Author/s:
Botha, F;Nguyen, VH

Title:
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Date:
2022-01-01

Citation:
Botha, F. & Nguyen, V. H. (2022). Opposite nonlinear effects of unemployment and sentiment on male and female suicide rates: Evidence from Australia. Social Science and Medicine, 292, https://doi.org/10.1016/j.socscimed.2021.114536.

Persistent Link:
https://hdl.handle.net/11343/295940

Opposite Nonlinear Effects of Unemployment and Sentiment on Male and Female Suicide Rates: Evidence from Australia

Ferdi Botha[a,b,*] & Viet H. Nguyen[a]

[a] Melbourne Institute: Applied Economic & Social Research, The University of Melbourne

[b] ARC Centre of Excellence for Children and Families over the Life Course

* Corresponding author. Email: ferdi.botha@unimelb.edu.au

111 Barry Street, Level 5, Faculty of Business and Economics, Carlton, VIC 3052

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Abstract

We investigate gender differences in the effects of unemployment and sentiment on suicide rates. Using monthly Australian data, we find a positive relationship between the unemployment rate and the suicide rate, and a negative relationship between consumer sentiment and the suicide rate. However, there is strong evidence of nonlinearity in the effects of both unemployment and sentiment on suicide rates, with substantial gender differences. For men, an increase in the unemployment rate increases the suicide rate, but an unemployment decrease has no effect; we find the opposite for women. For men, an increase in sentiment has stronger effects on the suicide rate than a decrease in sentiment. Again, we observe the opposite effect for women. Among sentiment components, forward-looking expectations are stronger predictors of suicide rates than present conditions. Sentiment has a much stronger effect on male suicide rates than on female suicide rates.

JEL: C22, E24, E70, I10

Keywords: Suicide rate, unemployment rate, consumer sentiment, Australia, asymmetry

1. Introduction

Globally, suicide is one of the leading causes of non-natural death, with the World Health Organization (WHO) reporting roughly 703,000 suicide deaths each year (WHO, 2021). Although 77% of global suicides occurred in low- and middle-income countries (WHO, 2021), according to the 2017 Global Burden of Disease Study suicide rates in high-income and high Social-Demographic Index (SDI) countries are considerably higher than the world average (IHME, 2018). While the high suicide rates in high-income and high-SDI countries pose a significant public health concern in these countries, it also raises an important question of the influences of economic factors on suicide rates.

Among high-income and high SDI countries, Australian male and female suicide rates, at 17.4 and 5.0 deaths per 100,000 population respectively, are around the averages (IHME, 2018). Among OECD countries, Australian male and female suicide rates are slightly above the OECD averages (OECD, 2019). Moreover, among OECD nations with suicide rates around the OECD averages, Australia is the largest economy. These factors make Australia an interesting and relevant case to study the impacts of macroeconomic conditions on suicide rates. Since the mid-1980s, at least 2,000 suicides (on average 12.8 deaths per 100,000 population) were reported annually in Australia, and from 2017 to 2019 there were between 3,100 and 3,300 suicides each year (equating to about 13 deaths per 100,000). Importantly, there is a substantial gender difference with men accounting for just more than three quarters of reported suicides (AIHW, 2019; ABS, 2020a; WHO, 2021).

The substantial gender difference in suicide rates is, importantly, a phenomenon observed across the world (IHME, 2018). There are likely a multitude of psychological and socio-economic factors that cause this gender difference. However, abstracting from social and psychological factors, as individuals within an economy, both men and women are subject to the same economic conditions and macroeconomic events such as financial crises or recessions. This raises the question of whether there are major differences in the ways that men and women respond to changes in economic conditions. Research into the factors that influence suicide rates and the mechanisms through which such factors influence suicide rates can provide valuable information for well-targeted policy initiatives and interventions.

In this paper, we focus on the roles of economic factors in explaining suicide rates. We use two popular macroeconomic variables, namely the unemployment rate and a consumer sentiment index, as proxies for economic factors indicative of current and future economic conditions, respectively. The unemployment rate is often used as one of the key economic variables to construct the coincident index of economic activity, to monitor current economic conditions (Stock and Watson, 1991; Stock and Watson, 2011; Lim and Nguyen, 2015). The consumer sentiment index is mainly predictive of future economic conditions, particularly household consumption (Carroll, Fuhrer, and Wilcox, 1994; Bryant and Macri, 2005; Chua and Tsiaplias, 2009).

We estimate linear and nonlinear Auto-Regressive Distributed Lag (ARDL) models to allow for both symmetric and asymmetric effects of economic variables on suicide rates, on monthly Australian data from February 1990 to September 2018. We also split the sample by gender to study possible different mechanisms through which economic factors influence male and female suicide rates. In addition to the reasons provided earlier, our focus on Australian data is also partly due to advantages of the Westpac-Melbourne Institute Consumer Attitudes, Sentiments, and Expectations (CASiE) survey which is used to construct sentiment measures. CASiE is modelled on the University of Michigan Survey of Consumers (MSC), but it consists of 1,200 consumers per month as compared to around 500 consumers in the MSC. Importantly, CASiE is stratified by gender, age and location so it is representative of the Australian population.

Existing studies on determinants of suicide rates mostly focus on the effects of objective economic factors. The unemployment rate is most frequently used as a proxy for objective economic factors and generally has a significant effect on suicide rates across a range of countries. Specifically, an increase in unemployment rates leads to an increase in suicide rates, and vice versa (Gerdtham and Johannesson, 2003; Barstad, 2008; Altinanahtar and Halicioglu, 2009; Andrés and Halicioglu, 2010, 2011; Andrés et al., 2011; Ceccherini-Nelli and Priebe, 2011; Antonakakis and Collins, 2014; Ruhm, 2015; Aggrawal et al., 2017; Mattei and Pistorei, 2019; Abdou et al., 2020; Atalay et al., 2020, Meda et al., 2021). Real economic growth is the other popular proxy in the literature though its effect on suicide rates is less

pronounced than that of the unemployment rate (Ceccherini-Nelli and Priebe, 2011; Gonzalez and Quast, 2011; Okada and Samreth, 2013; dos Santos et al., 2016).

The limited focus on consumer sentiment in explaining suicide is surprising. Suicide is ultimately an individual outcome and might therefore also be dependent on personal circumstances or perceptions as opposed to current, objectively measured, economic factors. Moreover, there is growing evidence that negative future economic expectations and uncertainty can adversely impact reported stress levels and individual mental health (Rhode et al., 2016; van Giesen and Pieters, 2019; Avdic et al., 2020; Johnston et al., 2020), and suicide (Korhonen et al., 2016; Christian et al., 2019; Vandoros et al., 2019; de Bruin et al., 2020). The studies of Berk et al. (2006) and Collins et al. (2021) begin to shed some light on the influence of economic indicators on suicide rates using a consumer sentiment index (Nowzohour and Stracca, 2020). As a self-reported measure, a consumer sentiment index can reflect the emotional responses of individuals to their own perceived current or expected economic circumstances and "capture the underlying feeling of economic pressures on an individual that are unlikely to be reflected in measures of unemployment" (Collins et al., 2021:6).

Berk et al. (2006) investigate the effects of a range of current economic indicators as well as a consumer sentiment index on suicide rates using Australian data from January 1968 to August 2002. Estimating a linear regression of suicide rates on a single variable at a time, they find a positive relationship between the unemployment rate and the suicide rate for men, but a negative relationship for women. They also find a negative association between the consumer sentiment index and the male suicide rate, but no association with the female suicide rate, though the correlations with the consumer sentiment index and its components are generally very small. Collins et al. (2021) estimate several dynamic panel models using US state-level data and find that an increase in the consumer sentiment index reduces state suicide rates, and that this effect is larger for females than for males. The authors also find that the unemployment rate is mostly insignificant in explaining suicide rates. Neither Berk et al. (2006) nor Collins et al. (2021) investigates the possibility of nonlinearity in the effects of current and forward-looking economic indicators on suicide rates.

With growing evidence that consumers respond asymmetrically to economic information (Soroka, 2006; Nguyen and Claus, 2013), and that economic stressors play more important roles in suicide among men than among women (Qin et al., 2000; Wunderlich et al., 2001), recent studies also investigate possible asymmetry in the relationship between suicide rates and current economic conditions. Wu and Cheng (2010) find that economic expansion in the US, measured by positive deviations of the unemployment rate from its trend, significantly reduces fatalities from suicide while recession has no significant effect. This asymmetry only holds for men and working-age groups. Chang and Chen (2017) examine the responses of suicide rates to unemployment rates across age groups in the US using annual data between 1928-2013. The authors find evidence that economic expansion (a decrease in the unemployment rate) has a greater effect on the suicide rate of those aged over 45 than economic recession does. Lin and Chen (2018) also find evidence of asymmetry in the effects of economic cycles on the suicide rates of different age groups. None of these studies, however, considers possible asymmetries in the effects of economic indicators such as a consumer sentiment index on suicide rates.

To our knowledge, this paper is the first to study the asymmetric effects of both unemployment and sentiment on suicide rates in a unified framework. Several studies also use other social and economic factors such as the divorce rate, fertility rate, migration, population density, alcohol and cigarette consumption, income, expenditures on mental health, public health and public welfare as controls in their analyses (Wu and Chen, 2010; Chang and Chen, 2017; Collins et al., 2021). However, because most of these variables are often insignificant in explaining changes in suicide rates (as is also the case in our study), we focus only on two of the most important factors in the literature, namely the unemployment rate and consumer sentiment, in favor of more parsimonious models.

Chang and Chen (2017) and Collins et al. (2021) are the two studies closest to our analysis. However, in explaining the suicide rates of different demographic groups, such as males and females, both Chang and Chen (2017) and Collins et al. (2021) use aggregate measures of the economic indicators rather than demographic-specific measures. Although aggregate measures, such as economy-wide unemployment rate and sentiment, do influence, say, the male suicide rate, using the male-specific unemployment rate and sentiment is likely to be

more relevant in explaining male suicide rates. Furthermore, although men and women are exposed to the same macroeconomic conditions, gender-specific unemployment rates and consumer sentiment indices, to a certain extent, capture possible differences in the impacts of common macroeconomic conditions on male and female economic outcomes, and hence different suicide rates. We therefore use gender-specific unemployment rates and consumer sentiment and match these to gender-specific suicide rates to more accurately capture the potential differential influences of economic circumstances on male and female suicide rates.

Our empirical analyses reveal four key findings. First, the results confirm a long-run level relationship between suicide rates and the unemployment rate and the consumer sentiment index. As expected, the suicide rate is positively associated with the unemployment rate and negatively associated with sentiment. Second, among the consumer sentiment index's components, expectations of family finances and expectations of short-term and longer-term economic conditions significantly influence suicide rates, but components relating to present conditions are less important. This suggests that influencing individuals' economic expectations could be a key channel for policy interventions.

Third, we find that unemployment and consumer sentiment have very different asymmetric effects on male and female suicide rates. An increase in the unemployment rate significantly increases the suicide rate for men, but a decrease has no effect on male suicide rates. The opposite is true for women. An increase in sentiment tends to have a stronger effect on the suicide rate in men than a decrease. Again, the opposite is true for women. This suggests that a policy intervention targeting both men and women, through influencing the unemployment rate and/or sentiment, may not be as effective as policy interventions tailored specifically at men and at women.

Finally, we find that sentiment has a much stronger effect on the suicide rate among men than among women. This contrasts with Collins et al.'s (2021) finding, for which there are two possible explanations: (i) Collins et al. (2021) do not consider the possibility of asymmetric effects of sentiment on suicide rates. If the association between sentiment and suicide rates is indeed nonlinear, a linear framework could obscure the true relationship and the true magnitude of their association; (ii) in explaining male and female suicide rates, Collins et al.

(2021) use aggregate factors, including an aggregate consumer sentiment index, rather than gender-specific measures. As mentioned above, gender-specific economic variables are likely to be more relevant in explaining gender-specific suicide rates. Our findings suggest that policy intervention targeting sentiment will likely have a stronger impact on male suicide rates than on female suicide rates.

2. Data

We use monthly data on Australian suicide rates, unemployment rates, and the consumer sentiment index and its components for the period February 1990 to September 2018. The choice of our sample period is due to two factors. First, unit records for CASiE are only available from February 1990. These are required to construct gender-specific consumer sentiment indices and their components. Second, detailed suicide rates up to September 2018 were provided in a customised report (see Section 2.1). The remainder of this section defines and describes the main variables of interest. Figure 1 plots the time series of all variables and Table 1 reports their summary statistics.

---- Insert Figure 1 and Table 1 about here ----

2.1 Suicide Rate

Age-standardised suicide rates, per 100,000 persons, were provided by the Australian Bureau of Statistics (ABS, 2019). These include aggregate suicide rates as well as the male and female suicide rates. The mean aggregate suicide rate over the sample period was 1.01 deaths per 100,000. The mean male suicide rate is about 3.5 times larger than the female suicide rate, at 1.59 deaths per 100,000 among men and 0.45 deaths per 100,000 among women.

2.2 Unemployment Rate

Monthly unemployment rates were obtained from the Australian Bureau of Statistics (ABS, 2020b). We use the aggregate unemployment rate for all analyses of the overall sample, the female unemployment rate for all analyses involving the female sub-sample, and the male unemployment rate for all analyses involving the male sub-sample. The average aggregate

unemployment rate is 6.65% and the male unemployment rate (6.73%) is slightly higher than the female unemployment rate (6.54%).

2.3 Consumer Sentiment Survey Data

As stated, we use consumer sentiment data from the Westpac-Melbourne Institute Consumer Attitudes, Sentiments, and Expectations (CASiE) survey to approximate Australian households' economic sentiment. CASiE is the longest continuing consumer survey in Australia, starting on a quarterly basis from March 1973 and since February 1990 has been conducted monthly. Prior to March 1993 the sample size varied between 1,000 to 2,500 consumers per month, but it has been fixed at 1,200 respondents since. Before August 2016, data collection was conducted only by telephone but has since changed into a combination of telephone and online survey. The sample is stratified by age, gender and state so that it is representative of the Australian population. Unlike the University of Michigan Survey of Consumers (MSC), no households are re-interviewed. The survey is thus a pure repeated cross-section.

The consumer sentiment index derived from the CASiE survey is widely accepted and has been applied in many different contexts, such as studying the forecasting of economic output and consumption (Chua and Tsiaplias, 2009), the effect of consumer sentiment on equity markets (Akhtar et al., 2011), the formation of consumer expectations (Claus and Nguyen, 2018), the response of consumer sentiment to good and bad news (Nguyen and Claus, 2013) and monetary policy analysis (Claus and Nguyen, 2020; Kirchner, 2020).

CASiE is modelled on the MSC and the consumer sentiment index is constructed based on consumers' responses to five core questions (see Table A.1). As detailed in Leahy and Summers (2004), the responses to each of the five questions are then used to construct a component index as the weighted proportion of optimists (whose answers are 'better-off'/'good') less the weighted proportion of pessimists (whose answers are 'worse-off'/'bad') plus 100. Weights are based on stratification factors from census surveys of the Australian Bureau of Statistics and are normalized to sum to 100 percent. By construction, the index is bounded between 0 and 200 with 100 being the neutral point where the proportion of

optimists equals the proportion of pessimists. At 0 everybody is pessimistic and at 200 everybody is optimistic.

The first component index, *C1*, captures consumers' reported current family financial conditions while the second, *C2*, captures consumers' expected family financial conditions in the next 12 months. The third and fourth component indexes, *C3* and *C4*, reflect information on consumers' expectations of economic conditions in the next 12 months and next 5 years, respectively. The final component, *C5*, reflects consumers' current buying intentions of major household items. The overall consumer sentiment index is constructed as a simple average of the five component indexes. An index value greater (smaller) than 100 indicates that the proportion of optimists (pessimists) outweighs the proportion of pessimists (optimists) (for more background information, see Leahy and Summers, 2004).

On average, a slightly greater proportion of Australians tend to be optimistic than pessimistic (see Table 1 and Figure 1). The highest levels of optimism relate to family finances in the next 12 months and in terms of the times to buy major household items, whereas the greatest pessimism relates to family finances in the last 12 months. Men are on average more optimistic than women on the overall index as well as in each of its sub-components.

2.4 Unit Root Tests

We conducted unit root tests on all variables using the Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPSS) test for the null hypothesis of stationarity of the data series. The full results and relevant technical information are reported in Table A.2. Overall, our unit root test results show that most of the variables are nonstationary I(1), and importantly none of them are I(2) as required for the ARDL and NARDL modelling approaches (Pesaran, Shin and Smith, 2001).

3. Econometric Methods

Abstracting from social and psychological factors, we assume that the suicide rate, s_t, is determined by economic factors indicative of current and future economic conditions, denoted C_t and F_t, respectively. This is written as:

$$s_t = f(C_t, F_t) \quad (1)$$

To proxy for economic factors informative about current conditions, we use the unemployment rate, u_t, and to proxy for mainly forward-looking economic conditions, we use the consumer sentiment index, csi_t. We assume that $f(.)$ is a linear function, and hence express the long-run level relationship between the suicide rate and the two economic factors as:

$$s_t = c + \beta u_t + \lambda csi_t + e_t \quad (2)$$

where c is an intercept, $e_t \sim iid(0, \sigma_e)$ is the error term, and β and λ respectively capture the impact of the unemployment rate and consumer sentiment on the suicide rate. Theoretically, we expect that $\beta > 0$ (a higher unemployment rate increases the suicide rate) and $\lambda < 0$ (an increase in the CSI decreases the suicide rate).

3.1 ARDL Modelling

To investigate the relationship between the suicide rate, the unemployment rate and consumer sentiment in a more general setting that allows us to capture their interactions both in the short-run and in the long-run, we follow Pesaran and Shin's (1999) approach and embed the level relationship specified in (2) in an Auto-Regressive Distributed Lag (ARDL) model:

$$s_t = a + \sum_{i=1}^{p} \pi_i \, s_{t-i} + \sum_{i=0}^{q} \varphi_i \, u_{t-i} + \sum_{i=0}^{q} \theta_i \, csi_{t-i} + \epsilon_t, \; \epsilon_t \sim iid(0, \sigma_\epsilon) \quad (3)$$

Following Pesaran and Shin (1999), the ARDL(p,q,q) model in (3) can be rewritten into the following error-correction form:

$$\Delta s_t = a + \alpha s_{t-1} + \mu u_{t-1} + \rho csi_{t-1} + \sum_{i=1}^{p-1} A_i \, \Delta s_{t-i} + \sum_{i=0}^{q-1} B_i \, \Delta u_{t-i} + \sum_{i=0}^{q-1} C_i \, \Delta csi_{t-i} + \epsilon_t \quad (4)$$

where $\alpha = \sum_{i=1}^{p}(\pi_i - 1)$, $\mu = \sum_{i=0}^{q}\varphi_i$, $\rho = \sum_{i=0}^{q}\theta_i$, $A_i = -\sum_{j=i+1}^{p}\pi_i$ for $i = 1, \dots, p-1$, $B_0 = \varphi_0$, $B_i = -\sum_{j=i+1}^{q}\varphi_i$ for $i = 1, \dots, q-1$, $C_0 = \theta_0$, $C_i = -\sum_{j=i+1}^{q}\theta_i$ for $i = 1, \dots, q-1$. Equation (4) can be further written as:

$$\Delta s_t = \alpha e_{t-1} + \sum_{i=1}^{p-1} A_i \Delta s_{t-i} + \sum_{i=0}^{q-1} B_i \Delta u_{t-i} + \sum_{i=0}^{q-1} C_i \Delta csi_{t-i} + \epsilon_t \quad (5)$$

in which α is the adjustment coefficient and $e_{t-1}$is the error-correction term expressed as:

$$e_{t-1} = s_{t-1} - c - \beta u_{t-1} - \lambda csi_{t-1} \quad (6)$$

where $c = -a/\alpha$ is the restricted intercept, and $L_u = -\mu/\alpha$ and $L_{csi} = -\rho/\alpha$ are the long-run coefficients capturing the level impacts of the unemployment rate and consumer sentiment, respectively, on the suicide rate. Note that (6) captures the exact level relationship postulated in (2). All ARDL models are estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance. To test if there exists a level relationship between the three key variables, we use the Bounds-testing approach by Pesaran, Shin and Smith (2001). The null hypothesis is:

$$H_{0,ARDL}: a = \alpha = \mu = \rho = 0$$

If the null hypothesis is rejected, there exists a level relationship between the suicide rate, the unemployment rate and consumer sentiment.

Our estimation procedure follows the general-to-specific approach proposed by Pesaran, Shin and Smith (2001). Initially, we estimate a general ARDL model with the lag length guided by the Akaike Information Criterion. We then keep all the lagged level (long-run) regressors, which capture the level relationship among variables, while sequentially removing insignificant first-differenced (short-run) regressors. After arriving at the final model, we apply the Bounds-testing approach to investigate the level relationship among the variables.

3.2 NARDL Modelling

To further investigate whether unemployment and sentiment may have nonlinear impacts on the suicide rate, we employ the nonlinear autoregressive distributed lag (NARDL) model proposed by Shin, Yu and Greenwood-Nimmo (2014). To do so, we decompose changes in the unemployment rate, Δu_t, and consumer sentiment, Δcsi_t, into positive and negative quantities as follows:

$$\Delta u_t^+ = \max(\Delta u_t, 0), \Delta u_t^- = \min(\Delta u_t, 0),$$
$$\Delta csi_t^+ = \max(\Delta csi_t, 0), \Delta csi_t^- = \min(\Delta csi_t, 0),$$

and

$$u_t^+ = \sum_{i=1}^{t} \Delta u_i^+ , u_t^- = \sum_{i=1}^{t} \Delta u_i^-,$$
$$csi_t^+ = \sum_{i=1}^{t} \Delta csi_i^+ , csi_t^- = \sum_{i=1}^{t} \Delta csi_i^-$$

are partial sum processes of positive and negative changes in the unemployment rate and consumer sentiment. By construction,

$$u_t = u_0 + u_t^+ + u_t^-$$

and

$$csi_t = csi_0 + csi_t^+ + csi_t^-$$

With the above quantities, we estimated the following NARDL version of the error-correction model in (4):

$$\Delta s_t = a + \alpha s_{t-1} + \mu^+ u_{t-1}^+ + \mu^- u_{t-1}^- + \rho^+ csi_{t-1}^+ + \rho^- csi_{t-1}^- + \sum_{i=1}^{p-1} A_i \Delta s_{t-i} + \sum_{i=0}^{q-1} B_i^+ \Delta u_{t-i}^+ + \sum_{i=0}^{q-1} B_i^- \Delta u_{t-i}^- + \sum_{i=0}^{q-1} C_i^+ \Delta csi_{t-i}^+ + \sum_{i=0}^{q-1} C_i^- \Delta csi_{t-i}^- + \epsilon_t \quad (7)$$

in which the error-correction term is now defined as:

$$e_{t-1} = s_{t-1} - c - \beta^+ u_{t-1}^+ - \beta^- u_{t-1}^- - \lambda^+ csi_{t-1}^+ - \lambda^- csi_{t-1}^- \quad (8)$$

where ${L_u}^+ = -\mu^+/\alpha$, ${L_u}^- = -\mu^-/\alpha$, ${L_{csi}}^+ = -\rho^+/\alpha$, and ${L_{csi}}^- = -\rho^-/\alpha$ are the long-run coefficients capturing the possible nonlinear level impacts of the unemployment rate and

consumer sentiment, respectively, on the suicide rate. Note that (8) captures the nonlinear level relationship among variables. For all NARDL models, we follow the same general-to-specific approach (Pesaran, Shin and Smith, 2001). All NARDL models are also estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

To test if there exists a nonlinear level relationship between the three key variables, we also use Pesaran, Shin and Smith's (2001) Bounds-testing approach with the null hypothesis:

$$H_{0,NARDL}: a = \alpha = \mu^+ = \mu^- = \rho^+ = \rho^- = 0$$

If the null hypothesis is rejected, there exists a nonlinear level relationship between the suicide rate, the unemployment rate and consumer sentiment. To test if the level impacts of the unemployment rate and consumer sentiment on the suicide rate are indeed nonlinear, we further test the following hypotheses:

$$H_{0,UNEMPLOYMENT}: \mu^+ = \mu^-; H_{0,SENTIMENT}: \rho^+ = \rho^-$$
$$H_{1,UNEMPLOYMENT}: \mu^+ \neq \mu^-; H_{1,SENTIMENT}: \rho^+ \neq \rho^-$$

Rejecting the null hypothesis suggests nonlinear impacts of the relevant variable on the suicide rate.

Finally, given that the consumer sentiment index is a composite measure, we also investigate the possible heterogeneous impacts of the index's sub-components on the suicide rate. To do so, we subsequently replace csi_t with c_{it} for $i = 1, \dots, 5$ (the five components of the index) in our ARDL and NARDL models in (4) and (7), respectively.

4. Results

In this section, we report and discuss the estimation results. Specifically, we estimate equation (4) (ARDL) to investigate the impacts of economic conditions on the suicide rate in a linear framework and estimate equation (7) (NARDL) to investigate if these factors have

asymmetric impacts on the suicide rate. For each equation, we estimate three sets of results: one for all respondents (aggregate), one for male respondents (males) and one for female respondents (females). For ease of interpretation, the estimated coefficients on the consumer sentiment components are multiplied by ten, i.e. the reported estimates are thus the impact of a ten index point increase in the consumer sentiment index (roughly one standard deviation) on the suicide rate.

To translate the estimated effects of changes in the unemployment rate and consumer sentiment index on suicide rates into the number of suicides in the actual population of interest (rather than only deaths per 100,000 individuals), we use the Australian Bureau of Statistics' demographic estimates as at June 2020. For this purpose, we use the population estimates for the over-18 population for two reasons. Firstly, the influences of economic factors on those aged under 18 years, and hence their suicide rates, are likely to be much weaker than on those aged 18 years and over as the majority of those aged under 18 years is not in the labour force. Secondly, the CASiE survey is sampled based on this population. Therefore, using the over-18 population estimates enables more accurate translation of our estimated effects of economic factors into actual number of suicides. For those aged 18 and over, the estimates for the aggregate, male, and female populations are 21.03 million, 9.83 million, and 10.2 million, respectively (ABS, 2021).

4.1 ARDL Estimation Results

The results of the ARDL models for the aggregate sample are reported in Table 2, for males in Table 3 and for females in Table 4. Each table provides six sets of estimation results and test statistics for six models in which sentiment is sequentially approximated by the overall consumer sentiment index and its five component indexes, *C1* to *C5*.

The key parameter estimates are the coefficients on s_{t-1} (α, adjustment coefficient) and on u_{t-1} (μ) and csi_{t-1} (ρ), which capture the impacts of the unemployment rate and sentiment (and its sub-components), respectively, on the suicide rate. The value of α is expected to be significant and negative for the specified model to hold. Furthermore, consistent with the theoretical predictions of equation (2), we expect that $\mu > 0$ and $\rho < 0$. The estimates of L_u and L_{csi}, computed as $L_u = -\mu/\alpha$ and $L_{csi} = -\rho/\alpha$, capture the long-run level impacts of

the unemployment rate and consumer sentiment index on the suicide rate, respectively. F_{PSS} is the *F*-statistic for the Bounds test of the null hypothesis of no level relationship between the suicide rate and the economic indicators ($H_{0,ARDL}$).

---- Insert Table 2 about here ----

The ARDL results for the aggregate sample in Table 2 show that the adjusted R^2 values in all six models are relatively large, indicating that the explanatory variables explain around 32% of the variation in the suicide rate. This variation is similar in size to previous research (Andrés et al., 2011; Korhonen et al., 2016) explaining changes in suicide rates using an ARDL approach. The results of the specification tests show that all models are well-specified. The values of the F_{PSS} statistics in all six models confirm the existence of a level relationship between the suicide rate and at least one of the included economic indicators.

Turning to the key parameters, the α estimates are negative and significant in all six models and range from -0.373 to -0.397, indicating a relatively quick speed of adjustment towards the long-run equilibrium (also see Section 4.2.1), consistent with Andrés et al. (2011) and Okada and Samreth (2013). The estimates of L_u are positive and significant in all models, which underscore the importance of the unemployment rate in explaining the suicide rate. Based on these estimates, an increase in the unemployment rate of one percentage point eventually raises the suicide rate by between 0.025 to 0.040 persons per 100,000 population per month in the long run, or an additional 5.26 to 8.41 suicides per 21.03 million population (for example: [21,030,000/100,000] x 0.025 = 5.26). Our finding of a significant increase in suicide rates in response to higher unemployment rates is supported by, among others, Antonakakis and Collins (2014), Ruhm (2015), and Meda et al. (2021). However, the finding contrasts with recent research by Atalay et al. (2020), who found no evidence of a relationship between unemployment rates and suicide in Australia. It should be noted, however, that Atalay et al. (2020) studied mortality and unemployment at the state level and their findings are thus not entirely comparable to those reported here.

The estimates of L_{csi} are negative and significant in four of the six models. The component indexes capturing consumers' current family finances (*C1*) and buying intentions (*C5*) do not

appear to matter in explaining movements in the aggregate suicide rate. The significance of the estimates of L_{csi} for the overall consumer sentiment index and its forward-looking component indexes, *C2* to *C4*, suggests that perceived future economic conditions explain the suicide rate. The negative coefficients are as expected and supported by Collins et al.'s (2021) finding that higher consumer sentiment is associated with lower suicide rates. Specifically, a 10-index point increase in the consumer sentiment index lowers the suicide rate by between 0.012 and 0.042 per 100,000 persons, or 2.52 to 8.83 suicides in a population of 21.03 million.

The ARDL estimation results for males and females are provided in Tables 3 and 4, respectively. The specification test results show that all the estimated models for males and females are well-specified. The values of the adjusted R^2 in models for males are higher than those for the aggregate, but smaller than those for females. All the α estimates are significant and negative in both the male and female samples. The estimated values of α for males are higher in absolute terms than those in the aggregate, but smaller in absolute terms than those for females. This suggests that gender-specific economic factors appear more relevant in explaining variations in gender-specific suicide rates, and that economic factors have higher explanatory power for the female suicide rate than for the male suicide rate. The values of the F_{PSS} statistics in all the models for males and females again confirm the existence of a level relationship between the suicide rate and at least one of the included factors.

---- Insert Tables 3 and 4 about here ----

Turning to the estimates of the parameter capturing the level impact of the unemployment rate on the suicide rate, i.e. L_u, all the estimates for males are significant and positive, as expected, ranging from 0.056 to 0.071. Importantly, the magnitude of these estimates is around twice as large as that in the aggregate models (Table 2). In contrast, all the estimates of L_u are insignificant for females. One explanation for the latter finding could be due to an asymmetric relationship between the female unemployment rate and the female suicide rate, which is investigated in Section 4.2. Regarding the estimates of L_{csi}, for males four of the six coefficients are significant and negative with its values ranging from -0.023 to -0.053. This suggests that a 10-index point rise in the consumer sentiment index or its significant components decreases the suicide rate in the long-run by between 0.023 to 0.053 suicides

per 100,000 people. The component indexes relating to current family finances (*C1*) and family finances next in the 12 months (*C2*) do not appear to matter in explaining the male suicide rate. For females, the estimates for four of the six sub-components factors are significant and negative. The component indexes relating to current family finances (*C1*) and buying intentions (*C5*) are not significant in explaining the female suicide rate.

Overall, our ARDL results for the aggregate sample as well as for males and females suggest that the consumer sentiment index does play an important role in explaining changes in the suicide rate. The insignificant level impacts of the unemployment rate among females and some components of the consumer sentiment index among both males and females could be due to the nonlinear association between the suicide rate and economic indicators that cannot be observed in the linear ARDL framework. We discuss this issue below.

4.2 NARDL Estimation Results

The NARDL estimation results are reported in Table 5 (aggregate), Table 6 (males) and Table 7 (females). The setup and content of these tables are similar to those for the ARDL models, but with three important differences. First, there are two coefficients capturing the long-run level impacts of the unemployment rate on the suicide rate, L_u^+ and L_u^-, and two coefficients capturing the level impacts of the consumer sentiment index (or its components), on the suicide rate, L_{csi}^+ and L_{csi}^-. L_u^+ and L_{csi}^+, respectively, capture the impacts of increases in the unemployment rate and sentiment whereas L_u^- and L_{csi}^- capture the impacts of decreases in the unemployment rate and sentiment. Second, $W_{u^+=u^-}$ is the Wald statistic testing for symmetry between L_u^+ and L_u^-, and $W_{csi^+=csi^-}$ is the Wald statistic testing for symmetry between L_{csi}^+ and L_{csi}^-. Third, F_{PSS} is the *F*-statistic testing for the nonlinear asymmetric level relationship between the suicide rate and the economic indicators ($H_{0,NARDL}$).

---- Insert Table 5 about here ----

For the aggregate NARDL results provided in Table 5, the estimates of the adjustment coefficient, α, are all significant and negative, ranging from -0.366 to -0.405, roughly on par in terms of magnitude with those in the ARDL models. The values of the F_{PSS} statistics indicate

a level relationship between the suicide rate and at least one of the included explanatory variables. The results of the Wald tests, $W_{u^+=u^-}$ and $W_{csi^+=csi^-}$, however, show that there is only very weak evidence of asymmetric impacts of the economic indicators on the aggregate suicide rate. Only in the NARDL model with the suicide rate, the unemployment rate and consumers' expectation of economic conditions in the next 5 years (*C4*), are the null hypotheses of symmetry rejected at the 10% level.

With regards to the key parameter estimates, there is at least one significant estimate of L_u^+ and L_u^- that captures the impact of the unemployment rate on the suicide rate in each model. Although there are differences in the magnitude of the estimates of L_u^+ and L_u^-, these differences are not statistically significant, consistent with the results of the Wald tests for asymmetry. For the sentiment indicators, there is at least one significant estimate of L_{csi}^+ or L_{csi}^- in each model except for the model with buying intentions (*C5*). The differences between the estimates of L_{csi}^+ or L_{csi}^- are not statistically significant in most NARDL models. Overall, the NARDL results for the aggregate sample show that there is only very weak evidence of a nonlinear relationship between the suicide rate and the economic indicators.

Turning to the NARDL results for males and females in Tables 6 and 7, respectively, the F_{PSS} statistics confirm the existence of a level relationship between the suicide rate and at least one of the explanatory variables.

---- Insert Tables 6 and 7 about here ----

In contrast to the aggregate results, the gender-specific results of the Wald tests for asymmetry provide stronger evidence of a nonlinear relationship between the suicide rate and the explanatory variables. For males, there is statistically significant asymmetry in the impacts of both unemployment and sentiment in the model with the overall consumer sentiment index, the model with *C3*, and asymmetric impacts of the consumer sentiment index only in the model with *C5*. For females, the tests indicate statistically significant asymmetry in the impacts of both unemployment and sentiment in the models with *C1* and *C4*, and asymmetric impacts of the sentiment component indicator only in the model with *C2*.

Regarding the direction of asymmetry, increases in the male unemployment rate (estimates of L_u^+) generally have stronger effects on the male suicide rate than a decrease in the male unemployment rate (estimates of L_u^-). In contrast, decreases in the female unemployment rate generally have a stronger impact on the female suicide rate than increases in the female unemployment rate. With respect to the influence of sentiment, increases in the consumer sentiment index and its components (estimates of L_{csi}^+) generally have a stronger impact on the male suicide rate than their decreases (estimates of L_{csi}^-). Again, in contrast to the results for males, decreases in the consumer sentiment index and its components have a stronger effect on the female suicide rate than their increases.

The above results highlight what is arguably one of the key findings of this paper, namely that unemployment and consumer sentiment influence the suicide rates of men and women very differently. For males, the driving source of a reduction in the suicide rate is an increase in consumer sentiment, whereas the driving source of an increase in the suicide rate is an increase in the unemployment rate. For females, the main source of a reduction in the suicide rate is a decrease in the unemployment rate whereas the main source of an increase in the suicide rate is a decrease in consumer sentiment. This demonstrates that the channels through which the unemployment rate and consumer sentiment influence male and female suicide rates are completely different. These results are summarized in Table 8.

---- Insert Table 8 about here ----

The finding that male suicide rates, but not female suicide rates, increase with higher unemployment rates is consistent with previous evidence of gender differences in the response to unemployment. For example, research has found that unemployment has a much larger negative effect on men's well-being and mental health compared to that of women (Clark, 2003; Artazcoz et al., 2004; Strandh et al., 2013), unemployment increases suicide risk for men but not women often due to gender role expectations (Qin et al., 2000; Payne et al., 2008), and men suffer from feelings of defeat and depression following job loss whereas women tend to view such an event more optimistically, especially if they have children (Forret et al., 2010). The findings are also in part supported by Chang and Chen (2017), who found nonlinear relationships between suicide rates and unemployment, though their emphasis was

on suicide rates across different age groups rather than gender differences in suicide. On average, men are more optimistic than women (see Table 1). A decline in consumer sentiment may exacerbate average levels of pessimism among women even further. To the extent that consumer sentiment reflects underlying psychological stress and uncertainty (van Giesen and Pieters, 2019; Nowzohour and Stracca, 2020), a decline (increase) in consumer sentiment can increase (decrease) suicide risk for women (men).

Finally, the estimates of the adjustment coefficients are all significant and negative in all the NARDL models for males and females. However, their absolute values are higher, and considerably higher among females, than their counterparts in the ARDL models. This finding, together with the above results, indicates that there is strong evidence of asymmetry in the impacts of our economic indicators on the male and female suicide rates, and that the NARDL models are preferred over the ARDL models when the sample is disaggregated by gender.

4.2.1 Dynamic Multiplier Analysis

Our ARDL and NARDL analyses indicate that consumer sentiment matters for suicide rates with evidence of nonlinear associations. In this sub-section, we focus on the asymmetric impacts of consumer sentiment on the suicide rate. We investigate the gender differences and the duration it takes for the impacts of an increase and a decrease in consumer sentiment to be fully embedded in the suicide rate. To do this, we use the NARDL estimates to compute the asymmetric dynamic multiplier impacts of the consumer sentiment index on the suicide rate (see Shin, Yu and Greenwood-Nimmo, 2014).

The results from both ARDL and NARDL models, as discussed in the previous sections, indicate that among the components of the consumer sentiment index, consumers' current family finances (*C1*) and buying intentions (*C5*) are not significant in explaining the suicide rate. Therefore, we only study the dynamic multiplier impacts of the other three components—*C2*, *C3* and *C4*—on the suicide rate. The significant level relationships between the three forward-looking components of the CSI – family finances in the next 12 months (*C2*), economic conditions in the next 12 months (*C3*), and economic conditions in the next 5 years (*C4*) – and the suicide rate suggest that the impact of consumer sentiment on the suicide rate is mainly through the consumer expectations channel. Increasing or decreasing optimism

about expected future conditions, rather than about current conditions, is key to explaining changes in the suicide rate.

Figure 2 plots the computed dynamic multipliers, capturing the asymmetric impacts of increases and decreases in the consumer sentiment index and in its three forward-looking components on the suicide rate. The first column reports the results for the aggregate sample, the second column the results for males and the last column the results for females. As discussed in the previous sections, the suicide rate is negatively associated with sentiment given the negative values of the estimated coefficients on both csi_{t-1}^{+} and csi_{t-1}^{-}, i.e. an increase (decrease) in the consumer sentiment index lowers (raises) the suicide rate. For ease of demonstration, we multiply the impacts of decreases in consumer sentiment and its components with -1 to contrast with the impacts of their increases.

---- Insert Figure 2 about here ----

A closer look at Figure 2 reveals several findings. First, it takes around six to eight months for the impacts of increases or decreases in the consumer sentiment index to be fully embedded in the suicide rate, in the aggregate sample as well as for males and females. This indicates that the impact of consumer sentiment on the suicide rate is cumulative rather than instantaneous. Second, consumer sentiment has stronger impacts on the suicide rate among males than among females, with the magnitude of the impacts for males at least twice as large as for females. For example, an increase of 10 index points in the consumer sentiment index reduces the male suicide rate by 0.068 persons per 100,000 after six months (or 6.68 persons in a male population of 9.83 million), whereas it reduces the female suicide rate by 0.015 persons per 100,000 (or 1.53 persons in a female population of 10.2 million).

Finally, though there is very weak evidence of asymmetric impacts of consumer sentiment on the suicide rate in the aggregate, there is stronger evidence of asymmetry for both males and females, but in opposite directions. For males, the impacts of the overall consumer sentiment index and economic conditions in the next 12 months (*C3*) are asymmetric, with increases in these indices having stronger impacts on suicide rates than decreases (Figure 2(b) and 2(h)). For females, the impacts of family finances in the next 12 months (*C2*) and economic

conditions in the next 5 years (*C4*) are asymmetric as well, but decreases in these indices having stronger impacts on suicide rates than increases (Figure 2(f) and 2(l)). The opposite directions of asymmetric impacts of consumer sentiment between males and females could be an explanation for the weak evidence of asymmetric impacts of consumer sentiment in the aggregate.

5. Robustness Checks

In our preliminary analyses, we also considered a broader set of economic variables to proxy for different dimensions of economic conditions. Specifically, we explored controlling for the monetary policy environment via the central bank policy rate (the Reserve Bank of Australia's target cash rate) and also used the ASX/S&P200 index to control for activity in the Australian share market. However, these variables were never significant in both the short-run and long-run analyses, and hence made no meaningful contribution to explaining suicide rates. These variables were therefore not included in the final estimations, but the results from these exercises are available upon request.

To evaluate the sensitivity of our results with respect to a change in the sample period, we re-estimate the ARDL and NARDL models in the aggregate (with the unemployment rate and the consumer sentiment index) over a longer sample period. This longer sample starts from February 1978 as the monthly unemployment rate provided by the Australian Bureau of Statistics is only available from this point onwards. As the monthly CASiE survey only began in February 1990, the monthly sentiment data prior to February 1990 is linearly interpolated from the quarterly sentiment data (estimations by gender are not possible as the data are not available pre-1990). Panel A in Table A.3 in the Appendix provides the ARDL estimation results in the aggregate over this longer sample period, and Panel B provides the NARDL estimation results. In general, the inferences based on the estimation results from this longer sample period are consistent with the inferences based on our current sample period, demonstrating that our findings are relatively robust to sample periods.

6. Conclusion

In this paper we combined monthly suicide rates in Australia with both unemployment and consumer sentiment to test how these affect suicide rates over time. We use linear and nonlinear ARDL models, proxying current economic circumstances with the unemployment rate, and future economic conditions with the consumer sentiment index and its components. Our study is the first to conduct a detailed investigation into how consumer sentiment—that captures perceptions and expectations of both personal and broader economic conditions—explain changes in suicide rates, and whether there is any nonlinearity in how suicide rates respond to changes in the unemployment rate and consumer sentiment. Alongside results consistent with the existing literature, we also report several novel findings.

Consistent with previous research, we find that the unemployment rate is an important predictor of suicide rates. In general, an increase in the unemployment rate increases the suicide rate in the long run. The consumer sentiment index is also a strong predictor of suicide rates, with some of its components being more important than others in explaining suicide. The results show that consumer expectations play a major role, with more positive expectations associated with lower suicide rates. There is also strong evidence that consumer sentiment has stronger effects on male suicide rates than on female suicide rates.

A striking result is the presence of, and differences in, nonlinear effects in the response of suicide to unemployment and consumer sentiment. Specifically, male and female suicide rates respond very differently to changes in the unemployment rate as well as the consumer sentiment index. For men, suicides rise significantly when the unemployment rate increases, but fall when consumer sentiment improves. Male suicide rates do not respond to falls in unemployment rates, and generally respond weaker to a decline in sentiment as compared to an increase in sentiment. For women, suicides fall significantly when the unemployment rate declines but increases significantly when consumer sentiment worsens. Female suicide rates do not respond to increases in the unemployment rate and respond weaker to rises rather than declines in consumer sentiment.

Our findings have several important implications for suicide prevention policies that use the unemployment rate and sentiment indicators as channels of interest. First, because male and female suicide rates respond so differently to changes in the unemployment rate and in consumer sentiment, a policy targeting both men and women within a unidimensional framework is likely to be less effective than policies targeting men and women separately. Second, given that suicide rates are affected more by forward-looking components of the consumer sentiment index than components that measure current conditions, policy interventions using the sentiment channel will likely be more effective by targeting consumers' expectations of future conditions rather than their current conditions. Finally, the sentiment channel is particularly relevant for men as the effects of the consumer sentiment index and its forward-looking components on the male suicide rate are around twice as large as those on the female suicide rate.

Existing suicide prevention policies in Australia indeed recognize economic disadvantage—such as job loss or financial difficulties—as one of the significant risk factors predicting suicide (Productivity Commission, 2020). However, there is no clear indication that suicide prevention initiatives account for gender differences in responses to changes in the broader economy, how such changes affect individuals' perceptions of the future, and how current economic conditions and future expectations might interact in raising suicide rates. Our results point to a necessity for suicide prevention initiatives to consider adjusting interventions based on the business cycle. Prevention policies should focus especially closely on men during times of adverse economic shocks with huge negative influences on labour market activity. A strong intervention focus should be put on women during times of considerable rises in consumer pessimism, which can often occur prior to observing weaker economic conditions (Chua and Tsiaplias, 2009). Ultimately, what may be most effective include economic policies that prioritize low unemployment and conditions that make people optimistic about the future.

Our study examines gender differences in the influences of common economic conditions on suicide rates. We did not examine these relationships across different age groups, but linear and nonlinear associations between economic conditions and suicide rates may also exist for various age groups (Chang and Chen, 2017). We leave the study of age-group differences to future research. Another potentially interesting avenue for future research would be to

explore whether geographical variations in economic conditions lead to the spatial differences in suicide rates; for example, using Australian state-level data and testing how state-level unemployment rates and state-level consumer sentiment and/or business conditions affect state suicide rates over time within a panel data framework. Such an analysis will likely need to use data at annual frequency, given that some Australian states often have relatively low suicide numbers, making analyses at higher frequency such as monthly or quarterly, less feasible. Results from such a study could then be used to inform state-specific public health policies on suicide prevention.

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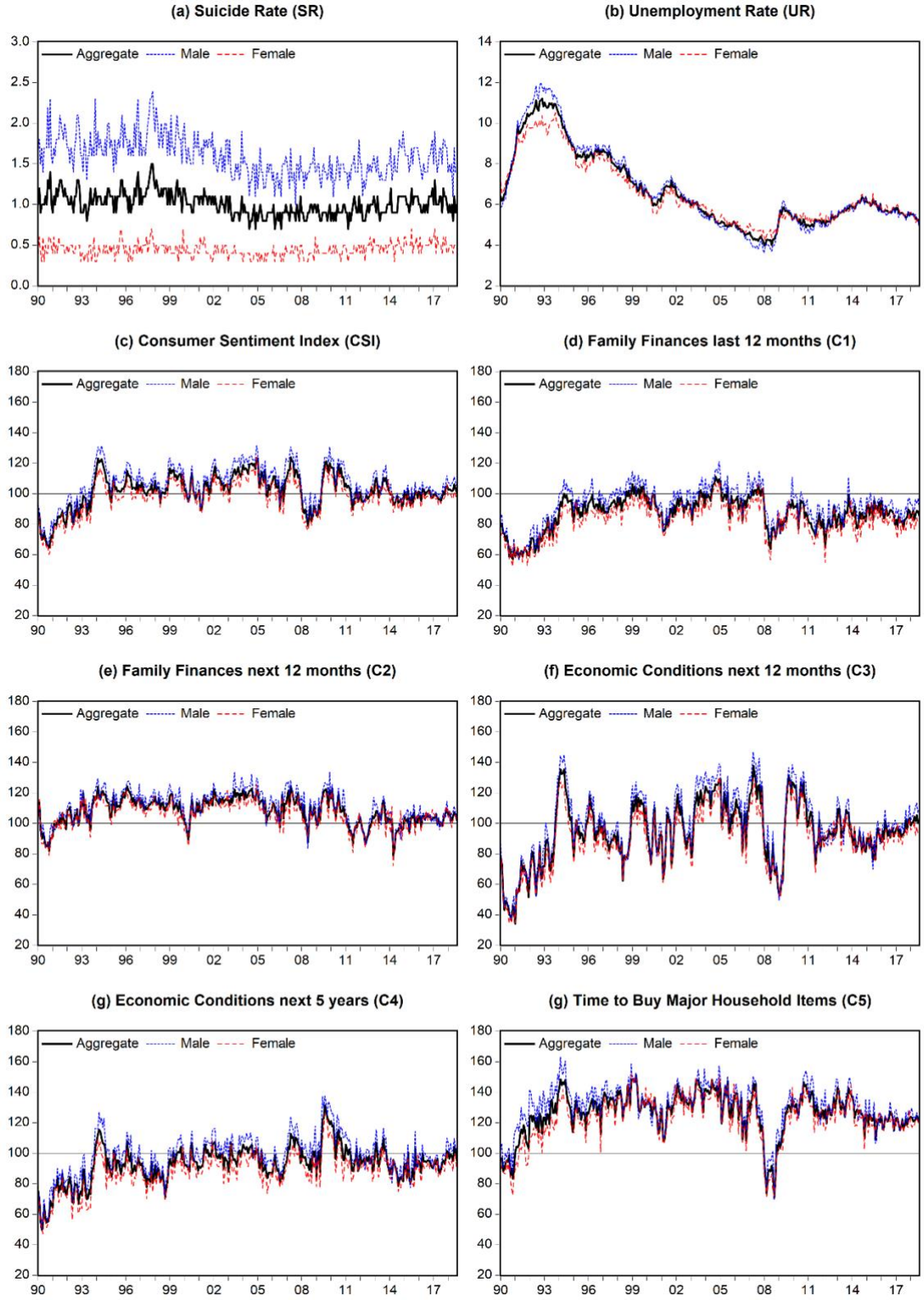
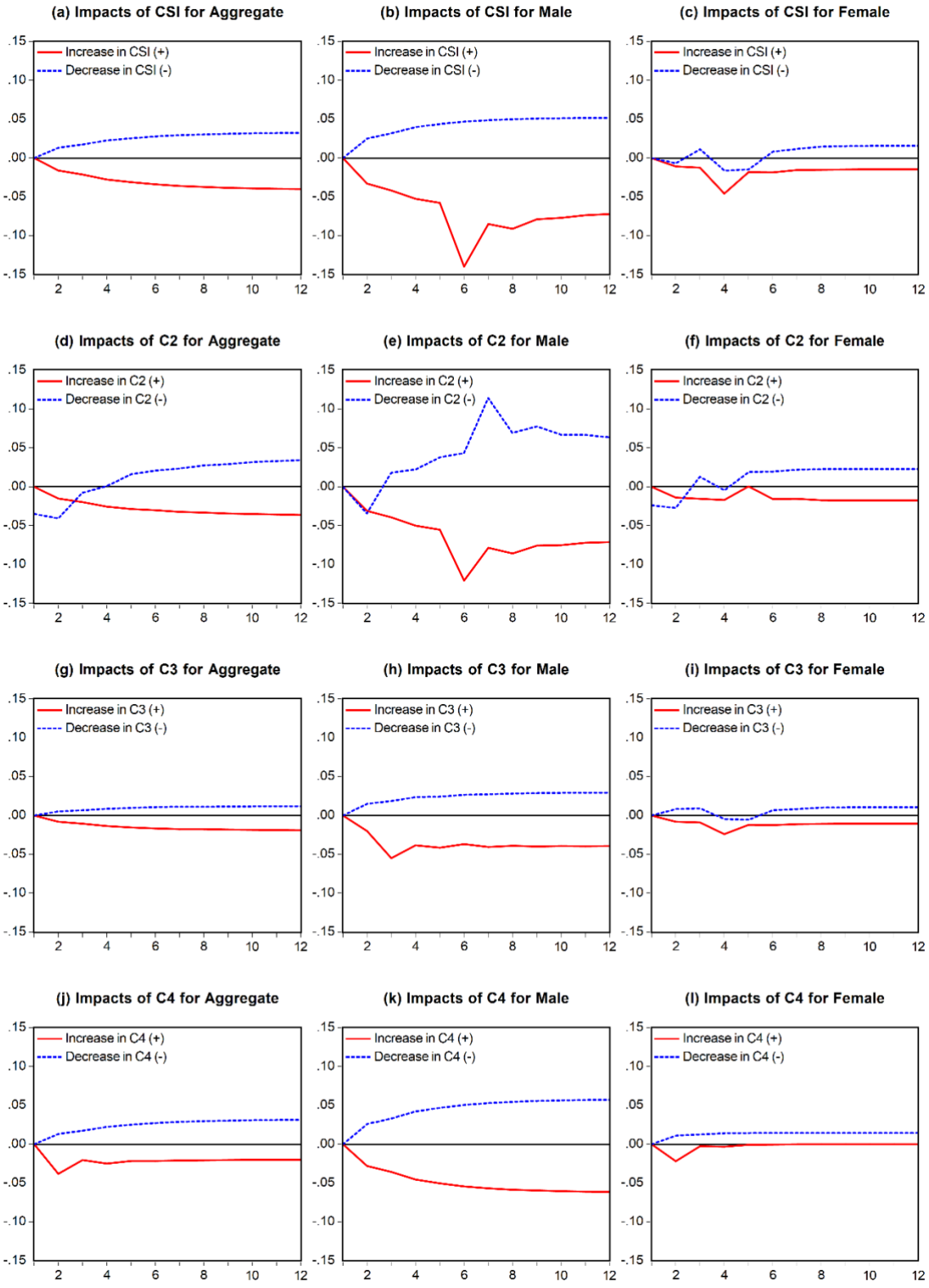
Figure 1: Data Plots



Source: ABS (2019, 2020b), Melbourne Institute

Figure 2: Impacts of Consumer Sentiment on Suicide Rates - Dynamic Multipliers in NARDL



Note: CSI: consumer sentiment index; C2: family finances in the next 12 months; C3: economic conditions in the next 12 months; C4: economic conditions in the next 5 years.

Table 1: Summary Statistics

		SR	CSI	C1	C2	C3	C4	C5	UR
Aggregate	*Mean*	1.01	101.88	87.19	108.16	94.68	93.02	126.24	6.65
	SD	0.14	11.22	11.05	8.83	19.98	12.13	14.07	1.85
	Max	1.50	123.94	111.22	124.40	137.92	131.31	151.25	11.22
	Min	0.70	64.61	57.24	79.00	34.17	49.78	71.04	3.98
Male	*Mean*	1.59	106.82	92.53	111.44	100.04	98.91	131.17	6.73
	SD	0.25	12.16	12.35	10.17	22.17	13.42	14.29	2.07
	Max	2.40	131.58	121.04	133.51	146.89	137.55	162.95	12.00
	Min	1.00	66.24	56.84	83.63	36.82	50.44	69.97	3.62
Female	*Mean*	0.45	97.90	82.71	105.84	90.32	88.10	122.53	6.54
	SD	0.09	10.96	10.85	8.74	18.67	11.88	15.42	1.58
	Max	0.70	123.89	108.29	125.32	130.46	125.49	151.58	10.52
	Min	0.30	60.16	52.33	72.46	34.62	47.42	71.86	4.24

Note: SR: suicide rate; CSI: consumer sentiment index; C1: family finances in the last 12 months; C2: family finances in the next 12 months; C3: economic conditions in the next 12 months; C4: economic conditions in the next 5 years; C5: time to buy major household items; UR: unemployment rate; SD: standard deviation.

Table 2. ARDL results: Full sample

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.387*** (0.064)	s_{t-1}	-0.376*** (0.063)	s_{t-1}	-0.380*** (0.063)	s_{t-1}	-0.397*** (0.066)	s_{t-1}	-0.390*** (0.064)	s_{t-1}	-0.373*** (0.063)
u_{t-1}	0.013*** (0.004)	u_{t-1}	0.015*** (0.004)	u_{t-1}	0.015*** (0.004)	u_{t-1}	0.013*** (0.004)	u_{t-1}	0.010** (0.004)	u_{t-1}	0.015*** (0.004)
csi_{t-1}	-0.012** (0.005)	csi_{t-1}	0.009 (0.006)	csi_{t-1}	-0.014** (0.006)	csi_{t-1}	-0.005* (0.003)	csi_{t-1}	-0.017*** (0.005)	csi_{t-1}	-0.004 (0.005)
Δs_{t-1}	-0.272*** (0.043)	Δs_{t-1}	-0.279*** (0.046)	Δs_{t-1}	-0.277*** (0.044)	Δs_{t-1}	-0.273*** (0.043)	Δs_{t-1}	-0.280*** (0.043)	Δs_{t-1}	-0.258*** (0.044)
Δu_{t-3}	-0.076** (0.036)	Δu_{t-4}	0.071* (0.036)	Δu_{t-3}	-0.069* (0.035)	Const.	0.357*** (0.070)	Δu_{t-3}	-0.073** (0.033)	Δs_{t-6}	-0.101** (0.042)
Const.	0.427*** (0.085)	Δu_{t-5}	0.068** (0.033)	Const.	0.433*** (0.088)			Δu_{t-5}	0.050* (0.029)	Δu_{t-3}	-0.068* (0.037)
		Δcsi_{t-3}	-0.014* (0.008)					Δcsi_{t-6}	0.017** (0.008)	Δcsi_{t-5}	-0.012* (0.007)
		Const.	0.202** (0.089)					Const.	0.484*** (0.081)	Const.	0.332*** (0.086)
L_u	0.034*** (0.010)	L_u	0.040*** (0.010)	L_u	0.040*** (0.010)	L_u	0.034*** (0.009)	L_u	0.025*** (0.009)	L_u	0.039*** (0.010)
L_{csi}	-0.031** (0.013)	L_{csi}	0.023 (0.018)	L_{csi}	-0.037** (0.015)	L_{csi}	-0.012* (0.007)	L_{csi}	-0.042*** (0.013)	L_{csi}	-0.011 (0.012)
Adj. R^2	0.322	Adj. R^2	0.321	Adj. R^2	0.321	Adj. R^2	0.322	Adj. R^2	0.339	Adj. R^2	0.324
F_{PSS}	9.80	F_{PSS}	10.71	F_{PSS}	10.12	F_{PSS}	9.51	F_{PSS}	10.25	F_{PSS}	9.61
χ^2_N	0.22 [0.892]	χ^2_N	0.08 [0.962]	χ^2_N	0.25 [0.883]	χ^2_N	0.12 [0.944]	χ^2_N	0.02 [0.992]	χ^2_N	0.51 [0.775]
χ^2_{SC}	0.04 [0.979]	χ^2_{SC}	0.07 [0.966]	χ^2_{SC}	0.13 [0.937]	χ^2_{SC}	0.24 [0.887]	χ^2_{SC}	1.22 [0.544]	χ^2_{SC}	0.99 [0.610]
χ^2_{HET}	19.39 [0.002]	χ^2_{HET}	12.97 [0.073]	χ^2_{HET}	20.09 [0.001]	χ^2_{HET}	17.78 [0.001]	χ^2_{HET}	25.72 [0.001]	χ^2_{HET}	18.25 [0.011]
χ^2_{FF}	0.42 [0.519]	χ^2_{FF}	1.33 [0.249]	χ^2_{FF}	0.24 [0.623]	χ^2_{FF}	0.10 [0.749]	χ^2_{FF}	2.56 [0.110]	χ^2_{FF}	0.70 [0.402]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. $L_u$and L_{csi} are the long-run coefficients of the unemployment rate and consumer sentiment index, respectively. Changes in the suicide rate are in relation to a one percentage point change in the unemployment rate and a ten index point change in the consumer sentiment index. F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu = \rho = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 2 I(1) regressors) are 3.35, 3.87 and 5.00 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 3. ARDL results: Males

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.424*** (0.067)	s_{t-1}	-0.420*** (0.065)	s_{t-1}	-0.412*** (0.067)	s_{t-1}	-0.434*** (0.067)	s_{t-1}	-0.440*** (0.068)	s_{t-1}	-0.430*** (0.071)
u_{t-1}	0.026*** (0.007)	u_{t-1}	0.030*** (0.007)	u_{t-1}	0.028*** (0.007)	u_{t-1}	0.026*** (0.007)	u_{t-1}	0.025*** (0.007)	u_{t-1}	0.030*** (0.007)
csi_{t-1}	-0.021** (0.009)	csi_{t-1}	0.007 (0.009)	csi_{t-1}	-0.005 (0.008)	csi_{t-1}	-0.010** (0.004)	csi_{t-1}	-0.023*** (0.007)	csi_{t-1}	-0.014** (0.006)
Δs_{t-1}	-0.285*** (0.043)	Δs_{t-1}	-0.289*** (0.046)	Δs_{t-1}	-0.310*** (0.043)	Δs_{t-1}	-0.291*** (0.041)	Δs_{t-1}	-0.290*** (0.041)	Δs_{t-1}	-0.299*** (0.043)
Δu_t	-0.078* (0.045)	Δcsi_{t-5}	-0.030** (0.015)	Δcsi_{t-5}	-0.035** (0.016)	Δu_{t-2}	-0.075* (0.046)	Δu_{t-2}	-0.072* (0.041)	Const.	0.663*** (0.131)
Δu_{t-2}	-0.078* (0.046)	Const.	0.406** (0.128)	Δcsi_{t-6}	-0.029** (0.014)	Const.	0.616*** (0.102)	Const.	0.768*** (0.117)		
Δcsi_{t-5}	-0.032* (0.018)			Const.	0.521*** (0.128)						
Const.	0.726*** (0.136)										
L_u	0.062*** (0.013)	L_u	0.071*** (0.014)	L_u	0.069*** (0.013)	L_u	0.060*** (0.013)	L_u	0.056*** (0.013)	L_u	0.070*** (0.013)
L_{csi}	-0.051** (0.021)	L_{csi}	0.016 (0.022)	L_{csi}	-0.012 (0.020)	L_{csi}	-0.023** (0.010)	L_{csi}	-0.053*** (0.016)	L_{csi}	-0.032** (0.013)
Adj. R^2	0.370	Adj. R^2	0.361	Adj. R^2	0.367	Adj. R^2	0.366	Adj. R^2	0.375	Adj. R^2	0.368
F_{PSS}	10.92	F_{PSS}	11.24	F_{PSS}	10.07	F_{PSS}	11.33	F_{PSS}	12.20	F_{PSS}	9.71
χ^2_N	4.41 [0.110]	χ^2_N	6.66 [0.036]	χ^2_N	5.67 [0.059]	χ^2_N	4.69 [0.096]	χ^2_N	2.79 [0.247]	χ^2_N	5.03 [0.081]
χ^2_{SC}	3.03 [0.220]	χ^2_{SC}	4.81 [0.090]	χ^2_{SC}	1.77 [0.413]	χ^2_{SC}	1.34 [0.513]	χ^2_{SC}	1.31 [0.521]	χ^2_{SC}	1.06 [0.588]
χ^2_{HET}	17.55 [0.014]	χ^2_{HET}	16.34 [0.006]	χ^2_{HET}	16.17 [0.013]	χ^2_{HET}	15.46 [0.009]	χ^2_{HET}	21.02 [0.001]	χ^2_{HET}	16.16 [0.003]
χ^2_{FF}	0.33 [0.568]	χ^2_{FF}	0.50 [0.824]	χ^2_{FF}	0.03 [0.856]	χ^2_{FF}	0.02 [0.877]	χ^2_{FF}	0.31 [0.576]	χ^2_{FF}	0.01 [0.938]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. L_u and L_{csi} are the long-run coefficients of the unemployment rate and consumer sentiment index, respectively. Changes in the suicide rate are in relation to a one percentage point change in the unemployment rate and a ten index point change in the consumer sentiment index. F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu = \rho = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 2 I(1) regressors) are 3.35, 3.87 and 5.00 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 4. ARDL results: Females

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.508*** (0.067)	s_{t-1}	-0.499*** (0.065)	s_{t-1}	-0.532*** (0.068)	s_{t-1}	-0.511*** (0.067)	s_{t-1}	-0.513*** (0.069)	s_{t-1}	-0.491*** (0.064)
u_{t-1}	0.000 (0.003)	u_{t-1}	0.001 (0.003)	u_{t-1}	0.003 (0.003)	u_{t-1}	-0.000 (0.003)	u_{t-1}	-0.000 (0.003)	u_{t-1}	0.002 (0.003)
csi_{t-1}	-0.009* (0.005)	csi_{t-1}	-0.004 (0.005)	csi_{t-1}	-0.016*** (0.005)	csi_{t-1}	-0.006** (0.003)	csi_{t-1}	-0.008** (0.004)	csi_{t-1}	-0.001 (0.003)
Δs_{t-1}	-0.316*** (0.071)	Δs_{t-1}	-0.332*** (0.072)	Δs_{t-1}	-0.309*** (0.071)	Δs_{t-1}	-0.316*** (0.071)	Δs_{t-1}	-0.320*** (0.073)	Δs_{t-1}	-0.318*** (0.070)
Δs_{t-2}	-0.149*** (0.055)	Δs_{t-2}	-0.164*** (0.056)	Δs_{t-2}	-0.153*** (0.056)	Δs_{t-2}	-0.150*** (0.055)	Δs_{t-2}	-0.165*** (0.057)	Δs_{t-2}	-0.152*** (0.055)
Δu_{t-3}	-0.036** (0.017)	Δu_{t-3}	-0.038** (0.017)	Δu_{t-3}	-0.039** (0.016)	Δu_{t-3}	-0.038** (0.017)	Const.	0.298*** (0.060)	Δu_{t-3}	-0.031* (0.017)
Δcsi_{t-4}	-0.014** (0.007)	Const.	0.250*** (0.060)	Const.	0.388*** (0.066)	Δcsi_{t-4}	0.008* (0.004)			Δcsi_{t-4}	0.010** (0.004)
Const.	0.311*** (0.071)					Const.	0.282*** (0.050)			Const.	0.216*** (0.056)
L_u	0.001 (0.006)	L_u	0.003 (0.006)	L_u	0.006 (0.005)	L_u	-0.000 (0.006)	L_u	-0.001 (0.006)	L_u	0.004 (0.005)
L_{csi}	-0.017* (0.009)	L_{csi}	-0.009 (0.009)	L_{csi}	-0.030*** (0.009)	L_{csi}	-0.011** (0.005)	L_{csi}	-0.015** (0.007)	L_{csi}	-0.002 (0.007)
Adj. R^2	0.416	Adj. R^2	0.416	Adj. R^2	0.432	Adj. R^2	0.417	Adj. R^2	0.411	Adj. R^2	0.411
F_{PSS}	14.52	F_{PSS}	14.75	F_{PSS}	16.06	F_{PSS}	14.59	F_{PSS}	13.92	F_{PSS}	14.84
χ^2_N	5.10 [0.078]	χ^2_N	4.21 [0.122]	χ^2_N	3.81 [0.149]	χ^2_N	3.77 [0.152]	χ^2_N	2.77 [0.250]	χ^2_N	6.45 [0.040]
χ^2_{SC}	8.13 [0.017]	χ^2_{SC}	7.22 [0.027]	χ^2_{SC}	4.04 [0.133]	χ^2_{SC}	7.51 [0.023]	χ^2_{SC}	1.52 [0.467]	χ^2_{SC}	9.10 [0.011]
χ^2_{HET}	12.68 [0.080]	χ^2_{HET}	7.34 [0.290]	χ^2_{HET}	10.64 [0.100]	χ^2_{HET}	9.49 [0.220]	χ^2_{HET}	9.81 [0.081]	χ^2_{HET}	11.69 [0.111]
χ^2_{FF}	0.06 [0.811]	χ^2_{FF}	0.01 [0.919]	χ^2_{FF}	0.01 [0.922]	χ^2_{FF}	0.02 [0.879]	χ^2_{FF}	0.03 [0.864]	χ^2_{FF}	0.20 [0.658]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. $L_u$and L_{csi} are the long-run coefficients of the unemployment rate and consumer sentiment index, respectively. Changes in the suicide rate are in relation to a one percentage point change in the unemployment rate and a ten index point change in the consumer sentiment index. F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu = \rho = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 2 I(1) regressors) are 3.35, 3.87 and 5.00 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 5. NARDL results: Full sample

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.392*** (0.065)	s_{t-1}	-0.379*** (0.072)	s_{t-1}	-0.400*** (0.060)	s_{t-1}	-0.403*** (0.066)	s_{t-1}	-0.405*** (0.068)	s_{t-1}	-0.366*** (0.067)
u^+_{t-1}	0.019* (0.010)	u^+_{t-1}	0.013 (0.011)	u^+_{t-1}	0.011 (0.011)	u^+_{t-1}	0.025** (0.010)	u^+_{t-1}	-0.002 (0.016)	u^+_{t-1}	0.020** (0.010)
u^-_{t-1}	0.012** (0.006)	u^-_{t-1}	0.019*** (0.006)	u^-_{t-1}	0.012** (0.005)	u^-_{t-1}	0.009 (1.413)	u^-_{t-1}	0.015** (0.006)	u^-_{t-1}	0.012* (0.006)
csi^+_{t-1}	-0.016** (0.006)	csi^+_{t-1}	0.014* (0.007)	csi^+_{t-1}	-0.015** (0.007)	csi^+_{t-1}	-0.008** (0.003)	csi^+_{t-1}	-0.008 (0.007)	csi^+_{t-1}	-0.005 (0.005)
csi^-_{t-1}	-0.013** (0.005)	csi^-_{t-1}	0.011* (0.006)	csi^-_{t-1}	-0.015*** (0.006)	csi^-_{t-1}	-0.005* (0.003)	csi^-_{t-1}	-0.013** (0.005)	csi^-_{t-1}	-0.004 (0.004)
Δs_{t-1}	-0.270*** (0.044)	Δs_{t-1}	-0.259*** (0.047)	Δs_{t-1}	-0.286*** (0.046)	Δs_{t-1}	-0.258*** (0.046)	Δs_{t-1}	-0.271*** (0.046)	Δs_{t-1}	-0.272*** (0.045)
Δu^+_{t-3}	-0.112* (0.062)	Δs_{t-6}	0.077* (0.043)	Δs_{t-4}	-0.084** (0.041)	Δs_{t-6}	-0.085* (0.045)	Δu^+_{t-5}	0.104** (0.044)	Δs_{t-6}	-0.087* (0.045)
Const.	0.398*** (0.066)	Δu^+_{t-5}	0.132** (0.057)	Δu^+_{t-5}	0.092* (0.051)	Δu^+_{t-5}	0.098* (0.055)	Δu^-_{t-3}	-0.114* (0.0660)	Δu^+_{t-5}	0.110** (0.053)
		Δu^-_{t-4}	0.117** (0.057)	Δu^+_{t-6}	-0.103* (0.057)	Δu^+_{t-6}	-0.099* (0.055)	Δcsi^+_{t-1}	-0.030** (0.005)	Δu^+_{t-6}	-0.101* (0.055)
		Δcsi^+_{t-5}	-0.052** (0.021)	Δu^-_{t-3}	-0.107* (0.061)	Const.	0.365*** (0.065)	Const.	0.457*** (0.085)	Δu^-_{t-4}	0.096* (0.056)
		Δcsi^-_{t-6}	-0.027* (0.016)	Δcsi^-_t	0.035** (0.014)					Δcsi^-_{t-4}	0.028*** (0.010)
				Δcsi^-_{t-1}	0.045*** (0.017)					Const.	0.368*** (0.064)
		Const.	0.379** (0.072)	Const.	0.423*** (0.063)						
L^+_u	0.050** (0.023)	L^+_u	0.034 (0.029)	L^+_u	0.028 (0.026)	L^+_u	0.063*** (0.022)	L^+_u	-0.006 (0.040)	L^+_u	0.054** (0.024)
L^-_u	0.030** (0.013)	L^-_u	0.052*** (0.014)	L^-_u	0.031** (0.012)	L^-_u	0.021 (0.014)	L^-_u	0.036*** (0.011)	L^-_u	0.032** (0.015)
L^+_{csi}	-0.040*** (0.015)	L^+_{csi}	0.036* (0.020)	L^+_{csi}	-0.038** (0.027)	L^+_{csi}	-0.020*** (0.008)	L^+_{csi}	-0.021 (0.018)	L^+_{csi}	-0.014 (0.012)
L^-_{csi}	-0.034*** (0.013)	L^-_{csi}	0.031* (0.017)	L^-_{csi}	-0.038** (0.015)	L^-_{csi}	-0.013* (0.007)	L^-_{csi}	-0.031** (0.013)	L^-_{csi}	-0.010 (0.010)
Adj. R^2	0.317	Adj. R^2	0.335	Adj. R^2	0.339	Adj. R^2	0.330	Adj. R^2	0.338	Adj. R^2	0.333

F_{PSS}	6.96	F_{PSS}	8.10	F_{PSS}	8.79	F_{PSS}	6.99	F_{PSS}	7.53	F_{PSS}	7.18
χ^2_N	0.19 [0.911]	χ^2_N	0.83 [0.659]	χ^2_N	0.31 [0.856]	χ^2_N	0.24 [0.885]	χ^2_N	0.046 [0.977]	χ^2_N	0.82 [0.664]
χ^2_{SC}	0.17 [0.920]	χ^2_{SC}	1.49 [0.474]	χ^2_{SC}	1.78 [0.410]	χ^2_{SC}	0.27 [0.874]	χ^2_{SC}	0.08 [0.960]	χ^2_{SC}	1.60 [0.449]
χ^2_{HET}	22.16 [0.002]	χ^2_{HET}	19.83 [0.048]	χ^2_{HET}	26.48 [0.009]	χ^2_{HET}	17.13 [0.047]	χ^2_{HET}	21.93 [0.009]	χ^2_{HET}	17.64 [0.009]
χ^2_{FF}	0.32 [0.571]	χ^2_{FF}	0.36 [0.546]	χ^2_{FF}	0.35 [0.553]	χ^2_{FF}	1.19 [0.274]	χ^2_{FF}	0.97 [0.331]	χ^2_{FF}	0.85 [0.355]
$W_{u^+=u^-}$	0.94 [0.331]	$W_{u^+=u^-}$	0.44 [0.507]	$W_{u^+=u^-}$	0.02 [0.900]	$W_{u^+=u^-}$	3.24 [0.072]	$W_{u^+=u^-}$	1.09 [0.297]	$W_{u^+=u^-}$	0.89 [0.345]
$W_{csi^+=csi^-}$	1.03 [0.311]	$W_{csi^+=csi^-}$	0.61 [0.434]	$W_{csi^+=csi^-}$	0.00 [0.982]	$W_{csi^+=csi^-}$	3.37 [0.067]	$W_{csi^+=csi^-}$	1.27 [0.268]	$W_{csi^+=csi^-}$	0.97 [0.325]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. L^+_u and L^-_u, respectively, are the long-run coefficients related to positive and negative changes in the unemployment rate (by one percentage point). L^+_{csi} and L^-_{csi}, respectively, are the long-run coefficients related to positive and negative changes in the consumer sentiment index (by ten index points). F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu^+ = \mu^- = \rho^+ = \rho^- = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 4 I(1) regressors) are 3.09, 3.49 and 4.37 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. $W_{u^+=u^-}$ is the Wald test for long-run symmetry in the unemployment rate ($L^+_u = L^-_u$), and $W_{csi^+=csi^-}$ is the Wald test for long-run symmetry in the consumer sentiment index ($L^+_{csi} = L^-_{csi}$). Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 6. NARDL results: Males

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.480*** (0.067)	s_{t-1}	-0.426*** (0.070)	s_{t-1}	-0.454*** (0.065)	s_{t-1}	-0.506*** (0.066)	s_{t-1}	-0.450*** (0.066)	s_{t-1}	-0.451*** (0.071)
u_{t-1}^{+}	0.031** (0.012)	u_{t-1}^{+}	0.029* (0.016)	u_{t-1}^{+}	0.027** (0.013)	u_{t-1}^{+}	0.034*** (0.012)	u_{t-1}^{+}	0.021 (0.016)	u_{t-1}^{+}	0.037*** (0.014)
u_{t-1}^{-}	0.011 (0.009)	u_{t-1}^{-}	0.019** (0.010)	u_{t-1}^{-}	0.016* (0.009)	u_{t-1}^{-}	0.006 (0.009)	u_{t-1}^{-}	0.016* (0.009)	u_{t-1}^{-}	0.018* (0.009)
csi_{t-1}^{+}	-0.033*** (0.008)	csi_{t-1}^{+}	0.018 (0.010)	csi_{t-1}^{+}	-0.031*** (0.011)	csi_{t-1}^{+}	-0.020*** (0.004)	csi_{t-1}^{+}	-0.028*** (0.009)	csi_{t-1}^{+}	-0.027*** (0.007)
csi_{t-1}^{-}	-0.025** (0.007)	csi_{t-1}^{-}	0.005 (0.009)	csi_{t-1}^{-}	-0.027*** (0.009)	csi_{t-1}^{-}	-0.015*** (0.004)	csi_{t-1}^{-}	-0.026*** (0.007)	csi_{t-1}^{-}	-0.023*** (0.006)
Δs_{t-1}	-0.252*** (0.044)	Δs_{t-1}	-0.283*** (0.049)	Δs_{t-1}	-0.281*** (0.043)	Δs_{t-1}	-0.252*** (0.046)	Δs_{t-1}	-0.279*** (0.042)	Δs_{t-1}	-0.279*** (0.044)
Δu_{t}^{-}	-0.234*** (0.069)	Δu_{t}^{+}	0.171* (0.102)	Δu_{t}^{-}	-0.215*** (0.072)	Δs_{t-3}	-0.078* (0.046)	Δu_{t}^{-}	-0.220*** (0.072)	Δu_{t}^{-}	-0.198*** (0.072)
Δu_{t-2}^{-}	-0.177** (0.082)	Δu_{t}^{-}	-0.256*** (0.080)	Δu_{t-2}^{-}	0.171** (0.085)	Δu_{t}^{-}	-0.211*** (0.075)	Δu_{t-2}^{-}	-0.177** (0.086)	Δcsi_{t-4}^{-}	0.029* (0.015)
Δcsi_{t-5}^{+}	-0.078** (0.034)	Δcsi_{t-5}^{+}	-0.060** (0.028)	Δcsi_{t-5}^{+}	-0.061** (0.027)	Δu_{t-2}^{-}	0.167** (0.083)	Const.	0.733*** (0.116)	Const.	0.743*** (0.117)
Const.	0.754*** (0.110)	Const.	0.639*** (0.113)	Δcsi_{t-1}^{-}	0.061** (0.024)	Δcsi_{t-2}^{+}	-0.030** (0.015)				
				Δcsi_{t-6}^{-}	-0.065*** (0.022)	Const.	0.725*** (0.109)				
				Const.	0.691*** (0.111)						
L_{u}^{+}	0.064*** (0.023)	L_{u}^{+}	0.067** (0.032)	L_{u}^{+}	0.059** (0.027)	L_{u}^{+}	0.067*** (0.021)	L_{u}^{+}	0.046 (0.034)	L_{u}^{+}	0.081*** (0.027)
L_{u}^{-}	0.023 (0.017)	L_{u}^{-}	0.044** (0.021)	L_{u}^{-}	0.034* (0.018)	L_{u}^{-}	0.012 (0.018)	L_{u}^{-}	0.036* (0.018)	L_{u}^{-}	0.039** (0.018)
L_{csi}^{+}	-0.068*** (0.018)	L_{csi}^{+}	0.004 (0.022)	L_{csi}^{+}	-0.068*** (0.024)	L_{csi}^{+}	-0.040*** (0.009)	L_{csi}^{+}	-0.062*** (0.020)	L_{csi}^{+}	-0.061*** (0.016)
L_{csi}^{-}	-0.053*** (0.016)	L_{csi}^{-}	0.012 (0.021)	L_{csi}^{-}	-0.059*** (0.022)	L_{csi}^{-}	-0.029*** (0.009)	L_{csi}^{-}	-0.058*** (0.016)	L_{csi}^{-}	-0.051*** (0.014)
Adj. R^2	0.394	Adj. R^2	0.373	Adj. R^2	0.390	Adj. R^2	0.395	Adj. R^2	0.386	Adj. R^2	0.381
F_{PSS}	10.13	F_{PSS}	7.17	F_{PSS}	9.31	F_{PSS}	13.99	F_{PSS}	11.23	F_{PSS}	7.57
χ_N^2	4.09 [0.130]	χ_N^2	8.27 [0.016]	χ_N^2	2.21 [0.332]	χ_N^2	4.71 [0.095]	χ_N^2	2.214 [0.331]	χ_N^2	4.27 [0.118]

χ^2_{SC}	2.05 [0.359]	χ^2_{SC}	0.86 [0.652]	χ^2_{SC}	1.26 [0.532]	χ^2_{SC}	0.54 [0.762]	χ^2_{SC}	1.36 [0.506]	χ^2_{SC}	0.37 [0.832]
χ^2_{HET}	23.21 [0.006]	χ^2_{HET}	22.53 [0.007]	χ^2_{HET}	27.77 [0.004]	χ^2_{HET}	21.29 [0.019]	χ^2_{HET}	27.30 [0.001]	χ^2_{HET}	18.85 [0.016]
χ^2_{FF}	0.25 [0.616]	χ^2_{FF}	0.04 [0.851]	χ^2_{FF}	0.20 [0.653]	χ^2_{FF}	0.39 [0.531]	χ^2_{FF}	0.37 [0.542]	χ^2_{FF}	0.07 [0.789]
$W_{u^+=u^-}$	3.58 [0.058]	$W_{u^+=u^-}$	0.47 [0.494]	$W_{u^+=u^-}$	1.01 [0.316]	$W_{u^+=u^-}$	7.65 [0.006]	$W_{u^+=u^-}$	0.08 [0.783]	$W_{u^+=u^-}$	2.30 [0.129]
$W_{csi^+=csi^-}$	5.04 [0.025]	$W_{csi^+=csi^-}$	0.68 [0.410]	$W_{csi^+=csi^-}$	1.75 [0.185]	$W_{csi^+=csi^-}$	9.85 [0.002]	$W_{csi^+=csi^-}$	0.13 [0.715]	$W_{csi^+=csi^-}$	3.11 [0.078]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. L_u^+ and L_u^-, respectively, are the long-run coefficients related to positive and negative changes in the unemployment rate (by one percentage point). L_{csi}^+ and L_{csi}^-, respectively, are the long-run coefficients related to positive and negative changes in the consumer sentiment index (by ten index points). F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu^+ = \mu^- = \rho^+ = \rho^- = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 4 I(1) regressors) are 3.09, 3.49 and 4.37 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. $W_{u^+=u^-}$ is the Wald test for long-run symmetry in the unemployment rate ($L_u^+ = L_u^-$), and $W_{csi^+=csi^-}$ is the Wald test for long-run symmetry in the consumer sentiment index ($L_{csi}^+ = L_{csi}^-$). Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 7. NARDL results: Females

Consumer Sentiment Index (CSI)		Family Finances last 12 months (C1)		Family Finances next 12 months (C2)		Economic Conditions next 12 months (C3)		Economic Conditions next 5 years (C4)		Time to Buy Major Household Items (C5)	
Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)	Variable	Coeff. (S.E.)
s_{t-1}	-0.757*** (0.069)	s_{t-1}	-0.744*** (0.072)	s_{t-1}	-0.789*** (0.075)	s_{t-1}	-0.753*** (0.074)	s_{t-1}	-0.751*** (0.078)	s_{t-1}	-0.689*** (0.069)
u_{t-1}^{+}	0.015 (0.009)	u_{t-1}^{+}	-0.003 (0.009)	u_{t-1}^{+}	0.002 (0.011)	u_{t-1}^{+}	0.019* (0.010)	u_{t-1}^{+}	-0.004 (0.010)	u_{t-1}^{+}	0.013 (0.009)
u_{t-1}^{-}	0.015*** (0.005)	u_{t-1}^{-}	0.014*** (0.005)	u_{t-1}^{-}	0.013** (0.005)	u_{t-1}^{-}	0.016*** (0.006)	u_{t-1}^{-}	0.022*** (0.005)	u_{t-1}^{-}	0.016*** (0.005)
csi_{t-1}^{+}	-0.011* (0.006)	csi_{t-1}^{+}	0.007 (0.005)	csi_{t-1}^{+}	-0.014** (0.005)	csi_{t-1}^{+}	-0.008** (0.004)	csi_{t-1}^{+}	-0.003 (0.005)	csi_{t-1}^{+}	-0.000 (0.005)
csi_{t-1}^{-}	-0.012** (0.005)	csi_{t-1}^{-}	0.001 (0.005)	csi_{t-1}^{-}	-0.018*** (0.005)	csi_{t-1}^{-}	-0.008*** (0.003)	csi_{t-1}^{-}	-0.011*** (0.004)	csi_{t-1}^{-}	-0.002 (0.004)
Δs_{t-1}	-0.115** (0.046)	Δs_{t-1}	-0.126*** (0.047)	Δs_{t-1}	-0.112** (0.048)	Δs_{t-1}	-0.116** (0.047)	Δs_{t-1}	-0.128*** (0.049)	Δs_{t-1}	-0.123*** (0.047)
Δu_{t-3}^{+}	-0.068** (0.033)	Δcsi_{t-3}^{+}	-0.024** (0.009)	Δu_{t-3}^{+}	-0.059** (0.029)	Δu_{t-3}^{+}	-0.070** (0.033)	Δu_{t-3}^{+}	-0.063** (0.031)	Δu_{t-3}^{+}	-0.077** (0.030)
Δcsi_{t-3}^{+}	-0.032** (0.015)	Const.	0.350*** (0.039)	Δcsi_{t-4}^{+}	0.018* (0.010)	Δcsi_{t-3}^{+}	-0.014* (0.008)	Δcsi_{t-1}^{+}	-0.022** (0.009)	Δcsi_{t-2}^{+}	0.015* (0.008)
Δcsi_{t-1}^{-}	0.019 (0.012)			Δcsi_{t}^{-}	0.024** (0.012)	Δcsi_{t-3}^{-}	0.015* (0.008)	Const.	0.362*** (0.041)	Δcsi_{t-4}^{-}	0.022*** (0.008)
Δcsi_{t-3}^{-}	0.029** (0.013)			Δcsi_{t-1}^{-}	0.043*** (0.008)	Δcsi_{t-4}^{-}	0.014** (0.007)			Δcsi_{t-6}^{-}	0.013* (0.008)
Δcsi_{t-4}^{-}	0.026** (0.012)			Δcsi_{t-3}^{-}	0.021** (0.009)	Const.	0.323*** (0.041)			Const.	0.299*** (0.040)
Const.	0.346*** (0.040)			Const.	0.369*** (0.042)						
L_u^{+}	0.020 (0.013)	L_u^{+}	-0.004 (0.012)	L_u^{+}	0.003 (0.014)	L_u^{+}	0.025* (0.013)	L_u^{+}	-0.005 (0.013)	L_u^{+}	0.019 (0.012)
L_u^{-}	0.020*** (0.006)	L_u^{-}	0.019*** (0.007)	L_u^{-}	0.016** (0.007)	L_u^{-}	0.021*** (0.007)	L_u^{-}	0.030*** (0.007)	L_u^{-}	0.023*** (0.007)
L_{csi}^{+}	-0.015* (0.008)	L_{csi}^{+}	0.009 (0.007)	L_{csi}^{+}	-0.018** (0.007)	L_{csi}^{+}	-0.011** (0.004)	L_{csi}^{+}	-0.004 (0.007)	L_{csi}^{+}	-0.000 (0.007)
L_{csi}^{-}	-0.016** (0.006)	L_{csi}^{-}	0.002 (0.007)	L_{csi}^{-}	-0.023*** (0.006)	L_{csi}^{-}	-0.011*** (0.003)	L_{csi}^{-}	-0.015*** (0.005)	L_{csi}^{-}	-0.003 (0.006)
Adj. R^2	0.442	Adj. R^2	0.437	Adj. R^2	0.468	Adj. R^2	0.439	Adj. R^2	0.453	Adj. R^2	0.418
F_{PSS}	24.79	F_{PSS}	19.93	F_{PSS}	23.82	F_{PSS}	19.08	F_{PSS}	19.01	F_{PSS}	18.23
χ_N^2	8.91 [0.012]	χ_N^2	5.11 [0.078]	χ_N^2	5.40 [0.067]	χ_N^2	7.69 [0.021]	χ_N^2	6.47 [0.039]	χ_N^2	11.81 [0.003]

χ^2_{SC}	2.88 [0.237]	χ^2_{SC}	2.55 [0.279]	χ^2_{SC}	3.48 [0.176]	χ^2_{SC}	4.93 [0.085]	χ^2_{SC}	3.05 [0.217]	χ^2_{SC}	3.22 [0.199]
χ^2_{HET}	11.54 [0.400]	χ^2_{HET}	10.86 [0.145]	χ^2_{HET}	19.68 [0.050]	χ^2_{HET}	12.11 [0.278]	χ^2_{HET}	12.92 [0.115]	χ^2_{HET}	11.24 [0.339]
χ^2_{FF}	0.27 [0.606]	χ^2_{FF}	0.10 [0.753]	χ^2_{FF}	0.00 [0.966]	χ^2_{FF}	0.00 [0.970]	χ^2_{FF}	0.50 [0.478]	χ^2_{FF}	0.01 [0.936]
$W_{u^+=u^-}$	0.00 [0.993]	$W_{u^+=u^-}$	7.21 [0.007]	$W_{u^+=u^-}$	2.53 [0.112]	$W_{u^+=u^-}$	0.07 [0.799]	$W_{u^+=u^-}$	5.58 [0.018]	$W_{u^+=u^-}$	0.10 [0.754]
$W_{csi^+=csi^-}$	0.17 [0.681]	$W_{csi^+=csi^-}$	10.64 [0.001]	$W_{csi^+=csi^-}$	4.62 [0.032]	$W_{csi^+=csi^-}$	0.00 [0.945]	$W_{csi^+=csi^-}$	7.31 [0.007]	$W_{csi^+=csi^-}$	0.51 [0.474]

Note: *** p < 0.01, ** p < 0.05, * p < 0.10. L_u^+ and L_u^-, respectively, are the long-run coefficients related to positive and negative changes in the unemployment rate (by one percentage point). L_{csi}^+ and L_{csi}^-, respectively, are the long-run coefficients related to positive and negative changes in the consumer sentiment index (by ten index points). F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu^+ = \mu^- = \rho^+ = \rho^- = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 4 I(1) regressors) are 3.09, 3.49 and 4.37 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. $W_{u^+=u^-}$ is the Wald test for long-run symmetry in the unemployment rate ($L_u^+ = L_u^-$), and $W_{csi^+=csi^-}$ is the Wald test for long-run symmetry in the consumer sentiment index ($L_{csi}^+ = L_{csi}^-$). Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Table 8: Summary of NARDL results with respect to unemployment and sentiment

		↑ UR	↓ UR
Suicide rate	Male	↑	0
	Female	0	↓

		↑ CSI	↓ CSI
Suicide rate	Male	**↓**	↑
	Female	↓	**↑**

Note: UR and CSI denote the unemployment rate and consumer sentiment index, respectively. Bold arrows reflect a very strong effect, non-bold arrows denote a small to moderate effect, and 0 denotes no effect.

Appendix

Table A.1. CASiE questions

Item	Response categories
C1. [CURRENT FINANCIAL SITUATION] "About how people are getting along financially these days. Would you say YOU AND YOUR FAMILY are better-off financially or worse-off than you were AT THIS TIME LAST YEAR?"	*1. Better-off* *2. Same* *3. Worse-off* *4. Uncertain/Don't Know/It depends*
C2. [FUTURE FINANCIAL SITUATION] "Looking ahead to this time NEXT YEAR. Do you expect YOU & YOUR FAMILY to be better-off financially or worse-off or about the same as now?"	*1. Better-off* *2. Same* *3. Worse-off* *4. Uncertain/Don't Know/It depends*
C3. [FUTURE ECONOMIC CONDITIONS] "Thinking of economic conditions in AUSTRALIA AS A WHOLE. During the NEXT 12 months, do you EXPECT WE'LL have good times financially, or bad times, or what?"	*1. Good times* *2. Good with qualifications* *3. Some good, some bad* *4. Bad with qualifications* *5. Bad times* *6. Uncertain/Don't Know/It depends*
C4. [5-YEAR ECONOMIC FORECAST] "Looking ahead, what would you say is more likely? That in AUSTRALIA AS A WHOLE, WE'LL have CONTINUOUS good times during the NEXT 5 years or so, or WE'LL have some bad times - or what?"	*1. Continuous good times* *2. Good with qualifications* *3. Some good, some bad* *4. Some bad with qualifications* *5. Some bad times* *6. Uncertain/Don't Know/It depends*
C5. [CONSUMER BUYING INTENTIONS] "Next, about the MAJOR THINGS PEOPLE BUY for their homes. SPEAKING GENERALLY, do you think now is a good time or a bad time, FOR PEOPLE to buy major household items?"	*1. Good* *2. Some good, some bad* *3. Bad* *4. Don't know/Uncertain*

Source: Adapted from Leahy and Summers (2004).

Table A.2: Unit Root Tests

	Series Name	Aggregate		Males		Females	
		KPSS stat	*S.L.*	*KPSS stat*	*S.L.*	*KPSS stat*	*S.L.*
Panel A: Level (constant & no trend)	Suicide Rate (SR)	0.971	***	1.344	***	0.476	**
	Unemployment Rate (UR)	1.528	***	1.508	***	1.555	***
	Consumer Sentiment Index (CSI)	0.374	*	0.319	S	0.458	*
	Family Finances Last 12 Months (C1)	0.346	S	0.330	S	0.384	*
	Family Finances Next 12 Months (C2)	0.488	**	0.513	**	0.450	*
	Economic Conditions Next 12 Months (C3)	0.450	*	0.377	*	0.542	**
	Economic Conditions Next 5 Years (C4)	0.797	***	0.616	**	1.001	***
	Time to Buy Major Household Items (C5)	0.178	S	0.169	S	0.257	S
Panel B: Level (constant & trend)	Suicide Rate (SR)	0.319	***	0.308	***	0.402	***
	Unemployment Rate (UR)	0.364	***	0.343	***	0.395	***
	Consumer Sentiment Index (CSI)	0.292	***	0.285	***	0.305	***
	Family Finances Last 12 Months (C1)	0.313	***	0.297	***	0.348	***
	Family Finances Next 12 Months (C2)	0.292	***	0.314	***	0.270	***
	Economic Conditions Next 12 Months (C3)	0.227	***	0.234	***	0.219	***
	Economic Conditions Next 5 Years (C4)	0.257	***	0.249	***	0.268	***
	Time to Buy Major Household Items (C5)	0.182	**	0.138	*	0.220	***
Panel C: First differences (constant & no trend)	Suicide Rate (ΔSR)	0.039	S	0.037	S	0.187	S
	Unemployment Rate (ΔUR)	0.165	S	0.179	S	0.142	S
	Consumer Sentiment Index (ΔCSI)	0.047	S	0.047	S	0.113	S
	Family Finances Last 12 Months (ΔC1)	0.035	S	0.040	S	0.096	S
	Family Finances Next 12 Months (ΔC2)	0.030	S	0.029	S	0.070	S
	Economic Conditions Next 12 Months (ΔC3)	0.028	S	0.031	S	0.046	S
	Economic Conditions Next 5 Years (ΔC4)	0.091	S	0.175	S	0.132	S
	Time to Buy Major Household Items (ΔC5)	0.176	S	0.170	S	0.465	**

Note*: KPSS stat* is the Kwiatkowski-Phillips-Schmidt-Shin LM test statistic for the null hypothesis of stationarity. *S.L.* indicates the significance level at which the null hypothesis of stationarity is rejected. Specifically, ***, **, and * indicates that the null hypothesis of stationarity is rejected at 1%, 5% and 10% significance level, respectively, while S indicates that the null hypothesis is not rejected (i.e. the series is stationary). The asymptotic critical values at 1%, 5% and 10% significance levels, provided by Kwiatkowski, Phillips, Schmidt, and Shin (1992), are 0.739, 0.463, and 0.347, respectively, for the test equation with only a constant as the deterministic component, and are 0.216, 0.146, and 0.119, respectively, for the test equation with both a constant and linear trend as the deterministic components. If the test statistic is greater than the critical values, the null hypothesis of stationarity is rejected. To allow for the possibility that the variables may display a linear trend over the sample period, we conduct two versions of the KPSS test on the levels of all the variables; without a linear trend (Panel A) and with a linear trend (Panel B). The KPSS test equation for the first differences of all the variables only includes a constant as the deterministic component (Panel C). the results for the first differences in Panel C suggest that almost all the first differences are stationary with the only exception being *C5* among females, in which the null of stationarity is rejected at the 5% significance level. However, other unit root tests, including the Augmented Dickey-Fuller (Said and Dickey, 1984) and the Phillips-Perron (Phillips and Perrons, 1988) tests, on the first difference of *C5* in the female sample confirm that it is a non-stationary I(1) series. The Phillips-Perron test statistic is -38.339 and the Augmented Dickey-Fuller test statistic is -18.266. The associated critical values for both test statistics at 1%, 5% and 10% are -3.449, -2.869, and -2.571, respectively. Given the unit root test results for the levels of variables with a linear trend, we also experiment with adding a linear trend to our estimated models in equations (4) and (7), to allow for the possibility that the level relationship between the variables, as specified in equation (2), may include a linear trend. However, the estimated coefficients on the linear trend are highly insignificant in all the estimated models. Therefore, we proceed with our specified models in (4) and (7) without a linear trend.

Table A.3: ARDL and NARDL results over a longer sample period (Feb 1978- Sep 2018)

Panel A: ARDL results – Full sample				**Panel B: NARDL results – Full sample**			
Variables	Coeff.	S.E.	p-value	Variables	Coeff.	S.E.	p-value
s_{t-1}	-0.426	0.056	0.000	s_{t-1}	-0.541	0.082	0.000
u_{t-1}	0.025	0.006	0.000	u^{+}_{t-1}	0.027	0.009	0.004
csi_{t-1}	-0.019	0.007	0.004	u^{-}_{t-1}	-0.029	0.016	0.069
Δs_{t-1}	-0.294	0.040	0.000	csi^{+}_{t-1}	-0.030	0.009	0.001
Constant	0.706	0.117	0.000	csi^{-}_{t-1}	-0.006	0.011	0.576
L_u	0.059	0.011	0.000	Δs_{t-1}	-0.251	0.055	0.000
L_{csi}	-0.045	0.018	0.011	Δu^{+}_{t-6}	-0.161	0.086	0.064
				Δcsi^{-}_{t-2}	0.066	0.031	0.033
				Constant	0.829	0.127	0.000
				L^{+}_{u}	0.050	0.017	0.004
				L^{-}_{u}	-0.054	0.037	0.146
				L^{+}_{csi}	-0.055	0.019	0.004
				L^{-}_{csi}	-0.011	0.024	0.645
Adj. R^2	0.361			Adj. R^2	0.401		
F_{PSS}	20.996			F_{PSS}	11.211		
χ^2_N	4.019		0.134	χ^2_N	1.968		0.373
χ^2_{SC}	1.317		0.518	χ^2_{SC}	3.417		0.181
χ^2_{HET}	12.905		0.012	χ^2_{HET}	9.419		0.308
χ^2_{FF}	0.110		0.741	χ^2_{FF}	0.035		0.852

Notes: In Panel A: $L_u$and L_{csi} are the long-run coefficients of the unemployment rate and consumer sentiment index, respectively. F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu = \rho = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 2 I(1) regressors) are 3.35, 3.87 and 5.00 at 10%, 5%, and 1% significance levels. In Panel B: L^{+}_{u} and L^{-}_{u}, respectively, are the long-run coefficients related to positive and negative changes in the unemployment rate (by one percentage point). L^{+}_{csi} and L^{-}_{csi}, respectively, are the long-run coefficients related to positive and negative changes in the consumer sentiment index (by ten index points). F_{PSS} is the Pesaran, Shin and Smith (2001) F-statistic for the Bounds-Test of the null hypothesis $a = \alpha = \mu^{+} = \mu^{-} = \rho^{+} = \rho^{-} = 0$; the associated nonstandard critical values (for the case with a restricted intercept and no trend, 4 I(1) regressors) are 3.09, 3.49 and 4.37 at 10%, 5%, and 1% significance levels. χ^2_N, χ^2_{SC}, χ^2_{HET}, and χ^2_{FF} are LM tests for normality, serial correlation, heteroscedasticity, and functional form, respectively. Where relevant, *p*-values are in [.]. All models estimated with Newey-West HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariance.

Acknowledgements

This research was funded by the Australian Government through the Australian Research Council's *Centre of Excellence for Children and Families over the Life Course* (Project ID CE140100027 and CE200100025). We are grateful to the Mortality Data Centre at the Australian Bureau of Statistics for providing the suicide data, as well as to Steve Zubrick and three anonymous referees for comments and suggestions.