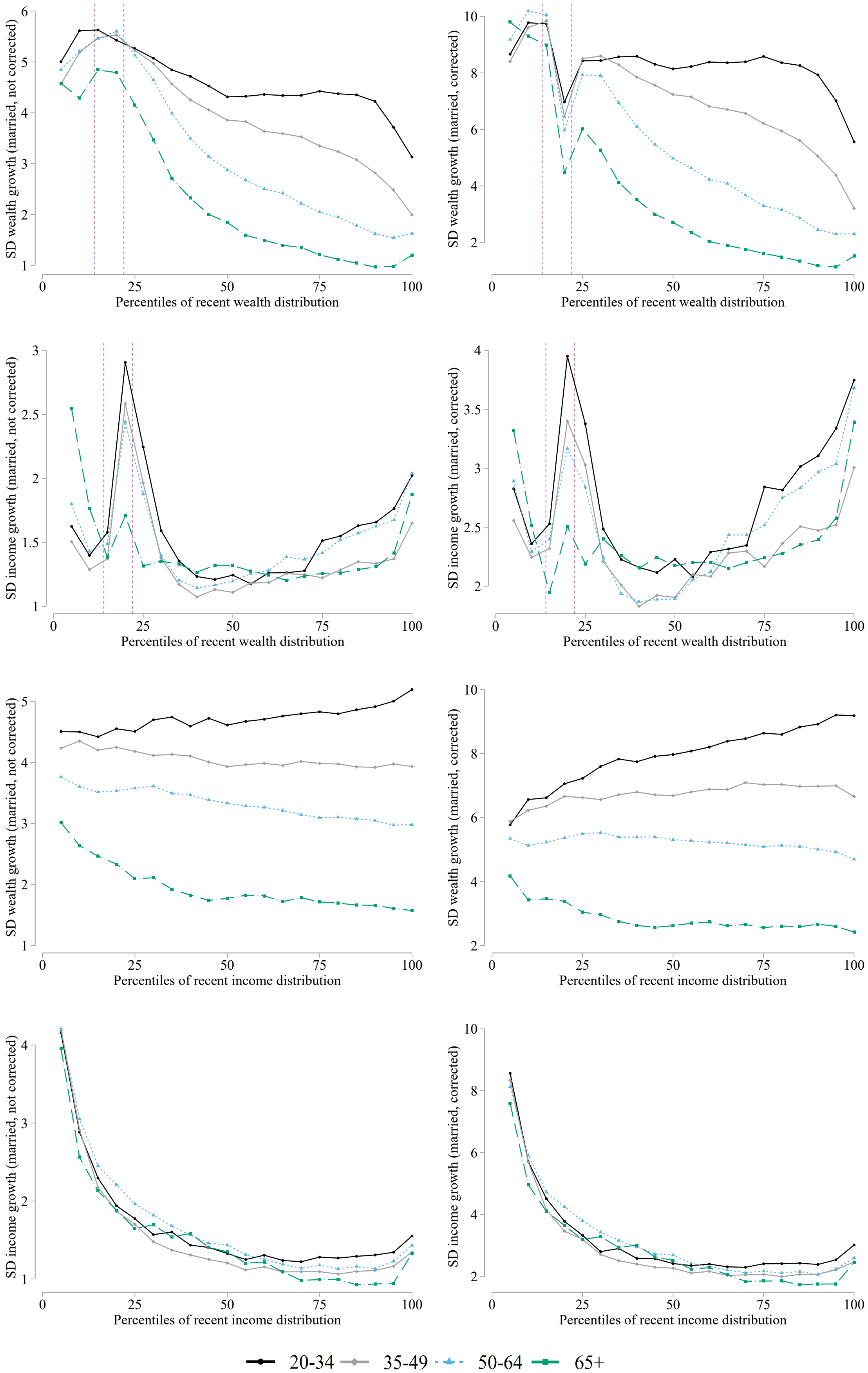

Figure B.2: S.D. wealth and income risk, married, without and with correction.

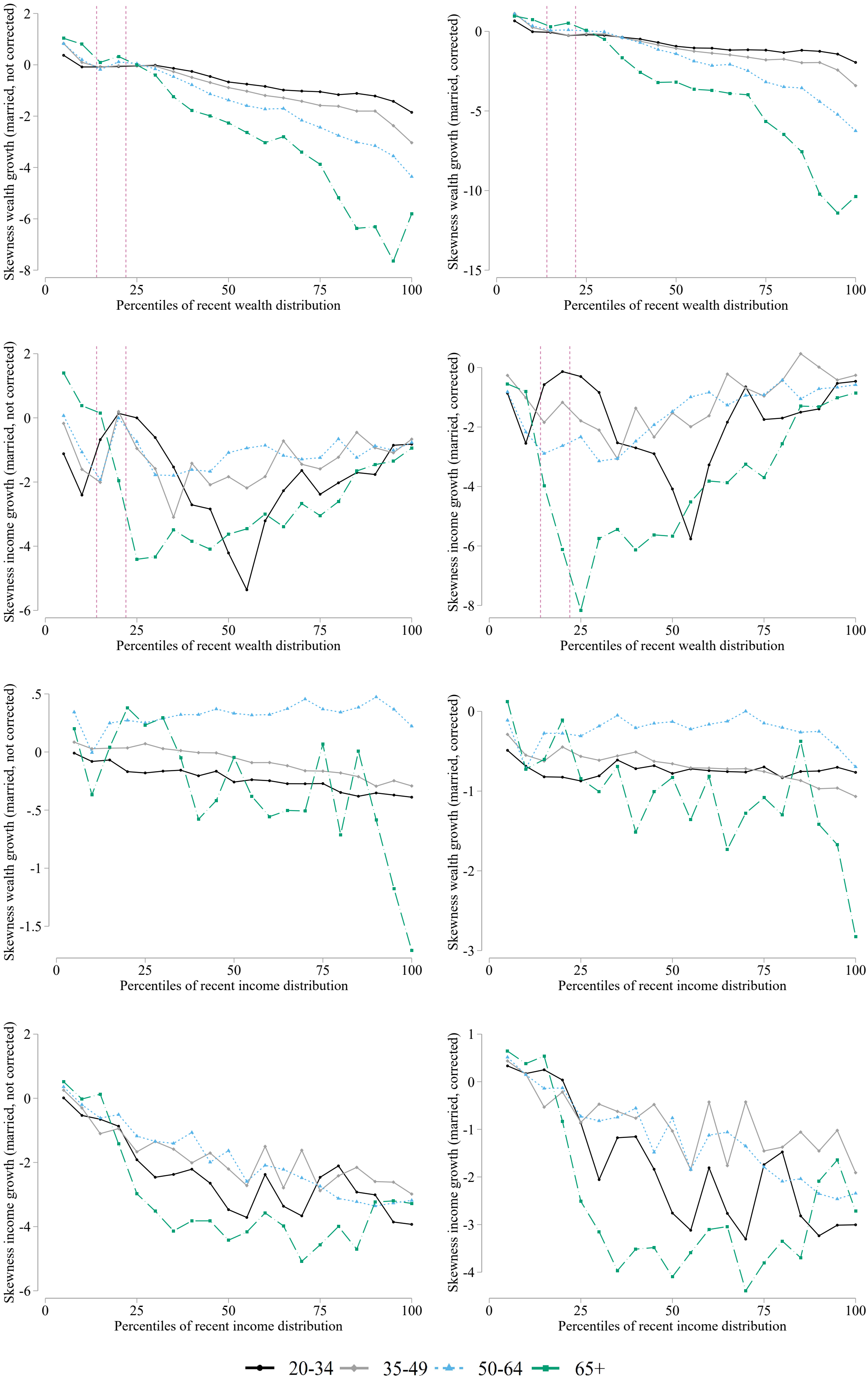

Figure B.3: Skewness wealth and income risk, married, without and with correction.

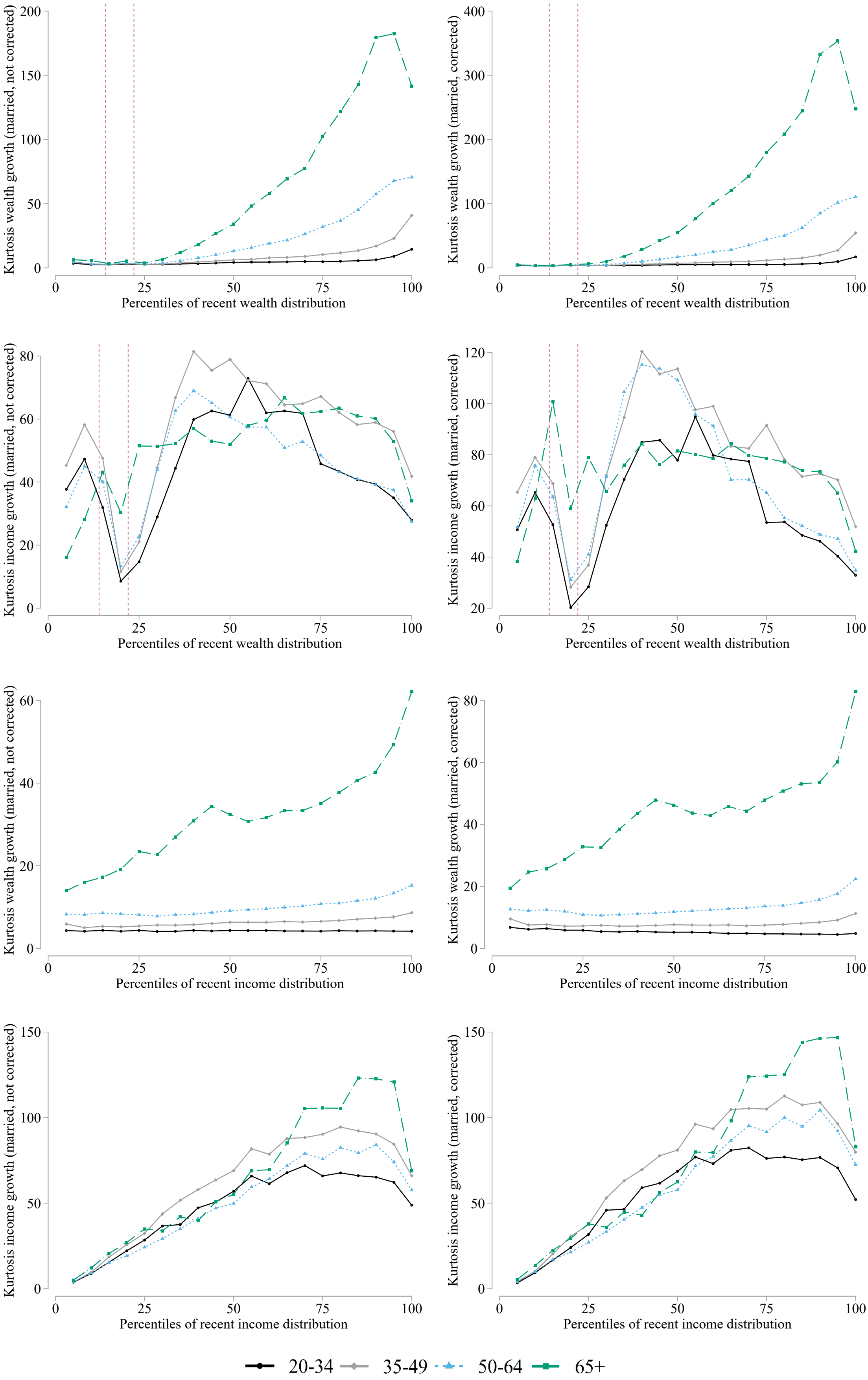

Figure B.4: Kurtosis wealth and income risk, married, without and with correction.

C Moment distributions for labor earnings and positive wealth of working-age population

The figures in this Section are analogous to Figures 6 to 9, but only consider positive wealth and labor earnings above 3,000 CHF. Left-hand side panels display patterns for singles and right-hand side panels for married households. All graphs correct for location in the recent income distribution when examining variation across the recent wealth distribution and for location in the recent wealth distribution when examining variation across the recent income distribution.

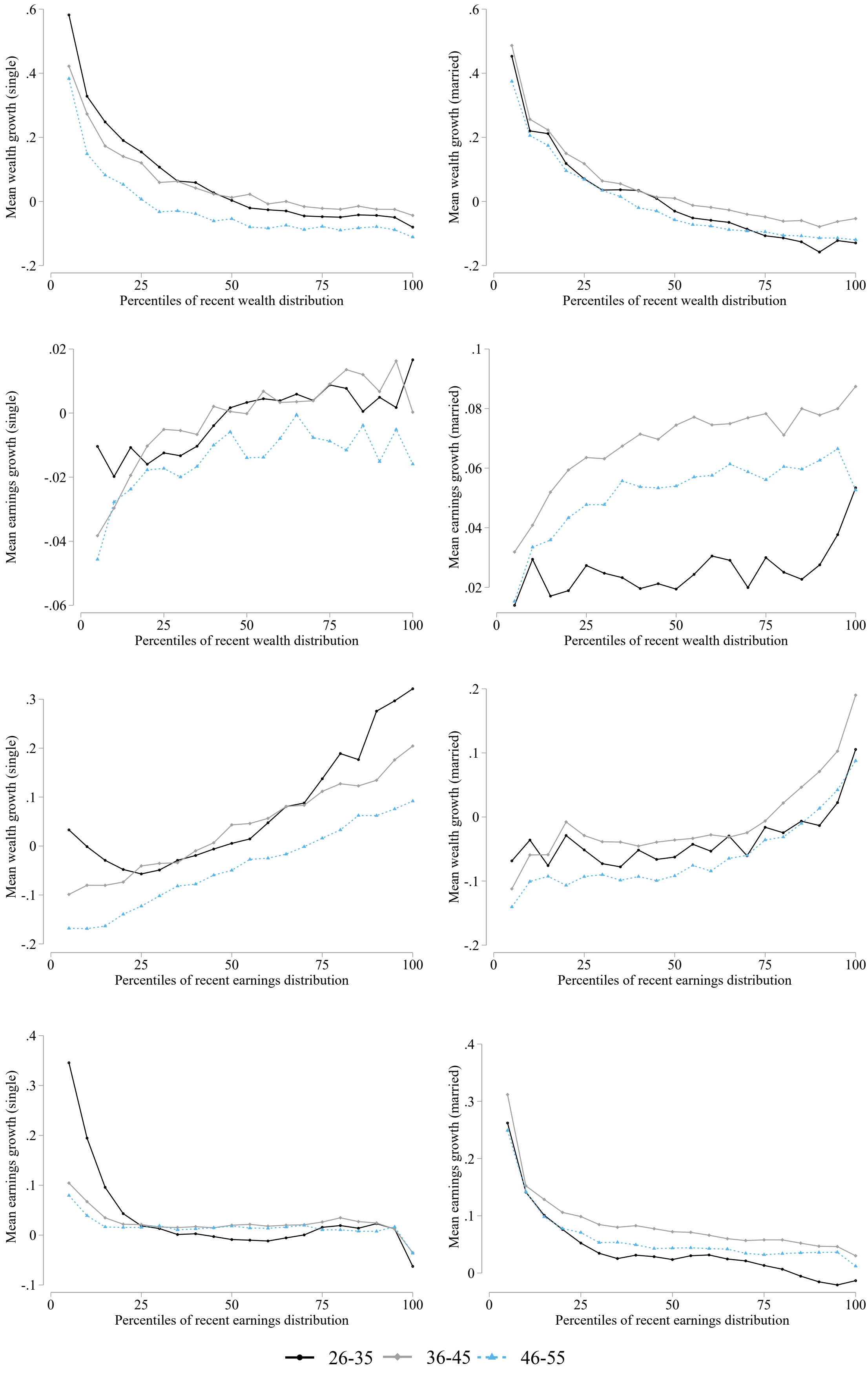

Figure C.1: Mean wealth and earnings growth for positive wealth and earnings.

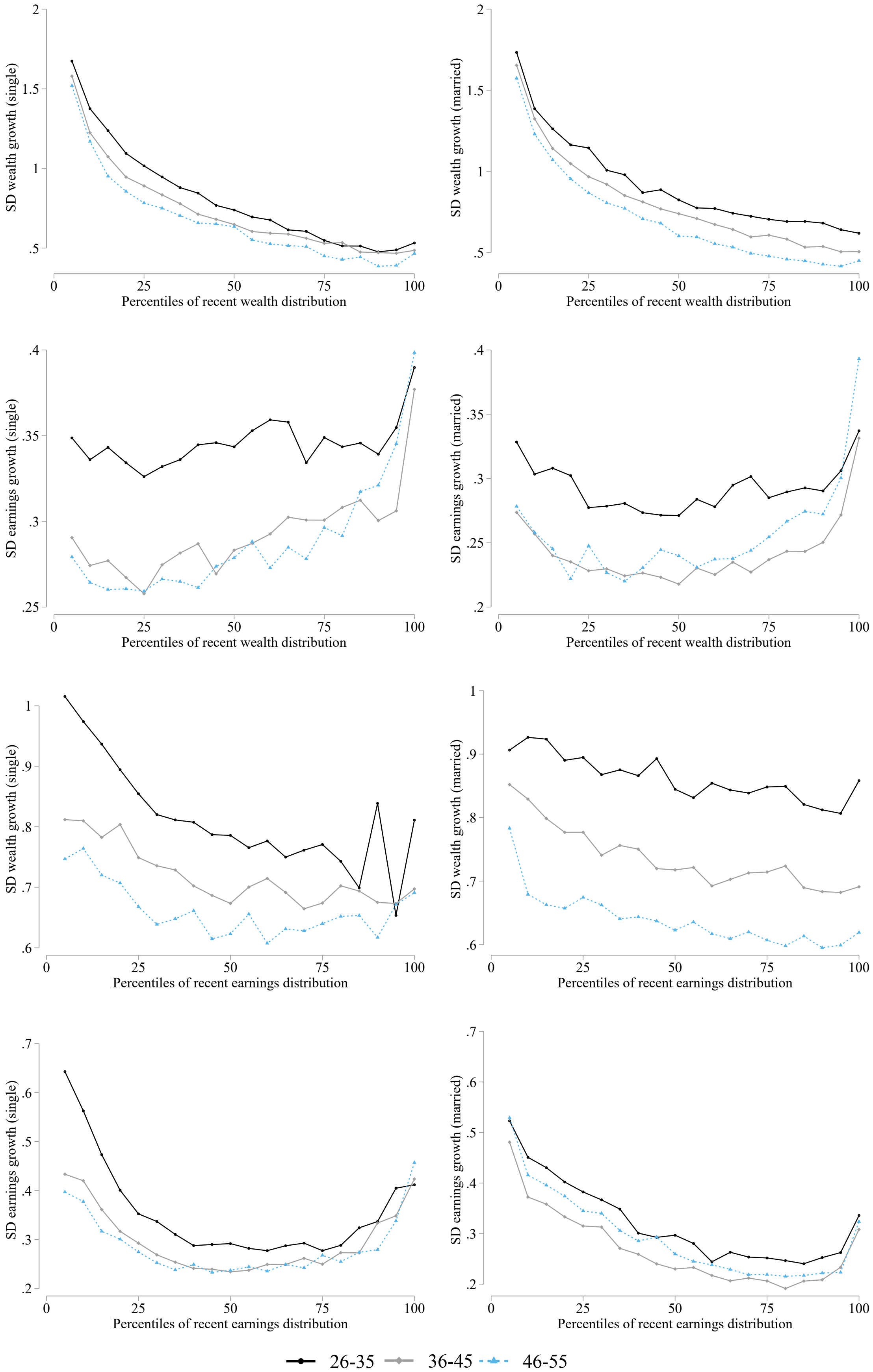

Figure C.2: S.D. wealth and earnings growth for positive wealth and earnings.

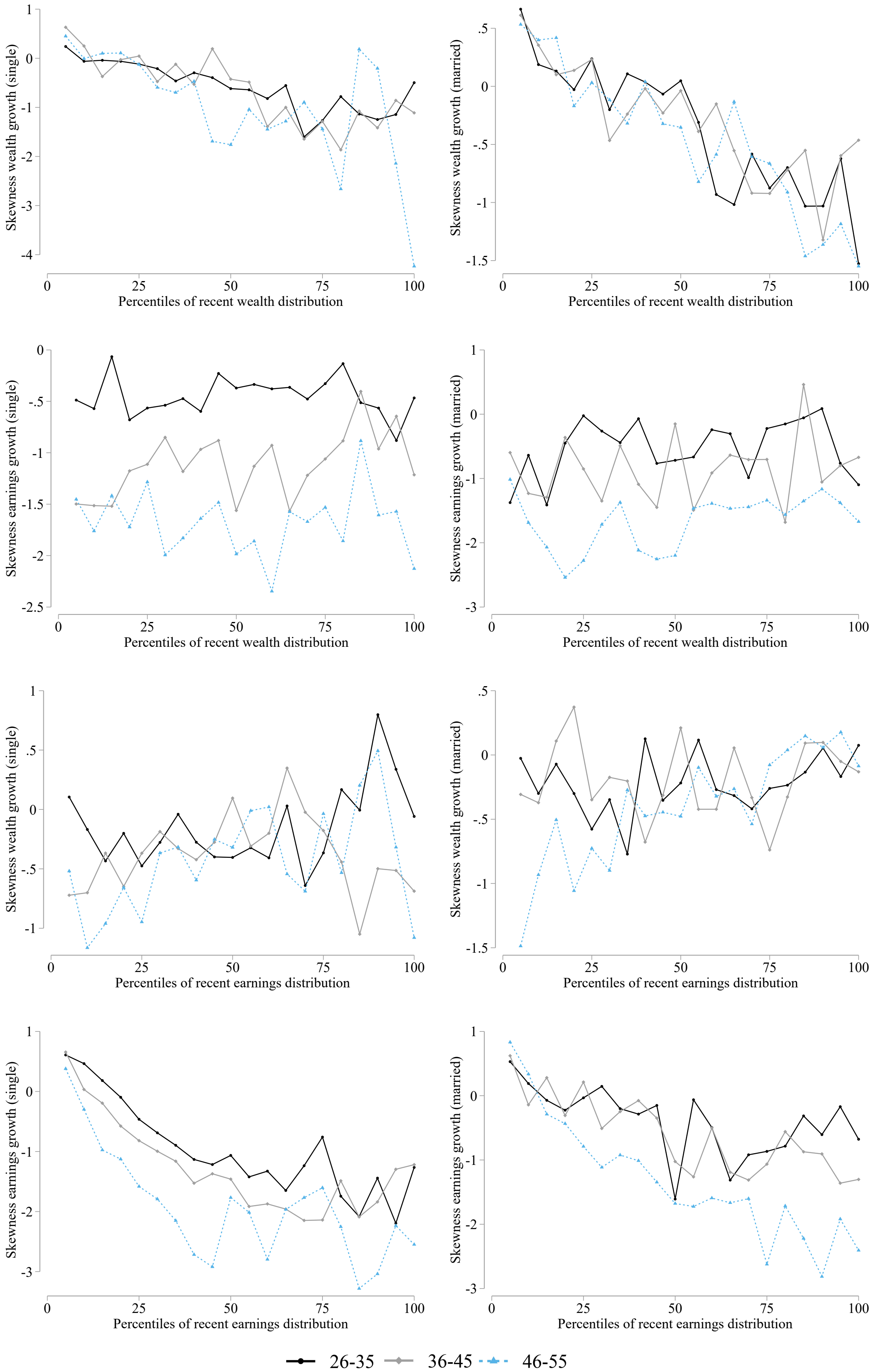

Figure C.3: Skewness wealth and earnings growth for positive wealth and earnings.

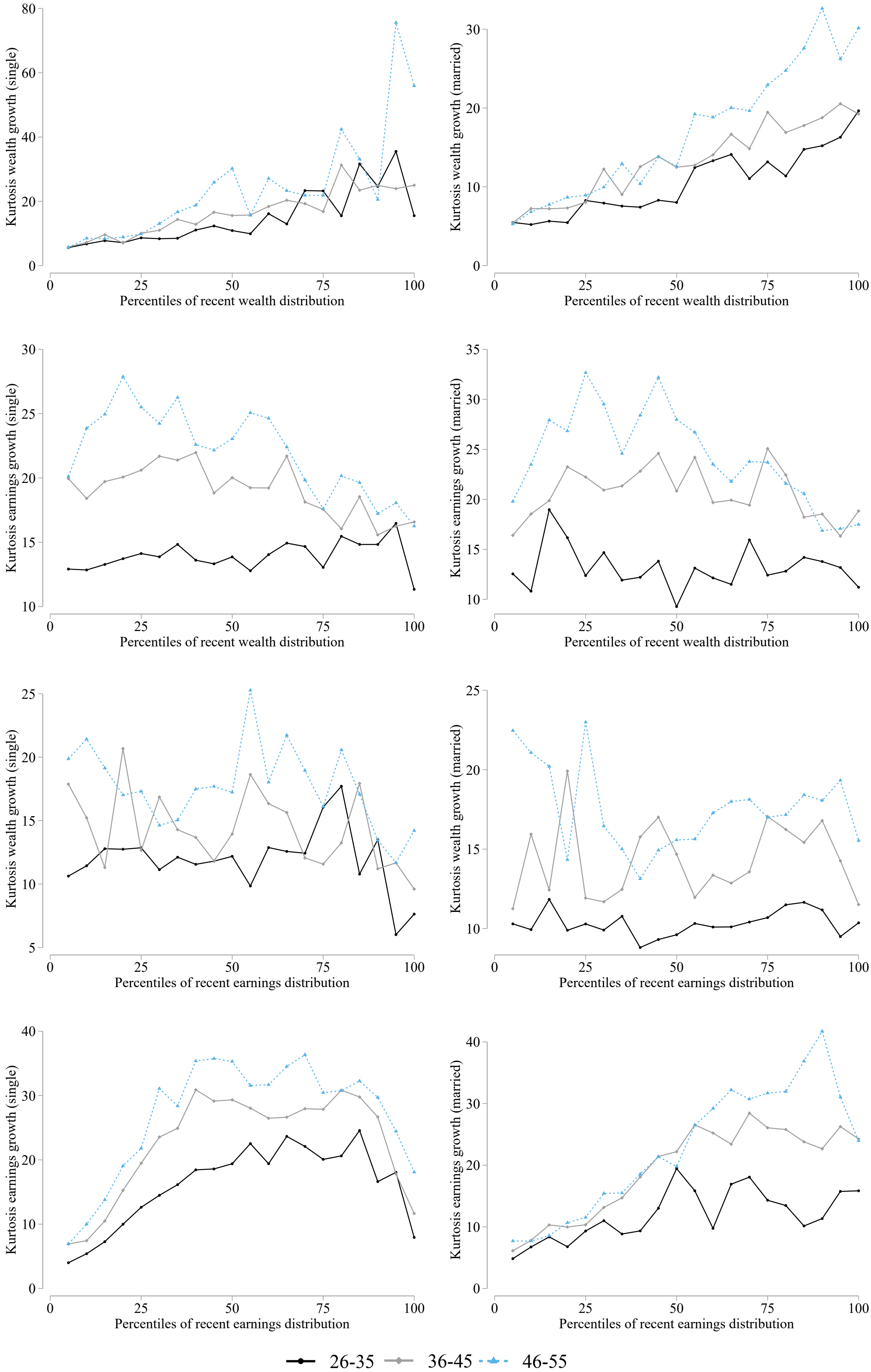

Figure C.4: Kurtosis wealth and earnings growth for positive wealth and earnings.

D Income growth

The tables in this section show regression output that is analogous to Tables 3 and 2, but with income growth as the dependent variable.

Table D.1: INCOME GROWTH PATTERNS BY RISK MOMENTS BY PERCENTILES RECENT INCOME IN INDIVIDUAL DATA.

	20-34		35-49		50-64		65+	
Mean wlth growth by inc	0.374	0.116	-0.046	-0.094	-0.132*	0.047	0.054	0.031
	(0.287)	(0.085)	(0.125)	(0.089)	(0.072)	(0.054)	(0.041)	(0.040)
S.D wlth risk by inc	-3.060***	-1.194***	-0.126	0.145	0.173	0.268***	0.352**	0.572***
	(0.470)	(0.346)	(0.198)	(0.148)	(0.110)	(0.069)	(0.168)	(0.143)
Skewn. wlth risk by inc	-0.066***	-0.062***	0.002	-0.007	-0.002	-0.014**	-0.028***	-0.022**
	(0.022)	(0.022)	(0.012)	(0.007)	(0.013)	(0.007)	(0.010)	(0.010)
Kurt. wlth risk by inc	-2.614***	-1.013***	-0.019	-0.015	-0.024	0.031	0.334***	0.286**
	(0.526)	(0.361)	(0.050)	(0.052)	(0.078)	(0.061)	(0.098)	(0.110)
S.D income risk by inc		1.197***		0.459***		0.738***		-0.404***
		(0.097)		(0.173)		(0.199)		(0.137)
Skewn. inc risk by inc		-0.141***		0.003		0.045**		0.033
		(0.050)		(0.023)		(0.023)		(0.031)
Kurt. inc risk by inc		0.897***		0.133		0.418***		-0.103*.
		(0.092)		(0.086)		(0.128)		(0.061)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	859,475		1,097,056		1,088,271		1,032,711	
R^2	0.0631	0.0769	0.0018	0.0070	0.0042	0.0170	0.0355	0.0369

Notes: Income growth as a function of income risk moments and wealth risk moments by recent income percentiles. Other controls include age and year dummies as well as a dummy indicator for marital status. Standard errors clustered at recent income percentiles. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.2: INCOME GROWTH PATTERNS BY RISK MOMENTS BY PERCENTILES RECENT WEALTH IN INDIVIDUAL DATA.

	20-34		35-49		50-64		65+	
	RW ≤ 0	> 0	≤ 0	> 0	≤ 0	> 0	≤ 0	> 0
Mean wlth growth by wlth	0.003	0.276***	0.018	0.147***	0.045	0.464***	0.071	0.259
	(0.031)	(0.073)	(0.038)	(0.033)	(0.031)	(0.089)	(0.088)	(0.193)
S.D wlth risk by wlth	-0.055	0.100**	0.119***	0.104***	0.000	-0.021	0.018	-0.106**
	(0.073)	(0.047)	(0.039)	(0.017)	(0.038)	(0.016)	(0.072)	(0.044)
Skewn. wlth risk by wlth	-0.113	-0.098	0.144	-0.081***	0.013	-0.039***	-0.050	-0.048**
	(0.094)	(0.075)	(0.113)	(0.016)	(0.094)	(0.013)	(0.566)	(0.023)
Kurt. wlth risk by wlth	0.349	-0.171***	-0.496	0.006	1.882*	-0.023*	13.726**	-0.054*
	(0.542)	(0.058)	(0.532)	(0.009)	(0.955)	(0.014)	(5.477)	(0.028)
S.D income risk by wlth	0.402***	0.225***	0.242***	-0.078***	0.215***	-0.010	0.512***	-0.479***
	(0.046)	(0.051)	(0.078)	(0.023)	(0.044)	(0.021)	(0.071)	(0.055)
Skewn. inc risk by wlth	0.119***	0.067***	0.084***	0.041***	0.076***	0.044***	0.109***	0.103***
	(0.027)	(0.011)	(0.021)	(0.004)	(0.018)	(0.005)	(0.033)	(0.023)
Kurt. inc risk by wlth	0.364***	0.147***	0.042	-0.019	0.186***	0.085***	0.552***	-0.188***
	(0.041)	(0.030)	(0.076)	(0.018)	(0.041)	(0.016)	(0.112)	(0.031)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	163,412	696,063	279,436	817,620	198,013	890,258	60,115	972,596
R^2	0.0170	0.0073	0.0021	0.0018	0.0069	0.0015	0.0244	0.0351

Notes: Income growth as a function of income risk moments and wealth risk moments by recent wealth percentiles. Other controls include age and year dummies as well as a dummy indicator for marital status. Standard errors clustered at recent wealth percentiles. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.