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RESEARCH ARTICLE

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Social and emotional well-being and economic insecurity of Aboriginal and Torres Strait Islanders: A multidimensional approach

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Abstract

This study examines the relative deprivation in the mental health, henceforth referred to as 'social and emotional well-being (SEWB)', of Aboriginal and Torres Strait Islander people in relation to non-Aboriginal and Torres Strait Islanders. The study uses the multidimensional deprivation methodology to quantify the deprivation in SEWB. The results show wide variation in the relative deprivation of the Aboriginal and Torres Strait Islanders people between the dimensions of SEWB. This study finds robust evidence that the Aboriginal and Torres Strait Islander people experience lower SEWB and higher economic insecurity than the rest and the gap refuses to narrow over time.

KEYWORDS
Aboriginal and Torres Strait Islanders people, closing the gap, economic insecurity, multidimensional deprivation, social and emotional well-being

JEL CLASSIFICATION
D63, I12, I14, I15, I18, I31

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this article, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute.

1 | INTRODUCTION

1.1 | Placing the study in the context of Sen's contribution

Following Sen's pioneering distinction between 'capability' and 'functioning' (most notably Sen, 1985), health is considered a basic capability needed for functioning satisfactorily so that the individual enjoys the freedom to lead a quality life and contribute to society. Sen distinguishes between outcome variables, such as employment, an individual's criminal record, and input variables, such as education and health, and draws the link between the two by arguing that the latter is needed to maintain an individual's ability to function at a level needed for her to maintain her 'capability' to lead a quality life and contribute to society. The relevance of Sen's contribution is the implication that in order to address the issue of the disproportionate share of the Aboriginal and Torres Strait Islanders people in prisons and suicide rates[1] (outcome variables) that constrain their 'capabilities' to function, we need to examine input variables, such as their mental health referred to henceforth as 'emotional and social well-being' (ESWB), that give rise to poor outcomes. This has underpinned the large attention paid by Sen and others to the study of health, especially of women and children in developing countries. In much of the health literature, however, attention has been focussed largely on 'physical health', not 'social and emotional well-being'[2] (SEWB). This overlooks the fact that 'SEWB' is as important a 'basic capability' as 'physical health' with the two indicators of health often moving in tandem.

1.2 | Lack of comparative evidence on the SEWB of the Aboriginal and Torres Strait Islanders people *vis-à-vis* the rest of Australia and for marginalised groups elsewhere

In contrast to the evidence on the disparity in standard of living indicators between the Aboriginal and Torres Strait Islanders people and the rest of the Australian population, there is little evidence on the corresponding disparity in SEWB between the two groups. Quantifying and analysing this disparity is one of the chief motivations of this study. There does exist, however, a significant literature on SEWB of the Aboriginal and Torres Strait Islander population. Examples include[3] Gee et al. (2014) and Sutherland and Adams (2019).

Inspired by Sen's contribution and extending his idea to 'multidimensional deprivation', as evident in the work of Alkire and Foster (2011), it is important to recognise that many of the variables such as SEWB are not unidimensional[4] but are composite indicators consisting of 'dimensions' that vary in their magnitude and direction. It is important to recognise this heterogeneity in devising effective policies. The present study builds on this recognition.

Fryer and Fagan (2003) have argued that unemployment causes widespread psychological distress and ill health and have discussed the need to adopt a 'community psychological perspective' to address the issue. Green (2011) had provided evidence on how employability moderated the impact of unemployment on SEWB. Stuckler et al. (2009) provide evidence that suggests that unemployment increases the risk of suicides, especially in ages less than 65 years. Marginalised social groups with limited scope for re-employment are therefore likely to be hard hit by job losses. Tsutsumi et al. (2001) provide Japanese evidence to suggest that 'employees with indirect supportive tasks (target for downsizing) were more likely to have depressive symptoms than direct assembly-line workers. Job strain, a combination of high demand and low control at work, was more frequent among the latter, while the combination of high effort and low reward was more frequent among the former' (p. 146). What makes the issue serious is that during economic crises, the impact is mainly on vulnerable groups with insecure employment, such as those who are already at severe risk of depression and suicide,[5] namely, the Aboriginal and Torris Strait Islanders in the current context. In the UK context, Hauck and Rice (2004) find that disadvantaged socioeconomic groups tend to experience more persistent deprivation in SEWB than the rest, and their upward mobility is much less as well. In devising strategy for improving the SEWB of the Aboriginal and Torris Strait Islanders, we need to be mindful of the effect of the legacy of White colonisation that has left a mark on their collective psyche over successive generations that makes

the policy interventions so challenging—see Griffiths et al. (2016). While calling for urgent enquiries into the impact of the recent Pandemic on SEWB, Holmes (2020) has laid out the research agenda and outlined the multiple lines such enquiries should take. A recent OECD report[6] has reiterated the need for 'an integrated whole of society response' in tackling the SEWB impact of the COVID-19 crisis. A nascent literature that does exist (e.g., Pierce et al., 2021; Santomauro et al., 2021) contains preliminary findings that can be built on as more data become available that are long enough to cover the pandemic and postpandemic periods.

The context of this study is Australia and the SEWB of a marginalised group, namely, the First Nations people. Raphael and Swan (1997) have argued that one needs to adopt a historical perspective to understand the SEWB of 'First Nations people', referred to here as 'Aboriginal and Torres Strait Islander people'. While the approach adopted in our study is economic, the policy interventions to improve their SEWB should be devised adopting a historical and community perspective in devising a comprehensive strategy. That the issue of SEWB is occupying increasingly the attention of Australian policy makers is evident from the setting up of an Inquiry by the Australian Government conducted by the Productivity Commission, whose recommendations were submitted recently (see Productivity Commission, 2020). The Productivity Commission's approach was exclusively economic, but the Inquiry was not on the Aboriginal and Torres Strait Islanders who are mentioned only in passing in several places though reference is made to the national strategic framework to address the issue of SEWB of Aboriginal and Torres Strait Islanders over 2017–2023 that was proposed in October, 2017.[7] It is worth pointing out that the 'national strategic framework' that was formulated prior to the pandemic needs to be revisited in the light of COVID-19. The present results suggest that not only do Aboriginal and Torres Strait Islanders experience worse SEWB than the rest of the country but that gap has been increasing in recent years.

While there is increasing awareness of the disadvantage faced by Aboriginal and Torres Strait Islanders and the need to address this issue, as evident for example in the 'Closing the Gap' Prime Minister's report prepared in 2018,[8] SEWB does not feature explicitly as an issue in the report that simply refers to the 'national strategic framework' mentioned above. None of the seven gaps identified in the report explicitly refers to that in SEWB and one is unaware of what that gap in SEWB is between Aboriginal and Torres Strait Islanders people and non-Aboriginal and Torres Strait Islander Australians, let alone set a target for reducing and eliminating it. SEWB, generally, and of Aboriginal and Torres Strait Islanders people in particular has not attracted the attention it merits. This is evident in the lack of literature on the SEWB of Aboriginal and Torres Strait Islanders people, an issue whose importance will increase in the postpandemic era. Moreover, SEWB impacts and is impacted by the quality of life indicators that have featured in the overall measure of well-being that has been studied widely in Australia and elsewhere, and in not recognising this interaction between the SEWB and non-SEWB dimensions of deprivation (e.g., unemployment), one is likely to undermine the effectiveness of the strategies proposed. The motivation of this paper is to address this limitation and provide evidence of the gap in SEWB between Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders as measured by the ratio of their SEWB scores and on the trajectory of this ratio over the period 2001–2019. Though the context of this study is Australia focussing on the SEWB of Aboriginal and Torres Strait Islanders, the longest living civilisation and the original inhabitants of the country, the results have wider relevance in countries with marginalised, minority subgroups on whose SEWB, especially gaps with the majority population groups, there is little evidence. For example, while Asher et al. (2022) provides comparative evidence of economic mobility of minority groups in India, namely, Scheduled Castes and Muslims showing that the upward mobility of the former is accompanied by downward mobility of the latter, there is no corresponding evidence on mobility in the state of SEWB even though the two are closely related.

We examine Economic insecurity with special reference to that experienced by Aboriginal and Torres Strait Islanders and provide evidence on the impact of economic insecurity on SEWB. While there is evidence on the effect of economic insecurity on physical health (e.g., Cheng et al., 2005; Chou et al., 2016) and on fertility (Clark & Lepinteur, 2022), the evidence on the effect of economic insecurity on SEWB is limited, with Rohde et al. (2016, 2017) constituting the pioneering studies in the area. The present study extends this nascent literature by providing evidence on the differential impact of economic insecurity on SEWB between the Aboriginal and Torres Strait

Islanders and non-Aboriginal and Torres Strait Islanders households and, more significantly, on the gap between the aggregate measure of economic insecurity of these subgroups in Australia. This helps to keep in perspective the corresponding gaps in their SEWB and living standards. Treatment of SEWB and economic insecurity in the same study reflects their close interconnectedness and the fact that economic insecurity is a significant contributor to deprivation in SEWB. This study does not seek to establish a causal link between SEWB and economic insecurity that is best left for a future exercise.

1.3 | Motivation of the study

This study principally attempts to answer the following questions: Has the gap in deprivation between the SEWB of the two groups narrowed over a period of 19 years (2001–2019)? How does the gap in SEWB between the two groups compare with that based on conventional indicators of living standards? Do the Aboriginal and Torres Strait Islanders experience greater economic insecurity than the non-Aboriginal and Torres Strait Islanders? Has economic insecurity affected the SEWB of Aboriginal and Torres Strait Islanders any more than that of the other groups? How does the estimated effect of economic insecurity on SEWB compare with that on physical health, and is the picture robust between the Aboriginal and Torres Strait Islanders and the rest of the Australian population?

The contribution of this study is both methodological and empirical, and we hope via the results to identify areas of targeted policy intervention in the context of SEWB of Aboriginal and Torres Strait Islanders. It recognises deprivation in SEWB as multidimensional in line with the recent literature on multidimensional deprivation (Alkire & Foster, 2011) extending that literature to the topic of SEWB. Such a recognition is essential for effective policy intervention since, as shown later, the extent of deprivation in SEWB experienced by the Aboriginal and Torres Strait Islanders, both in absolute terms and *vis-à-vis* the non-Aboriginal and Torres Strait Islanders, may vary with the question asked, and this variation needs to be recognised in devising policy. The study goes further by allowing for persistence in the deprivation as proposed in Nicholas and Ray (2012) and by examining its effect on the gap in the SEWB between the two groups of Australians identified above. It seeks to identify the SEWB dimensions where the persistence in deprivation is longest. In investigating the link between economic insecurity and SEWB, we follow the approach of Rohde et al. (2016) and extend their study by disaggregating between Aboriginal and Torres Strait Islanders and the rest of the population. The study combines the nonstochastic counting approach in measuring multidimensional deprivation with stochastic estimation of the effect of economic insecurity on SEWB in attempting to provide evidence on the gap in SEWB between the two groups. In another significant departure from the literature, this study also adopts a multidimensional approach to economic insecurity recognising its multiple dimensions, and its persistence over several periods.

Though the quantitative analysis of economic insecurity is relatively recent, there is now expanding literature that provides evidence on its behavioural and welfare effects. Hacker et al. (2014) propose a measure of economic insecurity based on the share of individuals who experience a significant income loss, defined as a 25% income decline from 1 year to the next, and who lack the financial buffer to withstand the loss. D'Ambrosio and Rohde (2014) analyse the distribution of economic insecurity in Italy and the United States over the Great Recession. Rohde et al. (2014) examine the distribution of economic insecurity in the United States, Germany, and Britain and find that much of the insecurity is concentrated in the lower end of the distribution. Rohde et al. (2015) calculate micro-level estimates of economic insecurity in Australia over time aggregated over individuals and find they loosely track national unemployment and GDP growth rates. The two studies that examine the effect of economic insecurity on health are Rohde et al. (2016, 2017). The present study is in this tradition but extends the literature by adopting a multidimensional approach to economic insecurity as it does with SEWB. The investigation was possible due to panel data on both Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders available in the Household, Income and Labour Dynamics in Australia (*HILDA*) Surveys, which now contain a sufficiently long time series allowing a meaningful investigation and supplemented by the health data from SF-36 survey.

The rest of the paper is organised as follows. Section 2 provides a brief description of the methodology of multidimensional deprivation incorporating persistence in the deprivation and its application in the current context along with the estimation of SEWB and its relationship with key determinants. Section 3 describes the data. The results are analysed in Section 4, and the paper concludes with Section 5.

2 | METHODOLOGY

2.1 | Multidimensional deprivation with persistence: counting approach

Assume we observe, for all N individuals in the population of interest, K different dimensions of deprivation and T equally spaced time-periods. We say that an individual i is deprived in dimension j at time t when $x_{ijt} < h_j$, where $i \in \{1,2,...,N\}$, $j \in \{1,2,...,K\}$, $t \in \{1,2,...,T\}$, x_{ijt} is individual i's attribute level in dimension j at time t, and h_j is a cut-off point that determines whether or not an individual is considered deprived in a particular dimension. For example, in the dimension 'health', x may be the individual's body mass index, in which case h would be some threshold below which the individual is considered underweight and, therefore, deprived in the health dimension. In the calculations reported below, we treat the cut off score as invariant to dimension, that is, $h_j = h$ for all j. In this study, deprivation is classified as a dichotomous outcome, that is, either deprived ($d_{ijt} = 1$) or not deprived ($d_{ijt} = 0$)—see Nicholas and Ray (2012) for extensions where the *depth* of deprivation in a particular dimension/period, that is, shortfall of the attribute level from the cut off, ($h_j - x_{ijt}$), is taken into account. As described in the following section, there were five questions on SEWB in the questionnaire covering different aspects, each of which constitutes a dimension. While the literature on multidimensional deprivation in standard of living deals with broadly defined dimensions such as health and education, with each dimension subdivided into subgroups, the present study deals exclusively with SEWB with each dimension defined by the responses to the five questions of the Short Form Health Survey (SF-36) asked to each respondent.

The multidimensional deprivation index used here is as follows:

$$\Omega_\alpha = \frac{\sum_{i=1}^{N} \left(\frac{\sum_j \sum_t^T d_{ijt}^0}{T*K} \right)^\alpha}{N} \tag{1}$$

d_{ijt}^0 is a binary variable that takes the value 1 (if deprived), 0 otherwise. $\alpha \geq 0$ allows for the sensitivity of the aggregate index to the distribution of deprivations among individuals, in this case across time and dimensions. It is applied in the unidimensional poverty context by Gradin et al. (2012). When $\alpha = 0$, Equation (1) gives us the headcount ratio of individuals in the population deprived in at least one dimension j for at least one time period t. When $\alpha = 1$, the weight for each individual is increasing in a linear fashion as the count of deprivations increases. As $\alpha \to \infty$, the index gives us a headcount ratio of individuals in the population deprived in all dimensions for all time periods.

While Equation (1) may incorporate the *duration* of deprivation (that is, the count of periods in which an individual is deprived in a particular dimension), it does not explicitly consider *persistence*, that is, the deprivation of an individual in a particular dimension over *consecutive* periods. To do so, let us consider each d_{ijt}^0 to belong to a deprivation spell, which is a sequence of uninterrupted deprivation periods in a particular dimension. c_{ijt} is the *length* of the deprivation spell associated with a particular d_{ijt}^0. Equation (1) can be extended to incorporate persistence of deprivation as follows[9]:

$$P\Omega_\alpha = \frac{\sum_{i=1}^{N} \left(\frac{\sum_j^K \left(\sum_t^T [d_{ijt}^0 * s] \right)}{T*K} \right)^\alpha}{N} \tag{2}$$

where $s \in [0, 1]$ is a nonnegative increasing function of c_{ijt} that takes on the maximum value of 1 when the deprivation in question ($d^0_{ijt} = 1$) is part of a $c = T$ period spell. In the empirical application of Equation (2), we specify $s = (c_{ijt}/T)^{\beta}$ where $\beta \geq 0$ is a parameter that determines the sensitivity of the index to the length of individual deprivation spells. Equation (2) with varying levels of sensitivity to distribution (α) and to persistence (β) in deprivation provides the multidimensional measure that is applied to SEWB. Since the focus of this study is SEWB, we do not extend the calculations to economic insecurity, though in future work one can also use Equations (1) and (2) to calculate the multidimensional deprivation index of economic insecurity similar to that on SEWB.

2.2 | Estimation of SEWB: the stochastic approach

Following Rohde et al. (2016), the basic estimating equation is the fixed effects model as follows:

$$M_{it} = \alpha_i + \gamma_t + X_{it}\beta + \sum_{j=1}^{6} \theta^j E^j_{it} + \varepsilon_{it} \tag{3}$$

where M_{it} is the indicator of SEWB of respondent i in period t, α is an $n \times 1$ dimensional vector of individual effects, γ_t is a series of year dummies, X_{it} is the matrix of the respondent i's characteristics at time t, β is a $k \times 1$ dimensional vector of parameter estimates, E^j_{it} ($j = 1, 2, 3$) are three subjective economic insecurity indicators measuring job insecurity, financial dissatisfaction, and inability to raise emergency funds,[10] and E^j_{it} ($j = 4,5,6$) are the three objective economic insecurity indictors measuring income drop, expenditure distress, and unemployment risk. θ^j is a scalar coefficient on E^j_{it} and ε_{it} is an error term. In keeping with the spirit of multidimensionality, Equation (3) is estimated both with M_{it} as the summary measure of SEWB, aggregating the dimensions using an unweighted mean, and with ${M_{it}}^r$ as the dependent variable where $r = 1,...,5$ denotes the SEWB dimension considered. The evidence that the effect of E^j_{it} on M^r_{it} varies between the combinations of j and r and between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders is one of the principal features of this study. To account for the distributional differences in the health and insecurity measures, we transform the measures to produce normalised indices that give the variables a mean of zero and a standard deviation of one over the pooled sample. The transformation allows like-for-like comparisons between the measures and thus gives each index standard-deviations-from-means interpretations. Furthermore, to account for potential heteroscedasticity and cluster effects, we use panel robust standard errors allowing for clustering by individual. Equation (3) is estimated for Aboriginal and Torres Strait Islanders and the rest allowing, separately, us to compare the effect of the economic insecurity variables on SEWB between the two groups.

In following Rohde et al. (2016) in using a fixed effects model, Equation (3) tackles the issue of endogeneity arising from the possibility that mental health can affect one's feeling of insecurity. A defence of (3) is provided by Rohde et al. (2016) when they say about the fixed effects model, it has 'the benefit of controlling for all time-invariant factors and therefore do not suffer from many of the endogeneity problems that plague most econometric models' (p. 254). The possibility of mutual dependence of mental health and economic insecurity points to the need to estimate them jointly using a simultaneous equation framework that is best left for a future exercise.

3 | DATA DESCRIPTION

For the analysis, this study uses data from the Household, Income, and Labour Dynamics of Australia (HILDA) Survey.[11] HILDA is a nationally representative household-based panel study, which collects social and economic data from annual interviews and self-completion questionnaires of persons aged 15 and older and follows the same individuals over time.[12] The HILDA Survey is funded by the Australian Government through Department of Families,

Housing, Community Services and Aboriginal and Torres Strait Islanders Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (University of Melbourne). The HILDA Survey began in 2001 with a large national probability sample of Australian households occupying private dwellings. The Wave 1 panel consisted of 19 914 individuals organised in 7682 households.

The data used in this study come from waves 1 to 19 of the HILDA survey (Release 19), which has surveys of households providing information collected annually from 2001 to 2019. Although new entrants were included in subsequent waves, we adopt a balanced panel and restrict observations to those who have completed the Person Questionnaires and Self Completion Questionnaires on the dimensions of interest in every period. To examine if attrition over the years has introduced bias in the evidence, the study also calculated the ratio of the SEWB measure of Aboriginal and Torres Strait Islanders to non-Aboriginal and Torres Strait Islanders on the unbalanced panel (i.e., total sample in each period). Since the questionnaires are administered to those of 15 years of age or above at the initial survey, the sample consists of individuals who were between 15 and 84 years old in 2001. More than 80% of the sample is aged between 20 and 60 years.

3.1 | SEWB dimensions

The dimensions of SEWB are those derived from the responses to the five questions of the Short Form Health Survey (SF-36) questions included in the Self-Completion Questionnaire (SCQ) of the HILDA survey relating to frequency of feelings over the last 4 weeks. The five questions are the following: (1) Have you been a nervous person (GH9B); (2) have you felt so down in the dumps that nothing could cheer you up (GH9C); (3) have you felt calm and peaceful (GH9D); (4) have you felt down (GH9F); and (5) have you been a happy person (GH9H). Responses to each of the questions are scored on a 6-point scale: [1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*. Table 1 details the questions used in the questionnaire for the respective SEWB dimensions. We reverse the scale for questions GH9D and GH9H to make them consistent with other variables. A person is considered deprived in an SEWB dimension, j, if that person reported values of 3 or less (i.e., h_j) in that dimension. In the analysis, we also utilise the aggregate SEWB scale where the raw scores on each of the five questions are summed and then transformed so that the scores range from 0 to 100, with low scores indicative of serious SEWB problem.[13] For the aggregate SEWB measure, we adopt a deprivation threshold of 50 or less to regard a person as deprived. The choice of dimensions was predetermined since this is the full list of the SEWB dimensions contained in the HILDA data.

TABLE 1 SEWB dimensions.

SEWB variable (dimension)	Description	Categories/coding
MH1 (GH9B)	Been a nervous person	[1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*
MH2 (GH9C)	Felt so down in the dumps that nothing could cheer you up	[1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*
MH3 (GH9D)	Felt calm and peaceful	[1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*
MH4 (GH9F)	Felt down	[1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*
MH5 (GH9H)	Been a happy person	[1] *All of the time*, [2] *Most of the time*, [3] *A good bit of the time*, [4] *Some of the time*, [5] *A little of the time*, [6] *None of the time*

3.2 | Other dimensions

In our later analysis, we also include nine standards of living dimensions together with the SEWB dimensions to compare and test the robustness of our results based exclusively on SEWB.[14] The choice of the nine living standard dimensions is consistent with Nicholas and Ray (2012) and used to quantify health, employment, and social well-being. Details of each dimension and its description are included in Table A1 of Appendix A.

For the health dimension, the physical health variable (phyhealth) identifies any limitations in the performance of everyday physical activities. The physical health indicator is based on the SF-36 physical health subscale, which comes from respondent answers to 10 of the SF-36 health survey questions. Responses are transformed to a combined score that ranges between 0 and 100. Higher scores correspond to better physical functioning. An individual is regarded as functioning poorly and deprived when a score of 50 or less is recorded.

Dimensions relating to economic conditions include respondents' ability to heat home (Heating), whether went without meals (Meals), ability to pay electricity, gas, or telephone bills on time (Utilities), and ability to pay the mortgage or rent on time (Rent).[15] Respondents were considered to be experiencing financial hardship and deprived if they responded 'yes' to any of these items. The other economic condition dimension includes the ability to raise AUD2000 at short notice (Raise 2K).[16] Responses ranged from "I could easily raise the money" to "I don't think I could raise the money" coded from one to four, respectively. An individual is 'deprived' if she states that she is unable to raise the money.

The employment status variable (Unemp) follows the Australian Bureau of Statistics (2001) definition of unemployment, that is, those without work, actively seeking work, and those who are also currently available for work. Those who are unemployed are 'deprived' for the purpose of this analysis.

An indicator for personal safety (safety) is derived from the reported level of satisfaction with 'how safe you feel', which is rated on a scale from 0 (*completely dissatisfied*) to 10 (*completely satisfied*). An individual with a score of 5 or less is taken to have low perceived safety and, hence, deprived. Lastly, a community dimension (community) recording satisfaction with 'feeling part of your local community' is rated on the 10-point scale as satisfaction with neighbourhood. An individual with score of 5 or less is taken to denote a low level of satisfaction with feeling part of the local community and deprived.

3.3 | Economic insecurity

In Equation (3), the responses to three subjective questions on the experiences of individuals in the HILDA survey are used to measure economic insecurity. The first subjective question asks the individuals to evaluate their feelings of security in their main form of employment with the statement 'I have a secure future in my job'. Responses are coded on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

The second subjective question asks the individual to consider overall level of financial satisfaction with the statement 'Show your satisfaction level with your current financial situation'. Responses to this question are coded on a 0 to 10 scale where 0 denotes *totally dissatisfied* and 10 denotes *totally satisfied*.

The third subjective question asks individuals their level of difficulty with which emergency funds may be raised at short notice in a time of financial hardships with the statement, 'Suppose you had only one week to raise $2000/$3000 for an emergency. Which of the following best describes how hard it would be for you to get that money?' Responses are coded on a 4-point scale where 1 represents *could easily raise emergency funds* and 4 represents *could not raise emergency funds* within the time frame.

The three subjective variables detailed above are all indicators of security. Following Rohde et al. (2016), we reverse the scale for the first and second subjective questions to make it consistent such that higher scores represent higher insecurity. We label the three variables as E^1, E^2, and E^3 to interpret as measures of job insecurity, financial dissatisfaction, and inability to raise emergency funds, respectively.

In addition to the three subjective measures, we also use the HILDA survey to derive three objective measures of insecurity following Rohde et al. (2015). The first objective measure is a dichotomous variable that takes on a value of 1 for all individuals within a household who will see their income in the coming year (i) drop more than 25% from the previous period and (ii) is lower than their average income over the 19 waves. This measure is defined as the *income drop* variable, which is a predictor of future distress in household income and is denoted E^4.

The second objective measure comes from the distress based upon the inability of household members to meet standard expenses. Dummy variables are used that indicate (i) an inability to make rental or mortgage payment, (ii) the pawning or selling of a household item, (iii) inability to pay utility bills (electricity, gas, telephone), and (iv) going without meals. The dummy variables are aggregated into an index from 0 to 4, which counts the number of stress criteria the household meets and an ordered probit model then forecasts the probability that an individual will exhibit either 3 or 4 of the above signs of expenditure related stress in the forthcoming year. This index, defined as the *expenditure distress* variable that captures the likelihood that an individual will display extreme expenditure related stress in the short-term future, is denoted E^5.

Lastly, the same idea is used to construct a measure of future unemployment. To model this, we fit a probit specification based on the dichotomous indicator of unemployment for the individual in the current period and values of the independent variables.[17] This measure, defined as the *unemployment risk* variable, gives the predicted probability of unemployment next year and denoted E^6.

3.4 | Covariates

A number of variables that could influence SEWB are used as controls in Equation (3). These include data on age, education, household size, log of household income, gender, marital status, employment status, and self-reported physical health. Marital status includes those who are married, never married/not in de facto relationship, separated, divorced, or widowed. Employment status includes the categories of employed, unemployed, and not participating in the labour force. Household income, which is measured as disposable income, is standardised using the square root of the household size while education is measured by a series of dummies indicating various levels of attainment (less than high school, high school, diploma, bachelor's degree, advanced degree). We include dummies for the state of residence and remoteness of the region in which the participant lives (major city, inner regional, outer regional, remote). We also use dummies to control for a set of major life events occurring during the past year including marriages, separations, pregnancies, births, and deaths of family members and victims of physical violence.

TABLE 2 Persistence-augmented deprivation scores aggregated across time and SEWB indicators (balanced panel).

Deprivation scores/ ratios	$\alpha=0$			$\alpha=1$			$\alpha=3$		
	$\beta=0$	$\beta=1$	$\beta=3$	$\beta=0$	$\beta=1$	$\beta=3$	$\beta=0$	$\beta=1$	$\beta=3$
All	0.4256	0.4256	0.4256	0.0683	0.0418	0.0681	0.0096	0.0034	0.0095
Aboriginal and Torres Strait Islanders	0.4536	0.4536	0.4536	0.0884	0.0560	0.0882	0.0139	0.0049	0.0139
Non-Aboriginal and Torres Strait Islanders	0.4254	0.4254	0.4254	0.0681	0.0417	0.0679	0.0095	0.0034	0.0095
Aboriginal and Torres Strait Islanders/ non-Aboriginal and Torres Strait Islanders ratio	1.0663	1.0663	1.0663	1.2985	1.3429	1.2990	1.4652	1.4412	1.4632

Note: Author's calculations based on HILDA datasets. Sample size in total for balanced panel: 3187.

TABLE 3 Persistence-augmented deprivation scores disaggregated by SEWB indicators and population subgroups with $\beta = 1$ (balanced panel).

	All			Aboriginal and Torres Strait Islander people			Non-Aboriginal and Torres Strait Islander people			Aboriginal and Torres Strait Islander people/non-Aboriginal and Torres Strait Islanders ratio		
Deprivation scores/ratios	$\alpha = 0$	$\alpha = 1$	$\alpha = 3$	$\alpha = 0$	$\alpha = 1$	$\alpha = 3$	$\alpha = 0$	$\alpha = 1$	$\alpha = 3$	$\alpha = 0$	$\alpha = 1$	$\alpha = 3$
MH1 (GH9B)	0.0404	0.0093	0.0011	0.0400	0.0085	0.0006	0.0404	0.0093	0.0011	0.9901	0.9140	0.5455
MH2 (GH9C)	0.0225	0.0037	0.0003	0.0385	0.0058	0.0003	0.0223	0.0037	0.0003	1.7265	1.5676	1.0000
MH3 (GH9D)	0.2002	0.0654	0.0104	0.2622	0.0938	0.0165	0.1996	0.0651	0.0103	1.3136	1.4409	1.6019
MH4 (GH9F)	0.0397	0.0070	0.0006	0.0478	0.0078	0.0006	0.0396	0.0070	0.0006	1.2071	1.1143	1.0000
MH5 (GH9H)	0.1154	0.0332	0.0048	0.1717	0.0537	0.0084	0.1148	0.0329	0.0048	1.4956	1.6322	1.7500

Note: Author's calculations based on HILDA datasets. Sample size in total for balanced panel: 3187. See Table 1 for description of the SEWB dimensions labelled GH9B, GH9C, GH9D, GH9F, and GH9H.

4 | RESULTS

4.1 | Persistence augmented estimate of SEWB and the distribution sensitivity of the relative deprivation of the Aboriginal and Torres Strait Islanders population

The following features of persistence augmented (β) estimates of SEWB reported for a variety of distribution sensitivity (α) values in Tables 2 and 3 are worth noting: (a) conditional on α fixed at an a priori value, the deprivation scores decline with an increase in the persistence parameter (β) suggesting the transitory nature of the deprivation, (b) consistent with our earlier observation, the Aboriginal and Torres Strait Islander people/non-Aboriginal and Torres Strait Islanders ratio in Table 3 varies with dimensions with the Aboriginal and Torres Strait Islanders

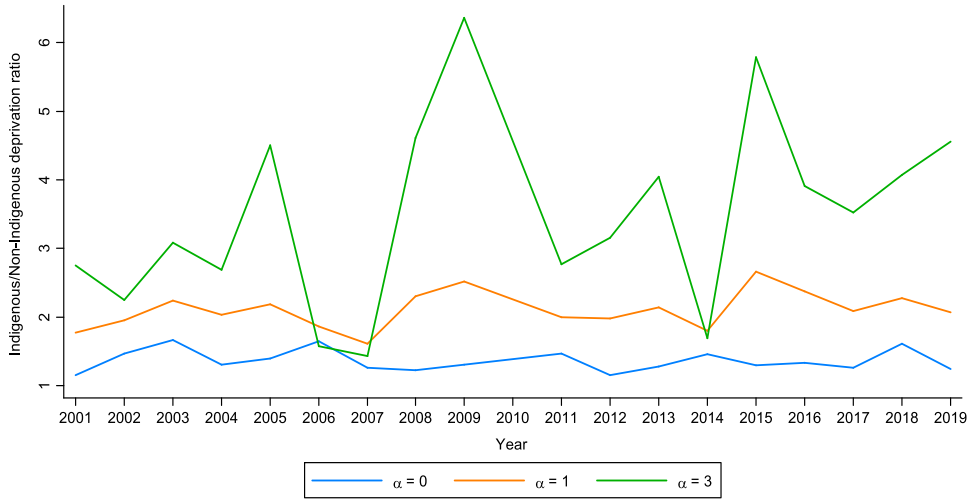

FIGURE 1 Ratio of deprivation scores of Indigenous to non-Indigenous over 10 living standard dimensions and time. [Colour figure can be viewed at wileyonlinelibrary.com]

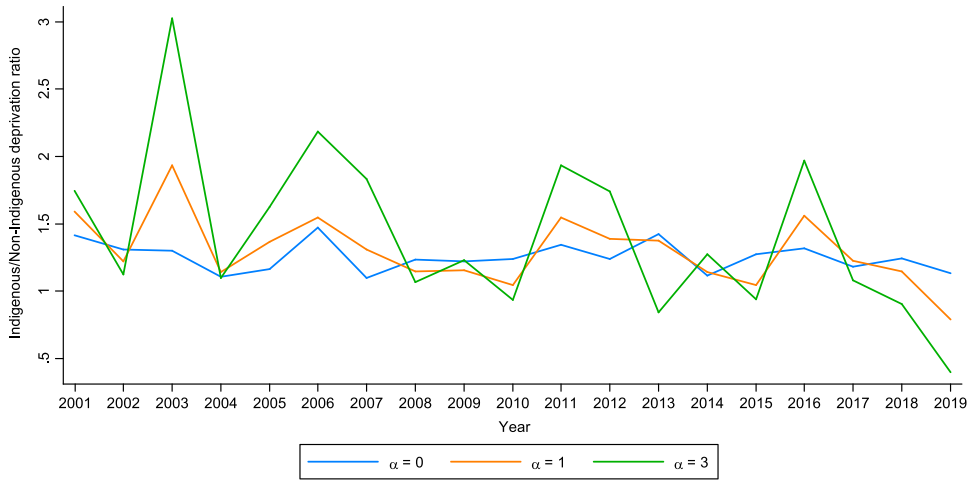

FIGURE 2 Ratio of deprivation scores of Indigenous to non-Indigenous over mental health dimensions and time. [Colour figure can be viewed at wileyonlinelibrary.com]

recording marginally lower relative deprivation (<1) *vis-à-vis* the non-Aboriginal and Torres Strait Islanders for the first indicator ('nervous person') and much higher relative deprivation for the others, and (c) most significantly, Table 3 shows that conditional on β fixed a priori, an increase in α is associated with a sharp increase in the Aboriginal and Torres Strait Islander people/non-Aboriginal and Torres Strait Islanders deprivation ratio in some of the SEWB dimensions, but not for others. Table 2 shows, however, that when aggregated over all the SEWB dimensions, an increase in the distribution sensitivity parameter, α, conditional on β, is associated with an increase in the Aboriginal and Torres Strait Islander people/non-Aboriginal and Torres Strait Islanders deprivation ratio. The last feature suggests that deprivation in SEWB of the Aboriginal and Torres Strait Islanders is felt acutely by those who are unfortunate enough to be deprived in more dimensions, a feature that is picked up by the distribution sensitivity measure, and it is for this group that the relative disparity with non-Aboriginal and Torres Strait Islanders is at its peak. This result is consistent with the observation of Rohde et al. (2014), who found that in the United States, Germany, and Britain, much of the economic insecurity is concentrated at the lower end of the distribution. Besides extending their result from economic insecurity to SEWB while adopting a different methodology and framework, the present study also finds that their evidence on the distribution sensitivity of the comparisons holds for Australia

TABLE 4 Impact of economic insecurity on SEWB: fixed effects estimates.

	Aboriginal and Torres Strait Islander people				Non-Aboriginal and Torres Strait Islander people			
Dep. Var.* = *SEWB **Variable**	$\widehat{\theta}^j$	**Std. Err.**	R^2	***N***	$\widehat{\theta}^j$	**Std. Err.**	R^2	***N***
Subjective indices								
Job insecurity (E^1)	−0.083***	0.021	0.064	2769	−0.073***	0.003	0.048	118 009
Financial dissatisfaction (E^2)	−0.091***	0.017	0.060	5648	−0.118***	0.003	0.047	184 804
Emergency funds (E^3)	−0.037**	0.019	0.053	5455	−0.067***	0.004	0.037	182 068
Objective indices								
Income drop (E^4)	0.004	0.010	0.052	5658	0.001	0.002	0.034	184 964
Expenditure distress (E^5)	−0.085***	0.017	0.085	2275	−0.104***	0.004	0.039	101 582
Unemployment risk (E^6)	−0.154***	0.027	0.098	2344	−0.189***	0.005	0.060	105 019
F test (1)	11.77*** (0.00)	--	--	--	339.73*** (0.00)	--	--	--
F test (2)	17.13*** (0.00)	--	--	--	487.31*** (0.00)	--	--	--
F test (3)	16.43*** (0.00)	--	--	--	533.49*** (0.00)	--	--	--
Controls	Yes	--	--	--	Yes	--	--	--
State fixed effects	Yes	--	--	--	Yes	--	--	--
Year fixed effects	Yes	--	--	--	Yes	--	--	--

Note: Columns one and five give estimates of standardised parameter $\widehat{\theta}^j$ from Equation (3) for the six insecurity measures. Std. Err. in columns two and six give robust standard error of estimates clustered at individual level. Columns three and seven give the within R^2 statistic, and columns four and eight show the number of individual observations. *F* test (1) refers to the test for the joint significance of coefficients of the six economic insecurity measures. *F* test (2) refers to the test for the joint significance of coefficients of the three subjective economic insecurity measures. *F* test (3) refers to the test for the joint significance of coefficients of the three objective economic insecurity measures. *p* values in parentheses. All regressions include control variables: income, age, gender, household size, education, employment status, marital status, geographical location, physical health summary index, and major life event dummies for births, deaths, marriage, separation, pregnancy, and victim of violence. ***$p < 0.01$, **$p < 0.05$, and *$p < 0.10$.

TABLE 5 Impact of economic insecurity on SEWB dimensions: fixed effects estimates.

Variable	Aboriginal and Torres Strait Islander people				Non-Aboriginal and Torres Strait Islander people			
	$\hat{\theta}^j$	Std. Err.	R^2	N	$\hat{\theta}^j$	Std. Err.	R^2	N
Dep. Var. = Nervous person (GH9B)								
Subjective indices								
Job insecurity (E^1)	−0.083**	0.036	0.038	2780	−0.052***	0.004	0.008	118 339
Financial diss. (E^2)	−0.046*	0.028	0.027	5686	−0.070***	0.004	0.009	185 626
Emergency funds (E^3)	−0.027	0.028	0.029	5482	−0.035***	0.005	0.008	182 749
Objective indices								
Income drop (E^4)	−0.021	0.016	0.026	5696	0.004*	0.002	0.007	185 788
Expenditure distress (E^5)	−0.062***	0.023	0.052	2275	−0.074***	0.005	0.011	101 582
Unemployment risk (E^6)	−0.107***	0.034	0.054	2344	−0.133***	0.006	0.017	105 019
F test	2.39** (0.03)	--	--	--	108.28*** (0.00)	--	--	--
Dep. Var. = Nothing could cheer one up (GH9C)								
Subjective indices								
Job insecurity (E^1)	−0.106***	0.038	0.044	2780	−0.053***	0.004	0.012	118 339
Financial diss. (E^2)	−0.117***	0.027	0.028	5686	−0.099***	0.005	0.015	185 626
Emergency funds (E^3)	0.011	0.035	0.028	5482	−0.052***	0.005	0.013	182 749
Objective indices								
Income drop (E^4)	0.012	0.014	0.023	5696	−0.004	0.003	0.011	185 788
Expenditure distress (E^5)	−0.079***	0.021	0.056	2275	−0.099***	0.006	0.020	101 582
Unemployment risk (E^6)	−0.132***	0.042	0.061	2344	−0.165***	0.006	0.028	105 019
F test	4.66*** (0.00)	--	--	--	155.51*** (0.00)	--	--	--
Dep. Var. = Felt Calm and peaceful (GH9D)								
Subjective indices								
Job insecurity (E^1)	−0.113***	0.032	0.041	2780	−0.071***	0.005	0.012	118 339
Financial diss. (E^2)	−0.106***	0.026	0.026	5686	−0.119***	0.005	0.017	185 626
Emergency funds (E^3)	−0.086***	0.031	0.025	5482	−0.059***	0.005	0.013	182 749
Objective indices								
Income drop (E^4)	0.006	0.015	0.021	5696	0.001	0.002	0.012	185 788
Expenditure distress (E^5)	0.065***	0.022	0.056	2275	−0.087***	0.005	0.015	101 582
Unemployment risk (E^6)	−0.181***	0.028	0.069	2344	−0.165***	0.006	0.023	105 019
F test	11.06*** (0.00)	--	--	--	165.25*** (0.00)	--	--	--
Dep. Var. = Felt mentally down (GH9F)								
Subjective indices								
Job insecurity (E^1)	−0.112***	0.034	0.044	2780	−0.074***	0.004	0.016	118 339
Financial diss. (E^2)	−0.097***	0.029	0.024	5686	−0.123***	0.005	0.019	185 626
Emergency funds (E^3)	−0.040	0.031	0.027	5482	−0.065***	0.005	0.016	182 749

(Continues)

TABLE 5 (Continued)

Variable	Aboriginal and Torres Strait Islander people				Non-Aboriginal and Torres Strait Islander people			
	$\widehat{\theta}^j$	Std. Err.	R^2	N	$\widehat{\theta}^j$	Std. Err.	R^2	N
Objective indices								
Income drop (E^4)	−0.001	0.013	0.020	5696	−0.0004	0.002	0.014	185 788
Expenditure distress (E^5)	−0.078***	0.019	0.078	2275	−0.100***	0.005	0.022	101 582
Unemployment risk (E^6)	−0.150***	0.034	0.084	2344	−0.182***	0.006	0.032	105 019
F test	6.91*** (0.00)	--	--	--	196.85*** (0.00)	--	--	--
Dep. Var. = Happy person (GH9H)								
Subjective indices								
Job insecurity (E^1)	−0.100***	0.034	0.037	2780	−0.073***	0.004	0.014	118 339
Financial diss. (E^2)	−0.105***	0.026	0.021	5686	−0.116***	0.005	0.019	185 626
Emergency funds (E^3)	−0.056**	0.028	0.019	5482	−0.067***	0.005	0.015	182 749
Objective indices								
Income drop (E^4)	0.022	0.017	0.017	5696	0.002	0.002	0.013	185 788
Expenditure distress (E^5)	−0.062***	0.019	0.054	2275	−0.089***	0.006	0.012	101 582
Unemployment risk (E^6)	−0.107***	0.036	0.057	2344	−0.174***	0.006	0.029	105 019
F test	5.99*** (0.00)	--	--	--	187.19*** (0.00)	--	--	--
Controls	Yes	--	--	--	Yes	--	--	--
State fixed effects	Yes	--	--	--	Yes	--	--	--
Year fixed effects	Yes	--	--	--	Yes	--	--	--

Note: Dependent variables are the five SEWB dimensions. $\widehat{\theta}^j$ refers to standardised parameter estimates from Equation (3) for the six economic insecurity measures. Std. Err. refers to robust standard error of estimate clustered at individual level. Columns three and six give the within R^2 statistic, and columns four and eight show the number of individual observations. *F* test refers to the test for the joint significance of coefficients of the six economic insecurity measures with *p* values given in parentheses. All regressions include control variables: see Table 3 notes. ***$p < 0.01$, **$p < 0.05$, and *$p < 0.10$.

as well. The policy implication is the need to target this group of Aboriginal and Torres Strait Islanders in devising initiatives to bolster SEWB. It is also worth noting from Table 2 that the order of magnitude of the Aboriginal and Torres Strait Islander people/non-Aboriginal and Torres Strait Islanders deprivation ratio is quite robust to the persistence parameter (β) with an increase in persistence not altering the ratio in any one direction sharply.

Figures 1 and 2 compare the relative deprivation of Aboriginal and Torres Strait Islanders between the aggregated 10 conventional living standard dimensions including mental and physical health[18] (Figure 1) and the aggregated five SEWB dimensions[19] (Figure 2), measured by the ratio of their deprivation scores to that of the non-Aboriginal and Torres Strait Islanders by plotting them (*y* axis) against year (*x* axis). Three features stand out: (a) in both cases, the relative deprivation increases with the distribution sensitivity parameter α, (b) the two measures of relative deprivation do not always move in the same direction, with that for SEWB declining towards the end of our sample period (2017–2019), which is partly true for the living standard dimensions in case of measures with little or no distribution sensitivity $(\alpha = 0, 1)$, but the reverse is the case for higher sensitivity $(\alpha = 3)$ with the relative deprivation of the Aboriginal and Torres Strait Islanders recording a sharp increase, and (c) the relative deprivation is much higher for living standards than for SEWB. The results of this section establish the distribution sensitivity of the

TABLE 6 Impact of Economic Insecurity on SEWB: Pooled OLS estimates.

	(1)		(2)		(3)		(4)		(5)		(6)	
Dep. Var.* = *SEWB Variable	$\widehat{\theta}^j$	**Std. Err.**	$\widehat{\theta}^j$	**Std. Err.**	$\widehat{\theta}^j$	**Std. Err.**	$\widehat{\theta}^j$	**Std. Err.**	$\widehat{\theta}^j$	**Std. Err.**	$\widehat{\theta}^j$	**Std. Err.**
Subjective indices												
Job insecurity (E^1)	−0.173***	0.004	--	--	--	--	--	--	--	--	--	--
Financial dissatisfaction (E^2)	--	--	−0.249***	0.005	--	--	--	--	--	--	--	--
Emergency funds (E^3)	--	--	--	--	−0.167***	0.005	--	--	--	--	--	--
Objective indices												
Income drop (E^4)	--	--	--	--	--	--	0.018***	0.002	--	--	--	--
Expenditure distress (E^5)	--	--	--	--	--	--	--	--	−0.170***	0.005	--	--
Unemployment risk (E^6)	--	--	--	--	--	--			--	--	−0.326***	0.006
Aboriginal and Torres Strait Islander people	−0.110***	0.045	−0.056*	0.033	−0.010	0.035	−0.065*	0.035	−0.070	0.047	−0.071	0.045
R^2	0.123	--	0.189	--	0.158	--	0.139	--	0.118	--	0.164	--
N	120 778	--	190 452	--	187 523	--	190 622	--	103 857	--	107 363	--
F test	702.48***	--	--	--	--	--	--	--	--	--	--	--
	(0.00)	--	--	--	--	--	--	--	--	--	--	--
Controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
State fixed effects	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Year fixed effects	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--

Note: $\widehat{\theta}^j$ refers to standardised parameter estimates from Equation (3) for the six economic insecurity measures. Std. Err. refers to Robust standard error of estimates clustered at individual level. The Aboriginal and Torres Strait Islanders dummy variable takes the value of 1 if the individual is an Aboriginal or Torres Strait Islander, and 0 otherwise. R^2 refers to the proportion of the variation explained by the model. N refers to the number of individual observations. F test refers to the test for the joint significance of coefficients of the six economic insecurity measures with p values given in parentheses. All regressions include control variables: see Table 3 notes. ***$p < 0.01$, **$p < 0.05$, and *$p < 0.10$.

results though, qualitatively, the relative deprivation of SEWB experienced by the Aboriginal and Torres Strait Islanders in relation to the non-Aboriginal and Torres Strait Islanders is robust.

4.2 | Comparative effects of economic insecurity on mental and physical health between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders

Let us now turn to estimation in examining the effect of economic insecurity on SEWB and on physical health. While the former is reported in Tables 4–6, the latter is reported in Table 7. In keeping with the motivation of this study, the focus of the results is on the comparison between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders. Since the economic insecurity measures (E^j_{it}, $j = 1,.,6$) are distributed differently with varying units of measurement, each measure is transformed to produce normalised indices that have a mean of zero and a standard deviation of one and hence Tables 4–6 provides estimates of the standard deviation shocks (θ) that are comparable across measures.

Table 4 allows a comparison of the effects of economic insecurity on SEWB between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders. The estimates show that, with the exception of income drop (E^3), economic insecurity has significant effects on the SEWB of both population subgroups. This is confirmed by the *F* statistic that reports the test of the joint significance of the economic insecurity coefficient estimates. The *F* values reported in Table 5 show that this result confirming high significance of the effect of economic insecurity on SEWB is true not only for the joint effect of all the six indices of economic insecurity but also for the

TABLE 7 Impact of Economic Insecurity on Physical Health: Fixed effects estimates.

	Aboriginal and Torres Strait Islander people				Non-Aboriginal and Torres Strait Islander people			
Dep. Var.* = *Physical health **Variable**	$\widehat{\theta}^j$	**Std. Err.**	R^2	***N***	$\widehat{\theta}^j$	**Std. Err.**	R^2	***N***
Subjective indices								
Job insecurity (E^1)	−0.016	0.017	0.058	2769	−0.007***	0.002	0.019	118 009
Financial dissatisfaction (E^2)	−0.0001	0.154	0.062	5648	−0.005*	0.003	0.051	184 804
Emergency funds (E^3)	0.011	0.020	0.059	5455	−0.014***	0.003	0.051	182 068
Objective indices								
Income drop (E^4)	−0.013	0.010	0.062	5658	−0.001	0.001	0.051	184 964
Expenditure distress (E^5)	−0.011	0.015	0.053	2275	0.011***	0.003	0.019	101 582
Unemployment risk (E^6)	−0.076***	0.030	0.060	2344	−0.079***	0.004	0.027	105 019
F test	2.73*** (0.01)	--	--	--	82.45*** (0.00)	--	--	--
Controls	Yes	--	--	--	Yes	--	--	--
State fixed effects	Yes	--	--	--	Yes	--	--	--
Year fixed effects	Yes	--	--	--	Yes	--	--	--

Note: $\widehat{\theta}^j$ refers to standardised parameter estimates of the six economic insecurity measures. Std. Err. refers to Robust standard error of estimates clustered at individual level. Columns three and seven give the within R^2 statistic, and columns four and eight show the number of individual observations. *F* test refers to the test for the joint significance of coefficients of the six economic insecurity measures with *p* values given in parentheses. All regressions include control variables: see Table 3 notes. ***$p < 0.01$, **$p < 0.05$, and *$p < 0.10$.

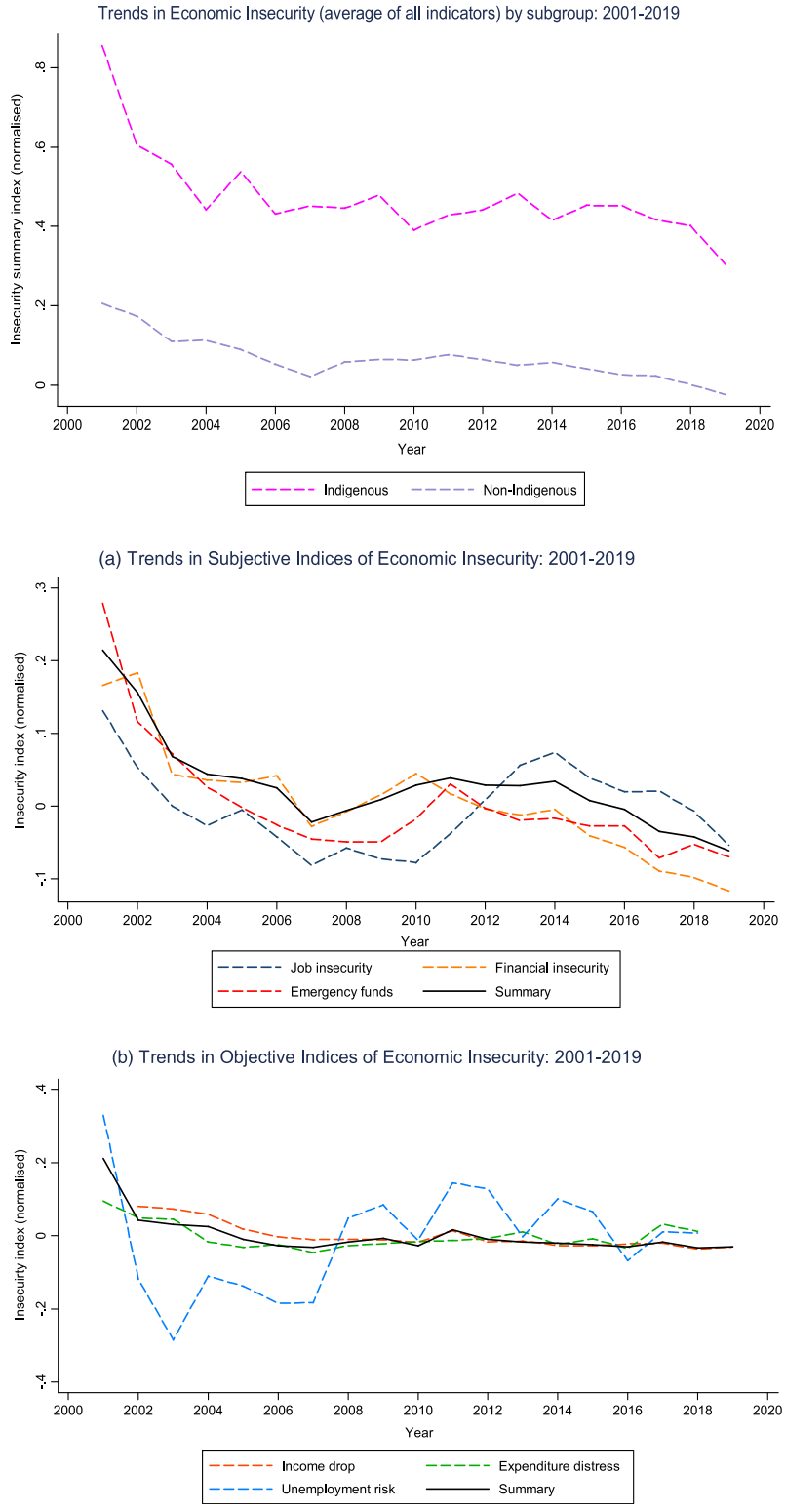

FIGURE 3 Legend on next page.

FIGURE 3 Trends in economic insecurity (average of all indicators) by subgroup: 2001–2019. (a) Trends in Subjective Indices of Economic Insecurity: 2001–2019. (b) Trends in Objective Indices of Economic Insecurity: 2001–2019. [Colour figure can be viewed at wileyonlinelibrary.com]

three subjective and the three objective indices tested separately. In case of both subgroups, Unemployment risk has a greater adverse effect on the SEWB than the other insecurity variables. A comparison of the economic insecurity coefficient estimates ($\widehat{\theta}^j$) between the subgroups shows that no generalised statement is possible on their relative magnitudes.

Table 5 allows an examination of the effects of economic insecurity disaggregated by the different aspects of SEWB as captured by the questions in HILDA described earlier. Consistent with Table 4, a comparison of the $\widehat{\theta}^j$ estimates between the two subgroups shows that no generalised statements can be made of their relative magnitudes. However, one feature of both tables is that at both the aggregated (Table 4) and dimension disaggregated levels (Table 5), job insecurity has a greater adverse effect on the SEWB of Aboriginal and Torres Strait Islanders than non-Aboriginal and Torres Strait Islanders. Table 6 provides formal evidence of the larger effect of economic insecurity on the SEWB faced by the Aboriginal and Torres Strait Islanders by pooling the two subgroups and introducing a dummy for Aboriginal and Torres Strait Islanders. The pooled estimates confirm the dominance of the effect of Job insecurity and Unemployment risk on SEWB over the others for both subgroups. To keep the evidence on the effect of economic insecurity on SEWB reported in Table 4 in perspective and facilitate a comparison, Table 7 presents the corresponding effects on physical health. In contrast to Table 4, with the exception of unemployment risk, the effects of economic insecurity on physical health for the Aboriginal and Torres Strait Islanders are insignificant, but this is not the case for the non-Aboriginal and Torres Strait Islanders population for several of the economic insecurity variables.

Evidence on the trends in economic insecurity over time experienced by the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders is provided in Figure 3 (aggregated over the subjective and objectives indices) and disaggregated between the two indices in Figure 3a (subjective indices) and Figure 3b (objective indices). The indices are normalised to allow comparison between and within each Figure. The disaggregated pictures presented in Figure 3a,b do not reveal any clear picture between the various measures except suggesting that the objective indices (Figure 3b) portray a higher amount of insecurity than the subjective indices (Figure 3a). Note, also, that while the subjective indices record a sharp fall in economic insecurity towards the end of our sample period, this is not the case with the objective indices. In both figures, job insecurity and unemployment risk dominate the other forms of economic insecurity.

5 | SUMMARY AND CONCLUSIONS

This paper contributes to the growing literature on the topic of SEWB. Though SEWB is closely related to an individual's well-being, and vice versa, the economic literature on the topic is relatively recent and limited. This study focusses on the SEWB of Aboriginal and Torres Strait Islanders in relation to the non-Aboriginal and Torres Strait Islanders on which there is very little evidence. The motivation of this study is to address this limitation. While much attention is paid in Australian policy discussions on 'closing the gap' between the two groups, unlike physical health on which significant attention is paid,[20] SEWB does not explicitly feature in the list of areas where the gap is quantified and targeted for policy interventions to close it. In asking a set of questions posed in the paper and attempting to provide answers, we seek to extend the discussion on devising welfare improving strategies to include SEWB in the list of priority areas for interventions. The growing divide between the two groups and the need to address the divide has recently attracted considerable interest in the wake of efforts to give the Aboriginal and Torres Strait Islanders a 'voice' that can be heard and acted upon. The timing and results of this study on SEWB should contribute to these efforts.

This study has several features that constitute deviations from the literature. First, it recognises that SEWB is multidimensional and uses the methodology of Multidimensional Deprivation to quantify the deprivation in SEWB. This approach has not been used before in any study of SEWB. The distribution sensitivity of the comparison of SEWB between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders with the picture altering as we restrict the comparison to those deprived in more and more dimensions is a result of interest. An important finding from our study is the need to distinguish between the alternative forms of deprivation in SEWB since there is no generalised, dimension variant, picture on the effects of the various forms of economic insecurity on the various components of SEWB. Second, in keeping with the recent methodological extensions in Multidimensional Deprivation, the study adopts a dynamic framework that allows the deprivation in SEWB to be persistent. Third, the study compares the estimated effects of economic insecurity between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders and between the various types of economic insecurity. Not only do the Aboriginal and Torres Strait Islanders' experience worse SEWB than the non-Aboriginal and Torres Strait Islanders, they experience greater level of economic insecurity. This is due to centuries of discrimination, violence and marginalisation, faced by the Aboriginal and Torres Strait Islanders people. As the referee pointed out, one requires 'a more adequate understanding of the ongoing effects of colonisation on Aboriginal and Torres Strait Peoples in Australia … (that) encompasses dispossession, breakdown of kinship structures, alienation from cultural practices, ongoing social disadvantage and experiences of discrimination, including low employment, and so on. It is within this context the SEWB becomes important.' We leave that for a future study.

Job insecurity and unemployment risk emerge as the insecurity dimensions with greater effect on SEWB than the others, along with the robust result that the magnitude of the effect of Job insecurity is larger for the Aboriginal and Torres Strait Islanders. Finally, the results on the estimated effects are asymmetric between physical health and SEWB with the adverse effects of economic insecurity on physical health much more significant for the non-Aboriginal and Torres Strait Islanders than for the Aboriginal and Torres Strait Islanders in sharp contrast to that on SEWB. An important lesson from our exercise is that in the Australian context, 'closing the gap' between the Aboriginal and Torres Strait Islanders and non-Aboriginal and Torres Strait Islanders should explicitly include SEWB as a target since the evidence shows that this gap has not been closing in the long time period considered in this study.

The study draws attention to data inadequacies as the topic of SEWB attracts more research. Though we had to rely on the responses to the questions on SEWB in the HILDA dataset, they are poor proxies of the true SEWB 'dimensions' in the Multidimensional Deprivation methodology. The limited literature on SEWB in Australia uses the HILDA dataset. HILDA was not designed as the source of specialist information on SEWB though it can be usefully augmented to allow research on the topic. The Short Form Health Survey (SF-36) questions included in the Self-Completion Questionnaire (SCQ) of the HILDA survey should be integrated with the rest of the Survey and the questions modified/elaborated to provide a richer set of information on SEWB similar to the standard of living dimensions. This is one of the lessons of this exercise. As the literature on SEWB grows so will be the demand for richer and more disaggregated information on the subject.

The present exercise can be extended to study the relative deprivation of other marginalised groups in Australia and in other countries with special reference to their deprivation in SEWB. Marginalisation and discrimination of minority groups by the mainstream can lead to deterioration in their SEWB. To address this, the first step is to (a) devise measures to quantify SEWB that will enable us to identify the nature and scale of the problem and how SEWB, both in aggregate and its individual components, is trending over time, and (b) provide for richer datasets that support it. This is a topic where a multidisciplinary approach is required to supplement and widen the economically focussed analysis of this study.

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CONFLICT OF INTEREST STATEMENT

There is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed in this study.

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ENDNOTES

[1] See the recent report by the Australian Human Rights Commission, https://humanrights.gov.au/sites/default/files/australias_criminal_justice_system_-_australias_third_upr_2021.pdf, which found an over-representation with for example, 'Aboriginal and Torres Strait Islander people are overall 12 times more likely to be in prison than non-Indigenous people. Aboriginal and Torres Strait Islander women are the fastest growing prisoner population and are 19 times more likely to be in prison than non-Indigenous women.'

[2] This term is more well known as 'Mental Health', but following the suggestion in https://healthinfonet.ecu.edu.au/learn/health-topics/social-and-emotional-wellbeing, we use the term, 'Social and Emotional Well Being' (SEWB) used by the Aboriginal and Torres Strait Islander people in this context. See also Kowal et al. (2007), for a discussion of the appropriateness of the term, SEWB, in the context of the socioeconomic disadvantage and health inequality faced by Aboriginal and Torres Strait Islander people. See also Markwick et al. (2015) for comparative evidence between the psychological distress of Aboriginal Islanders people and the others on data from the Australian state of Victoria.

[3] See https://healthinfonet.ecu.edu.au/learn/health-topics/social-and-emotional-wellbeing/ for a more complete list.

[4] The best example of a multidimensional welfare index, inspired by Sen's contribution, is the Human Development Index (HDI) that is now routinely used in cross-country comparisons.

[5] According to the Australian Institute of Health and Welfare, 'the rate of suicide deaths is approximately two and a half times as high among First Nations people compared with non-Indigenous Australians'—https://www.aihw.gov.au/suicide-self-harm-monitoring/data/populations-age-groups/suicide-indigenous-australians.

[6] https://www.oecd.org/coronavirus/policy-responses/tackling-the-mental-health-impact-of-the-covid-19-crisis-an-integrated-whole-of-society-response-0ccafa0b/.

[7] https://www.niaa.gov.au/resource-centre/indigenous-affairs/national-strategic-framework-mental-health-social-emotional-wellbeing-2017-23.

[8] https://www.pmc.gov.au/sites/default/files/reports/closing-the-gap-2018/sites/default/files/ctg-report-20183872.pdf?a=1. The lack of mention of SEWB is also true of the latest report (2023) available in https://www.niaa.gov.au/2023-commonwealth-closing-gap-implementation-plan/minister-indigenous-australians%E2%80%99-foreword.

[9] Nicholas and Ray (2012) contain further details on the persistence-augmented measure of multidimensional deprivation.

[10] See Rohde et al. (2016, eqs. 1–3) for expressions on how they are measured from information in the HILDA dataset.

[11] See Summerfield (2010) for more information about the survey.

[12] See Watson and Wooden (2004) for detailed description of the HILDA dataset.

[13] The transformed SEWB scores follow the procedure presented by Ware et al. (2000).

[14] To conserve space, results are not reported but available upon request.

[15] For analysis involving all 10 dimensions, Wave 10 (year 2010) is dropped from the analysis because the question was not updated. See Watson and Wooden (2010) for detailed explanation on changes made to Wave 10 of the HILDA Survey.

[16] In Waves 1–8, this question asks the respondent if they are able to raise $2000 in an emergency and was updated to $3000 from Wave 9 onwards.

[17] The equations are estimated for both probit models for each wave separately, and hence, no estimates can be obtained for the final period.

[18] See Table A1.

[19] See Table 1.

[20] See, for example, the Oxfam programme on improving the Health and Welfare of Aboriginal and Torres Strait Islander people Australians described in https://www.oxfam.org.au/what-we-do/indigenous-australia/health-and-wellbeing-program/.

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APPENDIX A

TABLE A1 Description of dimensions and variables.

Variable	Description	Deprivation cut-off (h_i)
SEWB	See Table 1	Individual is deprived in an indicator if the score does not cross the scale of 1–3
Community	Indicates the level of satisfaction with feeling part of your local community. Scale: 0 (*totally dissatisfied*) to 10 (*totally satisfied*)	Individual is deprived if the score does not cross the scale of 0–5
Heating	Was unable to heat home	Dichotomous variable that takes the value of 1 (*if deprived*) or 0 (*if not deprived*)
Meals	Went without meals	Dichotomous variable that takes the value of 1 (*if deprived*) or 0 (*if not deprived*)
Physical health	SF-36 Index on Physical Health pertaining to individual's physical health Scale: 0–100	Individual is deprived if does not cross 50
Raise2k	Difficulty in raising $2000 for an emergency Scale: 1 (*Could easily raise emergency funds*) to 4 (*Couldn't raise emergency funds*)	Individual is deprived if 'Couldn't raise emergency funds'
Rent	Could not pay the mortgage or rent on time	Dichotomous variable that takes the value of 1 (*if deprived*) or 0 (*if not deprived*)
Safety	Indicates your level of satisfaction with how safe you feel. Scale: Scale: 0 (*totally dissatisfied*) to 10 (*totally satisfied*)	Individual is deprived if the score does not cross the scale of 0–5
Utilities	Could not pay electricity, gas or telephone bills on time	Dichotomous variable that takes the value of 1 (*if deprived*) or 0 (*if not deprived*)
Unemp	Constructed from several questions pertaining to employment status based on the ABS (2001) classification	Unemployed persons are those aged 15 years and over who satisfy all three of the following: person is not employed, looking for work, available to start work.