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Does Sentiment or Anxiety Drive Consumer Demand?

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Abstract: The University of Michigan's Consumer Sentiment Index has preoccupied politicians, journalists, and Wall Street for decades (Uchitelle, 2002). This American economic indicator is now co-published with Thomson Reuters in London. The international reach of this index cries out for another look at George Katona's consumer sentiment construct as a predictor of consumer demand. Regressions from the British Household Panel Survey (BHPS) show that consumer sentiment is ineffectual in predicting micro variation in discretionary spending between consumers, within consumers over time, or between and within consumers overall. Moreover, consumer sentiment bears no relationship whatsoever to national consumer demand over annual BHPS surveys from 1997 to 2008. In contrast, an indicator of economic anxiety accounts for all three types of variation in micro demand, as well as variation in macro demand over time.

Key words: Common interval scale, cross-wave regression, discretionary spending, panelist weights, randomization-based panel regressions, survey opinion data.

1. History and Prospects of Demand Prediction with Surveys

1.1 20th Century

Macro demand. Consumer demand accounts for two-thirds of a modern nation's gross domestic product (GDP). Discretionary consumer spending is a crucial component of this demand. Since 1952 The University of Michigan's Survey Research Center has attempted to forecast discretionary spending in the United States with George Katona's Consumer Sentiment Index. This index, which launched the field of behavioral economics (cf., Mandell, Katona, Morgan and Schmiedeskamp, 1973), remains a closely watched indicator today. It is computed as the sum of five differences between proportions of favorable and unfavorable responses to the items in Table 1 (Curtin, 1973, p. 254). These questions are answered monthly by an American sample of 500 telephone respondents. Almost identical questions are now asked monthly of 1000 Chinese telephone

respondents in a stratified random sample drawn from 30 representative cities in eastern, middle, and western China. This eziData China Consumer Confidence Survey is conducted under the guidance of The University of Michigan's Survey Research Center. George Katona, who founded behavioral economics at Michigan, gave a history of the Survey Research Center's approach to measuring consumer sentiment and predicting consumer spending (Katona, 1975, Chapter 5).

Table 1: Questions in the Consumer Sentiment Index

We are interested in how people are getting along financially these days. Would you say that you and your family are better off or worse off financially than you were a year ago?
Now looking ahead, do you think that a year from now you people will better off financially, or worse off, or just about the same as now?
Now turning to business conditions in the country as a whole, do you think that during the next 12 months we'll have good times financially, or bad times, or what?
Looking ahead, which would you say is more likely: that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?
Now about the big things people buy for their homes, such as furniture, refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or a bad time for people to buy major household items?

Source: Curtin (1973, Table 15-1).

Apart from its worrisomely small sample sizes in the United States and China, doubts have lingered over the years about the incremental benefit of the sentiment index for predicting consumer spending. In an American econometric critique Shapiro (1972) questioned the need for this index, over and above hard economic data, in equations that forecast consumer demand. When used with European data the Consumer Sentiment Index offered little incremental benefit in consumer demand forecasting when added to the effect of disposable income (Vanden Abeele, 1983).

A second concern with Michigan's index involves the linguistic content of the items in Table 1. In a critique of "fallible indicators of the subjective state of the nation" Turner and Krauss (1978) stressed two linguistic imperatives for survey items making up subjective social indicators; namely, well defined meaning and precise referents. Bram and Ludvigson (1998) emphasized the importance of these properties for survey questions measuring consumer confidence. They reported that Michigan's expectation index (a subset of three items in Table 1)

gave no incremental forecast of consumption growth beyond predictors that are available without surveying consumers. They attribute this failure to the absence of job concerns among the items in Table 1. Uchitelle (2002) also expressed skepticism about the Michigan index, versus an array of specific survey questions, in predicting consumer spending. Dominitz and Manski (2004) echoed this concern, arguing for questions that are more personal and less ambiguous than those in Michigan's Consumer Sentiment Index.

The questions in Table 1 have neither the well defined meaning nor the precise referents called for by Turner and Krauss (1978). Moreover, most of these referents are futuristic and nebulous (cf., Adams and Klein, 1972; Praet and Vuchelen, 1984; Praet, 1985; Biart and Praet, 1987; Vanden Abeele, 1988). These linguistic deficits appear to contribute to the weakness of the Consumer Sentiment Index in predicting consumer demand.

Micro demand. A third issue with the Michigan Index stems from an exclusive concern with its aggregate characteristics (Curtin, 1973, 1984; Katona, 1979). This has obscured the low predictive power of the items in Table 1 for individual discretionary spending. Didow, Perreault and Williamson (1983, p. 340) reported that an individual sentiment score, calculated from five coded responses to the items in Table 1, "has not been found to be a significant predictor of expenditures in cross-sectional research". Bechtel (2012) emphasized that an indicator's cross-sectional prediction of micro demand is prerequisite to its prediction of macro demand when individual scores are averaged up to the national level. However, the disappointing performance of Michigan's index over the last sixty years in predicting micro and macro demand has not weakened its persuasiveness to the American media, Wall Street, and Reuters.

1.2 21st Century

The international reach of the Thomson Reuters/University of Michigan Consumer Sentiment Index cries out for a predictor of consumer demand that is more effective than George Katona's outdated sentiment construct. Discretionary consumption in America, Asia, and Europe is increasingly impeded by income inequality, which is causing global protest, financial uncertainty, and educational inequity (Aly, 2011; Duncan and Murnane, 2011; Collins, 2012; Krueger, 2012). The subjective and personal manifestation of loss of income and purchasing power is "economic anxiety", a term that is now common in public discourse (Herbert, 2008; Healy, 2008; Saad, 2008, 2011; Taylor, 2011; Robison, 2012; Newport, 2012). Just before the latest American presidential election Leonhardt (2012, October 23) observed

> This year, economic anxiety ⋯ is driving the campaign strategies of both

President Obama and Mitt Romney.

The links between inequity, distress, and consumption suggest that economic anxiety carries predictive potential for discretionary spending. This hypothesis was confirmed by Bechtel (2012) in a large cross-national sample from the fifth round of the European Social Survey (Fitzgerald, 2012). The present paper extends this work by using the British Household Panel Suvey (BHPS) to pit economic anxiety against consumer sentiment in accounting for three types of micro variation in discretionary spending; namely, variation between individuals, within individuals over time, and between and within individuals overall. We also compare economic anxiety with consumer sentiment in monitoring variation in annual British demand over the period 1997-2008. Our analyses show that consumer sentiment is ineffectual in explaining any of these four types of variation in discretionary spending. In contrast, economic anxiety predicts all four types of variation and presents itself as a replacement for consumer sentiment in national surveys that address consumer demand.

1.3 The Study Plan

Section 2 describes the BHPS subscales that generate our survey scores measuring demand, income, anxiety, and sentiment. Section 3 illustrates a multi-wave sample of these scores drawn from a multi-wave census of panelists. Sections 4 and 5 give the results of four regressions, which compare sentiment and anxiety as predictors of demand. Section 6 pleads for public polling, policy, and discourse to shake off their preoccupations with consumer sentiment and move on to the real task of reducing income inequality and economic anxiety.

2. Common Interval Scaling of Subscales and Scores

The BHPS (http://www.esds.ac.uk/longitudinal) makes it possible to compare the effects of income, anxiety, and sentiment on discretionary spending in a single dataset. "This survey may be unique in annually soliciting consumer confidence and spending responses from the same panel members. It is therefore a model for American, European, and Asian polling organizations that also wish to capture consumer confidence and spending at the household level" (Bechtel, 2005, p. 122). At both the micro and macro levels consumer anxiety and sentiment, perhaps more than any other psychological constructs, are tied to a widely accepted validity criterion; namely, discretionary expenditure.

In order to compare regression effects, the twelve BHPS subscales in Table 2, along with household income, are coded to a common interval scale. The origin and unit shared by each subscale is set by coding its lowest response as 0 and its highest response as 10. Averaging over the subscales tapping each construct gives

individual i's demand, anxiety, and sentiment scores on the t-th BHPS wave:

$$D_{it} = (D_{it1} + D_{it2} + D_{it3} + D_{it4})/4, \tag{2.1}$$
$$A_{it} = (A_{it1} + A_{it2} + A_{it3} + A_{it4} + A_{it5} + A_{it6})/6, \tag{2.2}$$
$$S_{it} = (S_{it1} + S_{it2})/2, \tag{2.3}$$

The sentiment score in (2.3) is generated from the last two items in Table 2, which closely mimic the first two items in Table 1. These items, which only obliquely address one's personal financial situation, are the best-known items in the Thomson Reuters/University of Michigan Consumer Sentiment Index.

The anxiety score in (2.2) is computed from the six items in Table 2 that more sharply specify one's financial and personal circumstances. These items define economic anxiety to include one's physical and mental health affected by her (his) monetary resources.

The scores D_{it}, A_{it}, and S_{it} share the same origin and unit as their twelve subscales on the right-hand sides of (2.1), (2.2), and (2.3). The common interval scaling of these scores, along with the income score I_{it}, enables us to compare the effects of income, anxiety, and sentiment on consumer demand.

3. Sampling from a Census of Panelists

Panelist i denotes a sequence of intra-individual vectors $Y_{it} = (D_{it}\ I_{it}\ A_{it}\ S_{it})^T$ for $t = 1, \cdots, T_i$. This sequence is illustrated by a single row in Table 3, where $t = 1$ for individual i's first appearance even though her (his) panel entry may actually occur later in the four-wave sequence. Our illustrative multi-wave census is the finite set of panelists in the seven rows in Table 3. It is an "unbalanced" panel because in successive waves panelists make different numbers of wave appearances due to panel attrition or later panel entry.

The boldface rows in Table 3 illustrate an unbalanced multi-wave sample of three panelists drawn from the multi-wave census of seven panelists. More generally, in a finite multi-wave census of N panelists each panelist i appears in T_i waves for $i = 1, \cdots, N$. In Table 3, $i = 1, \cdots, 7$ panelists and $\sum_i T_i = 22$ vectors Y_{it}. This example shows a sample of $n = 3$ panelists drawn from a multi-wave census of $N = 7$ panelists. This multi-wave sample contains 9 vectors Y_{it}.

In Table 3 each longitudinal weight w_i covers the sequence of years panelist i is monitored within a time span of four survey waves. The construction of longitudinal weights for sampled panelists is described in detail by the BHPS (http://www.esds.ac.uk/longitudinal). In the present study panelist weights are used in three randomization-based panel regressions. Table 3 illustrates these three kinds of panel regressions as running over

Table 2: Components of the demand, income, anxiety, and sentiment scales

Constructs and subscales		Common interval-scale coding
Discretionary spending	$\boldsymbol{D_{it}}$	**0 ..... 10**
Number of new durables purchased	D_{it1}	0 10
Total cost of new durables purchased	D_{it2}	0 10
{*color TV, VCR, satellite dish, cable TV, freezer, washing machine, tumble dryer, dish washer, microwave oven, home computer, CD player, telephone*}		
Amount spent eating out per month	D_{it3}	0 10
Amount spent on leisure per month	D_{it4}	0 10
Annual household income	$\boldsymbol{I_{it}}$	**0 ..... 10**
Economic anxiety	$\boldsymbol{A_{it}}$	**0 ..... 10**
How would you say you yourself are managing financially these days? *Comfortably Alright Just getting by quite difficult very difficult*	A_{it1}	0 **2.5** **5** **7.5** **10**
Do you save any amount of your income? *Yes No*	A_{it2}	0 10
Standard of living: Do you ⋯ *Keep your home adequately warm? Pay for a week's annual holiday away from home? Replace worn-out furniture? Buy new, rather than second-hand, clothes? Eat meat, chicken, or fish at least every second day? Have friends or family for a drink or meal at least once a month?*	A_{it3}	0 **1.67** **3.33** **5** **6.67** **8.33** 10
Are you covered by private medical insurance? *Yes, in own name Yes, via another family member No, not insured*	A_{it4}	0 **5** 10
Health problems or disabilities (physical health score)	A_{it5}	0 10
General Health Questionnaire (mental health score)	A_{it6}	0 10
Consumer sentiment	$\boldsymbol{S_{it}}$	0 **2.5** **5** **7.5** **10**
Would you say that you yourself are better off or worse off financially than you were a year ago? *Better Same Worse*	S_{it1}	0 **5** 10
Looking ahead, how do you think you will be a year from now? *Better Same Worse*	S_{it2}	0 **5** 10

Source: This table is derived and adapted from the British Household Panel Survey.

- the nine Y_{it} in the sampled panelists.
- the three $Y_{i\cdot}$ in the sampled panelists.
- the nine deviations $Y_{it} - Y_{i\cdot}$ in the sampled panelists.

Table 3: Unbalanced census and sample panels

Panelist	Measure 1	Measure 2	Measure 3	Measure 4	Panelist mean	Panelist weight
Individual 1	Y_{11}	Y_{12}	Y_{13}	Y_{14}	$Y_{1\cdot}$	
Individual 2	$\boldsymbol{Y_{21}}$	$\boldsymbol{Y_{22}}$	$\boldsymbol{Y_{23}}$	$\boldsymbol{Y_{24}}$	$\boldsymbol{Y_{2\cdot}}$	$\boldsymbol{w_2}$
Individual 3	Y_{31}	Y_{32}	Y_{33}	Y_{34}	$Y_{3\cdot}$	
Individual 4	$\boldsymbol{Y_{41}}$	$\boldsymbol{Y_{42}}$	$\boldsymbol{Y_{43}}$		$\boldsymbol{Y_{4\cdot}}$	$\boldsymbol{w_4}$
Individual 5	Y_{51}	Y_{52}	Y_{53}		$Y_{5\cdot}$	
Individual 6	$\boldsymbol{Y_{61}}$	$\boldsymbol{Y_{62}}$			$\boldsymbol{Y_{6\cdot}}$	$\boldsymbol{w_6}$
Individual 7	Y_{71}	Y_{72}			$Y_{7\cdot}$	

Note: This table is adapted from Bechtel (2009). The column labels denote wave appearances. Thus individual 1 entered the population panel on its first wave. However, individual 7 may have actually entered this population panel on its first, second, or third waves.

4. Randomization-Based Panel Regressions

Randomization-based (versus model-based) regressions over large population cross-sections are used by government agencies, polling organizations, and the survey industry. The vector parameter and estimator defining this classic weighted regression are found in recent literature (Chaudhuri and Stenger, 2005, p. 264; Opsomer, 2009, p. 7; Godambe and Thompson, 2009, p. 89; Lohr, 2010, p. 442). The subscripts we apply below to this parameter and estimator generate randomization-based panel regressions on three different BHPS datasets. Thus, the regression slopes in formulas (4.3), (4.4), and (4.5) measure three effects on consumer demand that cross-sectional surveys cannot access.

4.1 Micro Variation Across and Within Panelists

The census target parameter. Following Section 3, we define a multi-wave census as the finite set $\{D_{it}\ I_{it}\ A_{it}\ S_{it} \mid i = 1, \cdots, N;\ t = 1, \cdots, T_i\}$, where N is the number of panelists over successive waves (cf., Bechtel, 2009). The regression of D_{it} on I_{it}, A_{it}, and S_{it} is

$$D_{it} = \kappa + \iota I_{it} + \alpha A_{it} + \sigma S_{it} + \varepsilon_{it}, \quad \text{for} \quad i = 1, \cdots, N; \quad t = 1, \cdots, T_i. \tag{4.1}$$

In (4.1) ι, α, and σ are the effects of I_{it}, A_{it}, and S_{it} on D_{it}, and ε_{it} is a specification error. The subscript it indicates that the response and its predictors vary over individuals i and waves t.

The census intercept and slopes in (4.1) are identified by the OLS formula

$$\boldsymbol{\beta}_{\text{overall}} = \left[\sum X_{it}X_{it}^T\right]^{-1} \sum X_{it}D_{it}, \quad \text{for} \quad i = 1, \cdots, N; \quad t = 1, \cdots, T_i, \quad (4.2)$$

where $\boldsymbol{\beta}_{\text{overall}} = (\kappa\ \iota\ \alpha\ \sigma)^T$, and $X_{it} = (1\ I_{it}\ A_{it}\ S_{it})^T$.

The Horvitz-Thompson-type estimator. We define a multi-wave sample as the subset $\{D_{it}\ I_{it}\ A_{it}\ S_{it} \mid i = 1, \cdots, n; T = 1, \cdots, T_i\}$ of our multi-wave census. This sample of n BHPS panelists provides the following randomization-based estimator of $\boldsymbol{\beta}_{\text{overall}}$ in (4.2):

$$\boldsymbol{B}_{\text{overall}} = \left[\sum w_i X_{it}X_{it}^T\right]^{-1} \sum w_i X_{it}D_{it}, \quad \text{for} \quad i = 1, \cdots, n; \quad t = 1, \cdots, T_i, \quad (4.3)$$

where $\boldsymbol{B}_{\text{overall}} = (k\ i\ a\ s)^T$. The longitudinal panelist weights w_i are provided by the BHPS (http://www.esds.ac.uk/longitudinal). These weights are illustrated in last column of Table 3. The two weighted sample totals in (4.3) are Horvitz-Thompson estimators of the census totals in (4.2).

Results. Formula (4.3) provides our randomization-based estimates of the effects of income, economic anxiety, and consumer sentiment on discretionary spending. Due to the coding of all scores in Table 2 on the same interval scale, these effects may be directly compared.

As expected from long-standing econometric work, income is the dominant predictor of consumer spending (Shapiro 1972; Vanden Abeele, 1983). Our major finding, however, is the differential strength of anxiety and sentiment as incremental predictors of consumer demand over and above household income. The first column of Table 4 shows that consumer sentiment is ineffectual in accounting for variation in spending over consumers and within consumers over time. In contrast, economic anxiety is a strong predictor of this overall micro variation in demand.

4.2 Micro Variation across Panelists

The data replacement for our next regression overwrites the subscript it by the subscript $i\cdot$, producing the derived census $\{D_{i\cdot}\ I_{i\cdot}\ A_{i\cdot}\ S_{i\cdot} \mid i = 1, \cdots, N\}$. These individually averaged scores are illustrated as row means $Y_{i\cdot}$ for $i = 1, \cdots, 7$ in Table 3.

This subscript replacement gives the sample intercept and slope vector

$$\boldsymbol{B}_{\text{across}} = \left[\sum w_i X_{i\cdot}X_{i\cdot}^T\right]^{-1} \sum w_i X_{i\cdot}D_{i\cdot}, \quad \text{for} \quad i = 1, \cdots, n, \quad (4.4)$$

Table 4: Four demand regressions

	Micro regressions[1,2]			Macro
	Overall	Across-panelists	Within-panelists	Regression
Household income	0.894	1.118	0.241	1.549 [3]
	0.0247 [4]	*0.0618*	*0.0164*	*0.3165*
Economic anxiety	-0.172	-0.188	-0.079	-1.147 [5]
	0.0039	*0.0111*	*0.0038*	*0.4191*
Consumer sentiment	-0.069	-0.127	-0.019	-0.034 [6]
	0.0020	*0.0069*	*0.0016*	*0.0686*
Sample size	69186	8049	69186	12

[1]Each micro analysis is a weighted randomization-based regression (Lohr, 2010, Chapter 11).
[2]All micro-regression coefficients are significant beyond the 0.000001 level.
[3]The un-weighted macro-regression coefficient for income is significant at the 0.001 level.
[4]Standard errors are italic.
[5]The un-weighted macro-regression coefficient for anxiety is significant at the 0.026 level.
[6]The un-weighted macro-regression coefficient for sentiment is not significant ($p = 0.631$).

where $X_{i\cdot} = (1 \ I_{i\cdot} \ A_{i\cdot} \ S_{i\cdot})^T$. $\boldsymbol{B}_{\text{across}}$ is the Horvitz-Thompson-type estimator for a randomization-based regression of $D_{i\cdot}$ on $I_{i\cdot}$, $A_{i\cdot}$, and $S_{i\cdot}$ over the subset $\{D_{i\cdot} \ I_{i\cdot} \ A_{i\cdot} \ S_{i\cdot} \mid i = 1, \cdots, n\}$ of BHPS panelists. The slopes in this regression are more reliable than the slopes in a typical cross-sectional regression because they are computed from multiple measurements of individual i.

The cross-panelist slopes in Table 4 exceed their overall-regression counterparts because inter-individual differences are greater than intra-individual differences. Due to our common interval scale in Table 2, these slopes display the relative importance of anxiety versus sentiment in predicting individual differences in discretionary spending. Table 4 shows that anxiety again outperforms sentiment in accounting for demand differences between consumers.

4.3 Micro Variation within Panelists

Our second data replacement overwrites the subscript it with the subscript $it - i\cdot$. This generates a derived census of deviation scores $\{(Y_{it} - Y_{i\cdot})^T \mid i = 1, \cdots, N; \ t = 1, \cdots, T_i\}$, where

$$\begin{aligned}(Y_{it} - Y_{i\cdot})^T &= (D_{it} - D_{i\cdot}, I_{it} - I_{i\cdot}, A_{it} - A_{i\cdot}, S_{it} - S_{i\cdot}) \\ &\equiv Y^T_{it\text{-}i\cdot} = (D_{it\text{-}i\cdot}, I_{it\text{-}i\cdot}, A_{it\text{-}i\cdot}, S_{it\text{-}i\cdot}).\end{aligned}$$

This second subscript replacement produces the sample estimator

$$\boldsymbol{B}_{\text{within}} = \left[\sum w_i X_{it\text{-}i\cdot} X_{it\text{-}i\cdot}^T\right]^{-1} \sum w_i X_{it\text{-}i\cdot} D_{it\text{-}i\cdot}, \text{ for } i = 1, \cdots, n;\ t = 1, \cdots, T_i, \tag{4.5}$$

where $X_{it-i\cdot} = (1\ I_{it\text{-}i\cdot}\ A_{it\text{-}i\cdot}\ S_{it\text{-}i\cdot})^T$. $\boldsymbol{B}_{\text{within}}$ is the Horvitz-Thompson-type estimator for a randomization-based regression of $D_{it\text{-}i\cdot}$ on $I_{it\text{-}i\cdot}$, $A_{it\text{-}i\cdot}$, and $S_{it\text{-}i\cdot}$ over the subset $\{D_{it\text{-}i\cdot}\ I_{it\text{-}i\cdot}\ A_{it\text{-}i\cdot}\ S_{it\text{-}i\cdot} \mid i = 1, \cdots, n;\ t = 1, \cdots, T_i\}$ of BHPS panelists.

The within-panelist slopes in Table 4 are each less than their overall counterparts because intra-individual differences are less than inter-individual differences. The third column of Table 4 shows that income is still the dominant predictor of within-panelist changes in discretionary spending. However, once again economic anxiety markedly exceeds consumer sentiment in predicting these changes within consumers over time.

5. Macro Variation across Survey Waves

Table 4 shows that micro anxiety consistently and strikingly outperforms micro sentiment in predicting individual discretionary spending. These individual-level findings point to to a similar result when our four scores are aggregated up to the national level (cf., Didow, Perreault and Williamson, 1983; Bechtel, 2005, 2012). This hypothesis is strongly supported by a regression of demand wave means on income, anxiety, and sentiment wave means over the annual BHPS between 1997 and 2008.

5.1 Cross-Wave Regression

Our cross-wave slopes were obtained by regressing $D_{\cdot t}$ on $I_{\cdot t}$, $A_{\cdot t}$, and $S_{\cdot t}$ over the set $\{D_{\cdot t}\ I_{\cdot t}\ A_{\cdot t}\ S_{\cdot t} \mid t = 1, \cdots, 12\}$ of BHPS waves. The estimated intercept and slope vector is

$$\boldsymbol{B}_{\text{waves}} = \left[\sum X_{\cdot t} X_{\cdot t}^T\right]^{-1} \sum X_{\cdot t} D_{\cdot t}, \text{ for } t = 1, \cdots, 12, \tag{5.1}$$

where $X_{\cdot t} = (1\ I_{\cdot t}\ A_{\cdot t}\ S_{\cdot t})^T$.

Due to our common interval scale in Table 2, the slopes in $\boldsymbol{B}_{\text{waves}}$ measure comparable macro effects of income, anxiety, and sentiment on national discretionary spending. The estimates in the last column of Table 4 show that macro anxiety rivals national household income in predicting aggregate British demand over the period 1997-2008. As hypothesized from the poor performance of micro sentiment in Table 4, the effect of macro sentiment on macro demand is not statistically significant.

5.2 Wave Means

Table 5 exhibits the eleven demand, income, anxiety, and sentiment changes in the United Kingdom over the period 1997-2008. As predicted from our regression slopes in Table 4, nine demand changes in Table 5 are monitored by similar income changes. Seven demand changes are tracked by opposite anxiety changes, but only four demand changes are picked up by opposite sentiment changes. The wave means in Table 5 and the macro regression in Table 4 show that aggregate consumer sentiment on the BHPS bears no relationship whatsoever to British consumer demand.

Table 5: Wave means over 1997-2008

	97	98	99	00	01	02	03	04	05	06	07	08
Demand	1.54	$<$ 1.61	$<$ 1.68	$<$ 1.77	$<$ 1.82	$<$ 1.87	$<$ 1.94	$<$ 1.95	$<$ 1.97	$>$ 1.91	$<$ 1.97	$>$ 1.93
	0.014[1]	*0.014*	*0.015*	*0.015*	*0.016*	*0.017*	*0.018*	*0.018*	*0.018*	*0.018*	*0.019*	*0.019*
Income	0.46	$<$ 0.48	$<$ 0.49	$<$ 0.53	$<$ 0.56	$<$ 0.58	$<$ 0.59	$<$ 0.62	$<$ 0.64	$<$ 0.65	$<$ 0.67	$<$ 0.70
	0.004	*0.005*	*0.005*	*0.005*	*0.006*	*0.005*	*0.006*	*0.006*	*0.006*	*0.006*	*0.007*	*0.007*
Anxiety	3.78	$>$ 3.72	$<$ 3.76	$>$ 3.74	$>$ 3.67	$<$ 3.68	$>$ 3.65	$<$ 3.68	$=$ 3.68	$<$ 3.72	$>$ 3.71	$<$ 3.79
	0.018	*0.018*	*0.018*	*0.019*	*0.019*	*0.019*	*0.019*	*0.020*	*0.020*	*0.021*	*0.021*	*0.021*
Sentiment	4.34	$<$ 4.35	$=$ 4.35	$=$ 4.35	$=$ 4.35	$<$ 4.44	$<$ 4.50	$=$ 4.50	$<$ 4.64	$>$ 4.63	$>$ 4.59	$<$ 5.55
	0.031	*0.031*	*0.032*	*0.032*	*0.032*	*0.032*	*0.033*	*0.034*	*0.035*	*0.035*	*0.035*	*0.041*

[1]Standard errors are italic.

6. Toward Evidence-Based Prediction of Consumer Demand

6.1 Dispelling the Preoccupation with Consumer Sentiment

The international reach of the Thomson Reuters/University of Michigan Consumer Sentiment Index has motivated our present probe into the efficacy of consumer sentiment as a predictor of consumer demand. Three large-sample regressions from the British Household Panel Survey consistently demonstrate that consumer sentiment is ineffectual in explaining micro demand variation between consumers, within consumers over time, or between and within consumers overall. Moreover, variation in macro sentiment over twelve annual BHPS surveys from 1997 to 2008 is unrelated to variation in macro demand.

These consistent negative results from a high-quality dataset support protestations against the Consumer Sentiment Index as far back as Shapiro's (1972) econometric critique (See Section 1). A departure from this index was called for long ago by Didow, Perreault, and Williamson (1983, p. 347):

> The time has come to develop alternative measures of consumer sentiment and to collect data with them for future forecasting and related uses.

Despite the continuing reservations about the Consumer Sentiment Index, its march into the 21st century, unrevised and still based on small samples, has been unhelpful to the reputations of opinion polling and social science. As emphasized in Section 1, consumer demand accounts for two-thirds of a modern economy's gross domestic product (GDP). The accurate prediction of consumer spending in Asia, America, and Europe is key to resolving global financial uncertainty. In contributing to this resolution, human surveys can no longer afford to use vague, antiquated questions put to undersized samples, all perpetuated by media hype and Wall Street gullibility (cf., Uchitelle, 2002).

6.2 Looking Ahead

Bechtel (2005, p. 122) suggested the British Household Panel Survey as a promising dataset for generating and testing new survey predictors of discretionary consumer spending:

> The future of research in consumer confidence is thus fairly clear. Although the macro economy will remain paramount with policy makers, this national level of analysis can now be instructed from below by panel studies of consumer feelings, lifestyles, and spending at the individual level. This new approach to consumer confidence is made possible by the methods introduced by the BHPS.

The consumer feelings referred to by Bechtel (2005) morphed into the construct "economic anxiety" during the global financial crises of 2008 and 2012 (Herbert, 2008; Healy, 2008; Saad, 2008; 2011; Taylor, 2011; Robison, 2012; Newport, 2012; Leonhardt, 2012). As noted in Section 1, the connections between income inequality, distress, and consumption, suggest that economic anxiety has a potent negative impact on discretionary spending. This hypothesis was confirmed by Bechtel (2012), who showed that economic anxiety scores strongly predict individual-level consumer demand in the European Social Survey (ESS).

> This cross-sectional prediction ⋯ will be prerequisite to the prediction of aggregate demand when our scores can be averaged up to national and cross-national levels in time-series analyses (Bechtel, 2012, p. 704).

The present paper confirms these cross-sectional ESS results by demonstrating that economic anxiety accounts for three types of BHPS variation in micro demand. It also confirms that this "prerequisite" micro prediction carries over to the prediction of temporal variation in macro demand.

In view of these findings, the anxiety subscales in Table 2 give guidance for writing new items that will make up tomorrow's survey predictor of discretionary spending. The present results show that this predictor should include physical and mental health impacts of loss of income and purchasing power. In contrast to the amorphous and imprecise items in Table 1, the pointed meanings and clear referents of the economic anxiety items in Table 2 tap the personal side

of income inequality (cf., Turner and Krauss, 1978; Bram and Ludvigson, 1998; Uchitelle, 2002; Dominitz and Manski, 2004). The specter haunting the most extreme income inequality, i.e. unemployment, has been described by Samuelson and Nordhaus (1985, pp. 207-209) in their classic text *Economics*:

> However large the economic costs of unemployment, a recounting of dollars does not adequately convey the human, social, and psychological toll that persistent periods of involuntary unemployment bring. ⋯ recent studies indicate that unemployment leads to a deterioration of both physical and psychological health - higher levels of heart disease, alcoholism, and suicide. ⋯ other studies indicate that involuntary joblessness is a highly traumatic event for many people.

These words give added urgency to the construction of a survey indicator of economic anxiety in the United States and China, the world's largest economies, both with extreme income inequality (Wikipedia, 2012). The monitoring of economic anxiety stemming from income inequality, unemployment, and poverty is a crucial project for the 21st century.

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