Associations between Japan’s consumer confidence index and emotion-related variables such as depression, anxiety, and positive affect

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Abstract: The Consumer Confidence Index (CCI), which is an indicator of people’s subjective outlook for the economy, is claimed to have affective dimensions, but research exploring its emotional aspects is scant. We explore association and causality between the CCI and variables denoting three emotion-related psychological states: depression, anxiety, and positive affect. Study 1 used the data of a three-arm internet-based randomized controlled trial (RCT) which examined two types of psychological intervention intended to alleviate depression. As the data was four-wave panel (longitudinal) data at six-week intervals, we examined associations between the CCI and the three emotion-related variables by applying the fixed-effects model and random-effects model (Study 1A). We also examined whether psychological interventions enhance the CCI (Study 1B). Study 2 was based on an online observation in which the CCI and the three emotion-related variables were recorded three times at two-month intervals, thus three-wave panel data was constructed. In Study 2, we examined associations between the CCI and the three emotion-related variables in the same way as Study 1A. Results confirm an association but not causality between the CCI and anxiety as well as positive affect.

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PUBLIC INTEREST STATEMENT
How psychological factors influence economic phenomena is an area of growing interest, and yet empirical studies are scarce. To contribute to this issue, we focused on Japan’s consumer confidence index (CCI) as an indicator of survey respondents’ outlooks for Japan’s economy during 2015 and 2016. Although the CCI is known to predict some economic phenomena such as consumer spending and stock prices, whether it relates to emotional states such as depression, anxiety, and positive affect has not been explored sufficiently. Using two original datasets that include questions to calculate the CCI and measure the variables denoting three psychological conditions, we found that respondents with higher consumer confidence are less anxious and exhibit more positive affect. Results for depression were mixed. Our randomized control trial showed that interventions to alleviate depression had no effect on the CCI, suggesting there is no causal relation between depression and the CCI.
Existence of causality and association between the CCI and depression was not confirmed.

Subjects: Multidisciplinary Psychology; Cognition & Emotion; Economic Psychology

Keywords: consumer confidence index; depression; anxiety; positive affect

1. Introduction and review of literature

The influence of psychological factors on economic phenomena is an area of growing interest (Akerlof & Shiller, 2010). However, the difficulty of directly measuring relations between psychological variables and economic phenomena impedes thorough exploration. Consumer confidence is one possible mediator between psychological variables and economic phenomena. Although the definition of consumer confidence is elusive (Curtin, 2002), we focus on people’s subjective outlook for the economy, which can be optimistic or pessimistic. George Katona, originator of the idea of consumer confidence, hypothesized that “spending would increase when people become optimistic, and precautionary saving would rise when they became pessimistic” (Curtin, 2002). Subsequent studies show that consumer confidence indeed predicts several economic variables, particularly consumer spending.

Scholarship acknowledges that consumer confidence has affective as well as cognitive dimensions (Curtin, 2002), but its emotional components remain insufficiently explored. Hence, the first question the present studies address is whether consumer confidence is associated with variables denoting three emotion-related psychological states: depression, anxiety, and positive affect. The second question the present studies address is whether or not there is a causal relationship between consumer confidence and these three variables.

1.1. Consumer confidence index (CCI) and economic phenomenon

Many countries survey consumers and construct a consumer confidence index (CCI) from its results. Although questions vary from survey to survey, they center upon respondents’ outlooks for their respective national economies as well as the personal economic situations of the respondents (Curtin, 2007). For example, the monthly Consumer Confidence Survey by the Cabinet Office of Japan poses the following four questions about respondents’ outlooks for Japan’s economy and their personal economic situation and calculates its CCI from their responses.

(1) Half-a-year from now will your household be better or worse off?

(2) Half-a-year from now will your household income be larger or smaller than today?

(3) Half-a-year from now will the national employment situation (e.g., job stability or ease of finding jobs) be better or worse?

(4) Will half-a-year from now be a better or worse time to buy durable consumer goods?

Questions (1), (2) and (4) are mainly related to personal economic matters of the respondents and question (3) is mainly related to the national economic situation as a whole.

Many studies explore the relationships between the CCI and economic phenomena, and several indicate consumer confidence surveys have independent power to predict consumption (Dees & Soares Brinca, 2013; Eppright et al., 1998; Lahiri et al., 2016; Ludvigson, 2004). Studies further establish that the CCI predicts short-term growth in gross domestic product (Mourougane & Roma, 2003; Utaka, 2003), stock returns (Chen, 2011; Hsu et al., 2011; Rojo-Suárez & Alonso-Conde, 2020), and the unemployment rate (Mandal & McCollum, 2013). These studies as a whole suggest
that consumer confidence or people’s mental attitudes exemplified by consumer confidence have some impact on economic phenomenon.

1.2. Relationship between consumer confidence index and variables related to emotions

From previous studies, there are three hypotheses that support the causality or association between the CCI and emotion-related variables such as depression, anxiety, and positive affect. The first hypothesis is that consumer confidence affects emotional states. For example, appraisal theory (Ellsworth, 2013; Moors et al., 2013) and clinical practice (e.g., cognitive behavioral therapy (Beck, 1979)) claim that appraisals or thoughts influence emotions. It seems natural that consumer confidence—a subjective outlook—is an appraisal that ties to specific emotions, and that causality from consumer confidence to emotion is theoretically plausible.

The second hypothesis of the relationship between the CCI and the emotion-related variables is that emotional states such as depression, anxiety, and positive affect impact consumer confidence. Psychology and neuroscience associate depression and anxiety with pessimistic estimates of risk (Mitte, 2007; Miu et al., 2008; Peng et al., 2014; Stöber, 1997) and happiness with optimistic estimates (Isen & Patrick, 1983; Stanton et al., 2014). Similar results have been found for economy-related risk appraisal and decision making; Kühnen and Knutson (2011) note in an experimental study that participants who are exposed to pictures intended to induce negative mood tend to choose riskless assets over risky ones, suggesting anxiety elevates risk aversion.

The third hypothesis of the relationship between the CCI and the emotion-related variables is that third factors influence both consumer confidence and the emotion-related variables. Previous studies suggest that consumer confidence is influenced not only by economic factors but also by other factors including political and international events (Golinelli & Parigi, 2004; Malgarini & Margani, 2007). For example, Golinelli and Parigi (2004) showed government debt ratio to GDP and unemployment rate to have some influence on consumer confidence in the case of Japan, where the present studies were carried out. High unemployment rate is suggested to have negative impacts on mental health through subjective job insecurity (Erlinghagen, 2007; De Witte et al., 2016). Thus, a high unemployment rate may cause both a lower level of consumer confidence and a deterioration of mental health, creating spurious negative associations between consumer confidence and mental health.

Although the abovementioned studies suggest that there are causal links or associations between the CCI and the emotion-related variable, few studies have explored the relations between them. One major exception is Van Giesen and Pieters (2019), who found a negative correlation between optimistic consumer sentiment and mental stress. Without explicitly using the term “consumer confidence,” Senik (2008) explored association and causality between expectations for living standards and happiness in Russians by surveying with a question resembling those in surveys on the CCI: “Do you think that in the next 12 months you and your family will live better than today or worse?” Besides showing associations of expectations on future income with happiness and mental health, Senik (2008) claims a causal relation from expectations to happiness using instrumental variables. Using cross-sectional data, Knight and Gunatiaka (2010) showed that Chinese people who expect income to be higher in five years are happier than those who do not. Similar results in several countries suggest consumer confidence correlates positively with happiness and negatively with mental illness (Barazzetta, 2015; Ekici & Koydemir, 2014; Frijters et al., 2012).

2. Research questions

Drawing upon results from earlier studies, we propose three hypotheses.
Hypothesis 1. There is a positive (negative) association between the CCI and positive affect (depression and anxiety).

Hypothesis 2. Psychological interventions that alleviate negative emotional states enhance the CCI.

Hypothesis 3. Psychological interventions that enhance the CCI alleviate negative emotional states.

We explored hypotheses 1 and 2 in two studies. Study 1 is a randomized controlled trial (RCT) that examined the effects of two types of psychological intervention to alleviate depression. Study 2 examined data for consumer confidence and depression, anxiety, and positive affect at three points in time. Unfortunately, neither Studies 1 nor 2 originally aimed at exploring the association between the CCI and the emotion-related variables, although they include questions which allow for the calculation of the CCI and measuring the emotion-related variables. Thus, these studies are not observation studies of nationally representative samples, and exploration of hypothesis 1 through Study 1A and 2 are intended as preliminary. Further studies are required.

3. Study 1

3.1. Method

3.1.1. Participants and procedures
Study 1 is a secondary analysis of a three-arm RCT by Noguchi et al. (2017). A market research company sent an email inviting people in its database to participate in our study. We accepted only respondents between 19 and 66 years old who had experienced at least mild depression without suicidal ideation. We randomly allocated those who met the inclusion criteria, gave informed consent, and completed a baseline survey to three groups (1:1:1 allocation): an internet cognitive behavioral therapy (iCBT) arm, a simplified emotion-focused mindfulness (sEFM) arm, and a waiting-list. iCBT consists of a simple cognitive therapy exercise using the internet. sEFM is a simple mindfulness exercise in which participants are instructed to accept their negative emotions without judgment. Both therapies sought to alleviate depression and lasted five weeks. Respondents allocated to the waiting list were not assigned any therapeutic exercises.

Assessment time points were at the baseline period (T0), post intervention (T1), six weeks after T1 (T2), and six weeks after T2 (T3). We randomly assigned respondents on the waiting-list control group to iCBT or sEFM therapy randomly after assessment at T2. Study 1 occurred in 2015. T0 covers June 4–10, T1 July 23–29, T2 September 3–9, and T3 October 22–28. The study was approved by the Ethics Review Committee of the Chiba University Graduate School of Medicine on July 30th of 2014, and registered with the UMIN Clinical Trial Registry (UMIN-CTR) (ID: UMIN000015097).

3.1.2. Measures
The four questions used to calculate the CCI were those used in the monthly survey by the Cabinet Office of Japan. They addressed expectations for overall livelihood, income growth, employment, and willingness to buy durable goods during the next six months. Respondents rated each item on a five-point Likert scale from 1 (improve) to 5 (worsen). The CCI was calculated using the following formula by the Cabinet Office of Japan. We converted ratings of 1 (improve), 2 (improve slightly), 3 (no change), 4 (worsen slightly), and 5 (worsen) to 100, 75, 50, 25, and 0 points, respectively. We averaged the converted scores of all four questions to calculate the overall CCI. For example, the CCI score for respondents who indicated 3 for each question would be 50. Higher scores indicate greater consumer confidence.
Depression was measured by the Patient Health Questionnaire-9 (PHQ-9), a nine-item assessment of the severity of symptoms experienced during the past two weeks (Kroenke et al., 2001). PHQ-9 scores span from 0 to 27, with higher scores indicating more severe depression. We used the Japanese translation of the PHQ-9 (Muramatsu et al., 2007).

Anxiety was measured by the Generalized Anxiety Disorder-7 scale (GAD-7), a seven-item assessment of symptoms of general anxiety (Spitzer et al., 2006). GAD-7 scores span from 0 to 21 with higher scores indicating greater anxiety. We used the Japanese translation of the GAD-7 (Muramatsu et al., 2009).

Positive affect was measured by a four-item subscale of The Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). CES-D is a 20-item assessment of the severity of depressive symptoms during the previous week. The four items assessing positive affect in Study 1 were “I felt I was just as good as other people,” “I felt hopeful about the future,” “I was happy,” and “I enjoyed life” for the past week. Answers range from 0 (rarely or none of the time) to 3 (most or almost all the time). The score for positive affect is the sum of answers to the four questions and ranged from 0 to 12 with higher scores indicating greater positive affect. We used the Japanese translation of CES-D (Shima et al., 1985).

3.1.3. Statistical analyses

Study 1 involved two types of analyses. Study 1A estimated the collective association between the CCI and depression, anxiety, and positive affect as follows:

\[
CCI_{it} = \delta_1 d_1 + \delta_2 d_2 + \delta_3 d_3 + \beta_1 \text{DEP}_{it} + \beta_2 \text{ANX}_{it} + \beta_3 \text{POS}_{it} + \epsilon_i + \eta_t \quad (1)
\]

Variables are as follows. \( CCI_{it} \) represents the CCI of respondent \( i \) at time \( t (0, 1, 2, \text{or } 3) \). \( d_1 \), is a dummy representing the effect of time at \( T1 \); it is 1 when \( t = 1 \) (T1) and 0 when \( t = 0, 2, \text{or } 3 \). \( d_2 \) and \( d_3 \) are constructed in the same way. \( \text{DEP}_{it}, \text{ANX}_{it}, \text{and POS}_{it} \) refer respectively to depression (PHQ-9), anxiety (GAD-7), and positive affect (CES-D) of respondent \( i \) at time \( t \). \( \epsilon_i \) denotes unobservable person-specific characteristics that are constant over time. \( \eta_t \) is the error term. We estimated these equations in fixed-effects models using panel data to control for \( \epsilon_i \)--that is, time-invariant unobserved heterogeneity across participants (Gunasekara et al., 2014; McKenzie et al., 2014). Time-invariant variables are omitted from the regression equation in the fixed-effects models. In order to observe the association of major time-invariant variables with the CCI, we also estimated these equations in random-effects models in which time-invariant variables can be incorporated in the analyses. Age, marital status, final education, and employment status at baseline (T0) were included in the regression equation in the random-effects models. We conducted the Sargan-Hansen test of overidentifying restrictions by using the STATA command \textit{xtoverid} in order to decide whether a fixed-effects model or a random-effects model is preferable (Schaffer & Stillman, 2006). Cluster-robust standard errors were estimated for all the models.

Study 1B explored whether the two types of psychological interventions enhanced the CCI using analyses typical of RCTs. Linear mixed-effects models for repeated measures were conducted for the three therapeutic groups (iCBT, sEFM, or waiting list) \times time (T0, T1, T2). Interactions indicate whether psychological intervention (iCBT and sEFM) influences the CCI. We ran a random-intercepts model using restricted maximum likelihood estimation procedure and an unstructured covariance matrix. The covariate was the CCI at baseline. We performed intention-to-treat analyses. We excluded T3 from the models because psychological intervention for the waiting-list control group began after T2. STATA 15 performed all statistical analyses. We set significance at 5% (two-tailed).
3.2. Results
In all, 8,444 people answered the e-mailed invitation. After we culled respondents for inclusion criteria, 974 gave informed consent and completed a baseline survey. We apportioned participants into three groups: 326 to the iCBT arm, 323 to the sEFM arm, and 325 to the waiting-list arm. Table Table 1 shows participants' demographic characteristics at the baseline. Table Table 2 shows the means and standard deviations of the CCI and depression, anxiety, and positive affect at each time point. Given the nature of the study as psychological intervention to alleviate depression, the mean PHQ-9 score at baseline reached 9.7, indicating mild (5 ≤ PHQ-9 < 10) to moderate depression (PHQ-9 ≥ 10) per Kroenke et al. (2001).

3.2.1. Association of the CCI with depression, anxiety, and positive affect
Table Table 3 shows the estimates of Equation (1) in which the CCI was a dependent variable. Models 1 through 6 investigate separate associations between the CCI and depression (Models 1 and 2), anxiety (Models 3 and 4), positive affect (Models 5 and 6), and association between the CCI and all of the three emotion-related variables together (Models 7 and 8) by estimating fixed-effects models (Models 1, 3, 5, and 7) and random-effects models (Models 2, 4, 6, and 8). According to the Sargan-Hansen test, fixed-effect models were preferred for depression, positive affect, and all three emotion-related variables together (Model 1, Model 5, and Model7 respectively) and a random-effects model was preferred for anxiety (Model 4). Results indicate that the CCI is negatively associated with depression (PHQ-9) and anxiety (GAD-7) and positively associated with positive affect. All variables retained statistical significance in Model 7, but coefficients were smaller.

| Table 1. Demographic characteristics of participants at the baseline (study 1) |
|-----------------|-------|-------|-------|-------|
|                | iCBT  | sEFM  | Waiting list | Total |
| Sex            |       |       |               |       |
| Male           | 168   | (51.5%) | 159 (49.2%) | 159 (48.9%) | 486 (49.9%) |
| Female         | 158   | (48.5%) | 164 (50.8%) | 166 (51.1%) | 488 (50.1%) |
| Age Years (SD) | 44.3  | (11.3) | 43.3 (11.3) | 43.4 (11.3) | 43.7 (11.3) |
| Marriage       |       |       |               |       |
| Married        | 169   | (51.8%) | 170 (52.6%) | 186 (57.2%) | 525 (53.9%) |
| Divorced       | 29    | (8.9%) | 23 (7.1%)    | 21 (6.5%) | 73 (7.5%) |
| Widowed        | 1     | (0.3%) | 1 (0.3%)     | 1 (0.3%) | 3 (0.3%) |
| Never married  | 127   | (39.0%) | 129 (39.9%) | 117 (36.0%) | 373 (38.3%) |
| Final education|       |       |               |       |
| Junior high school | 5 | (1.5%) | 1 (0.3%) | 1 (0.3%) | 7 (0.7%) |
| Senior high school | 59 | (18.1%) | 66 (20.4%) | 79 (24.3%) | 204 (20.9%) |
| Two-year college | 57 | (17.5%) | 69 (21.4%) | 61 (18.8%) | 187 (19.2%) |
| Four-year college or more | 205 | (62.9%) | 187 (57.9%) | 184 (56.6%) | 576 (59.1%) |
| Employment status|       |       |               |       |
| Employed       | 237   | (72.7%) | 240 (74.3%) | 234 (72.0%) | 711 (73.0%) |
| Not employed and seeking a job | 23 | (7.1%) | 23 (7.1%) | 22 (6.8%) | 68 (7.0%) |
| Not employed and not seeking a job | 66 | (20.2%) | 60 (18.6%) | 69 (21.2%) | 195 (20.0%) |

Note. iCBT = internet-based cognitive behavioral therapy; sEFM = simplified emotion-focused mindfulness.
Table 2. Means and standard deviations of the CCI, depression, anxiety, and positive affect at each time point (study 1)

|                | iCBT | sEFM | Waiting list | Total |
|----------------|------|------|--------------|-------|
| **CCI**        |      |      |              |       |
| T0             | 326  | 39.2 (17.5) | 323  | 39.2 (18.2) | 325 | 41.6 (18.6) | 974 | 40.0 (18.1) |
| T1             | 254  | 39.1 (19.1) | 252  | 39.3 (20.3) | 275 | 41.3 (19.0) | 781 | 39.9 (19.5) |
| T2             | 240  | 37.0 (17.9) | 238  | 37.9 (20.0) | 260 | 39.2 (18.6) | 738 | 38.1 (18.9) |
| T3             | 233  | 36.5 (18.4) | 226  | 38.8 (19.8) | 225 | 42.5 (20.3) | 684 | 39.2 (19.7) |
| **Depression (PHQ-9)** |      |      |              |       |
| T0             | 326  | 9.7 (5.1)   | 323  | 9.6 (5.1)   | 325 | 9.7 (4.5)   | 974 | 9.7 (4.9)   |
| T1             | 254  | 9.3 (4.9)   | 252  | 8.7 (5.5)   | 275 | 9.5 (5.1)   | 781 | 9.2 (5.2)   |
| T2             | 240  | 9.9 (5.5)   | 238  | 9.2 (5.6)   | 260 | 9.3 (5.2)   | 738 | 9.5 (5.4)   |
| T3             | 233  | 9.3 (5.6)   | 226  | 9.3 (5.9)   | 225 | 8.3 (4.7)   | 684 | 9.0 (5.4)   |
| **Anxiety (GAD-7)** |      |      |              |       |
| T0             | 326  | 7.1 (4.6)   | 323  | 7.1 (4.9)   | 325 | 6.9 (4.3)   | 974 | 7.0 (4.6)   |
| T1             | 254  | 6.7 (4.7)   | 252  | 6.7 (4.8)   | 275 | 6.6 (4.5)   | 781 | 6.6 (4.7)   |
| T2             | 240  | 7.3 (5.2)   | 238  | 7.0 (5.3)   | 260 | 6.6 (4.6)   | 738 | 7.0 (5.0)   |
| T3             | 233  | 6.7 (5.0)   | 226  | 7.2 (5.2)   | 225 | 6.3 (4.5)   | 684 | 6.7 (4.9)   |
| **Positive affect (Subscale of CES-D)** |      |      |              |       |
| T0             | 326  | 3.8 (2.6)   | 323  | 3.8 (2.4)   | 325 | 3.9 (2.4)   | 974 | 3.8 (2.5)   |
| T1             | 254  | 4.1 (2.5)   | 252  | 3.8 (2.7)   | 275 | 3.9 (2.6)   | 781 | 4.0 (2.6)   |
| T2             | 240  | 3.9 (2.5)   | 238  | 4.0 (2.6)   | 260 | 3.9 (2.7)   | 738 | 3.9 (2.6)   |
| T3             | 233  | 4.1 (2.7)   | 226  | 4.0 (2.6)   | 225 | 4.5 (2.7)   | 684 | 4.2 (2.7)   |

Note. iCBT = internet-based cognitive behavioral therapy; sEFM = simplified emotion-focused mindfulness. T0 covers June 4–10, 2015. T1 covers July 23–29, 2015. T2 covers September 3–9, 2015. T3 covers October 22–28, 2015. CCI = Consumer Confidence Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; CES-D = Center for Epidemiologic Studies Depression Scale.

Table 3. Estimated associations between the CCI and depression, anxiety, and positive affect (study 1A)

| Dependent Variable: CCI | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Depression (PHQ-9)      | −0.55***| −0.68***|         |         | −0.25*  | −0.40***|         |         |
|                         | (0.10)  | (0.08)  |         |         | (0.11)  | (0.09)  |         |         |
| Anxiety (GAD-7)         | −0.70***| −0.74***|         |         | −0.48***| −0.36***|         |         |
|                         | (0.10)  | (0.09)  |         |         | (0.11)  | (0.10)  |         |         |
| Positive affect (Subscale of CES-D) |         |         |         |         | 0.67*** | 1.06*** | 0.51*** | 0.85*** |
|                         |         |         |         |         | (0.15)  | (0.13)  | (0.14)  | (0.12)  |
| Sex (reference = Male)  |         |         |         |         |         |         |         |         |
| Female                  | 2.00    | 1.87    | 1.74    | 1.65    |         |         |         |         |
|                         | (1.07)  | (1.09)  | (1.09)  | (1.06)  |         |         |         |         |
| Age                     | −0.38***| −0.37***| −0.37***| −0.38***|         |         |         |         |
|                         | (0.05)  | (0.05)  | (0.05)  | (0.05)  |         |         |         |         |
| Marriage (reference = married) |         |         |         |         |         |         |         |         |
| Divorced                | −1.74   | −2.31   | −2.12   | −2.16   |         |         |         |         |
|                         | (2.18)  | (2.18)  | (2.17)  | (2.14)  |         |         |         |         |
| Widowed                 | 6.26    | 4.26    | 5.95    | 4.08    |         |         |         |         |

(Continued)
Table 3. (Continued)

| Dependent Variable: CCI | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         | (5.20)  | (6.23)  | (5.12)  | (5.66)  |         |         |         |         |
| Never married           | −2.12   | −2.54*  | −1.82   | −1.88   |         |         |         |         |
|                         | (1.23)  | (1.25)  | (1.22)  | (1.20)  |         |         |         |         |
| Final education (reference = four-year college or more) |         |         |         |         |         |         |         |         |
| Junior high school      | −10.95  | −9.88   | −12.72* | −10.99  |         |         |         |         |
|                         | (6.61)  | (7.03)  | (6.36)  | (6.12)  |         |         |         |         |
| Senior high school      | −1.61   | −1.68   | −1.20   | −1.20   |         |         |         |         |
|                         | (1.35)  | (1.38)  | (1.37)  | (1.33)  |         |         |         |         |
| Two-year college        | −2.82   | −2.79   | −2.19   | −2.20   |         |         |         |         |
|                         | (1.45)  | (1.47)  | (1.46)  | (1.43)  |         |         |         |         |
| Employment status (reference = currently employed) |         |         |         |         |         |         |         |         |
| Not employed and        | 0.63    | 0.59    | −0.01   | 0.57    |         |         |         |         |
| seeking a job           | (2.41)  | (2.49)  | (2.41)  | (2.38)  |         |         |         |         |
| Not employed and        | −0.10   | −0.36   | −0.12   | 0.09    |         |         |         |         |
| not seeking a job       | (1.31)  | (1.34)  | (1.34)  | (1.30)  |         |         |         |         |
| Time (reference = Time 0)|         |         |         |         |         |         |         |         |
| Time 1                  | −0.02   | −0.21   | −0.04   | −0.15   | 0.18    | 0.00    | −0.18   | −0.36   |
|                         | (0.54)  | (0.54)  | (0.54)  | (0.55)  | (0.55)  | (0.54)  | (0.54)  | (0.54)  |
| Time 2                  | −1.69** | −1.83*** | −1.61** | −1.71** | −1.64** | −1.82** | −1.75** | −1.93*** |
|                         | (0.56)  | (0.55)  | (0.55)  | (0.57)  | (0.56)  | (0.55)  | (0.54)  | (0.54)  |
| Time 3                  | −0.65   | −0.89   | −0.51   | −0.65   | −0.51   | −0.83   | −0.84   | −1.17*  |
|                         | (0.59)  | (0.59)  | (0.59)  | (0.60)  | (0.59)  | (0.59)  | (0.59)  | (0.59)  |
| Constant                | 45.03*** | 61.91*** | 44.64*** | 60.83*** | 37.15*** | 51.05*** | 43.55*** | 58.83*** |
|                         | (1.03)  | (1.17)  | (0.81)  | (3.21)  | (0.65)  | (3.16)  | (1.16)  | (3.20)  |
| Model selection         | FE      | RE      | FE      | FE      | RE      | RE      | RE      |         |
| Sargan-Hansen           | 12.29 (p = 0.02) | 2.49 (p = 0.65) | 39.09 (p < 0.001) | 39.29 (p < 0.001) |         |         |         |         |
| Statistics              |         |         |         |         |         |         |         |         |
| No. of observations     | 3,177   | 3,177   | 3,177   | 3,177   | 3,177   | 3,177   | 3,177   | 3,177   |
| No. of groups           | 974     | 974     | 974     | 974     | 974     | 974     | 974     | 974     |
| R-squared (within)      | 0.0330  | 0.0328  | 0.0400  | 0.0400  | 0.0179  | 0.0172  | 0.0510  | 0.0486  |
| R-squared (between)     | 0.0693  | 0.1332  | 0.0406  | 0.1057  | 0.0875  | 0.1318  | 0.0904  | 0.1706  |
| R-squared (overall)     | 0.0684  | 0.1189  | 0.0438  | 0.0956  | 0.0633  | 0.1095  | 0.0878  | 0.1513  |

Notes: ***p < 0.001, **p < 0.01, *p < 0.05. Numbers in parentheses are cluster-robust standard errors. CCI = Consumer Confidence Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; CES-D = Center for Epidemiologic Studies Depression Scale; FE = fixed-effects models; RE = random-effects models. T0 covers June 4–10, 2015. T1 covers July 23–29, 2015. T2 covers September 3–9, 2015. T3 covers October 22–28, 2015. Gray shaded areas show preferred models by the Sargan-Hansen tests.

3.2.2. Effect of psychological intervention on the CCI

In Table 4 the effects of psychological intervention as estimated by linear mixed-effects model at T1 (post intervention) and T2 (follow-up) were not significant in all three comparisons: between iCBT and the waiting list, sEFM and the waiting list, and between iCBT and sEFM. Hence, neither iCBT nor sEFM therapy causally enhanced the CCI.
Table 4. Effects of psychological intervention on the CCI analyzed by linear mixed-effects model (study 1)

| Time | iCBT (95% CI) | sEFM (95% CI) | Waiting list (95% CI) | Intervention effect (95% CI), p value |
|------|---------------|---------------|-----------------------|--------------------------------------|
|      |               |               |                       |                                      |
| T0   | 39.65 (38.37, 40.92) | 39.65 (38.37, 40.93) | 40.08 (38.81, 41.36) |                                       |
| T1   | 39.93 (38.49, 41.36) | 40.16 (38.72, 41.60) | 40.18 (38.79, 41.56) | 0.19 (-2.24, 2.61); 0.88; 0.42 (-2.01, 2.85); 0.74; -0.23 (-2.69, 2.23); 0.86 |
| T2   | 37.60 (36.13, 39.08) | 38.76 (37.28, 40.24) | 38.14 (36.72, 39.56) | -0.10 (-2.57, 2.37); 0.94; 1.06 (-1.42, 3.53); 0.40; -1.15 (-3.66, 1.35); 0.37 |

Note. CCI = Consumer Confidence Index; iCBT = internet-based cognitive behavioral therapy; sEFM = simplified emotion-focused mindfulness. CI = confidence interval. T0 = baseline, T1 = post intervention, T2 = six weeks after T1. Predicted means (95% CI) from linear mixed-effects model with outcome measure at baseline, time (T0, T1, T2), treatment (iCBT, sEFM, waiting list), and interaction between time and treatment as fixed effects. Covariate was the CCI at baseline.

4. Study 2

4.1. Method

In Study 2, we designed and implemented an original online survey of Japanese respondents from 2015 to 2016. Although its main purpose was to examine statistical relationships between the human voice and psychological variables, we obtained data for the CCI and variables for depression, anxiety, and positive affect. A market research company contracted by the Research Institute of Economy, Trade, and Industry conducted the survey. It chose respondents from its list of registered monitors. Eligible participants for Study 2 were 19 to 70 years old, gave informed consent, and successfully recorded and uploaded their voice files per instruction from the market research company.

Participants answered the questionnaire for the CCI and the emotion-related variables at times T0, T1, and T2. T0 covers September 24–1 October 2015. T1 covers November 24–30, 2015. T2 covers January 25–31, 2016. The Ethics Committee of Hiramatsu Memorial Hospital approved the study.

Outcomes for the CCI, PHQ-9, GAD-7, and CES-D in the three periods in Study 2 mirror those in the four periods in Study 1A. Statistical analyses were performed in the same way as Study 1A.

4.2. Results

A total of 2,273 respondents answered the questionnaire at T0. Of these, 1,980 answered at T1. Of those, 1,847 answered at T2. Demographic characteristics of participants in the baseline survey are shown in Table 5. An administrative error omitted respondents’ final education in the survey for T0; thus, final education of those who responded only at T0 are missing. Means and standard deviations of the CCI and depression, anxiety, and positive affect at each time point are shown in Table 6. Scores for PHQ-9 and GAD-7 were below scores in Study 1A, and the score for positive affect was higher.

Table 7 shows the estimates of Equation (1) in which the CCI was dependent variable. Models 9 through 16 investigated separate associations between the CCI and depression (Models 9 and 10), anxiety (Models 11 and 12), positive affect (Models 13 and 14), and association between the CCI and all of the three emotion-related variables together (Models 15 and 16) by estimating fixed-effects models (Models 9, 11, 13, and 15) and random-effects models (Models 10, 12, 14, and 16). According to the Sargan-Hansen test, fixed effect models were preferred (Models 9, 11, 13, and 15). Results
indicate that the CCI was not associated with depression (PHQ-9), was negatively associated with anxiety (GAD-7), and was positively associated with positive affect when they are separated in the models (Models 9, 11, and 13). In Model 15 which includes all three emotion-related variables in the

Table 5. Demographic characteristics of participants at the baseline (study 2)

| Total         |          |
|---------------|----------|
| Sex           |          |
| Male          | 1478     | (65.0%) |
| Female        | 795      | (35.0%) |
| Age           |          |
| Years (SD)    | 45.5     | (10.9)  |
| Marriage      |          |
| Married       | 1379     | (60.7%) |
| Divorced      | 112      | (4.9%)  |
| Widowed       | 15       | (0.7%)  |
| Never married | 767      | (33.7%) |
| Final education |        |
| Junior high school | 31  | (1.4%)  |
| Senior high school | 410   | (19.4%) |
| Two-year college | 356   | (35.1%) |
| Four-year college or more | 1183 | (52.1%) |
| Missing       | 293      | (12.9%) |
| Employment status |      |
| Employed      | 1701     | (77.2%) |
| Not employed and seeking a job | 125  | (5.7%)  |
| Not employed and not seeking a job | 378 | (17.2%) |

Table 6. Means and standard deviations of the CCI, depression, anxiety, and positive affect at each time point (study 2)

| Time | N    | Means (SD) |
|------|------|-------------|
| CCI  |      |             |
| T0   | 2,273| 46.4 (17.3) |
| T1   | 1,980| 47.1 (17.4) |
| T2   | 1,847| 47.1 (18.2) |
| Depression (PHQ-9) |      |             |
| T0   | 2,273| 4.2 (4.9)   |
| T1   | 1,980| 4.5 (5.2)   |
| T2   | 1,847| 4.3 (5.1)   |
| Anxiety (GAD-7) |      |             |
| T0   | 2,273| 2.8 (3.9)   |
| T1   | 1,980| 3.1 (4.2)   |
| T2   | 1,847| 3.0 (4.2)   |
| Positive affect (Subscale of CES-D) | | |
| T0   | 2,273| 5.6 (3.3)   |
| T1   | 1,980| 5.5 (3.3)   |
| T2   | 1,847| 5.6 (3.3)   |

Note. CCI = Consumer Confidence Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; CES-D = Center for Epidemiologic Studies Depression Scale. T0 covers September 24–October 1, 2015. T1 covers November 24–30, 2015. T2 covers January 25–31, 2016.
Table 7. Estimated associations between the CCI and depression, anxiety, and positive affect (study 2)

| Dependent Variable: CCI | Model 9  | Model 10 | Model 11 | Model 12 | Model 13 | Model 14 | Model 15 | Model 16 |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Depression (PHQ-9)      | -0.17    | -0.60*** |         |          | 0.08     | -0.21*   |          |          |
|                         | (0.09)   | (0.07)   |          |          | (0.12)   | (0.10)   |          |          |
| Anxiety (GAD-7)         | -0.41*** | -0.81*** |         | -0.46*** | -0.56*** |         |          |          |
|                         | (0.10)   | (0.08)   |          | (0.13)   | (0.11)   |          |          |          |
| Positive affect (Subscale of CES-D) |         |          | 0.24**   | 0.60***  | 0.21*    | 0.47***  |          |          |
|                         |          |          | (0.08)   | (0.07)   | (0.08)   | (0.07)   |          |          |
| Sex (reference = Male)  |          |          |          |          |          |          |          |          |
| Female                  | 0.59     | 0.52     | 0.13     | 0.20     |          |          |          |          |
|                         | (0.80)   | (0.80)   | (0.82)   | (0.79)   |          |          |          |          |
| Age                     | -0.27*** | -0.27*** | -0.25*** | -0.30*** |          |          |          |          |
|                         | (0.03)   | (0.03)   | (0.04)   | (0.03)   |          |          |          |          |
| Marriage (reference = married) |          |          |          |          |          |          |          |          |
| Divorced                | -4.40*   | -4.60**  | -5.37**  | -4.21*   |          |          |          |          |
|                         | (1.75)   | (1.76)   | (1.84)   | (1.71)   |          |          |          |          |
| Widowed                 | -1.07    | -0.88    | -0.90    | -1.02    |          |          |          |          |
|                         | (5.13)   | (5.15)   | (4.95)   | (4.88)   |          |          |          |          |
| Never married           | -1.98*   | -2.41**  | -2.42**  | -1.84*   |          |          |          |          |
|                         | (0.80)   | (0.80)   | (0.81)   | (0.79)   |          |          |          |          |
| Final education (reference = four-year college or more) |          |          |          |          |          |          |          |          |
| Junior high school      | -6.83*   | -6.13    | -7.13*   | -5.82    |          |          |          |          |
|                         | (3.24)   | (3.29)   | (3.21)   | (3.25)   |          |          |          |          |
| Senior high school      | -3.16*** | -3.23*** | -2.94**  | -2.74**  |          |          |          |          |
|                         | (0.89)   | (0.89)   | (0.92)   | (0.87)   |          |          |          |          |
| Two-year college        | -1.31    | -1.41    | -1.05    | -1.06    |          |          |          |          |
|                         | (0.89)   | (0.89)   | (0.91)   | (0.87)   |          |          |          |          |
| Employment status (reference = currently employed) |          |          |          |          |          |          |          |          |
| Not employed and seeking a job | -0.43     | -0.36    | -0.51    | -0.08    |          |          |          |          |
|                         | (1.35)   | (1.34)   | (1.34)   | (1.32)   |          |          |          |          |
| Not employed and not seeking a job | 0.22        | 0.14    | -0.13    | 0.20     |          |          |          |          |
|                         | (0.84)   | (0.84)   | (0.85)   | (0.82)   |          |          |          |          |
| Time (reference = Time 0) |          |          |          |          |          |          |          |          |
| Time 1                  | 0.94**   | 1.09***  | 1.00**   | 1.11***  | 0.91**   | 0.94**   | 1.01**   | 1.16***  |
|                         | (0.31)   | (0.31)   | (0.31)   | (0.31)   | (0.31)   | (0.31)   | (0.31)   | (0.31)   |
| Time 2                  | 0.70*    | 0.84*    | 0.76*    | 0.90**   | 0.67*    | 0.74*    | 0.76*    | 0.90**   |
|                         | (0.34)   | (0.34)   | (0.34)   | (0.34)   | (0.34)   | (0.34)   | (0.34)   | (0.34)   |
| Constant                | 46.41*** | 61.98*** | 46.84*** | 62.30*** | 44.37*** | 56.08*** | 45.42*** | 60.97*** |
|                         | (0.56)   | (2.35)   | (0.52)   | (2.34)   | (0.64)   | (2.41)   | (0.80)   | (2.32)   |
| Model selection         | FE       | RE       | FE       | RE       | FE       | RE       | FE       | RE       |
| Sargan-Hansen Statistics| 79.96 (p < 0.001) | 52.95 (p < 0.001) | 85.29 (p < 0.001) | 85.24 (p < 0.001) |
| No. of observations     | 5,632    | 5,632    | 5,632    | 5,632    | 5,632    | 5,632    | 5,632    | 5,632    |

(Continued)
Table 7. (Continued)

| Dependent Variable: CCI | Model 9 | Model 10 | Model 11 | Model 12 | Model 13 | Model 14 | Model 15 | Model 16 |
|-------------------------|---------|----------|----------|----------|----------|----------|----------|----------|
| No. of groups           | 1.935   | 1.935    | 1.935    | 1.935    | 1.935    | 1.935    | 1.935    | 1.935    |
| R-squared (within)      | 0.0046  | 0.0028   | 0.0102   | 0.0089   | 0.0055   | 0.0039   | 0.0125   | 0.0099   |
| R-squared (between)     | 0.0365  | 0.1337   | 0.0606   | 0.1304   | 0.0175   | 0.0920   | 0.0739   | 0.1614   |
| R-squared (overall)     | 0.0281  | 0.1032   | 0.0477   | 0.1031   | 0.0142   | 0.0715   | 0.0577   | 0.1266   |

Notes: ***p < 0.001, **p < 0.01, *p < 0.05. Numbers in parentheses are cluster-robust standard errors. CCI = Consumer Confidence Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; CES-D = Center for Epidemiologic Studies Depression Scale; FE = fixed-effects models; RE = random-effects models. T0 covers September 24–1 October 2015. T1 covers November 24–30, 2015. T2 covers January 25–31, 2016. Gray shaded areas show preferred models by the Sargan-Hansen tests.

...model, depression (PHQ-9) remained insignificant and anxiety (GAD-7) and positive affect remained significant.

5. Discussion

The present studies explored relations between consumer confidence and emotion-related psychological variables: depression, anxiety, and positive affect. We examined the association of the CCI with PHQ-9 for depression, GAD-7 for anxiety, and a sub-scale of CES-D for positive affect by analyzing originally constructed two panel (longitudinal) data (Studies 1A and 2). By estimating associations between the CCI and each of the three variables, we found that the CCI was negatively associated with anxiety (GAD-7) and positively with positive affect (CES-D) in Study 1A and Study 2. The CCI was negatively associated with depression in Study 1A, but was not associated with it in Study 2. These associations remained more or less unchanged when models included all three variables simultaneously. However, Study 1A, an RCT, showed that neither iCBT nor sEFM improved the CCI. Hence, the effects of psychological intervention to alleviate depression on the CCI are not confirmed.

Studies 1A and 2 showed associations of the CCI with anxiety and positive affect. A fixed-effects model using panel (longitudinal) data can adjust for time-invariant factors. Thus, three transmission mechanisms between the CCI and the two emotion-related state variables are plausible. First, the CCI influences anxiety and positive affect. Second, anxiety and positive affect influence the CCI. Third, time-variant factors influence the CCI as well as anxiety and positive affect simultaneously. Results from Studies 1A and 2 rule out none of those three mechanisms. Results for the relationship between the CCI and depression are mixed. Negative association between the CCI and depression was found in Study 1A, but not in Study 2. This finding suggests that association of the CCI with depression, even if it exists, is smaller than the association of the CCI with anxiety and positive affect, especially in the sample more representative of the general population (participants in Study 2).

Study 1B showed that interventions intended to alleviate depression had no effect on improving the CCI, suggesting that depression does not affect economic assessments. However, reservations are warranted. First, effects for these two types of psychological intervention are small (Noguchi et al., 2017). With regard to PHQ-9, there was a non-significant difference in favor of the iCBT arm (−0.68, 95% CI: −1.42 to 0.05, p = 0.07) and a significant difference in favor of the sEFM arm (−0.97, 95% CI: −1.70 to −0.23, p = 0.01) compared with the waiting-list arm at T1 (Noguchi et al., 2017). There was no significant reduction in CES-D and GAD-7. The stable association between anxiety and the CCI in Studies 1A and 2 suggests that another type of intervention which alleviates anxiety rather than depression may yield different results if it meaningfully alleviates anxiety.
This study has four major limitations that invite future research. First, participants in Studies 1 and 2 might not represent the Japanese populace generally because they were recruited from a market research company’s website. More than half of our participants had attended university, a percentage greater than Japan’s national average. Participants in Study 1 were chosen from respondents who were mildly or more severely depressed, and results from analyzing them may differ from those of mentally healthier people. Also, participants in Study 2 were willing to record their voices and send them online to a market research company and in that respect may not be representative of the Japanese population.

Second, data in Study 1 are from respondents who participated in a psychological intervention. Those interventions may have created bias within the estimation of associations between the emotion-related variables and the CCI. Further studies using natural observation of representative samples could elucidate the relationships between the emotion-related variables and consumer confidence.

Third, time intervals between each wave were six weeks (Study 1) or two months (Study 2) and do not identify long-term associations between the CCI and the emotion-related variables.

Fourth, exploration of causality between the CCI and emotion-related variables was insufficient. Although Study 1B was an RCT, its result for the most relevant variable (anxiety) was not statistically significant. A causal relationship between the CCI and emotion-related variables, especially anxiety, should be further explored.

6. Conclusion and implications

In the present studies, we explore association and causality between the CCI and variables denoting three emotion-related psychological states: depression, anxiety, and positive affect. Results confirm an association but not causality between the CCI and anxiety in addition to positive affect. Existence of causality and association between the CCI and depression have not been confirmed. According to the present studies, the level of CCI and its fluctuation may be associated with anxiety and positive affect of people; when the CCI is higher, people tend to be happier and less anxious and vice versa. This may make it possible to view the CCI, which has tended to be solely regarded as an economic forecaster, from a new perspective. However, the data used for analyses in the present studies were not nationally representative, and thus results of the present studies should be treated carefully. Further studies are required.

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Competing interests
The authors declare no competing interest.

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References
Akerlof, G. A., & Shiller, R. J. (2010). Animal spirits: how human psychology drives the economy, and why it matters for global capitalism. Princeton university press.
Barazzetta, M. (2015). The asymmetric effect of expectations on subjective well-being. Retrieved from Beck, A. T. (1979). Cognitive therapy and the emotional disorders. Penguin.
Chen, S.-S. (2013). Lack of consumer confidence and stock returns. Journal of Empirical Finance, 18(2), 225–236. https://doi.org/10.1016/j.jempfin.2010.12.004
Curtin, R. (2002). Consumer confidence in the 21st century: changing sources of economic uncertainty. Paper presented at the 26th CIRET Conference, Taipei.
Curtin, R. (2007). Consumer sentiment surveys. Journal of Business Cycle Measurement and Analysis, (2007(1), 7–42. https://doi.org/10.1787/jbcma-v2007-art2-en
De Witte, H., Pieters, J., & De Cuyper, N. (2016). Review of 30 years of longitudinal studies on the association between job insecurity and health and well-being: is there causal evidence? Australian Psychologist, 51(1), 18–31. https://doi.org/10.1111/ap.12176
Dees, S., & Soares Brinca, P. (2013). Consumer confidence as a predictor of consumption spending: evidence for the United States and the Euro area. International Economics, 136, 1–14. https://doi.org/10.1016/j.inteco.2013.05.001
Ekici, T., & Koydemir, S. (2016). Income expectations and happiness: evidence from British panel data. Applied Research in Quality of Life. https://doi.org/10.1007/s11482-016-9380-9
Ellsworth, P. C. (2013). Appraisal theory: old and new questions. Emotion Review, 5(2), 125–131. https://doi.org/10.1177/1754073912463617
Eppright, D. R., Arguea, N. M., & Huth, W. L. (1998). Aggregate consumer expectation indexes as indicators of future consumer expenditures. Journal of Economic Psychology, 19(2), 215–235. https://doi.org/10.1016/S0167-4870(98)00005-1
Erlinghagen, M. (2007). Self-perceived job insecurity and social context: a multi-level analysis of 17 European Countries. European Sociological Review, 24(2), 183–197. https://doi.org/10.1093/esrcjm/042
Frijters, P., Liu, A. Y. C., & Meng, X. (2012). Are optimistic expectations keeping the Chinese happy? Journal of Economic Behavior & Organization, 81(1), 159–171. https://doi.org/10.1016/j.jebo.2011.09.007
Golinelli, R., & Parigi, G. (2004). Consumer sentiment and economic activity: A cross country comparison. Journal of Business Cycle Measurement and Analysis, (2004(2), 147–170. https://doi.org/10.1787/jbcma-v2004-art10-en
Gunasekara, F. I., Richardson, K., Carter, K., & Blakely, T. (2016). Fixed effects analysis of repeated measures data. International Journal of Epidemiology, 45(1), 264–269. https://doi.org/10.1093/ije/dyy221
Hsu, C.-C., Lin, H.-Y., & Wu, J.-Y. (2011). Consumer confidence and stock markets: The panel causality evidence. International Journal of Economics and Finance, 5(6), 91. https://doi.org/10.5539/ijef.v3n6p91
Isen, A. M., & Patrick, R. (1983). The effect of positive feelings on risk taking: when the chips are down. Organizational Behavior and Human Performance, 31(2), 194–202. https://doi.org/10.1016/0030-5073(83)90120-4
Knight, J., & Gunatilaka, R. (2010). Great expectations? the subjective well-being of rural–urban migrants in China. World Development, 38(1), 113–124. https://doi.org/10.1016/j.worlddev.2009.03.002
Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. Journal of General Internal Medicine, 16(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.01600906.x
Kuhnen, C. M., & Knutson, B. (2011). The influence of affect on beliefs, preferences, and financial decisions. Journal of Financial and Quantitative Analysis, 46(3), 605–626. https://doi.org/10.1017/s0022109011000123
Lahiri, K., Monokroussos, G., & Zhao, Y. (2016). Forecasting consumption: the role of consumer confidence in real time with many predictors. Journal of Applied Econometrics, 31(7), 1254–1275. https://doi.org/10.1002/jae.2494
Ludvigson, S. C. (2004). Consumer confidence and consumer spending. The Journal of Economic Perspectives, 18(2), 29–50. https://doi.org/10.1257/0895330041371222
Malgarini, M., & Margini, P. (2007). Psychology, consumer sentiment and household expenditures. Applied Economics, 39(13), 1719–1729. https://doi.org/10.1080/00038440600660635
Mandal, A., & McCollum, J. (2013). Consumer confidence and the unemployment rate in New York State: A panel study. New York Economic Review, 44(1), 3–19.
McKenzie, S. K., Imilach Gunasekara, F., Richardson, K., & Carter, K. (2016). Do changes in socioeconomic factors lead to changes in mental health? findings from three waves of a population based panel study. Journal of Epidemiology and Community Health, 68(3), 253–260. https://doi.org/10.1136/jech-2013-203013
Mitte, K. (2007). Anxiety and risky decision-making: the role of subjective probability and subjective costs of regret. Person. and Individual Differences, 43(2), 243–253. https://doi.org/10.1016/j.paid.2006.11.028
Miu, A. C., Heilman, R. M., & Houser, D. (2008). Anxiety impairs decision-making: psychophysiological evidence from an Iowa gambling task. Biological Psychology, 77(3), 353–358. https://doi.org/10.1016/j.biopsycho.2007.11.010
Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: state of the art and future development. Emotion Review, 5(2), 119–124. https://doi.org/10.1177/1754073912488165
Mourougane, A., & Roma, M. (2003). Can confidence indicators be useful to predict short term real GDP growth? Applied Economics Letters, 10(8), 519–522. https://doi.org/10.1080/1350485032000100305
Muramatsu, K., Kamijima, K., Yoshida, M., Osubo, T., Miyaoka, H., Muramatsu, Y., & Gejyo, F. (2007). The patient health questionnaire, Japanese version: Validity according to the mini-internationa neuropshychiatric interview plus. Psychological Reports, 101(3), 952–960. https://doi.org/10.2466/pr0.1997.1.952-960
Muramatsu, K., Muramatsu, Y., Miyaoka, H., Fuse, K., Yoshimine, F., Hosako, M., ... Kutsumi, R. (2009). Validation and utility of a Japanese version of the GAD-7. Paper presented at the PAMINERVA MEDICA 20th World Congress on psychosomatic medicine abstracts book.
Noguchi, R., Sekizawa, Y., So, M., Yamaguchi, S., & Shimizu, E. (2017). Effects of five-minute internet-based cognitive behavioral therapy and simplified emotion-focused mindfulness on depressive symptoms: A randomized controlled trial. BMC Psychiatry, 17(1), 85. https://doi.org/10.1186/s12888-017-1248-8
Peng, J., Xiao, W., Yang, Y., Wu, S., & Miao, D. (2014). The impact of trait anxiety on self-frame and decision making. Journal of Behavioral Decision Making, 27(1), 11–19. https://doi.org/10.1002/bdm.1783
Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1(3),
Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. Archives of Internal Medicine, 166(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Stöber, J. (1997). Trait anxiety and pessimistic appraisal of risk and chance. Personality and Individual Differences, 22(4), 465–476. https://doi.org/10.1016/S0191-8869(96)00232-2

Utaka, A. (2003). Confidence and the real economy - the Japanese case. Applied Economics, 35(3), 337–342. https://doi.org/10.1080/00036840210135205

Van Giesen, R. I., & Pieters, R. (2019). Climbing out of an economic crisis: A cycle of consumer sentiment and personal stress. Journal of Economic Psychology, 70, 109–124. https://doi.org/10.1016/j.joep.2018.12.004

Rojo-Suárez, J., & Alonso-Conde, A. B. (2020). Impact of consumer confidence on the expected returns of the Tokyo Stock Exchange: A comparative analysis of consumption and production-based asset pricing models. Plos One, 15(11), e0241318. https://doi.org/10.1371/journal.pone.0241318

Schaffer, M. E., & Stillman, S. (2006). XTOVERID: stata module to calculate tests of overidentifying restrictions after xtreg, xtpoisson, xtnbreg, xtivreg, xtivreg2, xthtaylor. Statistical Software Components S456779, Boston College Department of Economics, revised 15 Jan 2016.

Senik, C. (2008). Is man doomed to progress? Journal of Economic Behavior & Organization, 68(1), 140–152. https://doi.org/10.1016/j.jebo.2008.03.004

Shimo, S., Shikano, T., Kitamura, T., & Asai, M. (1985). A new self-rating scale for depression. Clinical Psychiatry, 27(6), 717–723.