Online Appendix

This document contains supplementary material for LINK.

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OA-1 Alternative definitions of Kelley's skewness

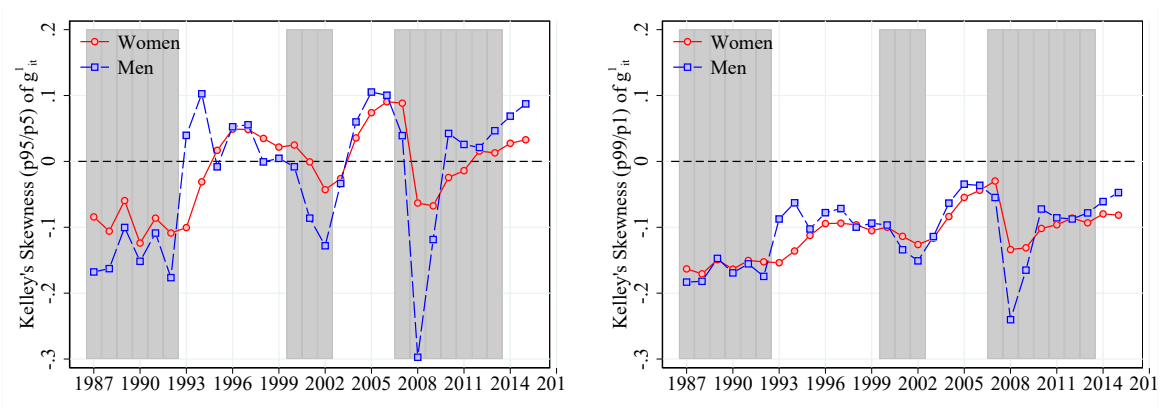
We check how different definitions of Kelley's skewness impact the results. Instead of considering the standard p90/p10 spread, we look at p95/p5 and p99/p1 for both earnings and disposable income:

$$\text{p95/p5} \ : \ \frac{(\text{p95} - \text{p50}) \ - \ (\text{p50} - \text{p5})}{\text{p95} - \text{p5}}$$

$$\text{p99/p1} \ : \ \frac{(\text{p99} - \text{p50}) \ - \ (\text{p50} - \text{p1})}{\text{p99} - \text{p1}}$$

Figure 28: Alternative Kelley's skewness of 1-Year Residual Log Earnings Growth

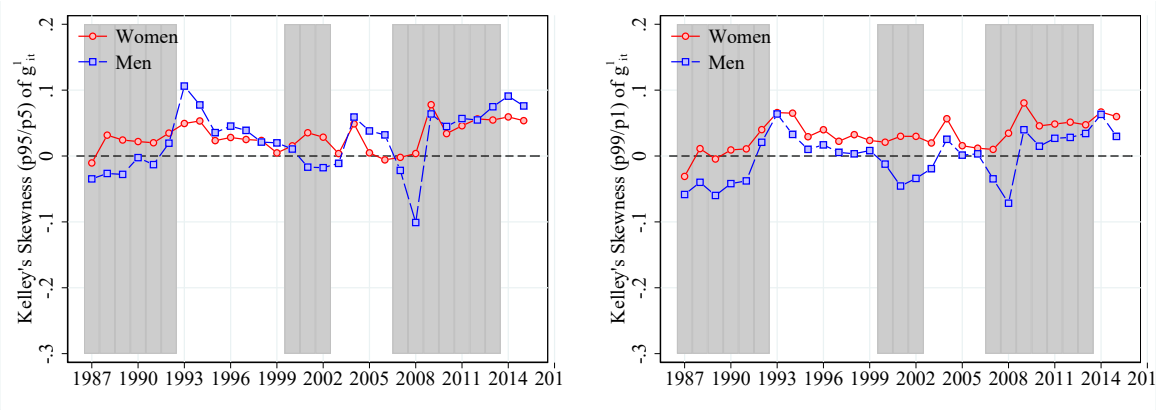
a *Kelley's skewness (p95/p5)* **b** *Kelley's skewness (p99/p1)*



Notes; Using residual one-year earnings changes, the figure plots the following variables against time: (a) Kelley's skewness calculated as $\frac{(p95-p50) \ - \ (p50-p5)}{p95-p5}$, (b) Kelley's skewness calculated as $\frac{(p99-p50) \ - \ (p50-p1)}{p99-p1}$. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

Figure 29: Alternative Kelley's skewness of 1-Year Residual Log Disposable Income Growth

a *Kelley's skewness (p95/p5)* **b** *Kelley's skewness (p99/p1)*

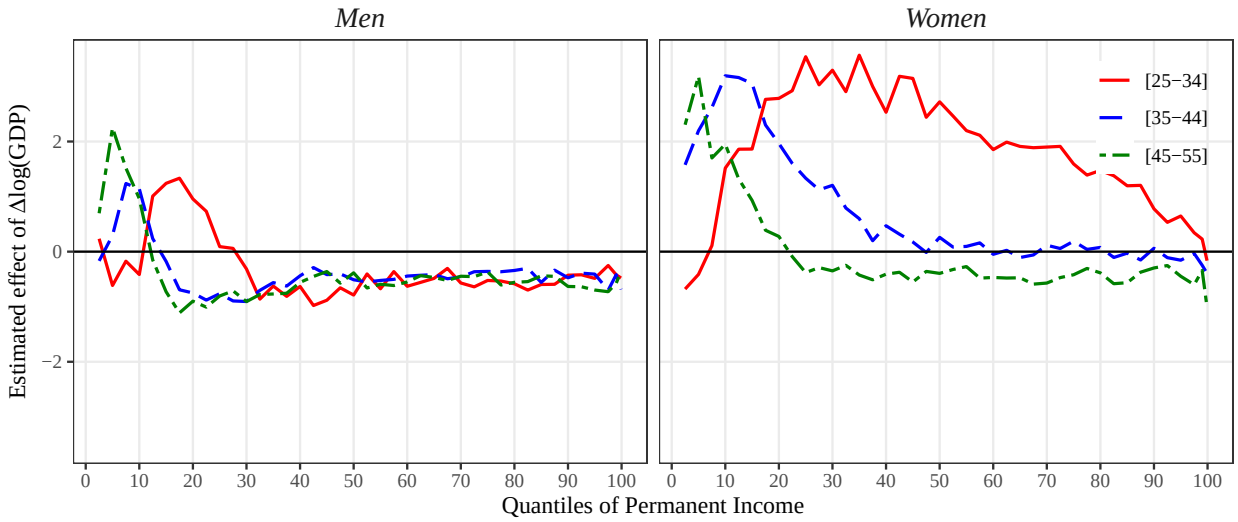


Notes; Using residual one-year disposable income changes, the figure plots the following variables against time: (a) Kelley's skewness calculated as $\frac{(p95-p50)\ -\ (p50-p5)}{p95-p5}$, (b) Kelley's skewness calculated as $\frac{(p99-p50)\ -\ (p50-p1)}{p99-p1}$. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

OA-2 Regression Results by Permanent Income Percentile

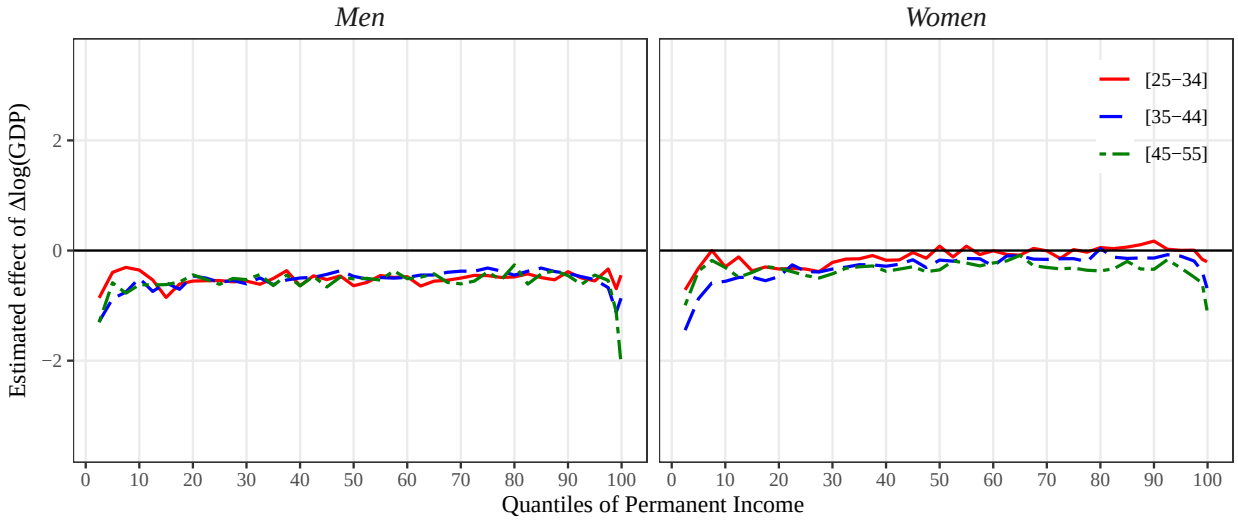
OA-2.1 How Dispersion of Residual Log Income Growth Correlates with log growth rate of GDP by Permanent Income Rank

Figure 30: Dispersion, Residual Log Earnings Growth



Notes: The figure presents estimates of the slope parameter from a regression of the dispersion of residual log earnings growth on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of earnings for men and women and by age groups. Dispersion is calculated as p90-p10.

Figure 31: Dispersion, Residual Log Disposable Income Growth



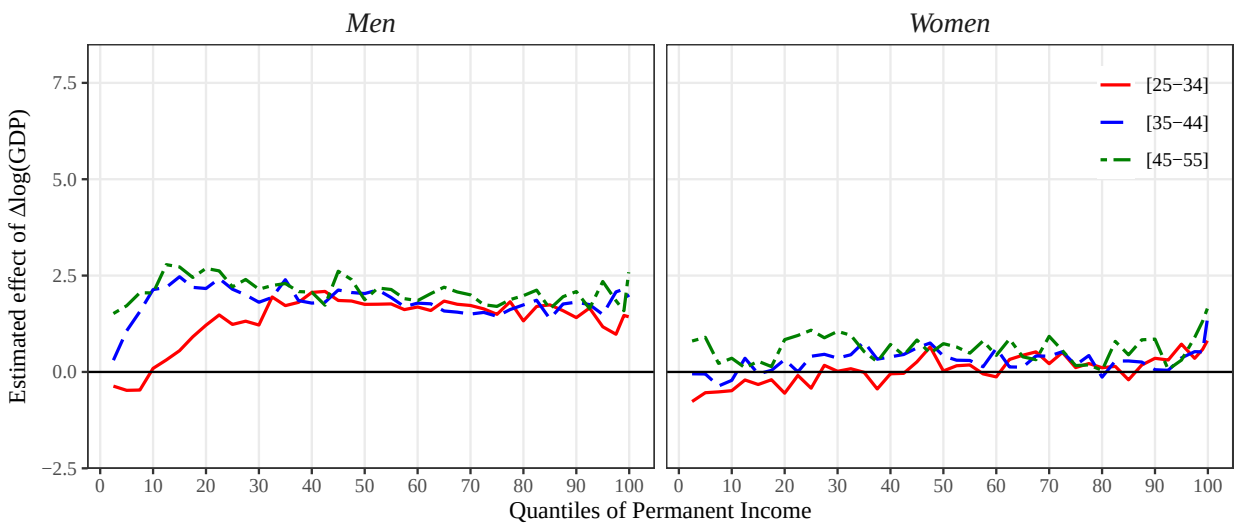
Notes: The figure presents estimates of the slope parameter from a regression of the dispersion of residual log disposable income growth on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of disposable income for men and women and by age groups. Dispersion is calculated as p90-p10.

OA-2.2 How Skewness of Residual Log Income Growth Correlates with Log Growth Rate of GDP by Permanent Income Rank

Figure 32: Skewness, Residual Log Earnings Growth Rate

Notes: The figure presents estimates of the slope parameter from a regression of skewness of the distribution of residual log earnings growth rates on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of earnings for men and women and by age groups. Kelley's skewness is calculated as $\frac{(p90-p50)-(p50-p10)}{p90-p10}$.

Figure 33: Skewness, Residual Log Disposable Income Growth Rate



Notes: The figure presents estimates of the slope parameter from a regression of skewness of the distribution of residual log disposable income growth rates on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of disposable income for men and women and by age groups. Kelley's skewness is calculated as $\frac{(p90-p50)-(p50-p10)}{p90-p10}$.

OA-2.3 How Kurtosis of Residual Log Income Growth Correlates with Log Growth Rate of GDP by Permanent Income Rank

Figure 34: Kurtosis, Residual Log Earnings Growth Rate

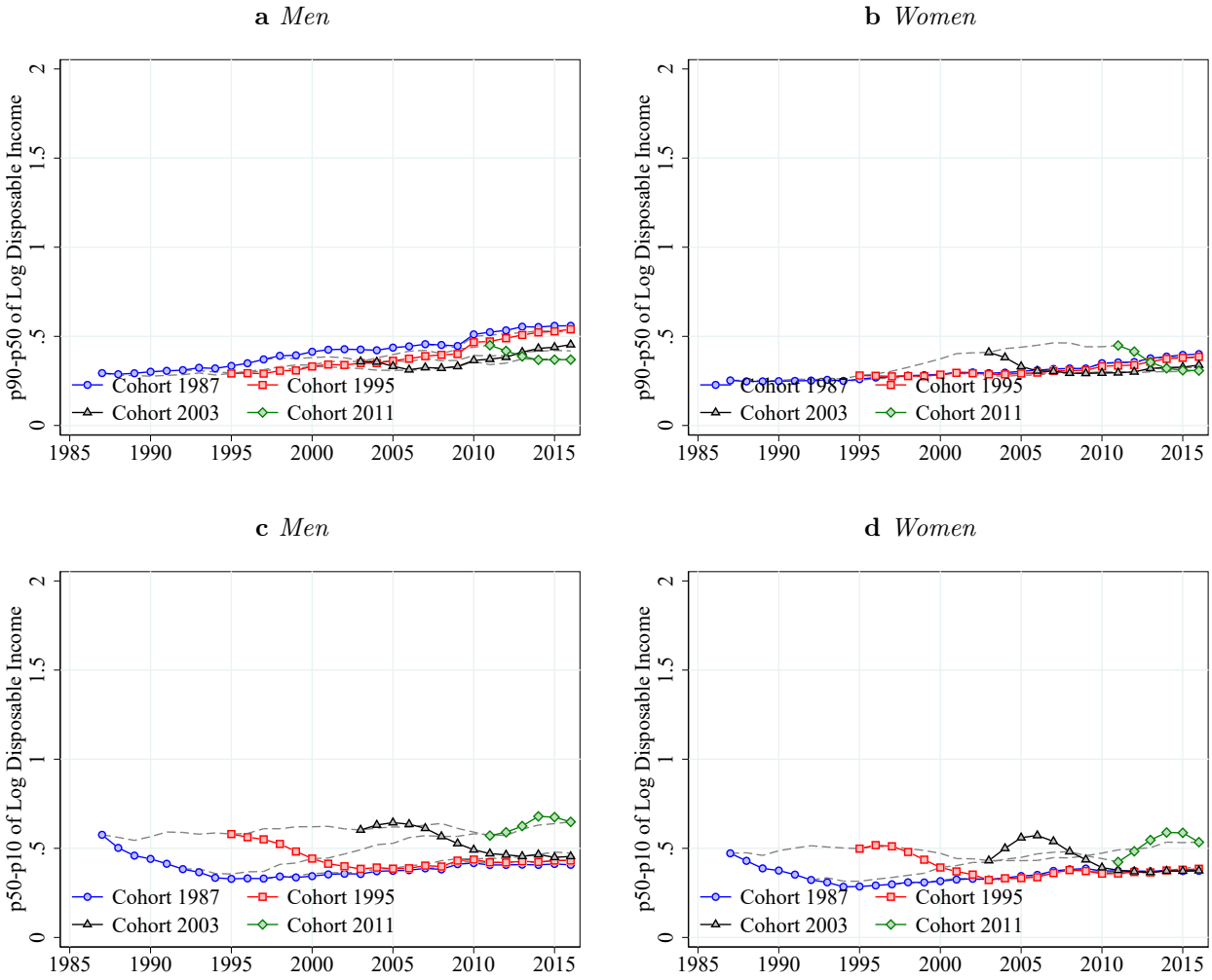
Notes: The figure presents estimates of the slope parameter from a regression of kurtosis of the distribution of residual log earnings growth rates on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of earnings for men and women and by age groups. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$.

Figure 35: Kurtosis, Residual Log Disposable Income Growth Rate

Notes: The figure presents estimates of the slope parameter from a regression of kurtosis of the distribution of residual log disposable income growth rates on log growth rate of GDP and a linear time trend, cf. equation (1), estimated by selected percentiles in the distribution of disposable income for men and women and by age groups. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$.

OA-3 Life-cycle Inequality Over Cohorts, Disposable Income

Figure 36: Life-Cycle Inequality Over Cohorts, Disposable Income



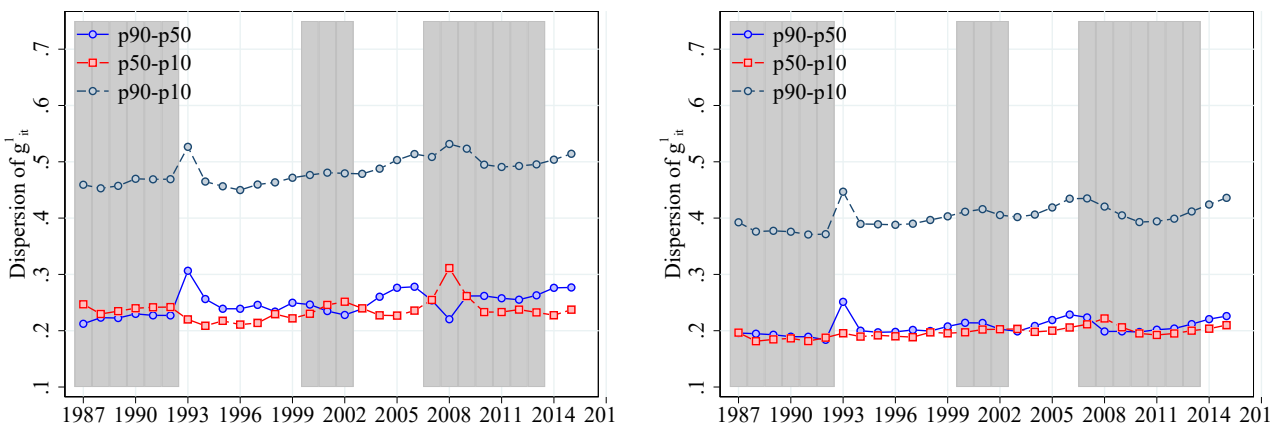
Notes: The figure plots life-cycle profiles of dispersion of raw log disposable income. CS sample. The following variables are plotted against time over the life cycle for four selected cohorts (indexed by age 25): (a) Men: p50-p10, (b) Women: p50-p10, (c) Men: p90-p50, (d) Women: p90-p50.

OA-4 Results Based on Gross Income

Note: In 1994, multiple transfers changed status from tax-exempt income to taxable income, with a subsequent rise in level. This was done to ease comparability between earned income and transfers. In the figures below, this shows up as a spike in 1993 (since g_{it}^1 is forward looking).

Figure 37: Dispersion of Distribution of 1-Year Residual Log Gross Income Growth Rates

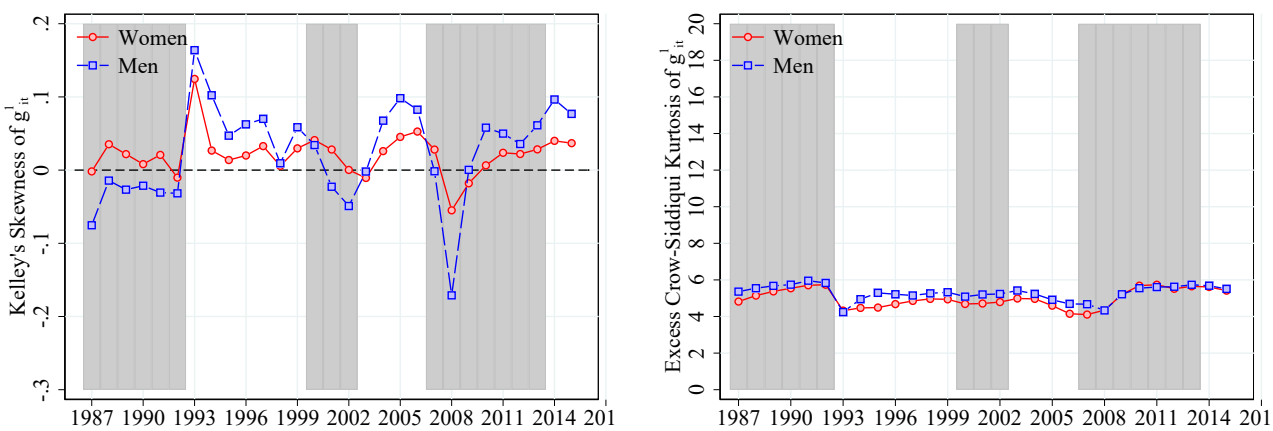
a *Men* **b** *Women*



Notes: Dispersion of distribution of 1-year residual log gross income growth rates, $g_{it}^1 = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: p90-p50 (blue), p50-p10 (red), and p90-p10 (grey) for men in panel a, and for women in panel b. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

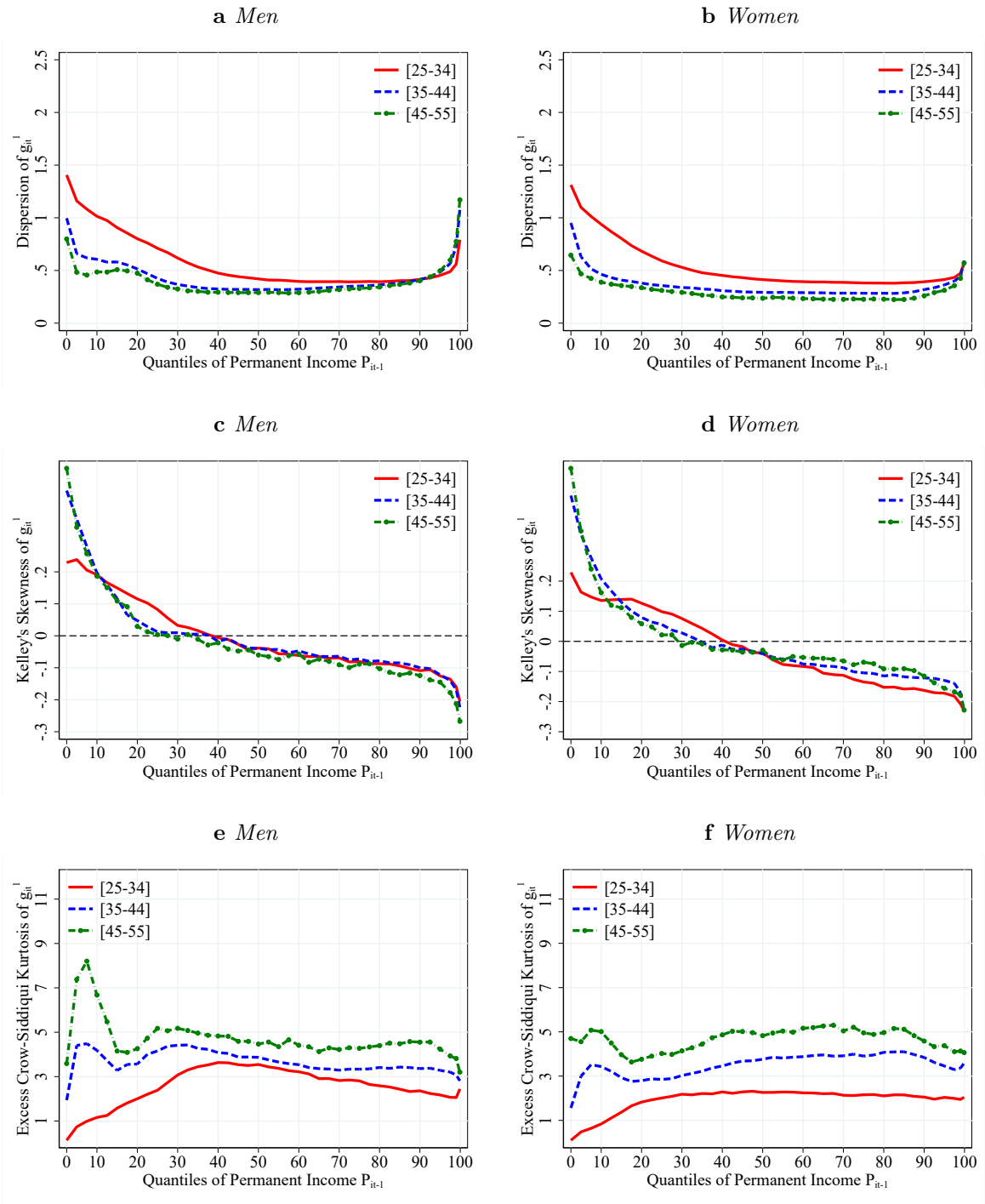
Figure 38: Skewness and Kurtosis of Distribution of 1-Year Residual Log Gross Income Growth Rates

a *Kelley's skewness* **b** *Excess Crow-Siddiqui kurtosis*



Notes: Skewness and kurtosis of distribution of 1-year residual log gross income growth rates, $g_{it}^1 = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: (a) Men and Women: Kelley's skewness calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$, (b) Men and Women: Excess Crow-Siddiqui kurtosis calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$ where the first term is the Crow-Siddiqui measure of kurtosis and 2.91, corresponds to the value of this measure for a normal distribution. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

Figure 39: Dispersion, Skewness and Kurtosis of Distribution of 1-Year Residual Log Gross Income Growth Rates

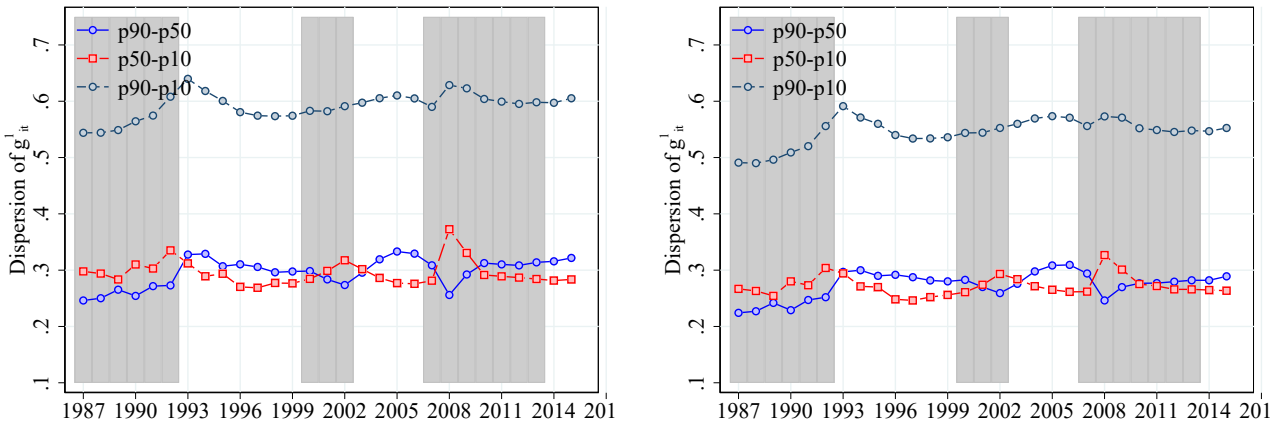


Notes: Dispersion, skewness, and kurtosis of 1-year residual log gross income growth, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. H sample in the period 1997-2016. Permanent Income is based on three years of income, t-2, t-1, t. The figure plots the following variables against permanent income quantile groups for the 3 age groups (denoted by color): (a) Men: p90-p10, (b) Women: p90-p10, (c) Men: Kelley's skewness, (d) Women: Kelley's skewness, (e) Men: Excess Crow-Siddiqui kurtosis, (f) Women: Excess Crow-Siddiqui kurtosis. Kelley's skewness is calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$, where the first term is the Crow-Siddiqui measure of kurtosis, and 2.91 corresponds to the value of this measure for a normal distribution.

OA-5 Results Based on Household Earnings

Figure 40: Dispersion of Distribution of 1-Year Residual Log Earnings Growth Rates, Households

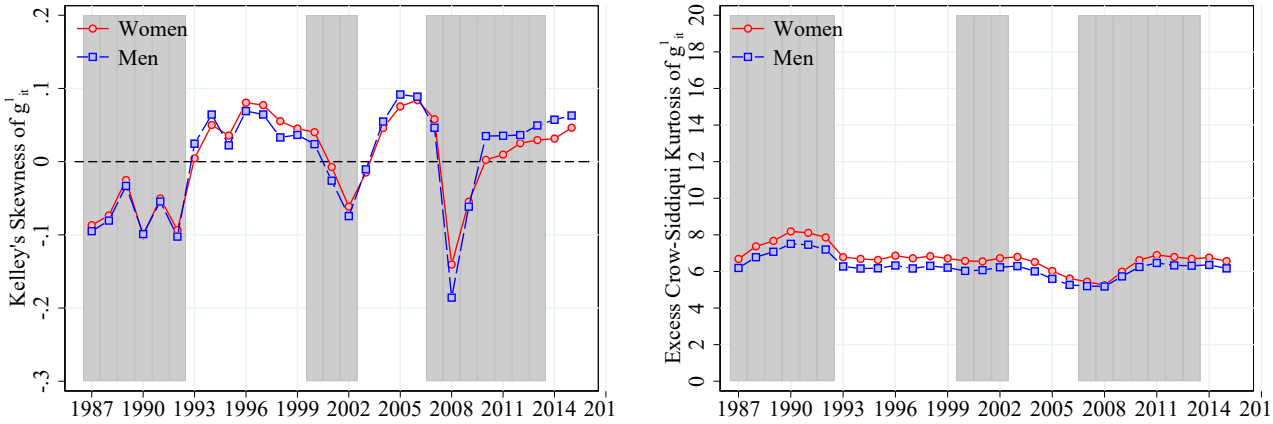
a *Men* **b** *Women*



Notes: Dispersion of distribution of 1-year residual household log earnings growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: p90-p50 (blue), p50-p10 (red), and p90-p10 (grey) for men in panel a, and for women in panel b. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

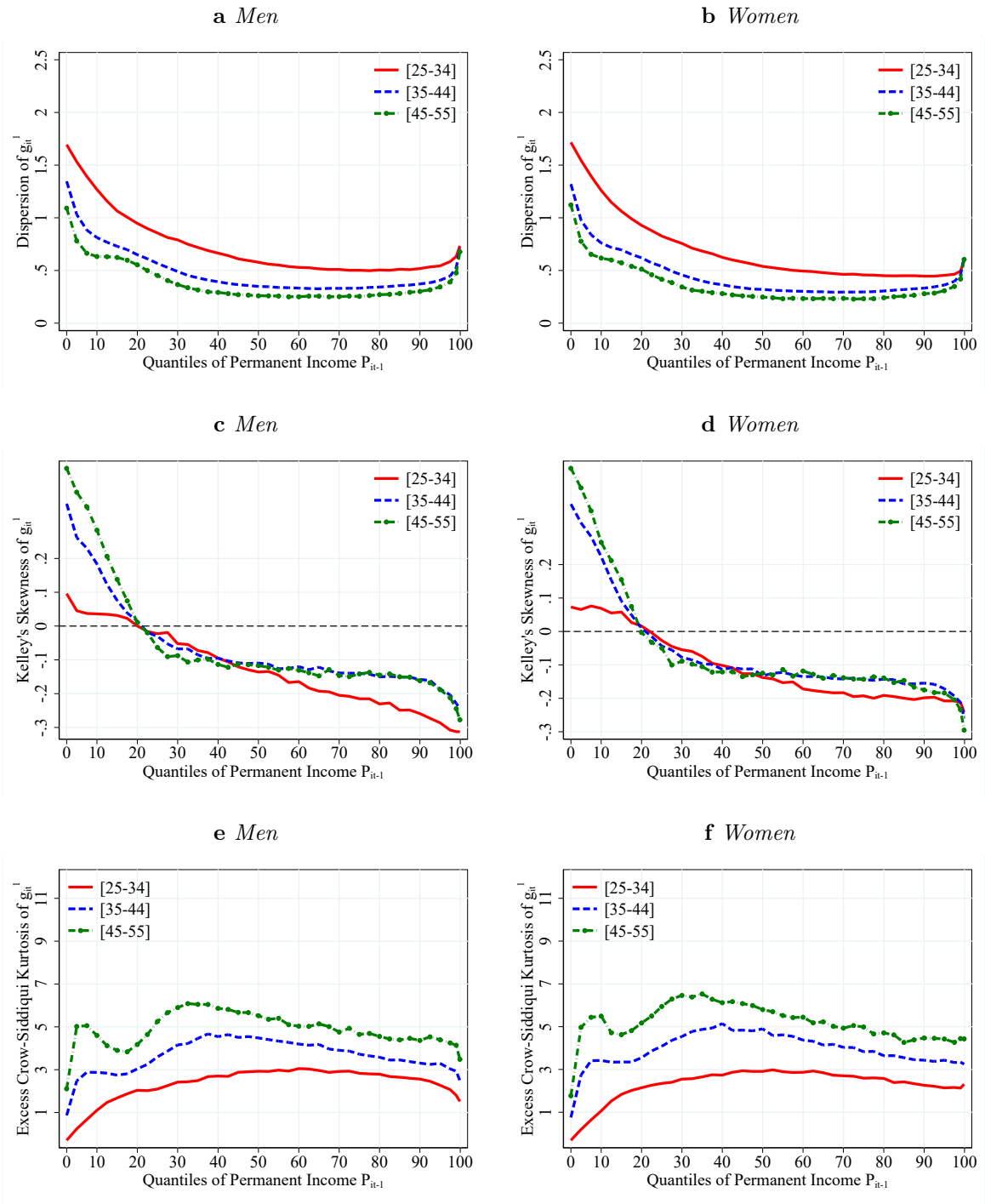
Figure 41: Skewness and Kurtosis of Distribution of 1-Year Residual Log Earnings Growth Rates, Households

a *Kelley's skewness* **b** *Excess Crow-Siddiqui kurtosis*



Notes: Skewness and kurtosis of distribution of 1-year residual household log earnings growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: (a) Men and Women: Kelley's skewness calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$, (b) Men and Women: Excess Crow-Siddiqui kurtosis calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$ where the first term is the Crow-Siddiqui measure of kurtosis and 2.91, corresponds to the value of this measure for a normal distribution. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

Figure 42: Dispersion, Skewness and Kurtosis of the Distribution of 1-Year Residual Log Earnings Growth Rates, Households

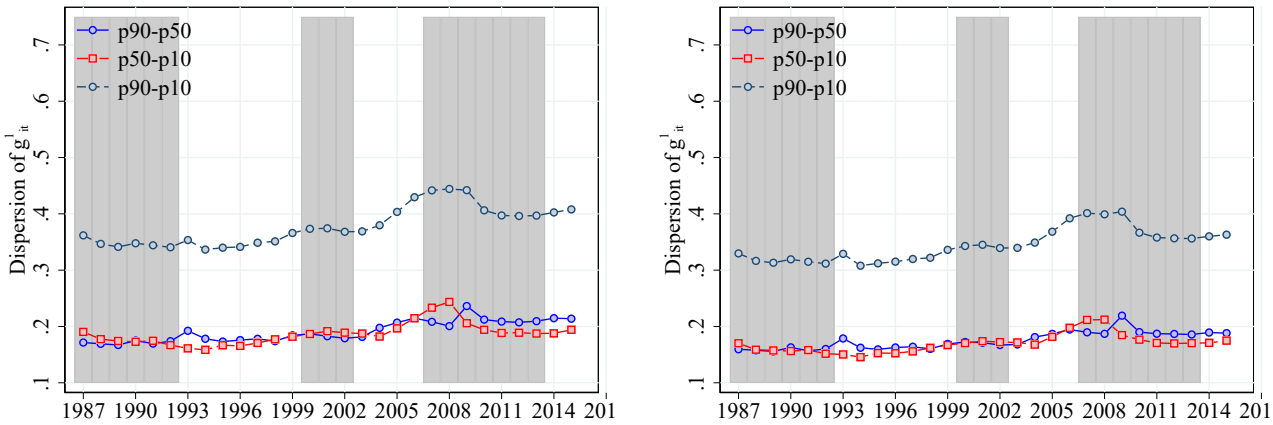


Notes: Dispersion, skewness, and kurtosis of distribution of 1-year residual household log earnings growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. H sample in the period 1997-2016. Permanent Income is based on three years of income, t-2, t-1, t. The figure plots the following variables against permanent income quantile groups for the 3 age groups (denoted by color): (a) Men: p90-p10, (b) Women: p90-p10, (c) Men: Kelley's skewness, (d) Women: Kelley's skewness, (e) Men: Excess Crow-Siddiqui kurtosis, (f) Women: Excess Crow-Siddiqui kurtosis. Kelley's skewness is calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$, where the first term is the Crow-Siddiqui measure of kurtosis, and 2.91 corresponds to the value of this measure for a normal distribution.

OA-6 Results Based on Household Disposable Income

Figure 43: Dispersion of the Distribution of 1-Year Residual Log Disposable Income Growth Rates, Households

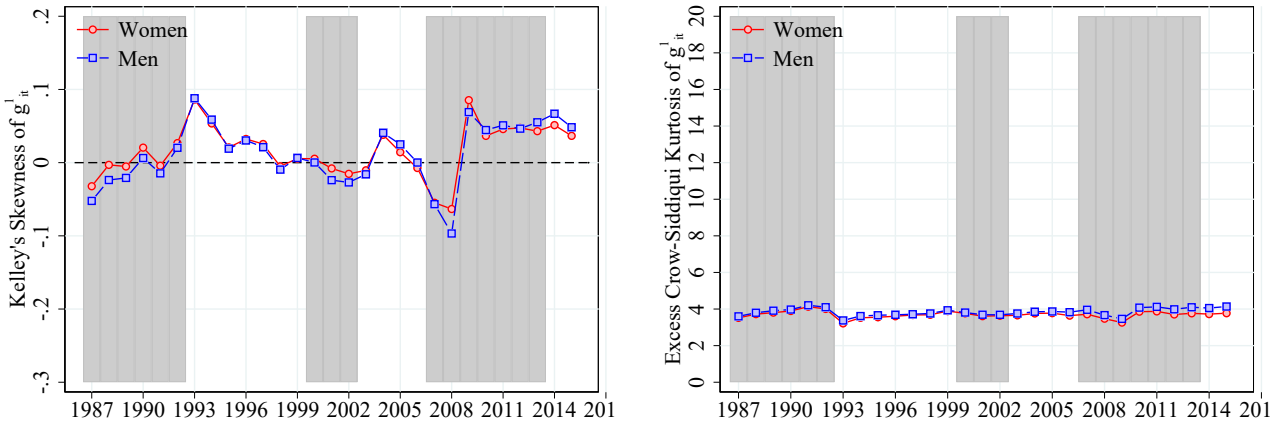
a *Men* **b** *Women*



Notes: Dispersion of distribution of 1-year residual household log disposable growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: p90-p50 (blue), p50-p10 (red), and p90-p10 (grey) for men in panel a, and for women in panel b. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

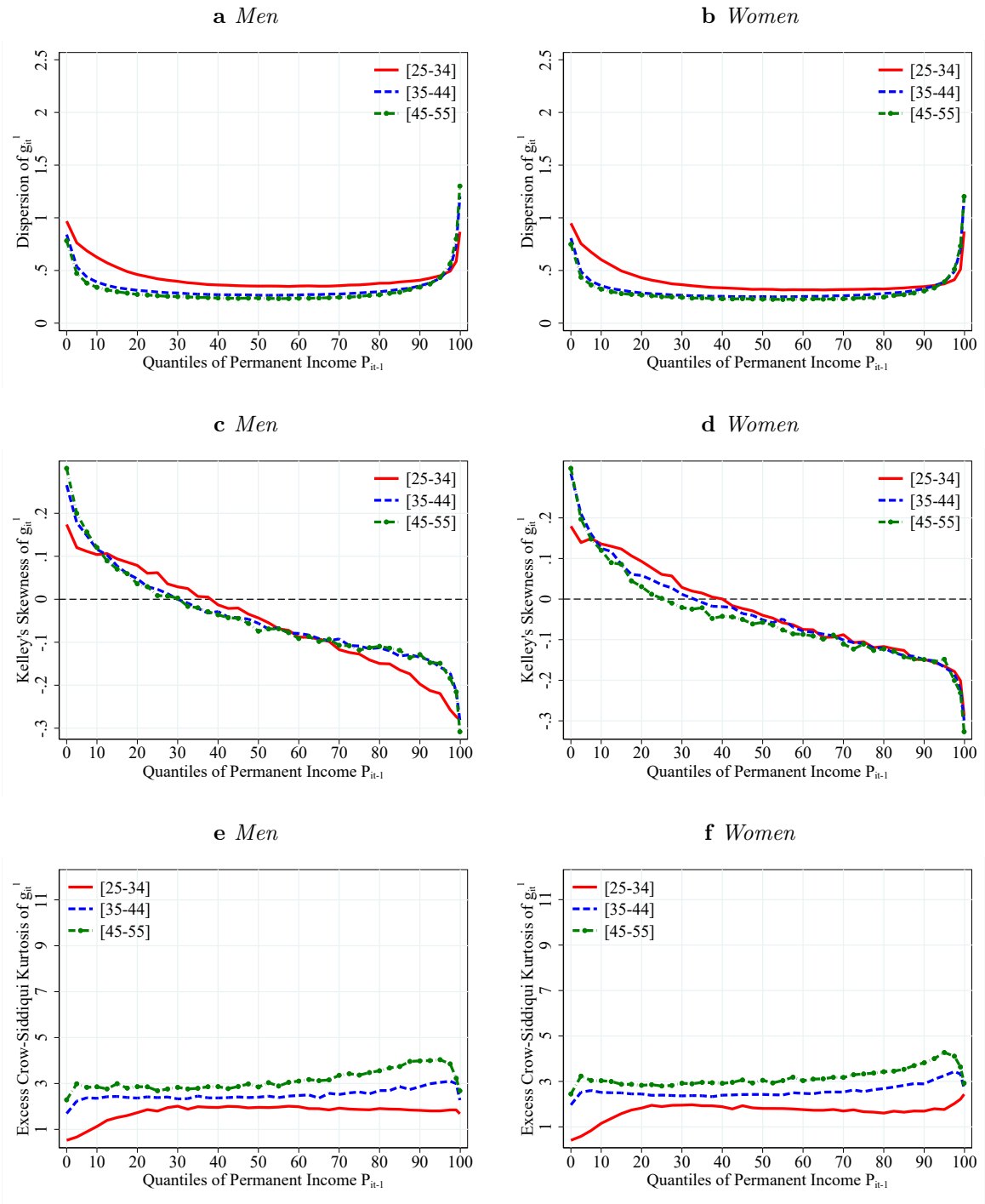
Figure 44: Skewness and Kurtosis of the Distribution of 1-Year Residual Log Disposable Income Growth Rates, Households

a *Kelley's skewness* **b** *Excess Crow-Siddiqui Kurtosis*



Notes: Skewness and kurtosis of distribution of 1-year residual household log disposable growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. LS sample. The figure plots the following variables against time: (a) Men and Women: Kelley's skewness calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$, (b) Men and Women: Excess Crow-Siddiqui kurtosis calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$ where the first term is the Crow-Siddiqui measure of kurtosis and 2.91, corresponds to the value of this measure for a normal distribution. The shaded areas indicate recessionary periods with GDP growth below 2 percent.

Figure 45: Dispersion, Skewness and Kurtosis of the Distribution of 1-Year Residual Log Disposable Income Growth Rates, Households

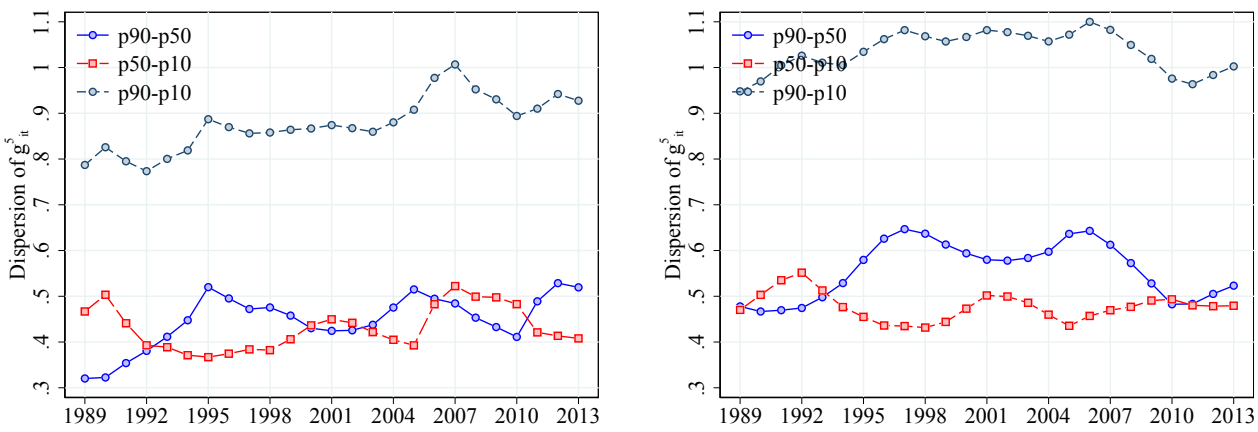


Notes: Dispersion, skewness, and kurtosis of distribution of 1-year residual household log disposable growth rates, $g^1_{it} = \varepsilon_{it+1} - \varepsilon_{it}$. H sample in the period 1997-2016. Permanent Income is based on three years of income, t-2, t-1, t. The figure plots the following variables against permanent income quantile groups for the 3 age groups (denoted by color): (a) Men: p90-p10, (b) Women: p90-p10, (c) Men: Kelley's skewness, (d) Women: Kelley's skewness, (e) Men: Excess Crow-Siddiqui kurtosis, (f) Women: Excess Crow-Siddiqui kurtosis. Kelley's skewness is calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$, where the first term is the Crow-Siddiqui measure of kurtosis, and 2.91 corresponds to the value of this measure for a normal distribution.

OA-7 Results Based on Earnings, 5-Year Growth Rates

Figure 46: Dispersion of the Distribution of 5-Year Residual Log Earnings Growth Rates

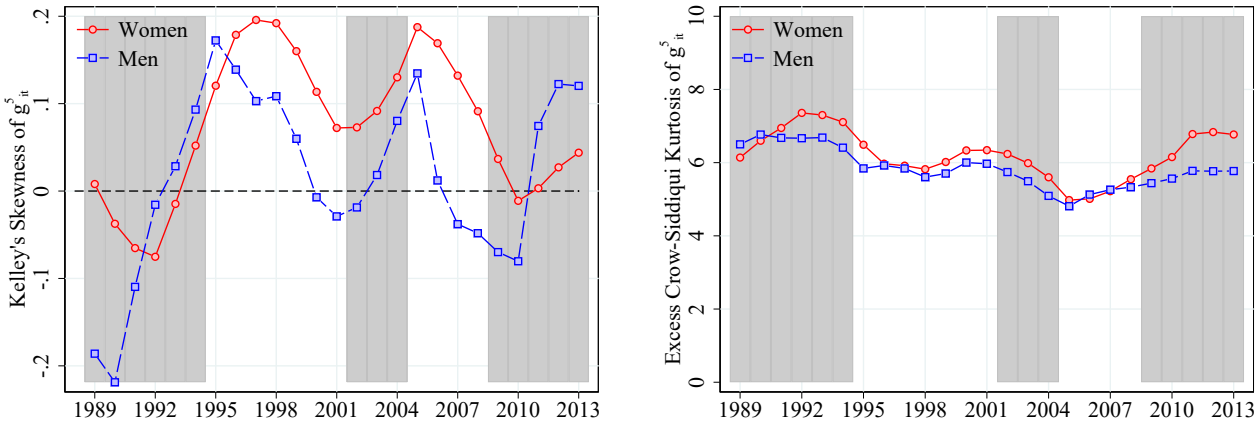
a *Men* **b** *Women*



Notes: Dispersion of distribution of 5-year residual log earnings growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. LS sample. The figure plots the following variables against time: p90-p50 (blue), p50-p10 (red), and p90-p10 (grey) for men in panel a, and for women in panel b.

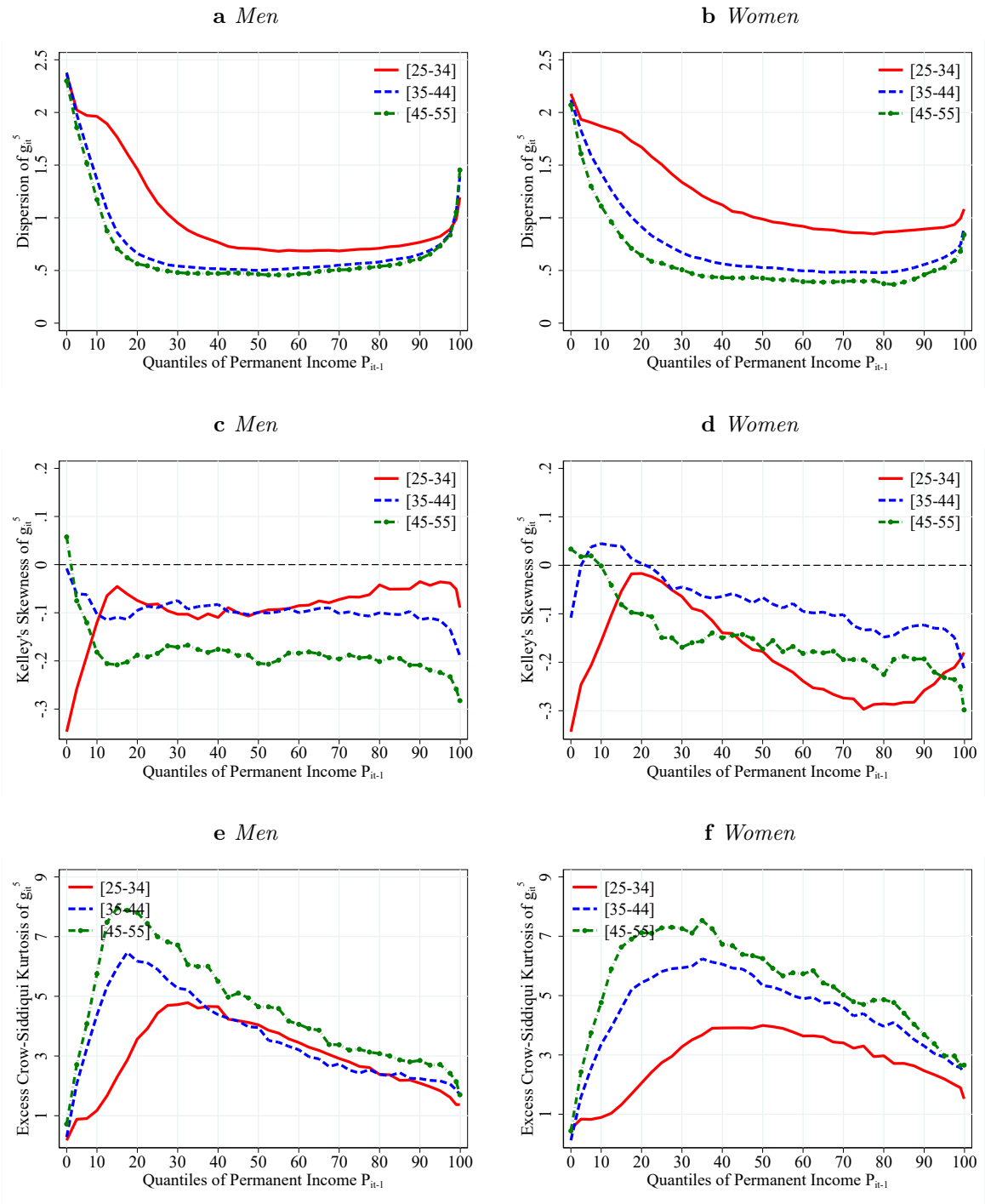
Figure 47: Skewness and Kurtosis of the Distribution of 5-Year Residual Log Earnings Growth Rates

a *Kelley's skewness* **b** *Excess Crow-Siddiqui kurtosis*



Notes: Skewness and kurtosis of distribution of 5-year residual log earnings growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. LS sample. The figure plots the following variables against time: (a) Men and Women: Kelley's skewness calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$, (b) Men and Women: Excess Crow-Siddiqui kurtosis calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$ where the first term is the Crow-Siddiqui measure of kurtosis and 2.91, corresponds to the value of this measure for a normal distribution.

Figure 48: Dispersion, Skewness and Kurtosis of the Distribution of 5-Year Residual Log Earnings Growth Rates

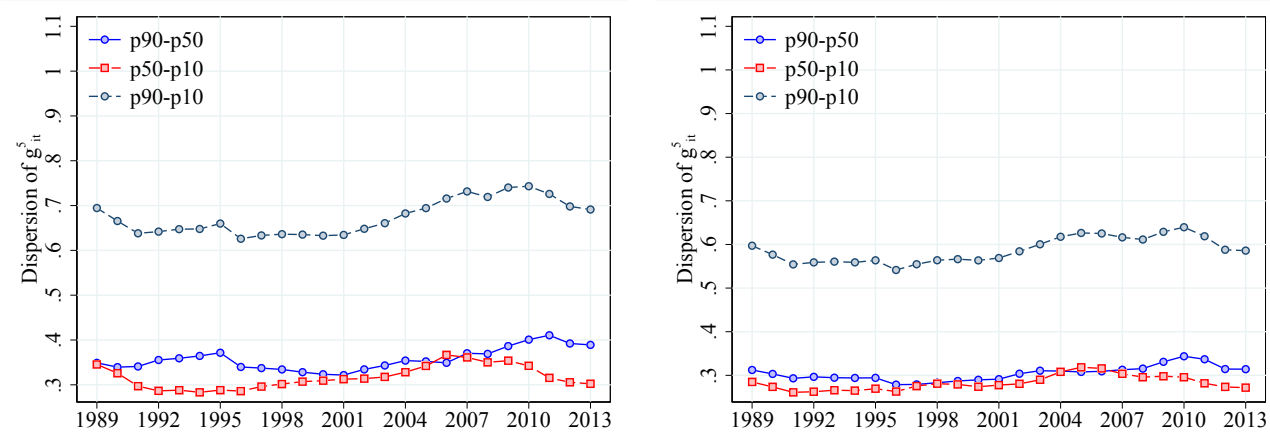


Notes: Dispersion, skewness, and kurtosis of distribution of 5-year residual log earnings growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. H sample in the period 1997-2016. Permanent Income is based on three years of income, t-4, t-3, $t-2$. The figure plots the following variables against permanent income quantile groups for the 3 age groups (denoted by color): (a) Men: p90-p10, (b) Women: p90-p10, (c) Men: Kelley's skewness, (d) Women: Kelley's skewness, (e) Men: Excess Crow-Siddiqui kurtosis, (f) Women: Excess Crow-Siddiqui kurtosis. Kelley's skewness is calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$, where the first term is the Crow-Siddiqui measure of kurtosis, and 2.91 corresponds to the value of this measure for a normal distribution.

OA-8 Results Based on Disposable Income, 5-Year Growth Rates

Figure 49: Dispersion of the Distribution of 5-Year Residual Log Disposable Income Growth Rates

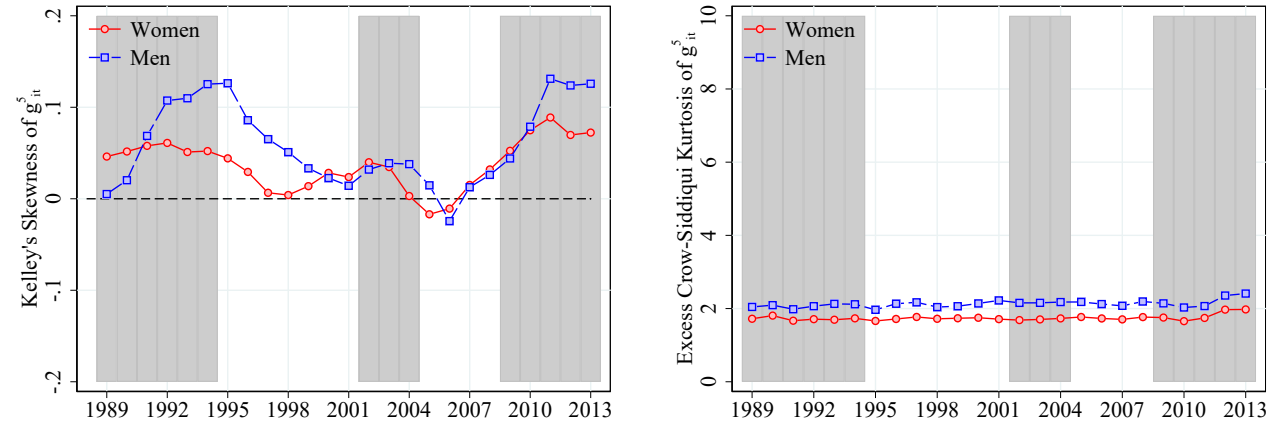
a *Men* **b** *Women*



Notes: Dispersion of distribution of 5-year residual log disposable income growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. LS sample. The figure plots the following variables against time: p90-p50 (blue), p50-p10 (red), and p90-p10 (grey) for men in panel a, and for women in panel b.

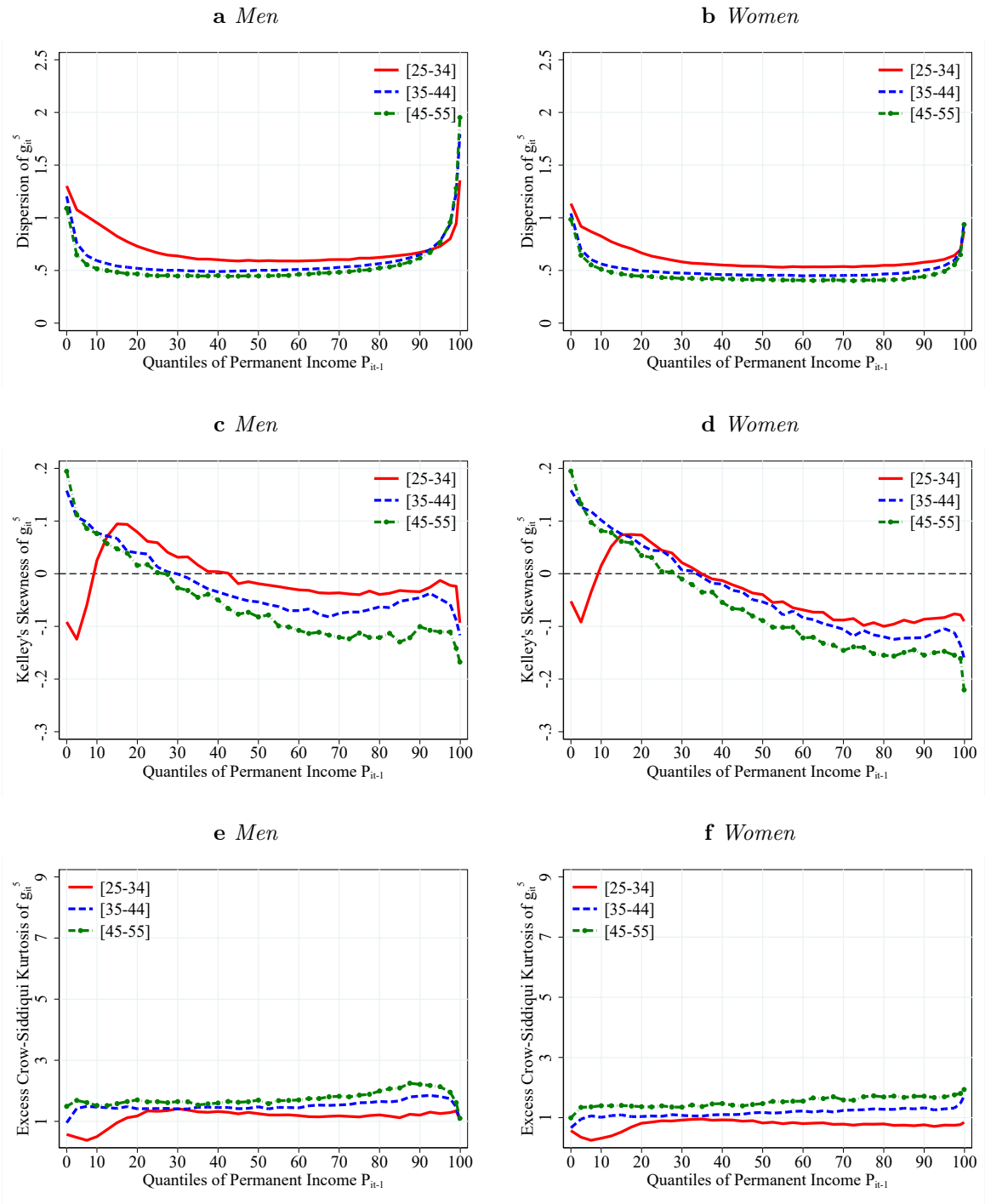
Figure 50: Skewness and Kurtosis of the Distribution of 5-Year Residual Log Disposable Income Growth Rates

a *Kelley's skewness* **b** *Excess Crow-Siddiqui kurtosis*



Notes: Skewness and kurtosis of distribution of 5-year residual log disposable income growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. LS sample. The figure plots the following variables against time: (a) Men and Women: Kelley's skewness calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$, (b) Men and Women: Excess Crow-Siddiqui kurtosis calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$ where the first term is the Crow-Siddiqui measure of kurtosis and 2.91, corresponds to the value of this measure for a normal distribution.

Figure 51: Dispersion, Skewness and Kurtosis of the Distribution of 5-Year Residual Log Disposable Income Growth Rates



Notes: Dispersion, skewness, and kurtosis of distribution of 5-year residual log disposable income growth rates, $g^5_{it} = \varepsilon_{it+3} - \varepsilon_{it-2}$. H sample in the period 1997-2016. Permanent Income is based on three years of income, t-4, t-3, $t-2$. The figure plots the following variables against permanent income quantile groups for the 3 age groups (denoted by color): (a) Men: p90-p10, (b) Women: p90-p10, (c) Men: Kelley's skewness, (d) Women: Kelley's skewness, (e) Men: Excess Crow-Siddiqui kurtosis, (f) Women: Excess Crow-Siddiqui kurtosis. Kelley's skewness is calculated as $\frac{(\text{p90}-\text{p50})-(\text{p50}-\text{p10})}{\text{p90}-\text{p10}}$. Excess Crow-Siddiqui kurtosis is calculated as $\frac{\text{p97.5}-\text{p2.5}}{\text{p75}-\text{p25}} - 2.91$, where the first term is the Crow-Siddiqui measure of kurtosis, and 2.91 corresponds to the value of this measure for a normal distribution.