How much do workers really lose to inflation?

August 30, 2025

https://github.com/jimb0w/Inflation

Contents

1 Average loss to inflation from July 2021 to June 2025

The goal was to estimate the total earnings (in dollars) lost to inflation for an average earner from July 2021 to June 2025 in Australia. Data were sourced directly from the Australian Bureau of Statistics (see the methods for full sources), and are shown in Figure 1.1. The slope of the lines is representative of an average across the economy, but for an individual wage earner, who only gets a pay rise once a year, while prices rise more or less continuously, the actual experience looks more like Figure 1.2.

We calculated the cumulative lost earnings to inflation (i.e., the area shown in Figure 1.3) under the following assumptions:

- The period of study starts at 1 July 2021 and ends on 30 June 2025.
- Workers receive annual wage rises on 1 January each year (timed to be at the mid-point of the study yearly cycles).
- Inflation is continuous.

Consumer Price Index (CPI) Employee Living Cost Index (ELCI)
The results are shown in Figure 2.1 and Table 1.1.

Figure 1.1: Crude data derived from the ABS.

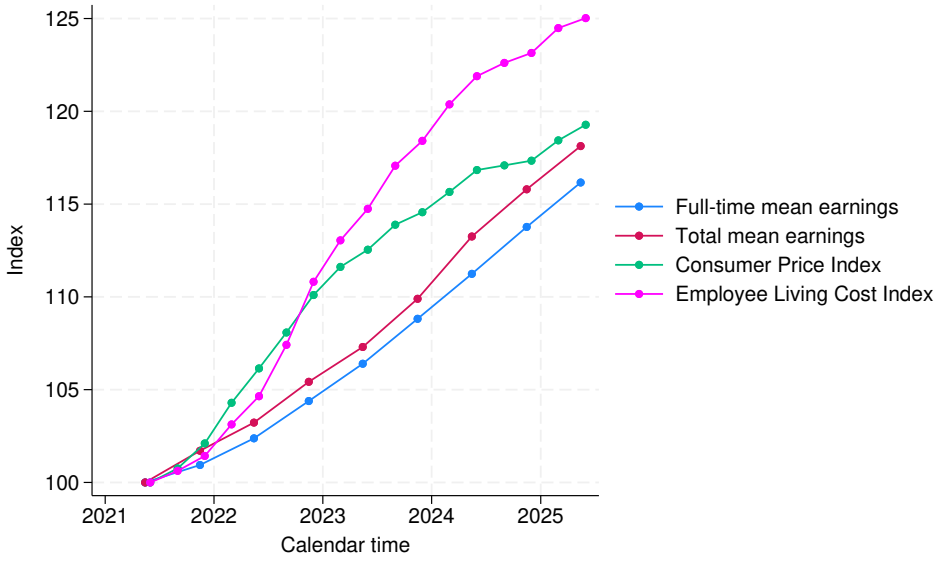

Figure 1.2: Schematic of what inflation looks like for an individual.

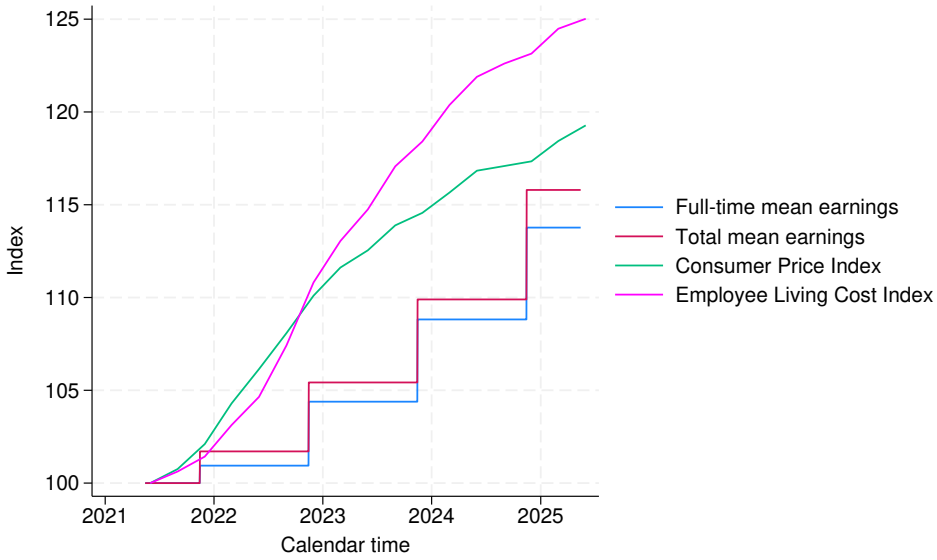

Figure 1.3: Illustration of what was estimated.

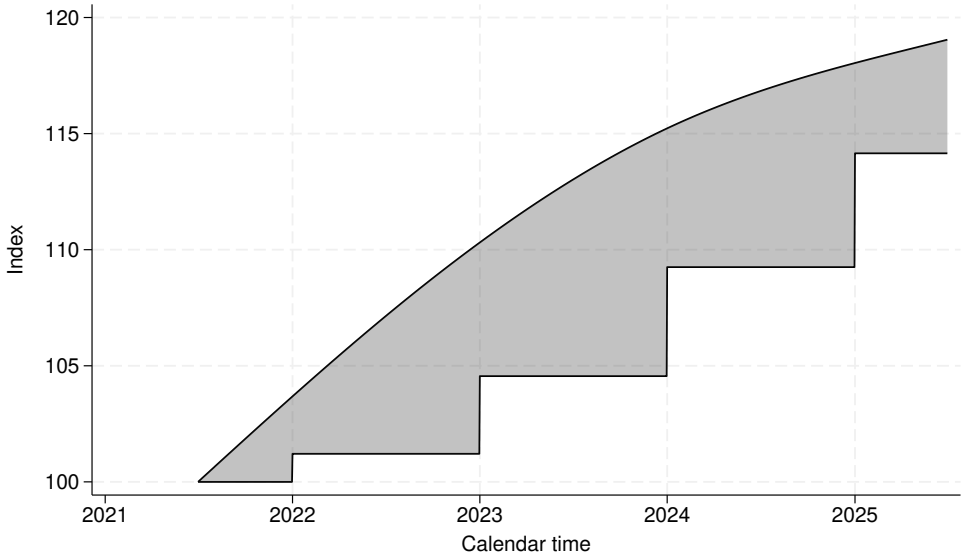

Figure 1.4: Cumulative loss to inflation for the average full time worker.

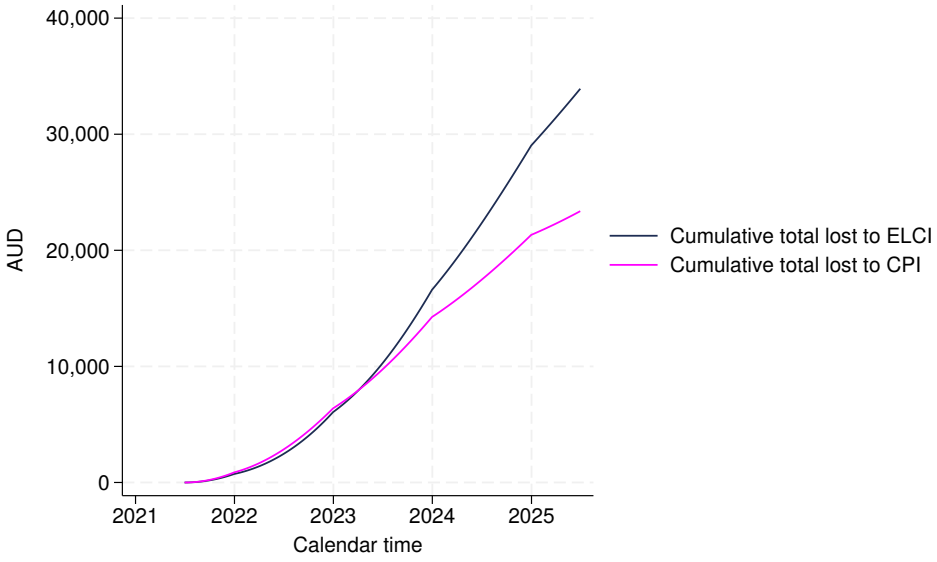

Table 1.1: Summary statistics.

Date	Full-time earnings	Full-time earnings if they matched CPI inflation	Full-time earnings if they matched ELCI inflation	Cumulative loss to CPI	Cumulative loss to ELCI
31dec2021	93,898.44	97,337.30	96,852.27	870.39	733.04
30jun2022	95,034.85	100,574.16	100,203.66	2,827.27	2,443.94
31dec2022	95,034.85	103,564.54	104,352.23	6,390.41	6,065.97
30jun2023	98,175.92	106,104.11	108,771.38	9,711.77	10,232.57
31dec2023	98,175.92	108,186.23	112,661.10	14,256.05	16,601.00
30jun2024	102,585.09	109,699.04	115,151.95	17,446.81	22,303.28
31dec2024	102,585.09	110,832.71	116,575.04	21,329.59	29,027.42
30jun2025	107,186.73	111,780.76	117,512.37	23,374.95	33,919.94

2 Median earnings

Mean earnings are right-skewed because of high-income earners; median earnings probably more accurately capture the experience for the average Australian than does the mean. Let's repeat the above calculations, but using median wage instead of mean. This will also be stratified by sex.

Figure 2.1: Cumulative loss to inflation for the median full time worker, by sex.

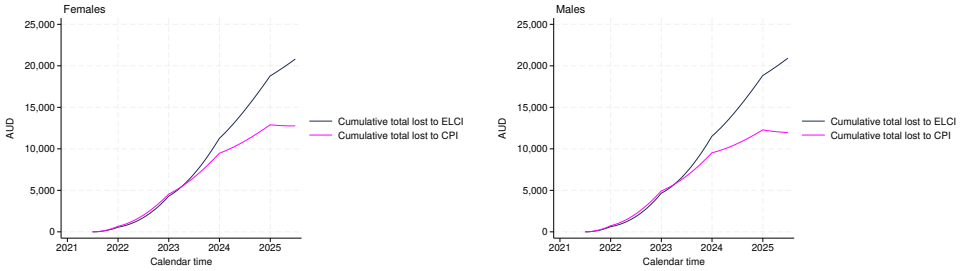

Table 2.1: Summary statistics.

Sex	Date	Full-time earnings	Full-time earnings if they matched CPI inflation	Full-time earnings if they matched ELCI inflation	Cumulative loss to CPI	Cumulative loss to ELCI
Females	31dec2021	71,666.95	74,291.63	73,921.43	664.32	559.48
Females	30jun2022	72,874.77	76,762.12	76,479.33	1,989.16	1,696.59
Females	31dec2022	72,874.77	79,044.49	79,645.69	4,537.17	4,289.55
Females	30jun2023	76,008.74	80,982.79	83,018.55	6,538.43	6,935.92
Females	31dec2023	76,008.74	82,571.95	85,987.34	9,464.22	11,253.98
Females	30jun2024	80,253.98	83,726.58	87,888.45	10,924.37	14,631.01
Females	31dec2024	80,253.98	84,591.84	88,974.61	12,901.97	18,777.26
Females	30jun2025	85,231.39	85,315.43	89,690.02	12,767.14	20,815.49
Males	31dec2021	79,778.12	82,699.87	82,287.78	739.51	622.80
Males	30jun2022	81,247.70	85,449.98	85,135.18	2,152.33	1,826.64
Males	31dec2022	81,247.70	87,990.66	88,659.90	4,925.73	4,650.08
Males	30jun2023	85,499.45	90,148.34	92,414.50	6,713.37	7,155.85
Males	31dec2023	85,499.45	91,917.34	95,719.30	9,522.90	11,515.21
Males	30jun2024	90,394.52	93,202.66	97,835.57	10,621.36	14,747.53
Males	31dec2024	90,394.52	94,165.85	99,044.66	12,290.07	18,830.31
Males	30jun2025	95,224.09	94,971.33	99,841.03	11,968.37	20,927.62

3 Methods

The full syntax – conducted in Stata, version 18.0 – is available at github.com/jimb0w/Inflation in the .do file. The methods build on Jerome Small and Andrew Cheeseman's prior work.

3.1 Data sources

All data were sourced from the Australian Bureau of statistics:

- Wages from here.
- CPI from here.
- ELCI from here.

The data are shown in Figure 3.1, but only data from May 2021 onwards were used (Figure 1.1). To generate Figure 1.2, I simply manipulated the ABS data to show wage rises once a year by removing the May 2022, 2023, and 2024 wage figures, and added observations the day before the November wage figures, thereby generating data that can be plotted to represent the age experience for a worker with one wage increase per year.

3.2 Converting to single-day data

Both the wage and inflation Figures are not continuous, but calculation of wage loss to inflation should be continuous, given that prices rise more or less continuously. To transform the data from bi-annually/quarterly into continuous data, I used linear regression with restricted cubic splines representing the effect of calendar time. Knots for the splines were spaced at four evenly spaced quantiles as recommended by Frank Harrell in his epic "Regression modeling strategies" (Table 2.3 in the 2001 edition of that textbook). The outcome (dependent variable) was wages, CPI, or ELCI, and only (spline effects of) calendar time was used as the independent variable. These regression models were then used to predict wages, CPI, and ELCI for each calendar day from 1 July 2021 to 30 June 2025. The fit of the models was checked, and they fit the data well (Figures 3.2-3.4). The predicted CPI and ELCI indices were then adjusted to have them be at 100 from 1 July 2021 by normalising the predicted values to the index on 1 July 2021.

3.3 Modelling total wage loss

Total wage loss was estimated using a simulation that ran over individual days. The simulation was populated with the data estimated above for CPI and ELCI. Wage data were derived from the modelled wage data, with wage increments increasing on 1 January each year (i.e., starting 6 months into the simulation). This was selected to reflect the fact that people generally receive a pay increase once per year, and averaged across the economy, that increase would occur halfway through each yearly "cycle". This is illustrated in Figure 1.3.

With this data, wages were converted into a daily number. The daily number on 1 July 2021 was multiplied by the CPI and ELCI to generate a wage that theoretically keeps up with inflation on a daily (i.e., continuous) basis. The amount lost each day to inflation was then derived by subtracting the actual wage per day from this theoretical wage that has kept up with inflation (CPI and ELCI). The cumulative lost wages estimate was the cumulative sum of this difference.

Figure 3.1: Crude data derived from the ABS.

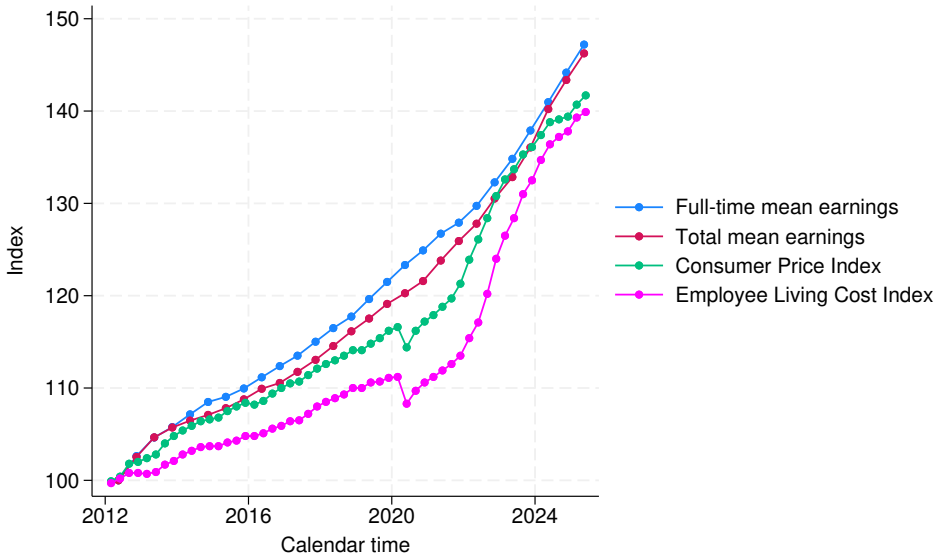

Figure 3.2: Model fit check for wage regression.

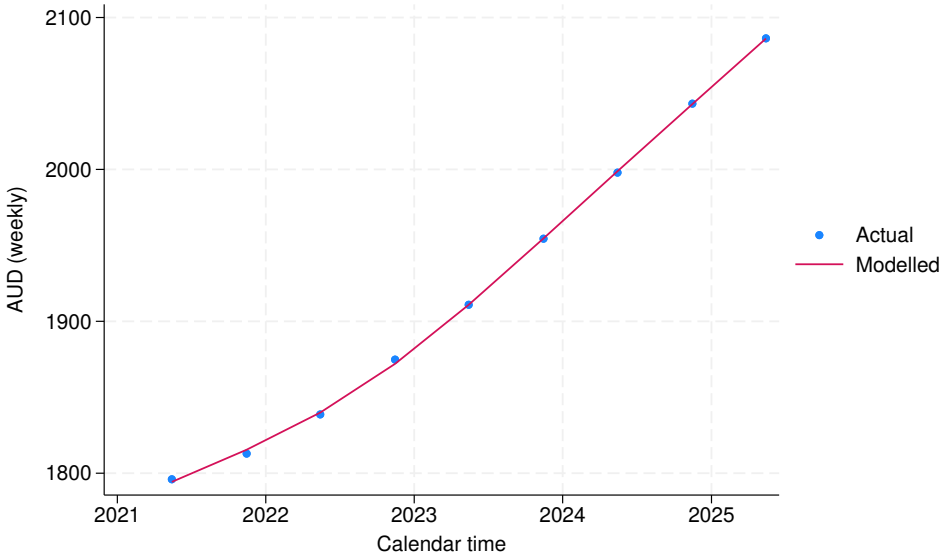

Figure 3.3: Model fit check for CPI regression.

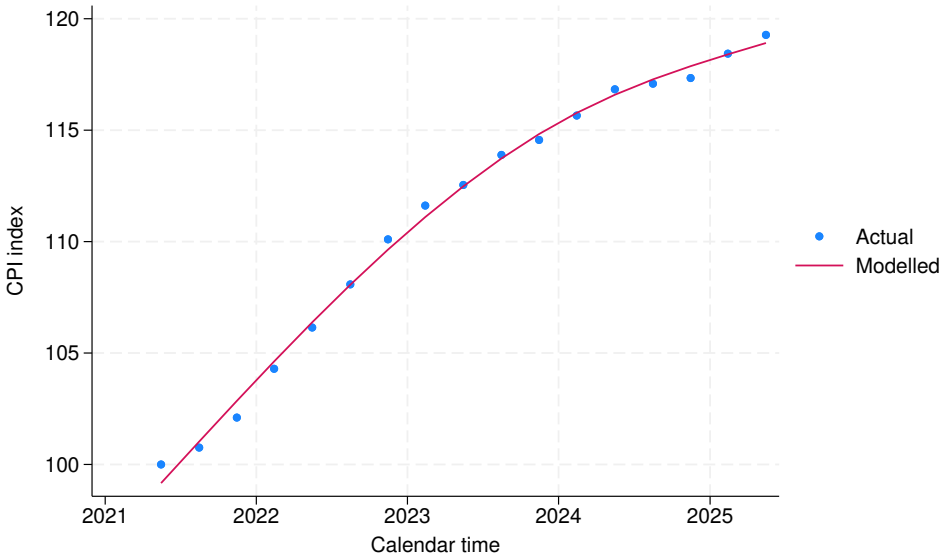

Figure 3.4: Model fit check for ELCI regression.