Surveys of Consumers:
Theory, Methods, and Interpretation

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Introduction

What is consumer confidence? The term is now part of our popular culture. Consumer confidence is cited by government officials, business executives, the media, as well as consumers themselves to describe national economic conditions. It has become so much a part of the national economic dialog that it is implicitly assumed that the term "consumer confidence" has a specific and widely agreed upon definition. It does have a precise meaning, but unfortunately, this definition is not widely used by the media. Perhaps the use and misuse of consumer confidence data is no worse that other widely used economic measures such as the inflation and unemployment rates. Nonetheless, I have recently read as many articles that reported that consumer confidence was high as low, and as many articles that cited consumer confidence as being consistent as inconsistent with spending trends.

There are four main reasons that the consumer sentiment data are misinterpreted: First, there is a confusion about the type of spending that is influenced by changes in consumer confidence. Second, no single index can capture the divergences across economic expectations that have been common during the past few years. Third, many have a mistaken view of the timing between changes in confidence and changes in spending behavior. Finally, the media has often exaggerated the significance of the typical change in the confidence index, yet have been too skeptical of the release of preliminary data.   I will briefly comment on each of these sources of confusion.

Discretionary Expenditures

Consumer confidence measures were devised in the late 1940's by George Katona at the University of Michigan as a means to directly incorporate empirical measures of consumer expectations into models of spending and saving behavior. Katona summarized his views by saying that consumer spending depends on both their "ability and willingness to buy." By spending, he meant discretionary purchases; by ability, he meant the income and assets of consumers; and by willingness, he meant consumers' assessments of their future job and income prospects. When consumers become optimistic they increase their spending, and when they become pessimistic they decrease their spending and increase their precautionary saving.

Discretionary purchases are the things that people buy that are not the necessities of life. All spending categories include discretionary items; the key provision is that discretionary purchases can be postponed. There is no reason to think that consumer confidence should play a role in determining the timing of necessary expenditures. The most commonly studied discretionary purchases are homes, vehicles, furniture, appliances, home electronics, PCs, and other large household durables. These are relatively infrequent and large purchases, often involve the use of credit, and are typically planned purchases—just the type of purchases that would critically depend on consumers' expectations about their future economic situation.

No measure of confidence is required to forecast whether people will pay their rent or mortgage, pay their vehicle loan or lease, purchase food or clothing, pay their electricity or water bill, or pay their insurance bills. Indeed, most consumer expenditures are not for discretionary purchases. That is not to say that some purchases within each of these categories are not discretionary. People do dine out, make discretionary clothing purchases, and decide when to fill and heat their pools. The distinction between discretionary and non discretionary purchases is often ignored. Sometimes it is justified by claims of practicality: given that separating discretionary from necessary spending is not easy and that trends in discretionary purchases usually dominate overall spending trends, maintaining the distinction has no practical impact. While this reasoning may not lead to wrong conclusions in normal times (whatever they are), amid the sharp divergences in the current economy it has caused confusion.

Divergent Expectations

Indeed, the current economic situation has been ripe for misinterpretation. Consumer expectations for interest rates, inflation, income, jobs, stock prices, home values, economic policies, to name just a few, have moved independently and often in opposite directions. As a result of these offsetting trends, consumer confidence has been close to its fifty year average in recent months. More than ever before consumers have held both positive and negative expectations about economic prospects. These divergences and the middling position of the sentiment index has formed the ideal mix for misinterpretation. This is not a deficit of the data nor of the method. Indeed, while confusion has reigned in the media, consumers have not been confused. Moreover, for anyone interested in scientific research, such divergences are the stuff upon which scientific advancement is built.

The Surveys of Consumers has never intended the Index of Consumer Sentiment to be the sole arbiter of changes in the economic expectations of consumers. Indeed, the Surveys of Consumers publishes a wide array of data on consumers' economic expectations. While the data typically indicate the same trends across most measures during most periods of time, there are often divergent trends as there have been during the past few years. Data are regularly published on real and nominal income expectations, unemployment, interest rates, and inflation expectations, what respondents identify as the most important changes in economic conditions, measures about buying conditions for a variety of products, attitudes toward saving and debt, holdings of various assets, reactions to changes in economic policies, and many other topics. When the divergences are extraordinary between how consumers judge interest rates and inflation rates, on the one hand, and wealth and job prospects on the other, any summary measure could not be expected to both predict the record home and vehicle sales as well as the disappointing sales of other non-interest sensitive purchases. When consumers demonstrate a sophistication and sensitivity to disparate economic trends, so too must the media.

**Expectations Change in
Advance of Behavior**

There would be no reason to measure consumer expectations if they did not predict future spending and saving behavior. Nonetheless, it is rather typical to read that, for example, the September data was not consistent with September retail sales. I have never read a report that compared consumer confidence data from say six months ago with current sales. Indeed, there is no reason to expect a relationship of this month's confidence data with this month's sales data although there is usually some correspondence.

The empirical evidence has consistently found that the data from the Surveys of Consumers does provide accurate forecasts six to twelve months in advance. For example, an article by Phil Howrey[1] was recently published in the *Brookings Papers on Economic Activity* that found the Index of Consumer Sentiment to be a significant predictor of future trends in GDP even after controlling for the economic variables typically used to predict GDP. A subcomponent of the overall index, called the Index of Consumer Expectations, was selected by the U.S. Commerce Department in 1989 as a component of the composite Index of Leading Economic Indicators because of its ability to forecast future trends in the economy. It remains part of the Index of Leading Indicators which is now published by the Conference Board.

Moreover, many of the other expectations questions included in the survey have proved to be remarkably accurate. A recent article in the *Journal of Economic Perspectives* by Lloyd Thomas[2] analyzed the Michigan inflation expectations series as well as the expectations of professional forecasters. The results indicated that consumers held slightly more accurate year-ahead forecasts of the inflation rate than professional forecasters (which replicates the finding of a study done more than ten years earlier by Ned Gramlich[3]). While consumers' forecasts did not fully correspond with the theory of rational expectations, the departure was in how efficiently they used information, as their expectations were accurate and unbiased.

The same findings emerge about consumers' unemployment expectations, with the data indicating a close correspondence with subsequent changes in the actual unemployment rate. Unemployment expectations also have an important impact on spending decisions. Christopher Carroll[4] has found the Michigan series on unemployment expectations to be a significant predictor of personal consumption expenditures even after controlling for the variables typically part of consumption models, including measures of permanent income.

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[1]Howrey, E. Philip, The Predictive Power of the Index of Consumer Sentiment. Brookings Papers on Economic Activity, 2001, Issue 1, pp 175-207.

[2]Thomas Jr., Lloyd B., *Survey Measures of Expected U.S. Inflation*. Journal of Economic Perspectives, Fall 1999, 13:4, pp 125-44.

[3]Edward M. Gramlich, *Models of Inflation Expectations Formation: A Comparison of Household and Economist Forecasts*. Journal of Money, Credit and Banking, May 1983, 15:2, pp 155-73.

[4]Carroll, Christopher D., and Wendy E. Dunn, Unemployment Expectations, Jumping (S,s) Triggers, and Household Balance Sheets, in NBER Macroeconomic Annual 1997, Editors Ben S. Bernake and Julio J. Rotemberg, Cambridge: MIT Press, 1997.

Sampling Errors

Perhaps the most often cited characteristic of the Surveys of Consumers is the relatively small sample size of 500 completed interviews per month—although this does yield 1,500 cases for quarterly forecast models. The sample size was chosen as a compromise between cost and data reliability. Over the past quarter century, the response rates have ranged from 60% to 70%. Moreover, even though the monthly sample size is already small, I have regularly released a mid month preliminary estimate based on about two-thirds of the full monthly sample. The release of preliminary results was initiated in August of 1990 following the invasion of Kuwait by Iraq. Given that consumer confidence had immediately plunged, I saw no benefit in keeping it a secret until the end of the month; the preliminary results are still being released because they have proved to be a reliable estimate of the final monthly figure.

The Surveys of Consumers are frequently compared with the Conference Board's sample of 5,000. This is a misleading comparison. First, the Conference Board's sample is 5,000. This is not the number of completed interviewers but the alleged size of the sample. Completed interviews total about 3,000 cases. Moreover, the 5,000 cases do not really represent the initial samples but a group of respondents that agreed to participate. I know of no published data on how large the original sample was that was used to screen for these 5,000 cases so that the representativeness of the sample could be assessed. True response rates for commercial mail surveys are rarely above 10%, however.

The most important characteristic of the equal probability sample design used by the Surveys of Consumers is that it permits the computation of sampling errors for statistics estimated from the survey data. In general, sampling errors are a function of the statistical characteristics of the estimator in question, the number of sample cases on which the estimate is based, and the design of the sample. There are a number of available computer programs which can calculate appropriate sampling errors for any given estimate. While it is not possible to provide sampling errors for every statistic that might be of interest without doing the actual computation, the standard errors of the main confidence indices have been calculated. (Information on the size of the estimated standard errors of percentages and differences in percentages are available on the project website at http://www.umich.edu/~umsurvey).

The Index of Consumer Sentiment represents the responses to five separate questions. Two questions focus on how the personal financial situation of the household has recently changed and how it is expected to change during the year ahead, two questions focus on the outlook for the economy over the near and longer terms, and one question focuses on buying conditions for household durables.

The basic formula for the Index of Consumer Sentiment is:

$$ICS_t = \sum_{j=1}^{5}(P_{jt}^f - P_{jt}^u)100 + 100$$

where

P_{jt}^f = the sample proportion giving favorable replies to the jth question at time t, and

P_{jt}^u = the sample proportion giving unfavorable replies to the jth question at time t.

Equivalently, the formula can be expressed in terms of the individual responses:

$$ICS_t = \sum_{J=1}^{5} \ \sum_{i=1}^{n} \frac{x_{ijt}}{n} (100) + 100$$

where

X^{ijt} = 1 if favorable response to j^{th} question by i^{th} respondent at time t,

X^{ijt} = -1 if unfavorable response to j^{th} question by i^{th} respondent at time t,

X^{ijt} = 0 for all other responses to j^{th} question by i^{th} respondent at time t.

The final figures are published as a proportion of the base year value (1966). The Index of Consumer Expectations and the Index of Current Economic conditions are calculated similarly, with the former based on the three component questions that focus on future economic conditions, and the latter on the other two components that focus on current economic conditions. As I am sure you all know, the standard errors of the estimates depend on the variances and covariances of each of the five favorable and five unfavorable response categories.

Table 1 provides estimates of the standard errors of the estimated levels of all three indices. Since the data are published monthly but many use the quarterly averages of the independent monthly samples in their models, I have included estimates of the standard errors for both frequencies. The only difference is sample size: 500 for monthly surveys and 1,500 for quarterly. The figures in this table represent two standard errors. Hence, the chances are 95 in 100 that the true value lies within a range equal to the published figure plus or minus the figures given in the table. Thus, for the Index of Consumer Sentiment, the 95% confidence interval for monthly data is about 3.3 Index-points, and it is about 1.9 Index-points for quarterly data. The 95% confidence intervals are slightly larger for the other two indices, which mainly reflect the fact that these indices have fewer component questions.

Despite these well known facts about the likely size of the standard errors of the indices, headlines in the media regularly trumpet a gain or loss in confidence when the Index of Consumer Sentiment changes by as little as one-tenth a point. This is perhaps the most frustrating and most common misinterpretation of the data.

Table 1:
Confidence Intervals for Indexes from the Surveys of Consumers

|	95% Confidence Intervals	
	Monthly Data	Quarterly Data
Index of Consumer Sentiment	± 3.29	± 1.91
Index of Consumer Expectations	± 4.03	± 2.33
Current Conditions Index	± 4.24	± 2.45

Given the intense interest in the period-to-period change in the indices, I have also calculated the standard errors for the changes actually observed in the indices during the past ten years. Table 2 gives the 95% confidence intervals for monthly and quarterly changes in all three indices. Thus, a month-to-month change of 4.8 points is required for the monthly difference in the Sentiment Index to be significant. For quarterly data, the minimum change needed for significance at the 95% confidence level is 2.6 points. As before, the confidence intervals are somewhat larger for the other two indices. It should be noted that "quarters" could be formed from any adjacent three-months, and changes between any two non-overlapping "quarters" could be compared with the 95% confidence intervals given in the table. More generally, the selected months or quarters do not necessarily have to be adjacent to calculate the period-to-period changes; the difference between any two months or quarters, say year-to-year comparisons, could be used.

Table 2:
Minimum Significance Change Required in Indexes from the Surveys of Consumers

	Minimum Period-to-Period Change Required For Significance at 95%	
	Monthly	Quarterly
Index of Consumer Sentiment	± 4.82	± 2.64
Index of Consumer Expectations	± 5.98	± 3.27
Current Conditions Index	± 6.00	± 3.29

The Accuracy of Preliminary Results

Given these standard errors, you may think that the even smaller sample sizes used for the preliminary estimates would result in more noise than true signal. The preliminary results are released at mid-month based on the first two-weeks of interviews, or about two-thirds of the full sample. These results are simply intended to give an early indication of the final data figures for the month. The accompanying chart shows the trends in the preliminary and final estimates for the Index of Consumer Sentiment. You might have trouble distinguishing the two lines since the time-series correlation is 0.99. Indeed, over the ten years

CHART 1: INDEX OF CONSUMER SENTIMENT PRELIMINARY VERSUS FINAL VALUES

INDEX VALUE (1966=100)

that these preliminary figures have been released, the differences between the preliminary and final figures have been quite small (see Table 3). For the Index of Consumer Sentiment, both the mean and median difference across all 139 surveys were virtually zero (both were less than 0.1 of an Index point—only the median difference was large enough to round up to 0.1). These data indicate that the preliminary figures have consistently provided a highly accurate estimate of the final figure.
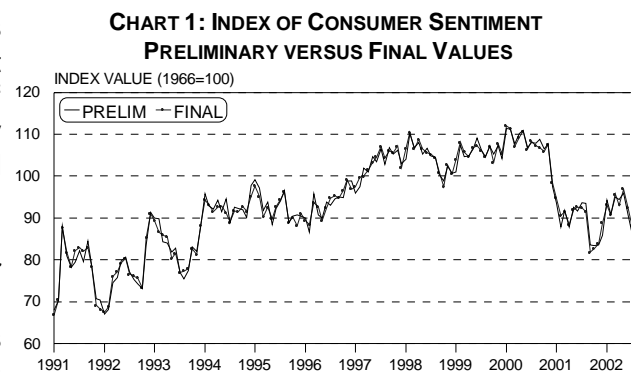
Table 3:
Preliminary Versus Final Figures: January 1991 to July 2002

	Difference (Final-Prelim)		Absolute Difference |Final-Prelim|		Time Series Correlation
	Mean	Median	Mean	Median	
Index of Consumer Sentiment	0.0	0.1	1.0	0.8	0.99
Index of Consumer Expectations	0.2	0.3	1.4	1.3	0.99
Current Conditions Index	-0.2	-0.2	1.4	1.3	0.99

Even the absolute size of the difference, which ignores whether the error was positive or negative, was very small. For the Index of Consumer Sentiment, the mean absolute difference was 1.0 Index point, and the median difference was 0.8 Index points. Thus, for the Index of Consumer Sentiment, the typical difference between the preliminary and final figures was about 1 Index point, with positive as well as negative differences equally as likely. This amounts to less than a third of the 95% confidence interval, and less than a fifth of the minimum month-to-month change required for significance.

Not only do the data show little, if any, systematic divergence, the variance or dispersion of the monthly differences has also been small. Moreover, the differences for one month were not systematically related to the observed differences in the following months. The serial correlations of the differences were virtually zero for each of the indices. Overall, the data indicate that the preliminary figures have proved to be reliable estimates of the final figures despite the smaller sample sizes.

Concluding Comments

I hope that my presentation has convinced you of a few basic facts about the Surveys of Consumers. First, while we may all agree that consumer confidence is an important component of all areas of consumer behavior, the concept of consumer confidence pioneered by the University of Michigan has focused solely on the role of economic expectations in determining the timing of discretionary purchases. Second, there is no single index that can distill all of the divergences in economic conditions that affect consumer spending. While such sharp divergences do not usually exist, the Surveys of Consumers provides the data necessary to separately track each of the important factors that affect spending decisions. Third, consumer expectations were designed to forecast future spending behavior not current spending, and their forecasting ability has been empirically confirmed. Fourth, no index is measured precisely; all have some degree of measurement and sampling error. Nonetheless, the Surveys of Consumers has a demonstrated history of smooth rather than erratic month-to-month changes, lessening the likelihood of false signals. Even the preliminary mid-month results are more accurate than statistical theory would suggest. Finally, it seems hardly necessary to note that none of these points are new, but all are important for the correct use of the data from the University of Michigan's Surveys of Consumers.