

# Lifecycle Earnings Risk and Government Insurance: New Evidence from Australia

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# Our study

## 1. How do earnings evolve over time?

- Documents earnings dynamics using Australian data
- Investigates the sources of earnings risks

## 2. How do family and government affect individual earnings process?

- Examines insurance against risks by family and government

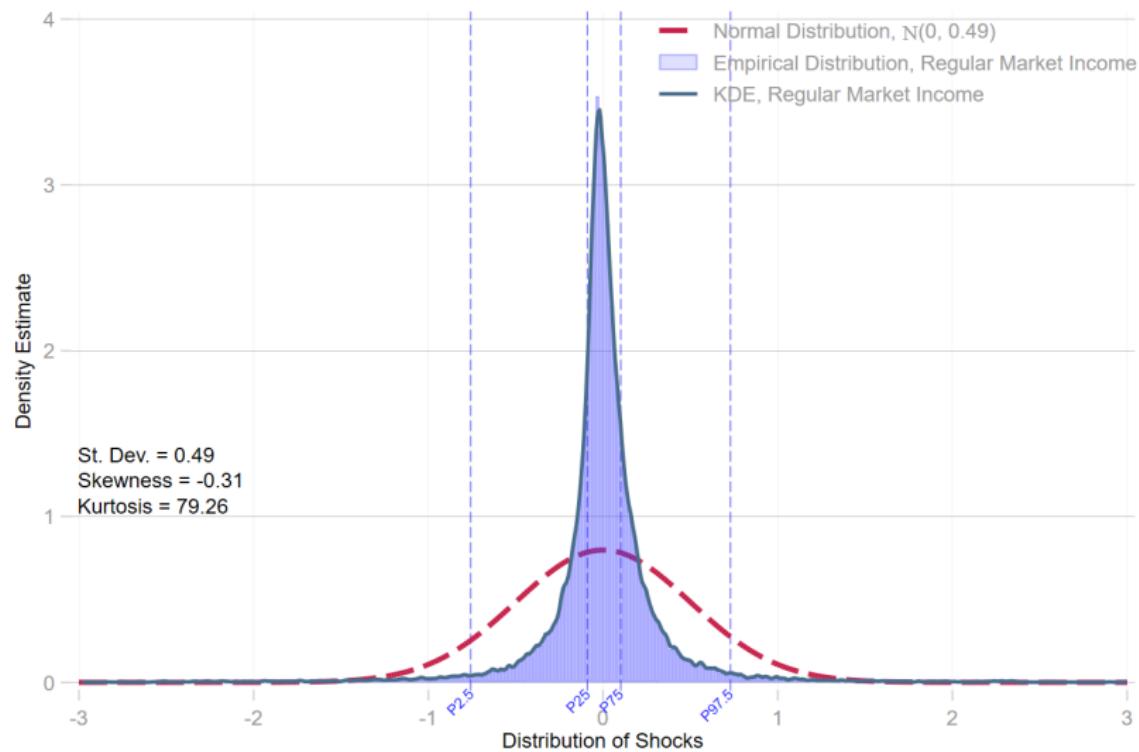
# Data and methodology

**Data:** HILDA 2001-2018 (133,697 observations).

**Sampling criteria:** (i) Primary earner, (ii) Employment history.

**Methodology:** Non-parametric approach following *Guvenen et al. (2019)* and *De Nardi et al. (2021)*.

# Empirical distribution of annual residual earnings shocks



See 3-year average earnings residual shock distribution.

## Related literature

### Non-gaussian properties of earnings dynamics:

- ▶ *Guvnen et al. (2015)*: US;
- ▶ *Halvorsen et al. (2020)*: Norway;
- ▶ *De Nardi et al. (2021)*: US and Netherlands.

### Studies in Australia:

- ▶ Gaussian shocks:
  - ▶ *Chatterjee et al. (2016)*: Wage inequality and unobserved shocks;
  - ▶ *Ishakov and Keane (2021)*: Age Pension in life cycle model;
- ▶ Level and first moment of income:
  - ▶ *Herault and Azpitarte (2015)*: Redistributive impact of tax and transfer;
  - ▶ *Tran and Zakariyya (2021)*: Trends in tax progressivity and redistribution.

## Comparison with the previous studies

Similar to the previous studies, results for Australia show:

1. Non-linear and non-Gaussian income dynamics;
2. Substantial government and family insurance against risks.

Differently, we find:

1. The distribution of earnings shocks:
  - ▶ dispersion (**2nd-order risk**) driven by  $\Delta w$ ;
  - ▶ left skewness (**3rd-order risk**) and excess kurtosis (**4th-order risk**) driven by  $\Delta h$ .
2. The dominant source of insurance against:
  - ▶ the second-order risk: **government transfers**;
  - ▶ the third- and fourth-order risks: **family market income**.

# New findings and key lessons

## What's new?

1. Risks are persistent for certain groups;
2. Risk equalizing effect of government insurance;
3. Within-country evidence of crowding-out effect of government insurance;
4. Kurtosis is complicated to interpret ([See appendix](#)).

## Key lessons:

1. Institutional structure may explain the cross-country differences;
2. Risk gap and welfare effect of redistribution;
3. Persistent risks suggest the importance of government insurance, but *what explains the persistence of risks?*
4. Government insurance may crowd out family insurance;
5. Incorporate realistic shock properties into models can offer new insights.

# Summary statistics of primary earners in 2001

Table 1: Summary statistics of primary earners in 2001

Primary Earner		N	Mean	Median	SD	Min	Max
Age	Individual	3,861	40.82	40	9.74	25	64
	Family	3,861	-	-	-	-	-
Weekly hours	Individual	3,861	40.19	40	13.10	0	120
	Family	3,861	52.94	47.00	32.32	0	201
Weekly wage	Individual	3,861	12,90.60	1,144.11	811.98	0.00	10,075.77
	Family	3,861	18,49.08	1,632.26	1,180.98	0.00	11,683.62
Labour Income	Individual	3,861	66,710.64	60,587.31	50,201.44	0.00	992,195.25
	Family	3,861	96,466.45	85,417.48	68,384.22	0.00	1.09e+06
Market income	Individual	3,861	69,068.36	61,324.12	50,124.60	-53,391.64	900,248.69
	Family	3,861	103,550.41	91,528.53	73,173.60	-28,221.30	1.01e+06
Private transfer	Individual	3,861	414.26	0.00	2,451.22	0.00	36,611.41
	Family	3,861	612.28	0.00	3,029.87	0.00	44,543.89
Total income tax	Individual	3,861	16,910.89	12,685.85	19,880.07	-3,252.31	448,410.50
	Family	3,861	23,922.32	17,950.27	26,323.12	-8,808.10	481,034.31
Public transfer	Individual	3,861	2,347.23	0.00	5,238.40	0.00	45,402.73
	Family	3,861	5,247.19	0.00	8,847.80	0.00	69,825.59

# Summary statistics of primary earners in 2018

Table 2: Summary statistics of primary earners in 2018

Primary Earner		N	Mean	Median	SD	Min	Max
Age	Individual	5,300	41.64	41	11.47	25	64
	Family	5,300	-	-	-	-	-
Weekly hours	Individual	5,300	39.45	40	12.06	0	130
	Family	5,300	55.72	50.00	31.94	0	234
Weekly wage	Individual	5,300	1,562.95	1,363.50	1,036.33	0.00	14,527.00
	Family	5,300	2,290.14	2,006.50	1,499.32	0.00	17,777.00
Labour Income	Individual	5,300	82,194.06	72,000.00	58,780.03	0.00	805,757.00
	Family	5,300	121,658.99	107,425.00	83,415.55	0.00	1.29e+06
Market income	Individual	5,300	84,748.35	73,449.00	62,508.26	-25,000.00	1.58e+06
	Family	5,300	131,037.47	113,995.50	98,461.26	-46,170.00	2.12e+06
Private transfer	Individual	5,300	516.35	0.00	4,264.81	0.00	200,000.00
	Family	5,300	1,123.80	0.00	8,729.99	0.00	303,468.00
Total income tax	Individual	5,300	19,816.53	14,818.00	23,828.99	-4,705.00	715,464.00
	Family	5,300	28,851.38	21,107.00	35,021.56	-7,165.00	892,464.00
Public transfer	Individual	5,300	1,982.52	0.00	5,308.02	0.00	52,067.00
	Family	5,300	4,642.08	0.00	9,547.05	0.00	72,386.00

## Derive moments of shocks: Non-parametric approach

Purge age and time effects:

$$\log \text{income}_{i,t} = \text{age}_{i,t} + \text{age}_{i,t}^2 + \text{year}_t + \mu_{i,t} \quad (1)$$

Calculate the  $n^{th}$ -order differences of  $\hat{\mu}_{i,t}$ :

$$\Delta_{\hat{\mu}_{i,t}}^n = \hat{\mu}_{i,t} - \hat{\mu}_{i,t-n} \quad (2)$$

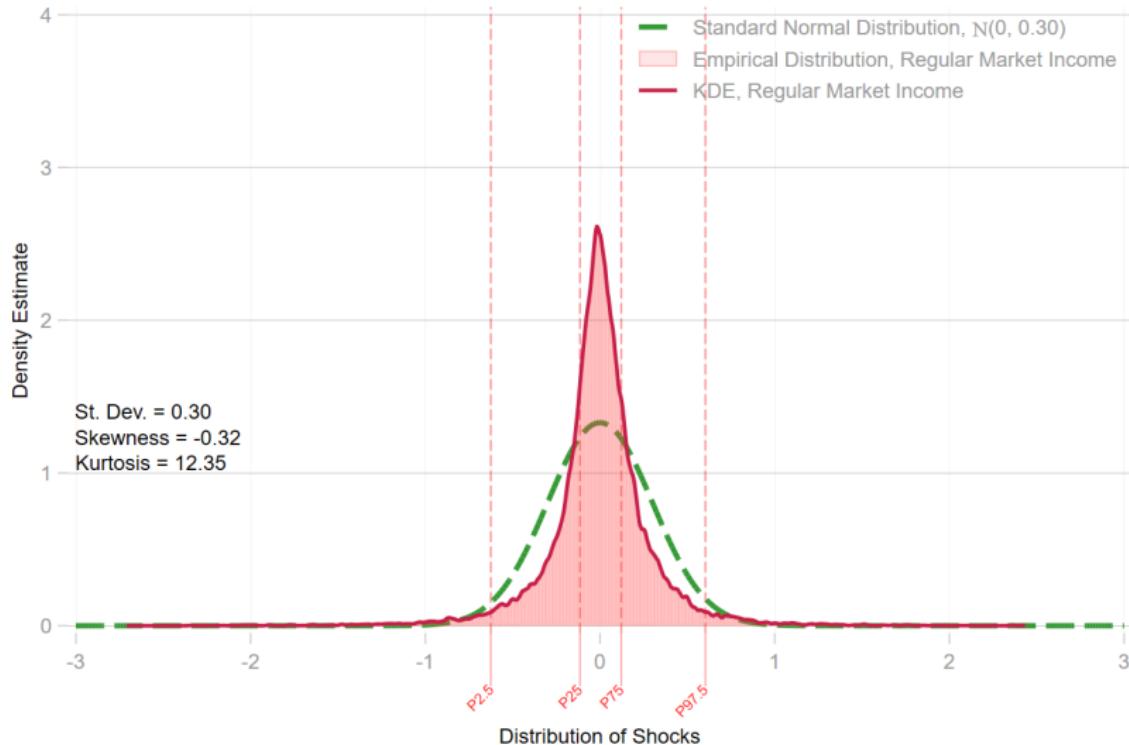
Group the residual shocks  $\Delta_{\hat{\mu}_{i,t}}^n$  by (i) age and (ii) *past income decile*.

Calculate moments of the shock distributions for each group:

$$\tilde{\mu}_{\Delta y}^k = \frac{E[(\Delta y - \mu_{\Delta y})^k]}{\sigma^k} \quad (3)$$

where  $\tilde{\mu}_{\Delta y}^k :=$  the  $k^{th}$  standardized moment of  $y$  shocks ( $k^{th}$ -order risks).

## Empirical distribution of 3-year average residual earnings shocks



# Insurance against income risks

*Insurance* := the extent to which an income component reduces risks.

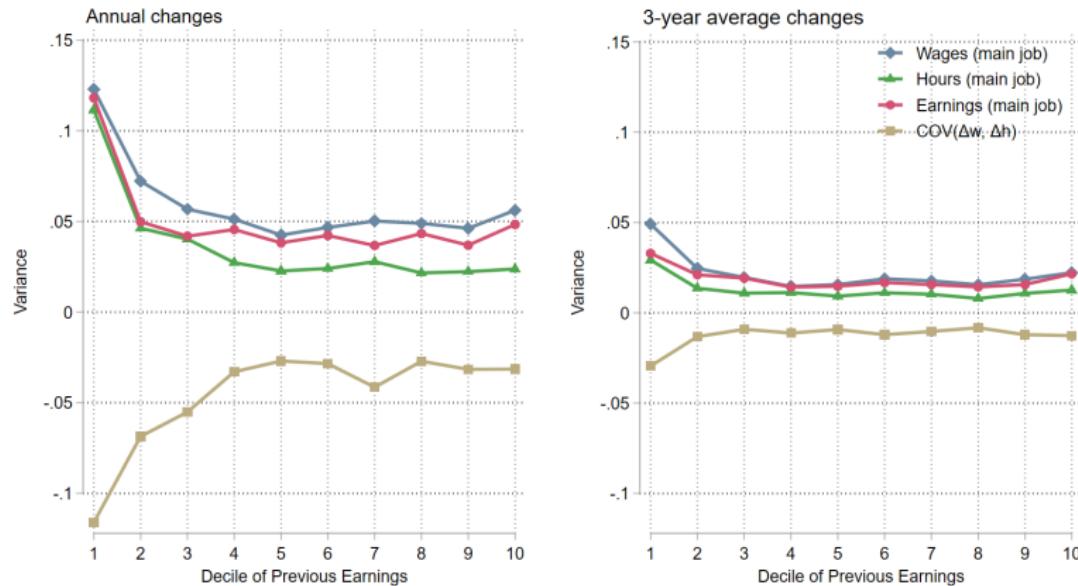
- ▶ Market income risks  $\xrightarrow[\text{(via members' annual earnings)}]{\text{family market income insurance}}$  Family market income risks
- ▶ Family market income risks  $\xrightarrow[\text{(via private transfers)}]{\text{family transfer insurance}}$  Family pre-gov't income risks
- ▶ Family pre-gov't income risks  $\xrightarrow[\text{(via income taxes)}]{\text{gov't tax insurance}}$  Family post-tax income risks
- ▶ Family post-tax income risks  $\xrightarrow[\text{(via public transfers)}]{\text{gov't transfer insurance}}$  Family post-gov't income risks

# Summary of analytical framework

Summary of analytical framework:

1. Calculate moments of distributions of residual income changes (*risks*);
2. Decompose the moment estimates to study sources of risks (See appendix);
3. Examine the degree of insurance by family and government.

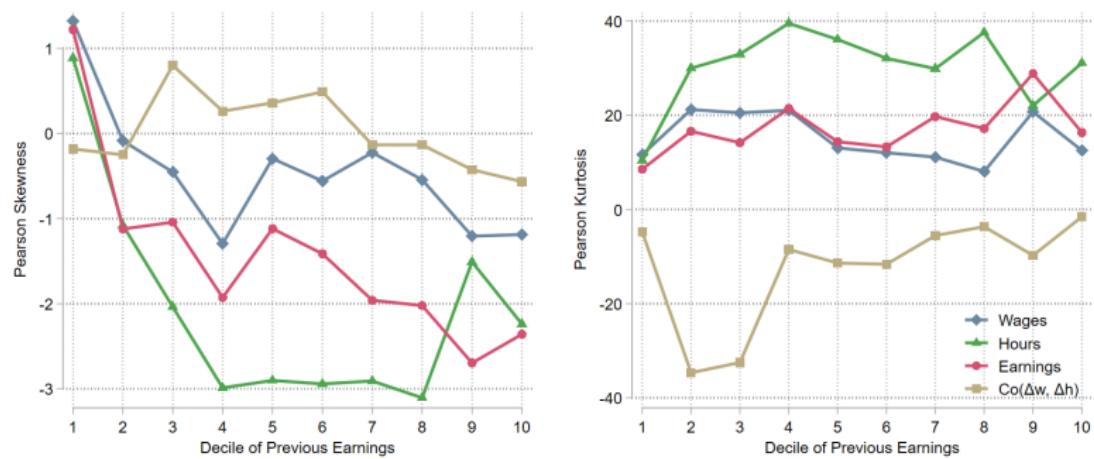
# Decomposition: Dispersion of shocks



**Figure:** Variances of annual and 3-year average changes in usual weekly earnings, wages, and hours of primary earners

See derivation of decomposition formulae in the appendix.

# Decomposition: Skewness and Kurtosis of shocks



**Figure:** Pearson Skewness and Pearson Kurtosis of annual average changes in usual weekly earnings, wages, and hours of main job of primary earners (at least 15 years of employment)

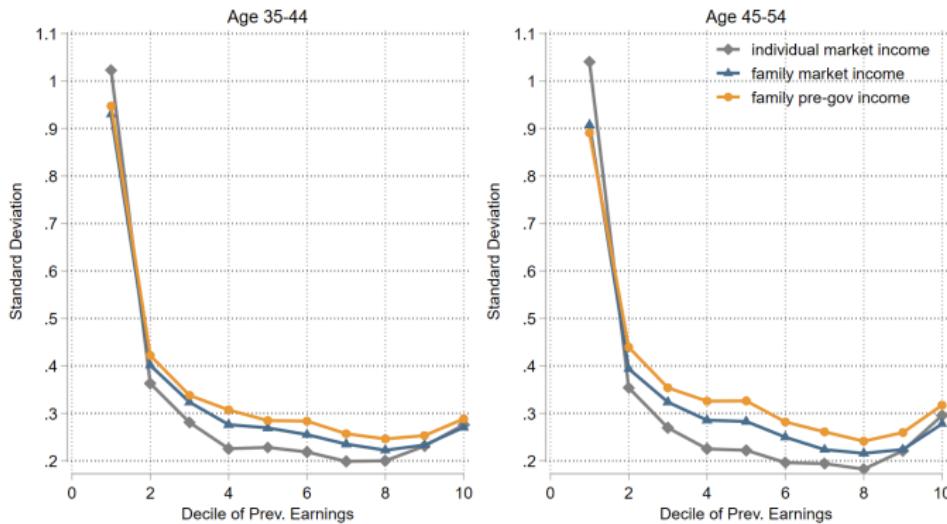
# Wage and Hour changes vs. Earnings changes



**Figure:** Annual changes in residual weekly wages and hours versus decile of annual changes in residual usual weekly earnings for primary earners in the 1st, 5th, and 9th deciles of past usual weekly earnings

See corresponding 3-year average change statistics in the appendix.

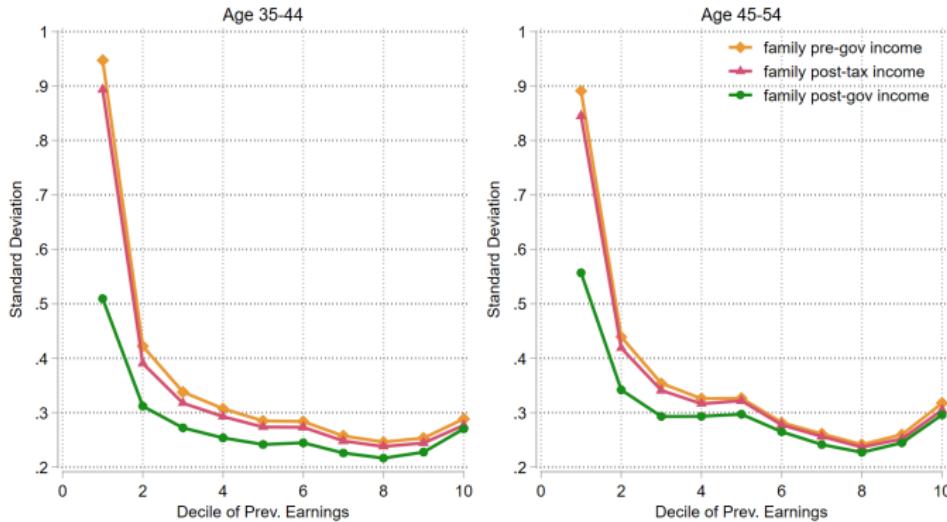
# Family insurance against 2nd-order risk



**Figure:** Standard deviation of the distribution of annual changes of family income (P1-P99) at different levels.

See a more detailed figure in the appendix.

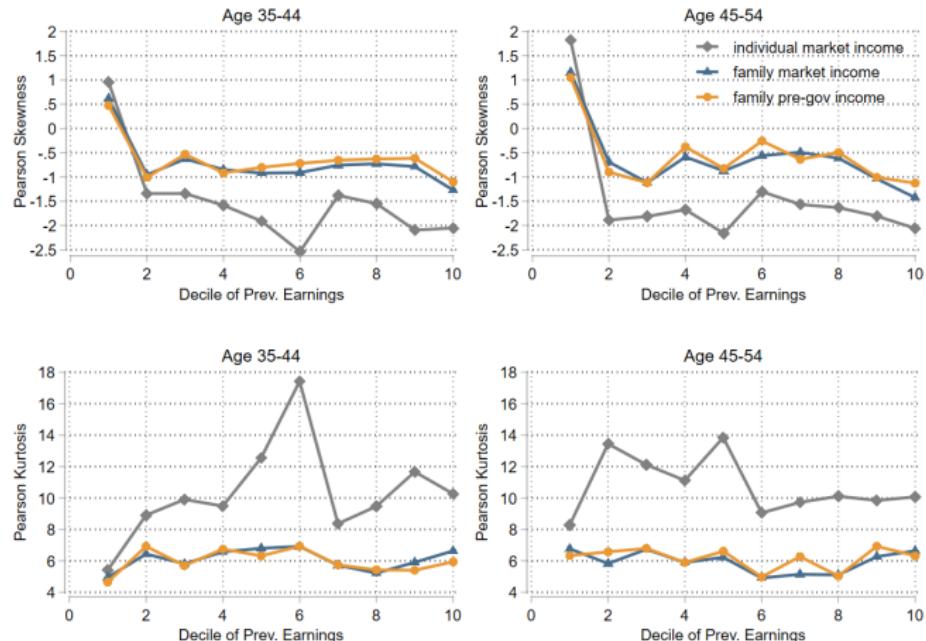
# Government insurance against 2nd-order risk



**Figure:** Standard deviation of the distribution of annual changes of post-tax and disposable (or post-government) family income (P1-P99) at different levels.

See a more detailed figure in the appendix.

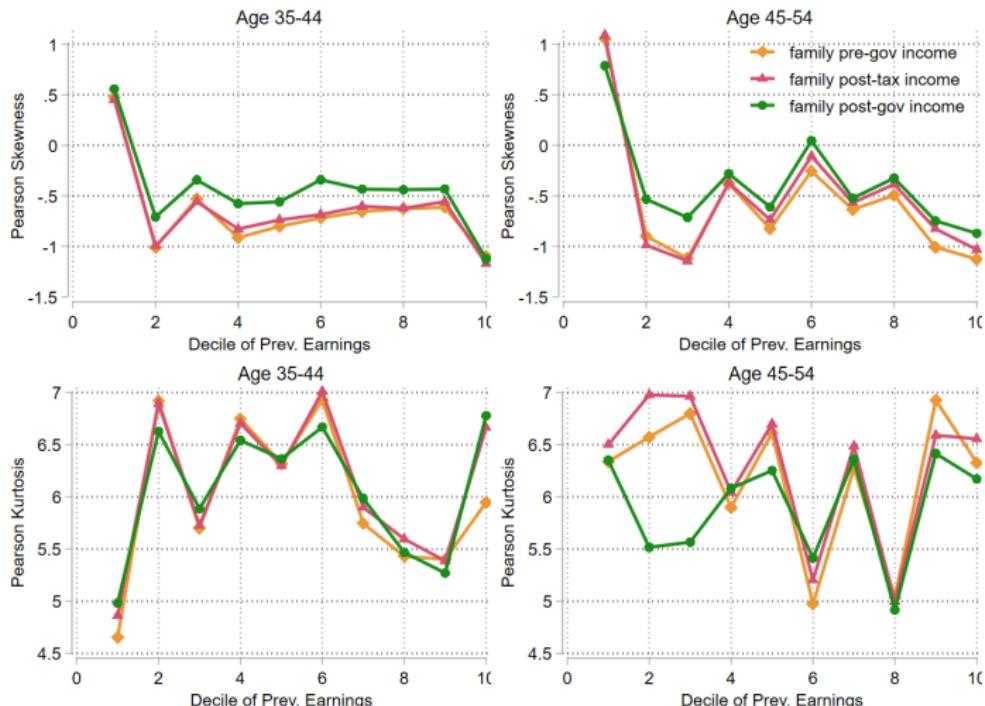
# Family insurance against 3rd- and 4th-order risks



**Figure:** Standardized Skewness (top) and Kurtosis (bottom) of the distribution of annual changes of family income (P1-P99) at different levels.

See a more detailed figure in the appendix.

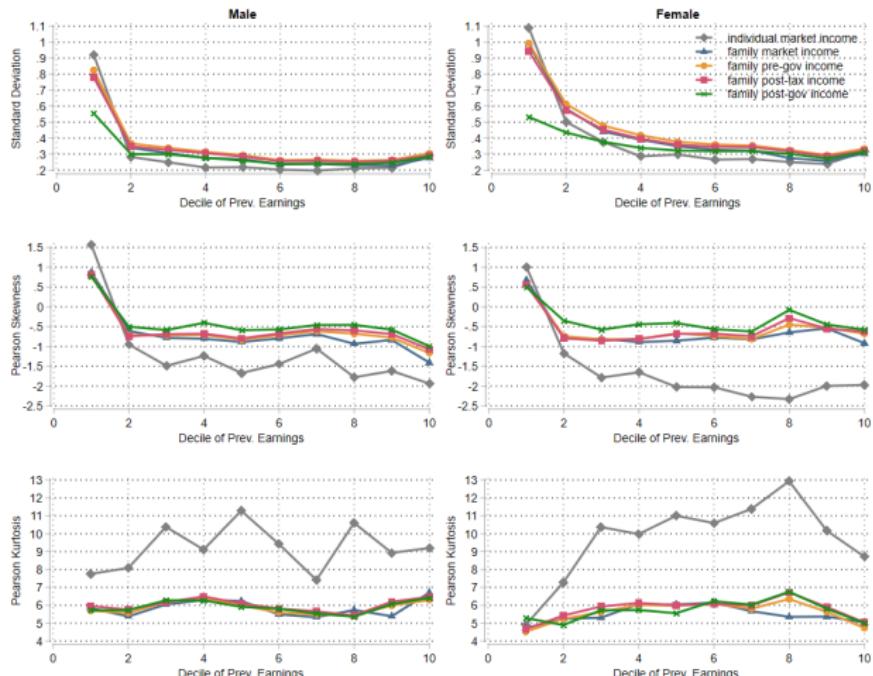
# Government insurance against 3rd- and 4th-order risks



**Figure:** Standardized Skewness (top) and Kurtosis (bottom) of the distribution of annual changes of post-tax and disposable (or post-government) family income (P1-P99) at different levels.

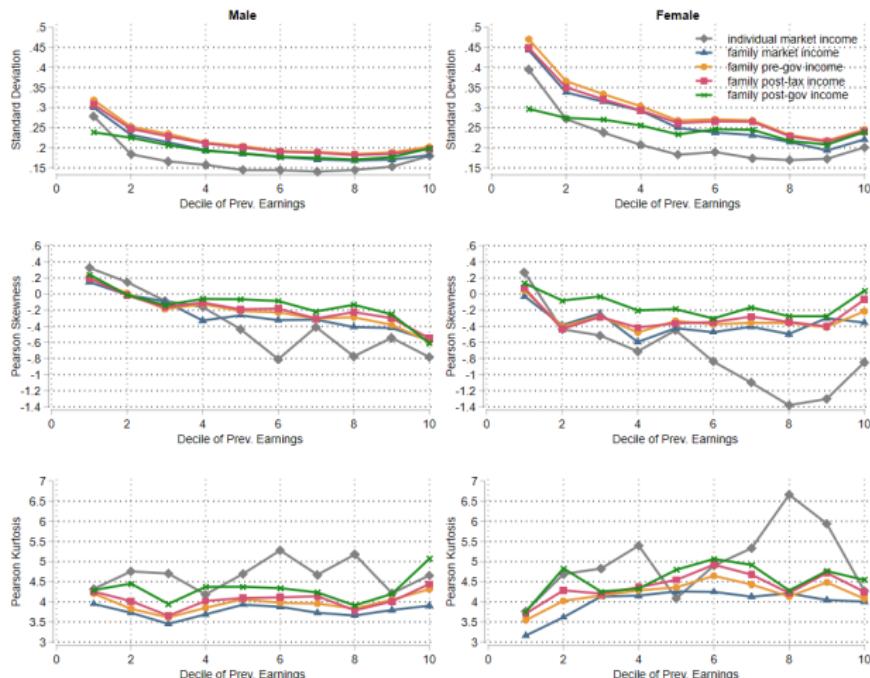
See a more detailed figure in the appendix.

# Insurance against *transitory* shocks: Male vs. Female



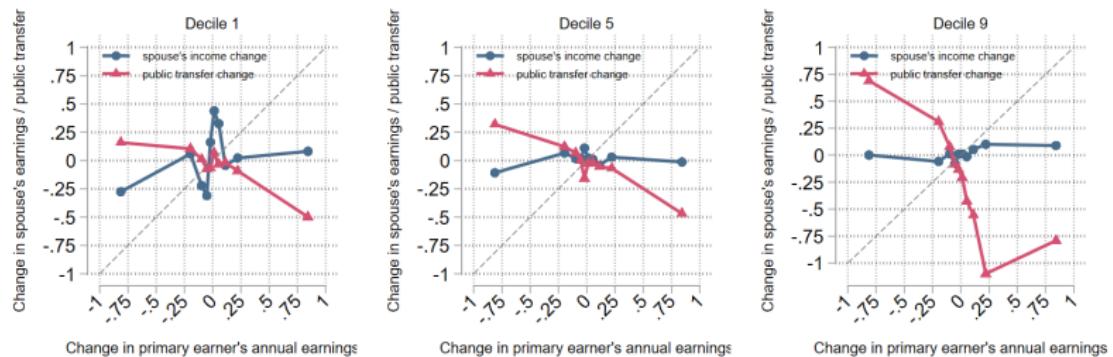
**Figure:** Moment properties of the distributions of annual income shocks of male (left panel) and female (right panel) primary earners (P1-P99 Pearson statistics).

# Insurance against *persistent* shocks: Male vs. Female



**Figure:** Moment properties of the distributions of 3-year average income shocks of male (left panel) and female (right panel) primary earners (P1-P99 Pearson statistics)

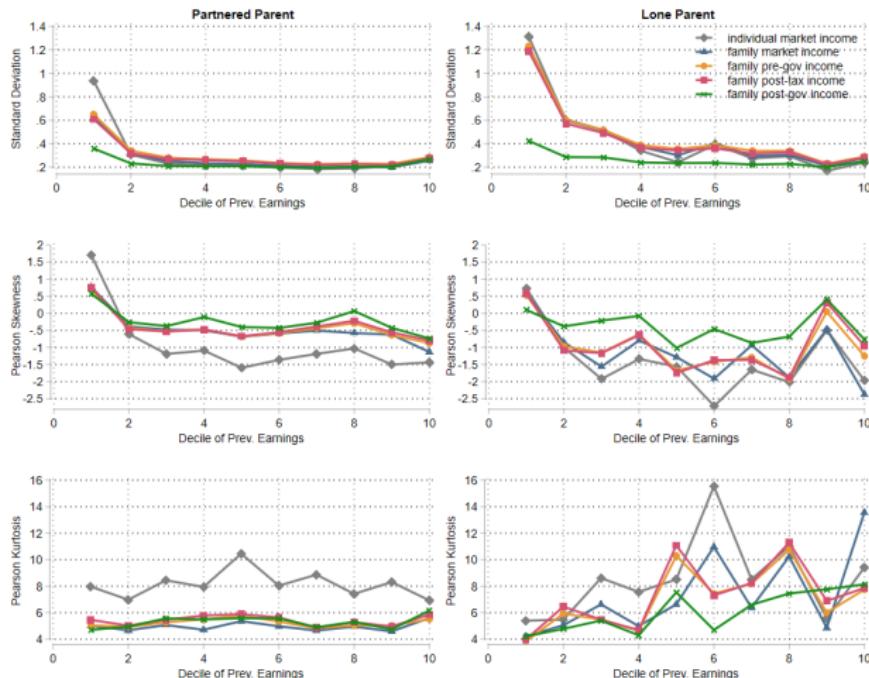
# Spousal response vs Public transfer



**Figure:** Annual changes in spousal earnings and public transfers versus decile of annual changes in past market earnings of primary earners in the 1st, 5th, and 9th deciles of past regular market income.

See a more detailed figure in the appendix.

# Insurance against *transitory* shocks: Partnered vs. Lone parents



**Figure:** Moment properties of the distributions of annual income shocks of partnered parent (left panel) and lone parent (right panel) primary earners (P1-P99 pearson\_statistics)

# Conclusion

Our findings on the dynamics of income suggest:

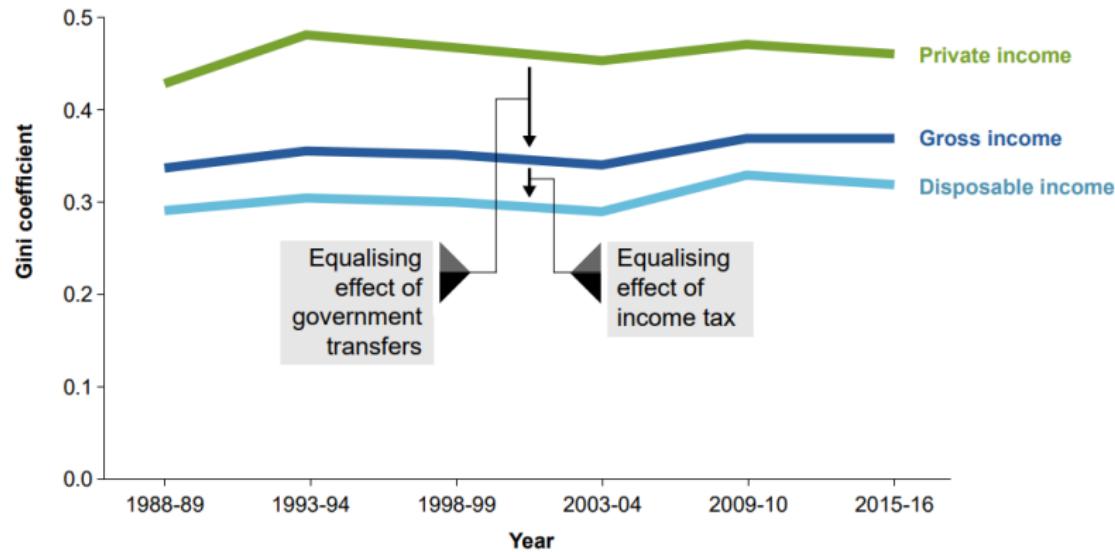
1. Similar earnings dynamics in Australia as in other OECD countries;
2. Differences with regards to the sources of risks and insurance;
3. Institution and behavioural response likely play key roles;
4. Accounting for realistic elements of shocks may change the narrative.

Future work:

1. Retirees and age pension;
2. Consumption risk;
3. Administrative data;
4. Quantitative macroeconomic model.

# Appendix: Inequality and the role of government in Australia

## Gini coefficients for equivalised income



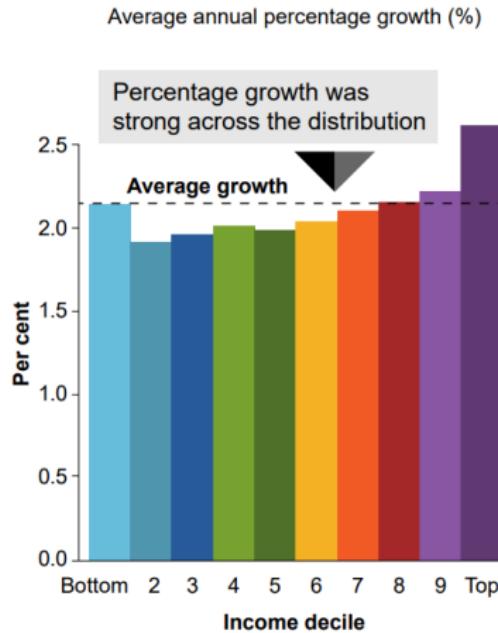
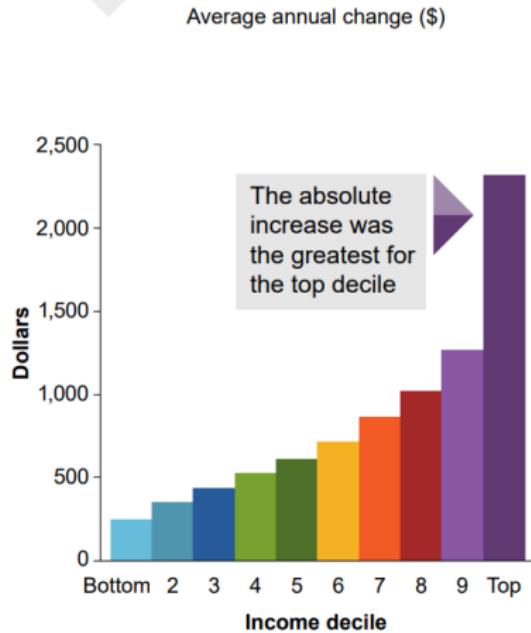
**Data:** ABS (Microdata: Household Expenditure, Income and Housing, 2015-16, Cat. no. 6540.0, released 25/10/17) and ABS HES Basic confidentialised unit record files for years 1988-89 through 2009-10 as available at 25/10/17. **Source:** *Rising Inequality? A stocktake of the evidence* (Productivity Commission, 2018).

See appendix for comparison between average annual income growth figures



# Appendix: Average disposable income growth (PC)

Average equivalised disposable income by income decile, 1988-89 to 2015-16



**Data:** ABS (Microdata: Household Expenditure, Income and Housing, 2015-16, Cat. no. 6540.0, released 25/10/17) and ABS HES Basic confidentialised unit record file for 1988-89 as available at 25/10/17.

## Appendix: Average annual growth of residual income by decile using equation 1

Income Decile	N	Individual	Individual	Household	Household
		Labour Income	Market Income	Pre-gov't Income	Disposable Income
1	9,544	59.75%	56.73%	27.54%	31.35%
2	9,559	6.41%	6.22%	4.05%	2.75%
3	9,541	-0.83%	-0.14%	0.42%	0.28%
4	9,556	-3.12%	-2.60%	-0.37%	-0.55%
5	9,524	-4.50%	-4.06%	-1.33%	1.83%
6	9,571	-4.76%	-4.75%	-2.53%	-1.86%
7	9,509	-4.53%	-4.95%	-2.04%	-1.6%
8	9,564	-3.98%	-4.58%	-1.98%	-1.52%
9	9,526	-5.34%	-6.38%	-3.76%	-2.92%
10	9,534	-7.70%	-10.12%	-7.34%	-5.94%

**Table 2:** The growth statistics shown are group means of residual changes for employees (not self-employed) age 25-64 after controlling for time and age effects. These figures account for cross-decile mobility over time.

[◀ Back to Introduction](#)

## Appendix: Derive moments of shocks via parametric approach (1)

Consider a parsimonious model for the residual income in equation 1:

$$\hat{\mu}_{i,t} = z_{i,t} + \epsilon_{i,t} \quad (4)$$

$$z_{i,t} = z_{i,t-1} + \eta_{i,t} \quad (5)$$

where  $\eta_{i,t}$  and  $\epsilon_{i,t}$  are drawn from some distributions  $F_\eta \sim (0, \sigma_\eta^2)$  and  $F_\epsilon \sim (0, \sigma_\epsilon^2)$ , respectively.

The  $n$ -year growth of  $\hat{\mu}_{i,t}$  is thus:

$$\Delta_{\hat{\mu}_{i,t}}^n = \hat{\mu}_{i,t} - \hat{\mu}_{i,t-n} \quad (6)$$

$$= \sum_{j=t-n+1}^t \eta_{i,j} + \epsilon_{i,t} - \epsilon_{i,t-n} \quad (7)$$

## Appendix: Derive moments of shocks via parametric approach (2)

Given the parametric model 7, the higher-order moments of the distribution of  $\Delta_{\hat{\mu}_{i,t}}^n$  are:

$$\sigma_{\Delta_{\hat{\mu}_{i,t}}^n}^2 = n\sigma_\eta^2 + 2\sigma_\epsilon^2 \quad (8)$$

$$S_{\Delta_{\hat{\mu}_{i,t}}^n}^n = \frac{n \times \sigma_\eta^3}{(n\sigma_\eta^2 + 2\sigma_\epsilon^2)^{\frac{3}{2}}} S_\eta \quad (9)$$

$$K_{\Delta_{\hat{\mu}_{i,t}}^n}^n = \frac{n \times \sigma_\eta^4}{(n\sigma_\eta^2 + 2\sigma_\epsilon^2)^2} K_\eta + \frac{2 \times \sigma_\epsilon^4}{(n\sigma_\eta^2 + 2\sigma_\epsilon^2)^2} K_\epsilon \quad (10)$$

Assuming  $N_\eta \sim (0, \sigma_\eta^2)$  and  $N_\epsilon \sim (0, \sigma_\epsilon^2)$ , we can estimate  $\sigma_\eta$  and  $\sigma_\epsilon$  (as in Chatterjee et al. (2016)) and work out the three moment statistics.

## Appendix: Additional consideration

We use quantile-based measures of skewness and kurtosis for comparability with the previous studies.

$$S_{kelley} = \frac{(P_{90} - P_{50}) - (P_{50} - P_{10})}{P_{90} - P_{10}} \quad (11)$$

$$K_{crow-siddiqui} = \frac{P_{97.5} - P_{2.5}}{P_{75} - P_{25}} \quad (12)$$

We consider robust moment statistics:  $P1-P99$ ,  $P5-P95$ , and  $P10-P90$ .

Alternatively, using [Arc-Percent Change method](#) yields similar results.

## Appendix: Decompose earnings shocks (1)

We have:

$$y_{i,t} = w_{i,t} \times h_{i,t} \quad (13)$$

$$\Rightarrow \frac{\% \Delta y_{i,t}}{dt} = \frac{\% \Delta w_{i,t}}{dt} + \frac{\% \Delta h_{i,t}}{dt} \quad (14)$$

which can be simplified as

$$\Delta y = \Delta w + \Delta h \quad (15)$$

Let  $\tilde{\mu}_z^k := \mathbb{E} \left( \frac{z - \mu_z}{\sigma_z} \right)^k$  and  $\sigma_z := \sqrt{\text{var}(z)}$  for a random variable  $z$ .

## Appendix: Decompose earnings shocks (2)

**Second moment:**

$$\sigma_{\Delta y}^2 = \sigma_{\Delta w}^2 + \sigma_{\Delta h}^2 - 2\text{cov}(\Delta w, \Delta h) \quad (16)$$

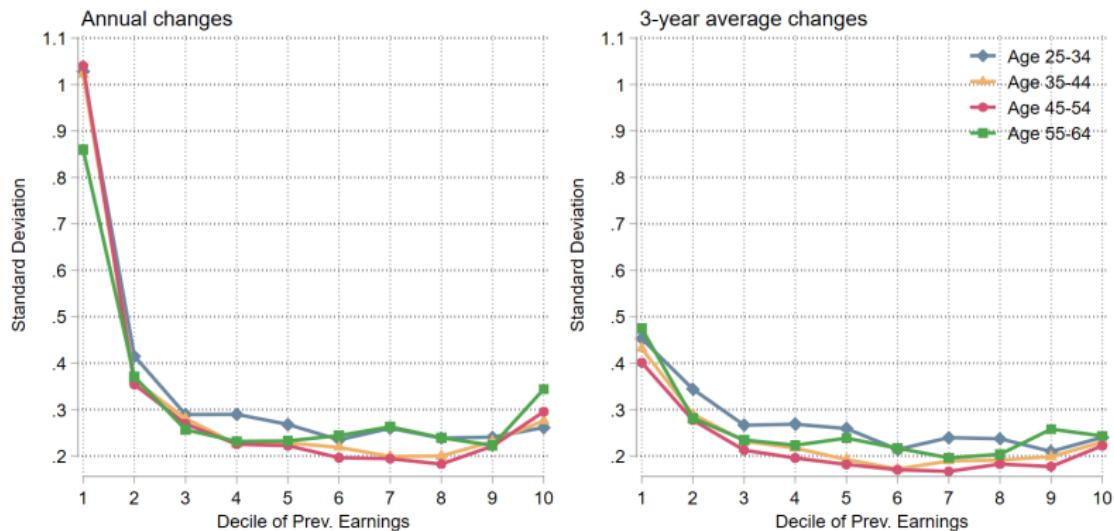
**Third moment:**

$$\begin{aligned} \tilde{\mu}_{\Delta y}^3 &= \frac{1}{\sigma_{\Delta y}^3} \left[ \sigma_{\Delta w}^3 \tilde{\mu}_{\Delta w}^3 + \sigma_{\Delta h}^3 \tilde{\mu}_{\Delta h}^3 \right] \\ &\quad + \frac{3}{\sigma_{\Delta y}^3} \left[ \mathbb{E}(\Delta h - \mu_{\Delta h})^2 (\Delta w - \mu_{\Delta w}) + \mathbb{E}(\Delta w - \mu_{\Delta w})^2 (\Delta h - \mu_{\Delta h}) \right] \end{aligned} \quad (17)$$

**Fourth moment:**

$$\begin{aligned} \tilde{\mu}_{\Delta y}^4 &= \frac{1}{\sigma_{\Delta y}^4} \left[ \sigma_{\Delta w}^4 \tilde{\mu}_{\Delta w}^4 + \sigma_{\Delta h}^4 \tilde{\mu}_{\Delta h}^4 \right] \\ &\quad + \frac{4}{\sigma_{\Delta y}^4} \mathbb{E} \left[ (\Delta h - \mu_{\Delta h})^3 (\Delta w - \mu_{\Delta w}) + (\Delta w - \mu_{\Delta w})^3 (\Delta h - \mu_{\Delta h}) \right] \\ &\quad + \frac{6}{\sigma_{\Delta y}^4} \mathbb{E} \left[ (\Delta w - \mu_{\Delta w})^2 (\Delta h - \mu_{\Delta h})^2 \right] \end{aligned} \quad (18)$$

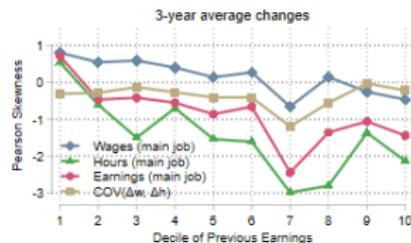
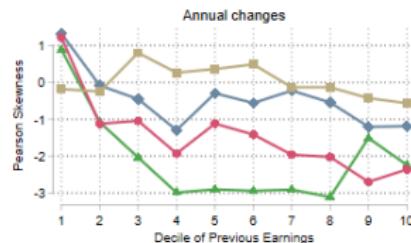
## Appendix: Volatility of shocks by income and age



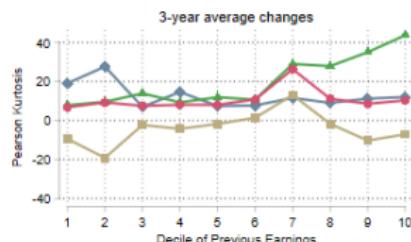
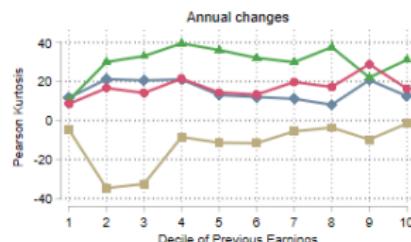
**Figure:** Standard deviation of the distribution of changes in regular market earnings for primary earner (P1-P99)

# Appendix: Decomposition (skewness and kurtosis)

Pearson Skewness



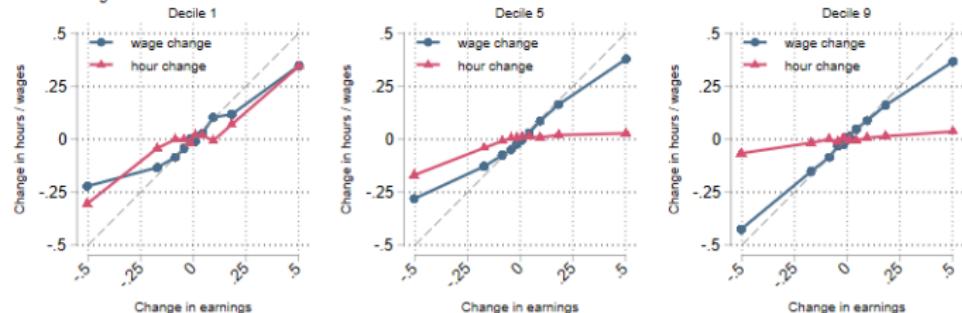
Pearson Kurtosis



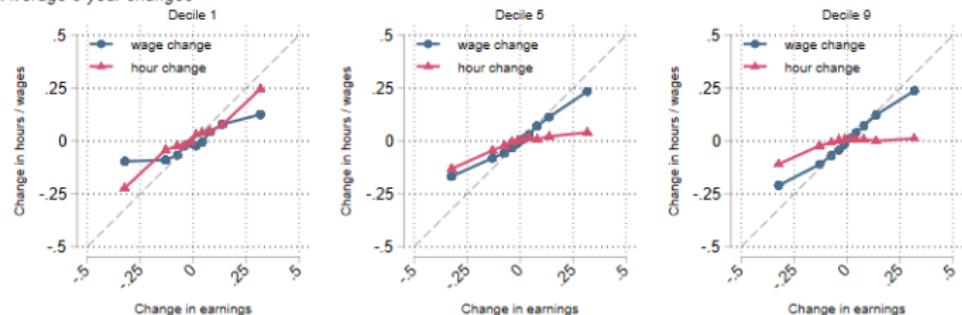
**Figure:** Pearson Skewness and Pearson Kurtosis of annual average and 3-year average changes in usual weekly earnings, wages, and hours of main job of primary earners (at least 15 years of employment)

# Appendix: Wage and Hour changes vs. Earnings changes

Annual changes



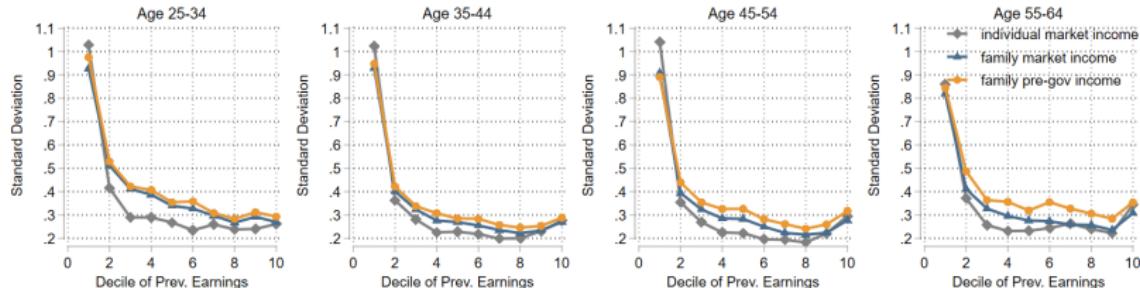
Average 3-year changes



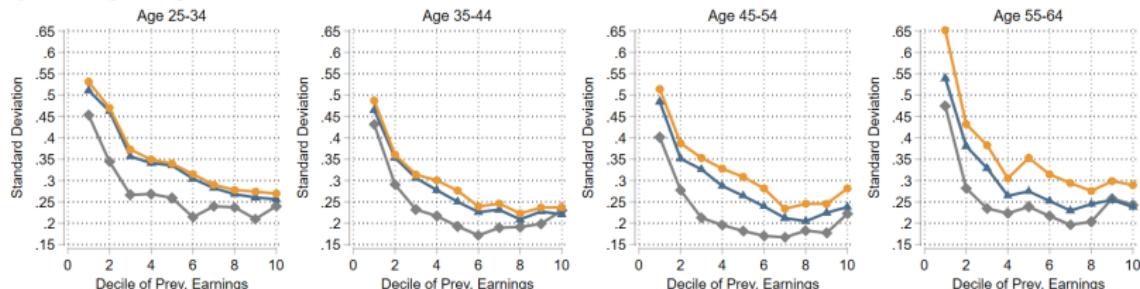
**Figure:** Changes in residual weekly wages and hours versus decile of changes in residual usual weekly earnings for primary earners in the 1st, 5th, and 9th deciles of past usual weekly earnings

Appendix: Family insurance against 2nd-order risk

## Annual changes

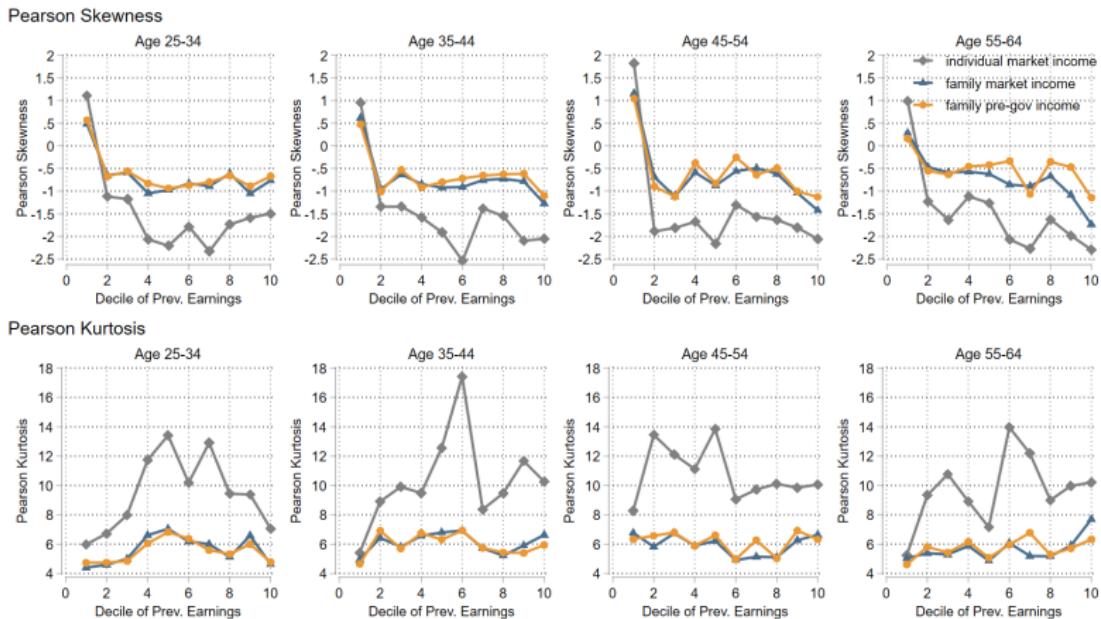


### 3-year average changes



**Figure:** Standard deviation of the distribution of annual and 3-year average changes of family income (P1-P99) at different levels. The figure captures the relative contribution of family market income and private transfer to the second-order risk of pre-government family income.

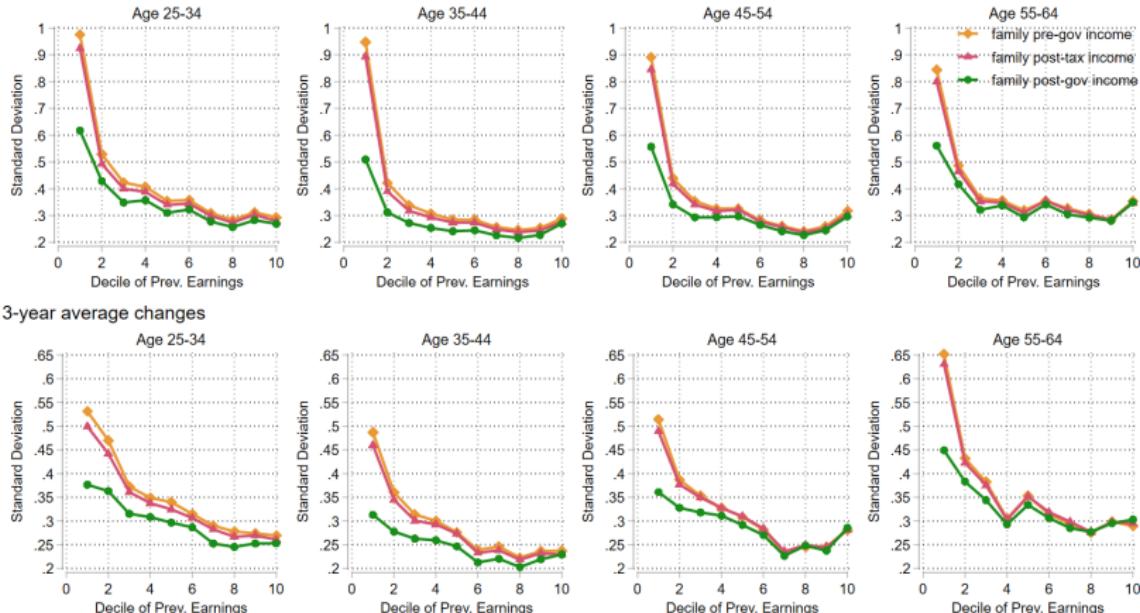
## Appendix: Family insurance against 3rd- and 4th-order risks



**Figure:** Skewness (top) and Kurtosis (bottom) of the distribution of annual changes of family income (P1-P99) at different levels. The figure captures the relative contribution of family market income and private transfer to the third- and fourth-order risks of pre-government family income.

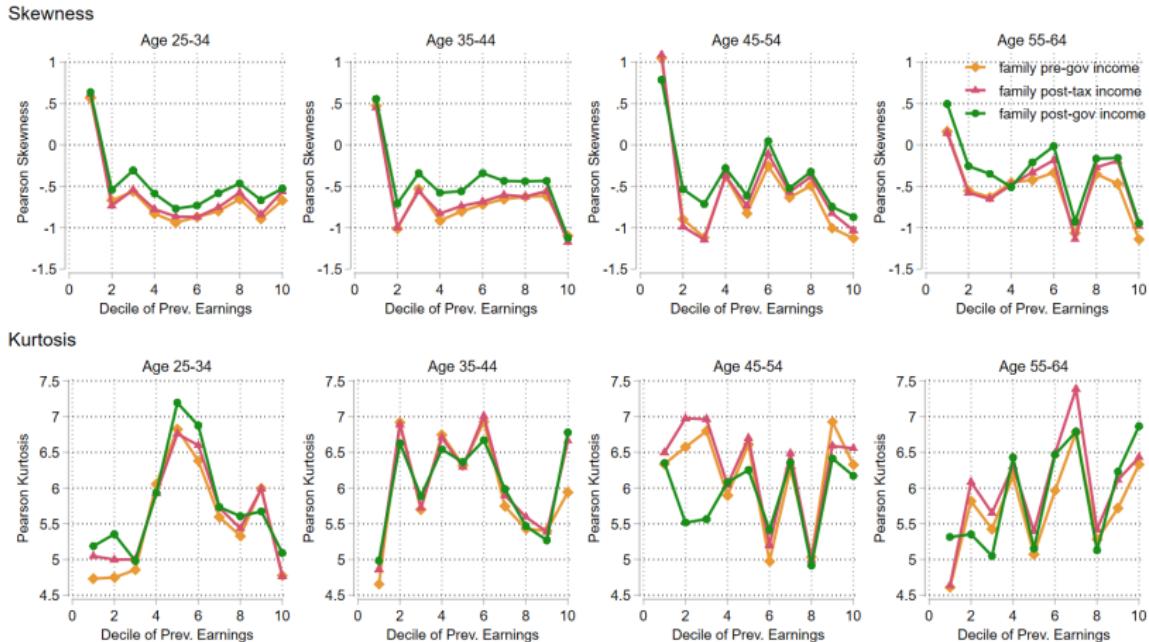
## Appendix: Gov't insurance against 2nd-order risks

## Annual changes



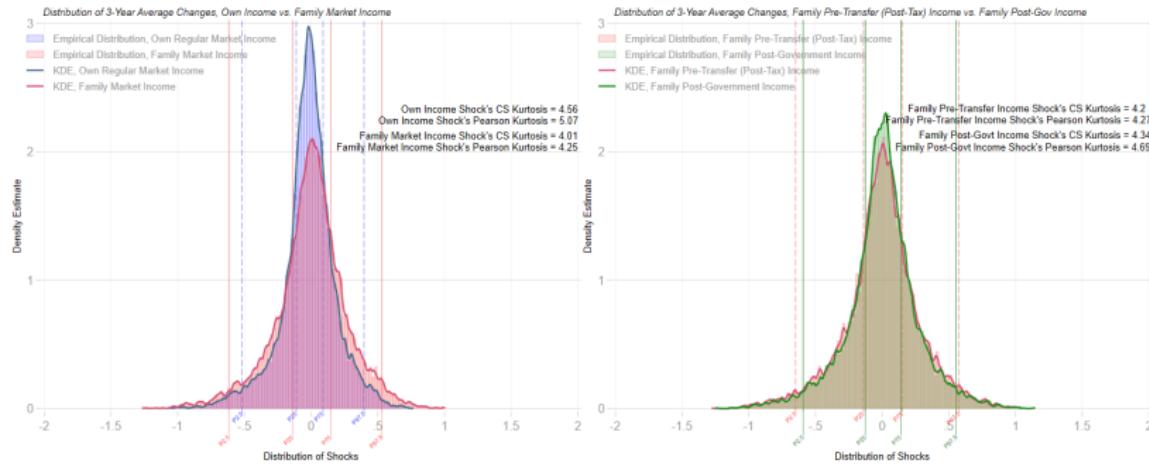
**Figure:** Standard deviation of the distribution of annual and 3-year average changes of post-tax and disposable (or post-government) family income (P1-P99) at different levels. The figure captures the relative contribution of tax and transfer to the second-order risk of disposable family income.

## Appendix: Gov't insurance against 3rd- and 4th-order risks



**Figure:** Skewness (top) and Kurtosis (bottom) of the distribution of annual changes of post-tax and disposable (or post-government) family income (P1-P99) at different levels. The figure captures the relative contribution of tax and transfer to the third- and fourth-order risks of disposable family income.

# Appendix: A closer look at kurtosis



A smaller kurtosis can originate from either: (i) *the contraction of density mass about the mean* (more households facing moderate shocks), or (ii) *the contraction of mass at the tailends* (fewer households facing extreme shocks). While (ii) is a positive effect on households, (i) is not.

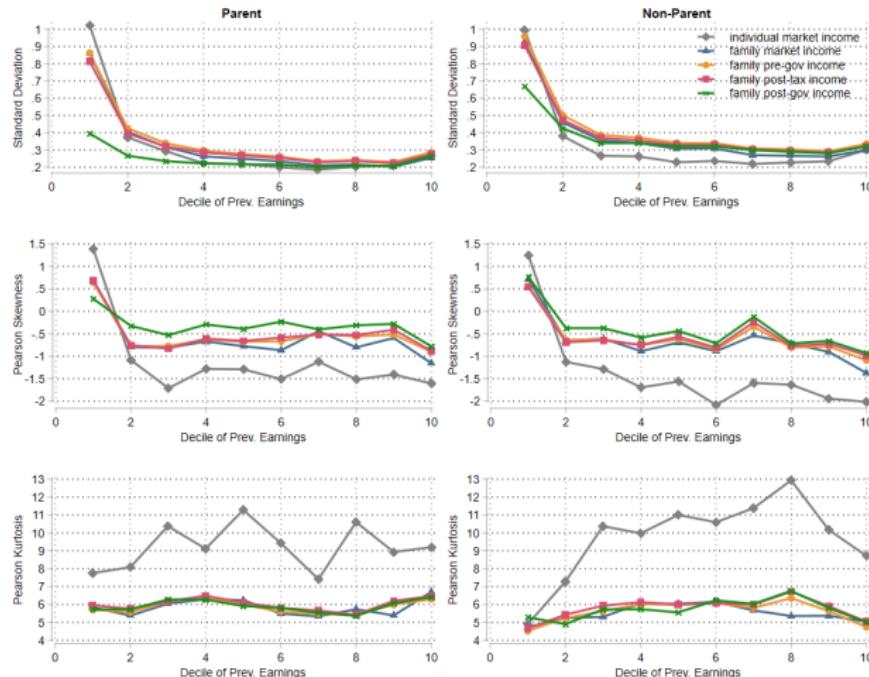
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## Appendix: Male vs. Female secondary earners

Secondary Earner		Age	Higher Education	Weekly Hours	Weekly Wage	Annual Market Income	Annual Govt Transfer
1	Male	34.3	44%	29.7	\$574	\$21,417	\$9,352.15
	Female	34.7	47%	25.2	\$563	\$20,372	\$9,935.98
2	Male	37.5	56%	35.6	\$809	\$39,519	\$4,021.98
	Female	36.4	53%	26.6	\$651	\$28,760	\$5,636.72
3	Male	40.7	66%	38.4	\$949	\$48,841	\$2,474.55
	Female	38.7	58%	29.4	\$759	\$37,230	\$3,362.50
4	Male	42.5	73%	40.3	\$1,185	\$64,725	\$1,454.20
	Female	40.2	66%	32.0	\$943	\$49,256	\$1,432.93
5	Male	45.8	81%	41.9	\$1,651	\$100,803	\$872.83
	Female	42.9	75%	33.6	\$1,253	\$72,570	\$994.40

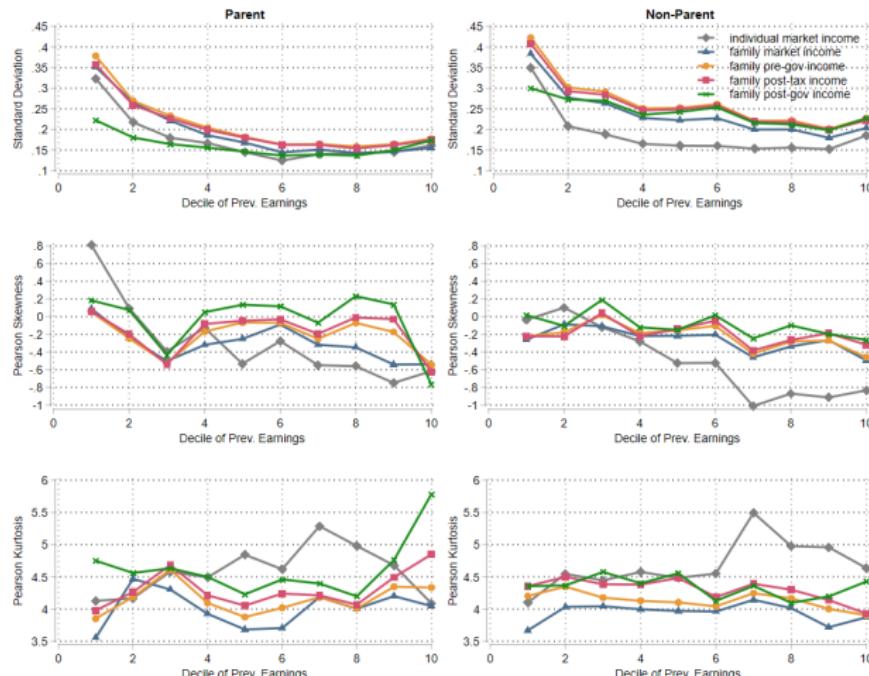
Table 2: Average 18-year Statistics for Male and Female Secondary Earners by Family Market Income Quintiles (All income and transfer values are stated in 2018 Australian dollar)

# Appendix: Insurance against *transitory* shocks and parenthood



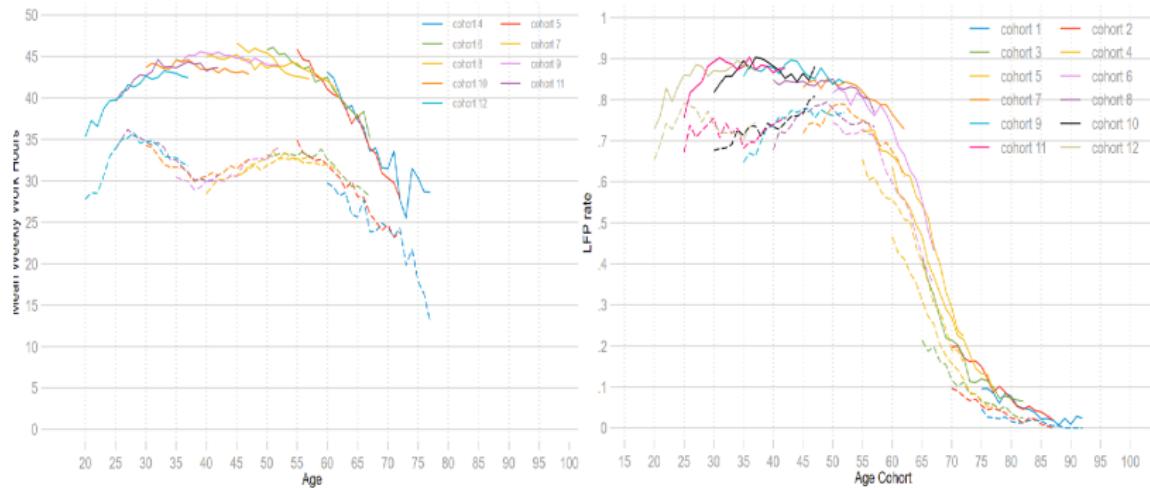
**Figure:** Moment properties of the distributions of annual income shocks of parent (left panel) and non-parent (right panel) primary earners (P1-P99 pearson statistics)

# Appendix: Insurance against *persistent* shocks and parenthood



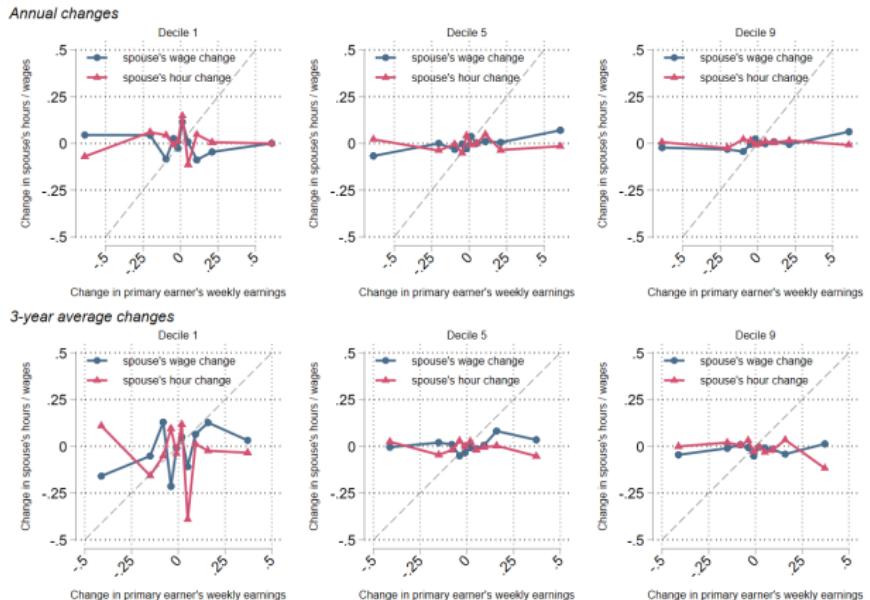
**Figure:** Moment properties of the distributions of 3-year average income shocks of parent (left panel) and non-parent (right panel) primary earners (P1-P99 pearson statistics)

# Appendix: Age-profiles of work hours and LFP rate



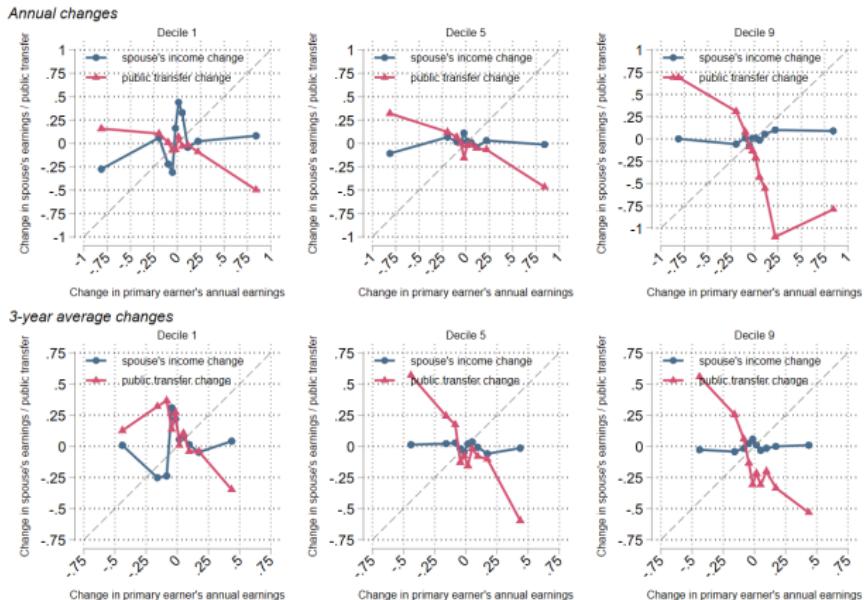
**Figure:** M-shaped age-profiles of work hours (left panel) and LFP rate (right panel). Solid line for men, dashed line for women.

# Appendix: Spousal response vs Public transfer



**Figure:** Changes in usual weekly wages and hours of spouse versus decile of changes in usual weekly earnings (main job) of primary earners in the 1st, 5th, and 9th deciles of past weekly earnings. The top and bottom panels report annual and 3-year average changes, respectively.

# Appendix: Spousal response vs Public transfer



**Figure:** Changes in spousal earnings and public transfers versus decile of changes of past market earnings of primary earners in the 1st, 5th, and 9th deciles of past regular market income. The top and bottom panels report annual and 3-year average changes, respectively.

# Appendix: Additional statistics

	Age 25-34		Age 35-44		Age 45-54		Age 55-64		
Past decile	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Total
1	231	294	497	309	519	319	396	124	2,689
	50.55%	6.42%	47.93%	3.82%	46.55%	3.85%	46.48%	3.46%	9.61%
	8.59%	10.93%	18.48%	11.49%	19.30%	11.86%	14.73%	4.61%	100.00%
2	66	556	195	688	184	694	125	292	2,800
	14.44%	12.15%	18.80%	8.51%	16.50%	8.38%	14.67%	8.15%	10.00%
	2.36%	19.86%	6.96%	24.57%	6.57%	24.79%	4.46%	10.43%	100.00%
3	51	598	78	789	98	783	95	350	2,842
	11.16%	13.06%	7.52%	9.76%	8.79%	9.45%	11.15%	9.77%	10.15%
	1.79%	21.04%	2.74%	27.76%	3.45%	27.55%	3.34%	12.32%	100.00%
4	34	554	65	782	83	821	54	380	2,773
	7.44%	12.10%	6.27%	9.67%	7.44%	9.91%	6.34%	10.61%	9.91%
	1.23%	19.98%	2.34%	28.20%	2.99%	29.61%	1.95%	13.70%	100.00%
5	21	614	56	871	82	775	66	352	2,837
	4.60%	13.41%	5.40%	10.77%	7.35%	9.36%	7.75%	9.83%	10.14%
	0.74%	21.64%	1.97%	30.70%	2.89%	27.32%	2.33%	12.41%	100.00%
6	20	454	48	967	36	874	48	340	2,787
	4.38%	9.92%	4.63%	11.96%	3.23%	10.55%	5.63%	9.49%	9.96%
	0.72%	16.29%	1.72%	34.70%	1.29%	31.36%	1.72%	12.20%	100.00%
7	16	420	38	889	47	992	23	424	2,849
	3.50%	9.17%	3.66%	11.00%	4.22%	11.98%	2.70%	11.84%	10.18%
	0.56%	14.74%	1.33%	31.20%	1.65%	34.82%	0.81%	14.88%	100.00%
8	10	393	27	911	27	982	19	409	2,778
	2.19%	8.58%	2.60%	11.27%	2.42%	11.86%	2.23%	11.42%	9.93%
	0.36%	14.15%	0.97%	32.79%	0.97%	35.35%	0.68%	14.72%	100.00%
9	4	359	24	916	30	1,064	15	415	2,827
	0.88%	7.84%	2.31%	11.33%	2.69%	12.85%	1.76%	11.59%	10.10%
	0.14%	12.70%	0.85%	32.40%	1.06%	37.64%	0.53%	14.68%	100.00%
10	4	336	9	963	9	978	11	495	2,805
	0.88%	7.34%	0.87%	11.91%	0.81%	11.81%	1.29%	13.82%	10.02%
	0.14%	11.98%	0.32%	34.33%	0.32%	34.87%	0.39%	17.65%	100.00%
Total		457	4,578	1,037	8,085	1,115	8,282	852	3,581
100.00%		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1.63%		16.36%	3.71%	28.89%	3.98%	29.59%	3.04%	12.80%	100.00%

Table 4: Proportion of primary earners in part-time employment by decile of usual weekly wages from main job. The subsample contains primary earners who report positive usual weekly labour earnings for at least 15 years of observation.

# Appendix: Additional statistics

Income Quintile	Parenthood	Married		Single		Total
		Male	Female	Male	Female	
Q1	Non-parent	143 4.34% 14.12%	455 12.14% 44.92%	238 21.38% 23.49%	177 19.39% 17.47%	1,013 11.17% 100.00%
	Parent	167 5.07% 15.11%	809 21.58% 73.21%	12 1.08% 1.09%	117 12.81% 10.59%	1,105 12.18% 100.00%
	Non-parent	200 6.07% 17.50%	407 10.86% 35.61%	319 28.66% 27.91%	217 23.77% 18.99%	1,143 12.60% 100.00%
	Parent	234 7.10% 27.08%	597 15.93% 69.10%	1 0.09% 0.12%	32 3.50% 3.70%	864 9.53% 100.00%
	Non-parent	327 9.92% 28.53%	379 10.11% 33.07%	261 23.45% 22.77%	179 19.61% 15.62%	1,146 12.64% 100.00%
	Parent	399 12.11% 49.50%	386 10.30% 47.89%	2 0.18% 0.25%	19 2.08% 2.36%	806 8.89% 100.00%
Q2	Non-parent	361 10.95% 40.07%	255 6.80% 28.30%	165 14.82% 18.31%	120 13.14% 13.32%	901 9.93% 100.00%
	Parent	548 16.63% 71.17%	219 5.84% 28.44%	2 0.18% 0.26%	1 0.11% 0.13%	770 8.49% 100.00%
	Non-parent	349 10.59% 54.53%	129 3.44% 20.16%	111 9.97% 17.34%	51 5.59% 7.97%	640 7.06% 100.00%
	Parent	568 17.23% 83.28%	112 2.99% 16.42%	2 0.18% 0.29%	0 0.00% 0.00%	682 7.52% 100.00%
Q3	Total	3,296 100.00% 36.34%	3,748 100.00% 41.32%	1,113 100.00% 12.27%	913 100.00% 10.07%	9,070 100.00% 100.00%

Table 6: Cross-tabulation of frequencies between parenthood, marital status and gender. Since HILDA tracks individuals and their households over time, we present a snapshot of the first cohort entering the survey in 2001. The table suggests a negative assortative matching (or matching of unlike) between higher income males and lower income females.

## Appendix: Additional statistics

Highest education attained	Married		Single		
	Male	Female	Male	Female	Total
High school or lower	1,226	2,227	639	494	4,586
	37.20%	59.45%	57.41%	54.11%	50.57%
	26.73%	48.56%	13.93%	10.77%	100.00%
Above high school, at most bachelor's degree	1,741	1,221	424	350	3,736
	52.82%	32.59%	38.10%	38.34%	41.20%
	46.60%	32.68%	11.35%	9.37%	100.00%
Above bachelor's degree, at most post-graduate degree	329	298	50	69	746
	9.98%	7.96%	4.49%	7.56%	8.23%
	44.10%	39.95%	6.70%	9.25%	100.00%
Total	3,296	3,746	1,113	913	9,068
%	100.00%	100.00%	100.00%	100.00%	100.00%
%	36.35%	41.31%	12.27%	10.07%	100.00%

Table 7: Cross-tabulation of frequency between education, marital status, and gender. Since HILDA tracks individuals and their households over time, we present a snapshot of the first cohort entering the survey in 2001. The table suggests a negative assortative matching (or matching of unlike) between higher education males and lower education females. The observed pattern becomes less pronounced in later years of survey, partly due to attrition and the inclusion of new and younger households in the survey.