

Technical Appendix

Appendix A: Literature Review

Poor mental health is both a consequence of and a predictor of unemployment (Olesen et al., 2013). There is also a link between mental health outcomes and the duration of displacement. Prolonged spells of unemployment have been associated with increased depressive symptoms (Mossakowski, 2009), while poor baseline mental health has been shown to predict the duration of displacement (Butterworth et al., 2011). This micro note aims to build on this literature by examining the relationship between mental health and the duration spent on unemployment insurance (UI). This differs from establishing a link between employment status and mental health in that those on UI may be either unemployed or employed.

Appendix B: Data

Our analysis uses individual-level data sourced from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey is a longitudinal study that tracks a representative sample of more than 17,000 individuals from 2001 to 2021. The panel nature of the HILDA Survey means that this data can be used more extensively to identify how much of the negative effect of unemployment on mental health is a within-worker versus between-worker effect.

Appendix C: Effect of Job Finding Expectations on Mental Health

We estimate the relationship between job finding expectations among unemployed workers and mental health scores. To achieve this, we use a basic ordinary least squares (OLS) framework with errors clustered at the individual level. Specifically, we estimate the model,

$$Mental\ Health_{it} = \beta_0 + \beta_1 \cdot Optimism_{it} + \beta_2 \cdot Income_{it} + \beta \cdot X_{it} + \varepsilon_{it},$$

where the dependent variable measures individual i 's mental health score in year t , based on a 0-100 scale created according to Ware, Snow, Kosinski's SF-36 Health Survey (2000). The regressor $Optimism_{it}$ denotes an unemployed worker's subjective probability of finding work in the next year, while $Income_{it}$ denotes an individual's personal disposable income in a given year. We also include a vector of controls in the vector X_{it} , which accounts for an individual's age, gender, socio-economic disadvantage, and presence of a health condition or disability in each period. The final term, ε_{it} , represents idiosyncratic errors.

The results of this estimated model are shown in Table C. The positive relationship between job finding expectations among unemployed workers and mental health scores can be approximated using the estimate of β_1 . That is, a worker who believes they have an 80 per cent chance of finding a suitable job in the next year reports a mental health score that is $\hat{\beta}_1 \times 10 \approx 0.5$ per cent higher than a worker who believes they have a 70 per cent chance of finding a job.²

We now wish to answer the question: *what change in an individual's personal disposable is associated with an improvement in mental health of the same magnitude?* That is, how much does the annual income between two similar workers need to vary to generate a difference in mental health score of approximately 0.5 per cent. This question can be answered by dividing the coefficient estimate $\hat{\beta}_1 \times 10$ by that of $\hat{\beta}_2$. That is,

$$\frac{\hat{\beta}_1 \times 10}{\hat{\beta}_2} \approx 59,752.778.$$

² We choose to evaluate the effect using the example of an unemployed worker with a 70 per cent expectation of finding work given this value is close to the sample average and sample median of job finding expectations (67.5 per cent and 75 per cent, respectively).

Table C: Regression output for mental health and job finding expectations

Variables	OLS
Optimism	0.0538*** (0.008)
Income	0.000009* (0.000)
Age	0.1032*** (0.018)
Health condition	-8.3033*** (0.5767)
Disadvantage	-2.0401** (0.6170)
Female	-3.3381*** (0.9420)
Observations	10,562
R-squared	0.0507

Notes: mean coefficients are presented with standard errors (clustered at the individual level) in parentheses.
* p<0.05, ** p<0.01, *** p<0.001

Appendix D: Regression Framework

We follow the approach adopted in Penrose & La Cava (2021) to understand the drivers of the negative relationship between mental well-being and the duration of a JSP spell. Specifically, we implement two key regression frameworks: an ordinary least squares (OLS) and a fixed effects (FE) model, each with errors clustered at the individual level. The former is given by,

$$Mental\ Health_{it} = \beta_0 + \beta_1 \cdot D_{1,it} + \beta_2 \cdot D_{2,it} + \dots + \beta_{12} \cdot D_{12,it} + \varepsilon_{it},$$

where the dependent variable measures individual i 's mental health score in year t , based on a 0-100 scale created according to Ware, Snow, Kosinski's SF-36 Health Survey (2000). The regressor $D_{q,it}$ then denotes a dummy variable equal to 1 if the total length (measured in quarters) of an individual's current JSP spell lies in the interval $(q - 1, q]$, while ε_{it} represent idiosyncratic errors.³

The FE regression model is instead given by,

$$Mental\ \widetilde{Health}_{it} = \beta_0 + \beta_1 \cdot \widetilde{D}_{1,it} + \beta_2 \cdot \widetilde{D}_{2,it} + \dots + \beta_{12} \cdot \widetilde{D}_{12,it} + \widetilde{\varepsilon}_{it},$$

where all variables have the same interpretation, noting that the "tilde" notation $\widetilde{y}_{it} = y_{it} - \bar{y}_i$ indicates that the variables are in deviation from the mean form for each individual over time, \bar{y}_i .

Since the data is demeaned in estimating this latter model, any between-subject variation is eliminated so that only within-subject variation remains. Hence, the FE coefficient estimates offer an estimate of the within effect of JSP spell duration on mental health: the *true duration dependence*. On the other hand, the pooled OLS model uses both the between and within variation of the panel data set. It follows that the difference between the two coefficient estimates should capture the between-subject variation: the *dynamic selection effect*. The results of both estimated models are shown in Table D.

³ The last dummy variable, $D_{12,it}$, is equal to 1 if the total length (measured in quarters) of an individual's current JSP spell is greater than 12 quarters.

Table D: Regression output for mental health and JobSeeker duration

Variables	OLS	FE
Total quarters on JobSeeker Payment		
1	-5.512*** (0.440)	-0.868*** (0.334)
2	-7.133*** (0.649)	-2.150*** (0.495)
3	-8.856*** (0.705)	-2.746*** (0.559)
4	-8.232*** (1.004)	-2.402*** (0.786)
5	-12.041*** (0.5580)	-2.647*** (0.464)
6	-10.852*** (1.193)	-2.929*** (0.906)
7	-11.333*** (1.174)	-4.476*** (0.908)
8	-9.693*** (1.542)	-2.352*** (1.114)
9	-11.648*** (0.911)	-1.855*** (0.654)
10	-12.336*** (1.899)	-3.644*** (1.414)
11	-10.634*** (1.794)	-3.881*** (1.196)
12+	-10.572*** (0.937)	-2.463*** (0.555)
Observations	279,444	279,444
R-squared	0.0097	0.0091

Notes: mean coefficients are presented with standard errors (clustered at the individual level) in parentheses.
* p<0.05, ** p<0.01, *** p<0.001

References

Butterworth, P., Leach, L. S., Pirkis, J., & Kelaheer, M. (2012). Poor mental health influences risk and duration of unemployment: a prospective study. *Social psychiatry and psychiatric epidemiology*, 47, 1013-1021.

Mossakowski, K. N. (2009). The influence of past unemployment duration on symptoms of depression among young women and men in the United States. *American journal of public health*, 99(10), 1826-1832.

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