

# Consumer Confidence and Consumer Spending

Sydney C. Ludvigson

**A**t least since the work of John Maynard Keynes, economists have pondered the ways in which consumer and investor sentiment—what Keynes (1936, Chapter 12) referred to as “animal spirits”—might influence the real economy. Today, the outcome of monthly consumer confidence surveys provides steady fodder for the business and financial press and is treated as an important piece of economic information. In the *New York Times* alone, more than 15 articles about consumer confidence and its potential impact on the economy appeared between July 2002 and June 2003. Consumer confidence is often cited by Federal Reserve Chairman Alan Greenspan as a key determinant of near-term economic growth (for example, Greenspan, 2002).

Despite the widespread attention given to surveys of consumer confidence, the mechanisms by which household attitudes influence the real economy are less well understood. Do consumer confidence surveys contain meaningful independent information about the economy, or do they simply repackage information already captured in other economic indicators? Do the surveys provide information about the future path of household spending, or do they reflect current or past events? Finally, do the surveys correspond neatly to any well-defined economic concept, or do they furnish only a nebulous barometer of household disposition?

This paper begins with an overview of how consumer confidence is measured and reported. It then evaluates what is known about the relationship between consumer attitudes and the real economy. The evidence suggests that the most popular survey measures do contain some information about the future path of

■ *Sydney C. Ludvigson is Assistant Professor of Economics, New York University, New York, New York, and Faculty Research Fellow, National Bureau of Economic Research, Cambridge, Massachusetts.*

aggregate consumer expenditure growth. However, much of that information can be found in other popular economic and financial indicators, and the independent information provided by consumer confidence predicts a relatively modest amount of additional variation in future consumer spending. Moreover, there is some evidence that consumer confidence surveys reflect expectations of income and non-stock market wealth growth, but evidence on the connection between these surveys and precautionary saving motives is mixed.

## **Measuring Consumer Attitudes: Survey Questions and Survey Components**

The University of Michigan's Consumer Sentiment Index and the Conference Board's Consumer Confidence Index are the most widely followed measures of U.S. consumer confidence.<sup>1</sup> Although the financial markets and the business community closely follow both indexes, much published academic research focuses on the Michigan index—most likely because of its longer time series. The Michigan index began as an annual survey in the late 1940s. In 1952, it was converted to a quarterly survey and in 1978 to a monthly survey. The Conference Board launched its index on a bimonthly basis in 1967 and expanded it to a monthly series in 1977. Figure 1 presents the basic time series of the two indices, with periods of recession shown by shaded areas. The two indexes broadly measure the same concept—public confidence in the economy—but they are based on different questions and sometimes give conflicting signals. To interpret movements in these two series, it is important to understand some key differences in the specific questions that are asked as well as in sample size, survey methodology and index formulation.

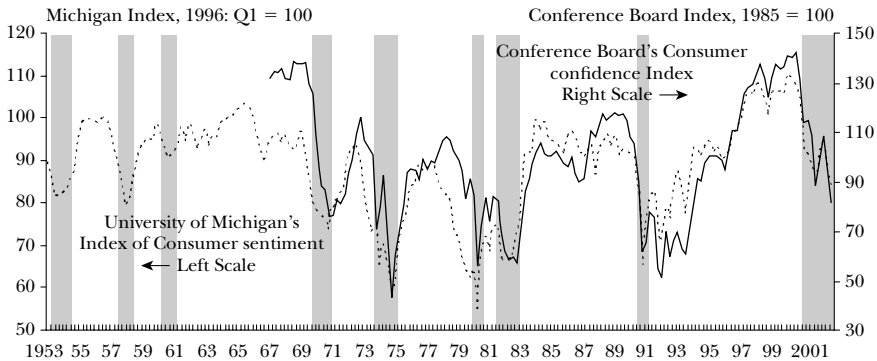
Both the Conference Board and the University of Michigan base their overall index of consumer confidence on five questions that are part of a broader survey of consumer attitudes and expectations, shown in Exhibit 1. In both of the surveys, each of the five questions is given equal weight in the overall consumer confidence index. In addition to the overall index, both organizations report two component indexes: a present situation component and an expectations component.

### **Present Situation Component**

On each survey, two of the five questions ask respondents to assess present economic conditions. The Conference Board's present situation component takes a "snapshot" approach, asking respondents to evaluate current business conditions and job availability. Notice that the Conference Board survey asks specifically about

<sup>1</sup> The material in this section closely reflects the discussion in Bram and Ludvigson (1998).

Figure 1  
Two Indexes of Consumer Attitudes



Sources: Conference Board; University of Michigan Survey Research Center.

Note: Shaded areas denote periods designated recessions by the National Bureau of Economic Research.

job prospects in the respondent's area. As a result, the Conference Board's present situation component closely tracks labor market conditions like the nation's unemployment rate and the growth in payroll employment. Michigan asks respondents to comment on the advisability of big-ticket household purchases and to assess changes in their own financial situation. Although this latter question is about the personal financial situation of the respondent, it does not directly ask about changes in the employment outlook. Thus, Michigan's present conditions component is less closely tied to labor market conditions and tends to reflect recent changes in the economy rather than the level of economic activity.

These differences are reflected in the cyclical behavior of the two component indexes. As shown in Figure 2, Michigan's present conditions component generally peaks in the early stages of economic recovery, when growth is high. By contrast, the Conference Board's present situation component generally peaks in the late stages of economic expansion, when unemployment is low and the level of economic activity is high. The present conditions components of the two indexes are not closely correlated.

### Expectations Component

The three questions that ask about consumers' expectations are fairly comparable in the two surveys. The Conference Board survey asks about expected changes in business conditions, job availability and respondents' income over the next six months. Because the Conference Board index includes a question about nominal income, it may overstate "confidence" during periods of high inflation. Michigan's poses questions on expected business conditions—both over the next year and over the next five years—and expected changes in the respondent's financial situation

*Exhibit 1***Component Questions of Consumer Confidence**

Five questions make up the confidence indexes reported by the University of Michigan and the Conference Board. Each set of questions is part of a broader monthly survey of consumer attitudes. The questions have been renumbered and reordered here, compared to the way in which they are asked, to facilitate comparisons between the surveys. Also, the two surveys use slightly different terminology for the index component based on the first two questions; the discussion here will adopt the term *present conditions* for both organizations.

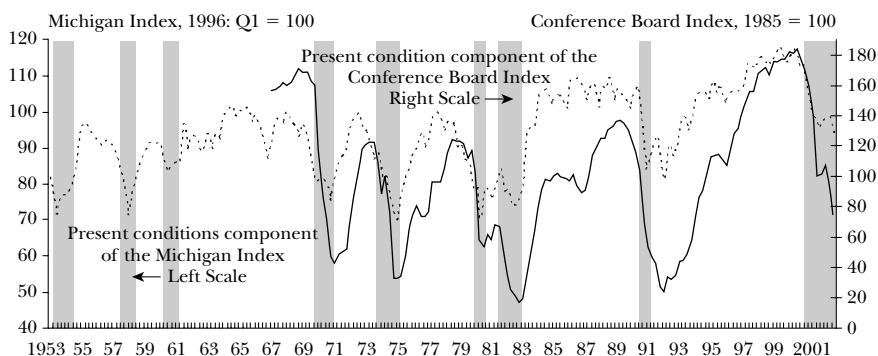
<i>Michigan Survey</i>	<i>Conference Board Survey</i>
<b>PRESENT CONDITIONS QUESTIONS</b>	<b>PRESENT CONDITIONS QUESTIONS</b>
Q1) Do you think now is a good or bad time for people to buy major household items? [good time to buy/uncertain, depends/bad time to buy]	Q1) How would you rate present general business conditions in your area? [good/normal/bad]
Q2) Would you say that you (and your family living there) are better off or worse off financially than you were a year ago? [better/same/worse]	Q2) What would you say about available jobs in your area right now? [plentiful/not so many/hard to get]
<b>EXPECTATIONS QUESTIONS</b>	<b>EXPECTATIONS QUESTIONS</b>
Q3) Now turning to business conditions in the country as a whole—do you think that during the next twelve months, we'll have good times financially or bad times or what? [good times/uncertain/bad times]	Q3) Six months from now, do you think business conditions in your area will be [better/same/worse]?
Q4) 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'll have periods of widespread unemployment or depression, or what? [good times/uncertain/bad times]	Q4) Six months from now, do you think there will be [more/same/fewer] jobs available in your area?
Q5) Now looking ahead—do you think that a year from now, you (and your family living there) will be better off financially, or worse off, or just about the same as now? [better/same/worse]	Q5) How would you guess your total family income to be six months from now? [higher/same/lower]

over the next year. This difference in time horizons appears to have little effect on response patterns and hence on index results.

The expectations components in the two surveys are highly correlated with each other, as shown in Figure 3. Moreover, Michigan's present conditions and expectations components are much more closely correlated than are the Conference Board's: the former exhibit a correlation of 0.82; the latter, a correlation of 0.40.

Figure 2

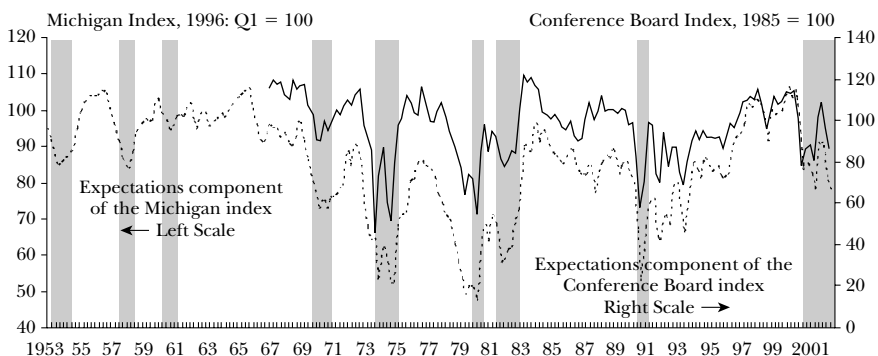
**Present Conditions of Consumer Attitudes**



Sources: Conference Board; University of Michigan Survey Research Center.  
 Note: Shaded areas denote periods designated recessions by the National Bureau of Economic Research.

Figure 3

**Expectations Component of Consumer Attitudes**



Sources: Conference Board; University of Michigan Survey Research Center.  
 Note: Shaded areas denote periods designated recessions by the National Bureau of Economic Research.

**Sample Size and Survey Procedures**

The most important methodological differences between the two surveys concern sample size, which affects sampling error and, thus, reliability, and index construction, which affects the range of movement in the indexes. The survey timing and release schedules also differ, which is an especially relevant consideration when conducting real-time analysis.

Michigan conducts its survey by phone throughout most of the month. Its sample size is approximately 500; a preliminary mid-month release is based on about two-thirds of the full sample phone interviews conducted early in the month. Final figures for the full sample are subsequently made available at the end of the month and are not subject to further revision. The Conference Board sends out a

mail survey at the end of the prior month, and responses flow in throughout the survey month. The effective sample size is roughly 3,500 (of a total mailing of 5,000). This sample of 5,000 is drawn from an original sample in which respondents agree to do the interviews. On the last Tuesday of the survey month, the Conference Board formally releases its preliminary figures based on about 2,500 responses. Final, revised data based on the full monthly sample are released with the next month's preliminary figures and are not subject to further revision. Thus, Michigan's preliminary figures are available earlier than the Conference Board's.

Both surveys may be affected by sampling problems. The Michigan index is based on a relatively small sample size of roughly 500, with the preliminary mid-month release only two-thirds of that. This small sample size undoubtedly leads to noisy estimates of the population values. The larger the sample size the smaller the sampling error and therefore the narrower the statistical confidence interval for the estimated consumer confidence index. Curtin (2002) computes quantitative estimates of how much sampling error could be reduced by increasing the sample size of the Michigan survey. He concludes that tripling the sample from 500 interviews to 1,500 would reduce the 95 percent confidence interval for the Index of Consumer Sentiment from  $\pm 3.3$  index points to  $\pm 1.9$  index points, which is a sizable reduction. On the other hand, Curtin (2002) also reports that the preliminary survey results based on two-thirds of the full Michigan sample are very accurate, having a correlation of 0.99 with the final estimate.

The Conference Board survey has a larger sample, but—unlike the Michigan index—the overall response rate is unknown because only the response rate of households that previously agreed to participate in the survey is reported. This procedure makes it difficult to assess the representativeness of the Conference Board sample. A representative sample requires assigning each sample element a known probability of selection and on the absence of nonresponse bias. For the Michigan survey, Curtin, Presser and Singer (2000) report that the response rate ranged from a high of 72 percent to a low of 67 percent between 1979 and 1996, averaging about 70 percent; Curtin, Presser and Singer (2003) find that since 1996, the Michigan index has experienced much more substantial reductions in the response rate. The authors note that access to technology designed to screen unwanted calls has skyrocketed in recent years, a factor that has likely increased the nonresponse error in both surveys. Both surveys are also subject to nonsampling sources of error including reporting, editing and processing errors.

### **Constructing the Indexes**

The University of Michigan and the Conference Board use different methodologies to construct their indexes from the raw response data. The example in Table 1 illustrates how the Conference Board and Michigan would construct an index for one question using the same raw response data. For each index, the responses to the question can be categorized as positive, negative or neutral.

Table 1

**Calculating the Two Indexes***(example: calculating index levels from raw response data)*

	<i>Base period</i>	<i>Prior month</i>	<i>Current month</i>
Percentages of responses			
Positive	25	30	24
Neutral	60	60	64
Negative	15	10	12
Indicator level			
Michigan diffusion measure	110.0	120	112.0
Michigan index	100.0	109.1	101.8
Conference Board			
Diffusion measure	62.5	75.0	66.7
Conference Board index	100.0	120.0	106.7

Hypothetical figures are shown for two months along with the base-period levels against which the indexes are benchmarked.

Michigan would first calculate a “diffusion measure” by adding the difference between the positive and negative percentages, plus 100. Thus, for example, the current month’s value is 112 ( $100 + 24 - 12$ ), and the prior month’s level is 120 ( $100 + 30 - 10$ ). Next, an index is constructed by dividing the level of diffusion measure by the base-period level of 110 and then multiplying by 100. In the example below, this calculation yields a value of 101.8 ( $112 \div 110 \times 100$ ) for the current month, down from the prior month’s level of 109.1 ( $120 \div 110 \times 100$ ).

Using the same raw responses, the Conference Board would calculate its diffusion measure by dividing the positive response percentage by the sum of the positive and negative response percentages. This procedure gives a value of 66.7 ( $24 \div (24 + 12) \times 100$ ) for the current month and 75 ( $30 \div (30 + 10) \times 100$ ) for the prior month. Next, the index is calculated to be 106.7 ( $66.7 \div 62.5 \times 100$ ) in the current month, down from a level of 120 ( $75.0 \div 62.5 \times 100$ ) in the prior month—a drop of 13.3 points.

How are the question-level indexes aggregated to obtain an overall index? Michigan first averages the diffusion indexes into a composite diffusion index and then converts the results to a base-period index. Conversely, the Conference Board converts each diffusion index to a base-year index and then averages the indexes together.<sup>2</sup> Because the Conference Board and Michigan use different base periods—1985 and 1966:Q1, respectively—the response patterns on which the indexes

<sup>2</sup> Because the Conference Board’s diffusion measures are converted into base-year indexes before they are averaged arithmetically, a given question’s effective weight in the index is influenced by the selection of the base year. In theory, the choice of the base year could affect the magnitude and even the direction of change in the index. (The resulting problems are similar to those associated with the old fixed-base-year GDP deflator.) In practice, however, this feature has no discernible effect on the Conference

are based may differ. As a result, the index *levels* of the two surveys are not comparable.

As a result of these methodological differences, the Conference Board's overall index and component measures have a wider range of movement than Michigan's; as the hypothetical example illustrates, identical shifts in the underlying responses tend to produce significantly larger moves in the Conference Board's indexes than in Michigan's. A good rule of thumb is that a one-point move in Michigan's index is comparable to a two-point move in the Conference Board index. Because of differences in survey methodology, index construction and base year, index levels are not comparable; monthly changes must be compared on a standardized basis rather than in absolute terms. On a standardized basis, the Conference Board's index is significantly less volatile than Michigan's index.

### **Interpretation of the Indexes**

Two of the most common dilemmas in relying on consumer confidence as an economic indicator are whether to focus on index-level or month-to-month changes and whether to focus on the present conditions or the expectations component. For the Conference Board index, it is particularly useful to examine the present condition and expectations components individually. The level of the present conditions component serves as a good proxy for the *level* of economic activity, while the expectations component is more closely correlated with the *rate* of economic growth. For example, the present conditions component has a negative correlation of 0.88 with the unemployment rate, whereas the expectations component has a correlation with a four-quarter percent change in GDP growth of almost 0.60. On Michigan's survey, both components are closely correlated and in general serve as an indicator of the pace of economic growth.

## **Do Consumer Confidence Surveys Predict Consumption?**

It would hardly be surprising to find that confidence surveys reflect the *current* state of the economy. After all, most households should be aware of recent changes in their own economic situation. A more interesting question is whether the surveys provide information about the *future* path of household spending that is not already contained in other popular economic indicators. We begin by presenting regressions that forecast consumer expenditure using consumer confidence, a baseline set of economic indicators, and then combin-

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Board's index. Also, the Conference Board's responses are seasonally adjusted, while Michigan's are not. However, the seasonal adjustment has little effect, because neither index exhibits much seasonality.

ing the two. We then discuss other research drawing connections between consumer confidence and consumption.

### Regressions with Consumer Confidence and Consumption

Table 2 presents how well the consumer confidence surveys can forecast the growth of various categories of personal consumption expenditure. Following Bram and Ludvigson (1998), Table 2 measures the effect of consumer attitudes on five categories of household personal consumption expenditure: total expenditure, motor vehicle expenditure, expenditure on all goods (excluding motor vehicles), expenditure on services and expenditure on durable goods excluding motor vehicles. The data, from the Bureau of Economic Analysis, span the period from the first quarter of 1968 to the fourth quarter of 2002; that is, the largest possible sample for which both indexes are available.

The independent variables included lags of consumer confidence over the previous four quarters. I do not report results for the present situation component because preliminary tests indicated that the expectations component of both indexes typically exhibited greater forecasting power. Previous research suggests that consumer sentiment may be linked to economic indicators largely because of unusually volatile movements in consumer attitudes during the Persian Gulf War and the 1990–1991 recession (for example, Leeper, 1992). To control for this possibility, we also included a dummy variable set equal to one in the quarters corresponding to the 1990–1991 recession.

For each category of consumption, Table 2 presents the adjusted R-squared statistic from a regression of consumption growth on the confidence measures. The  $p$ -values for the joint marginal significance of the lags of each variable, which appear in parentheses, give the probability that the explanatory variable can be excluded from the forecasting equation.<sup>3</sup> When the  $p$ -values are very low, the variables are statistically significant predictors of consumption growth.

Table 2 shows that measures of consumer attitudes on their own have both statistically and economically significant predictive power for quarterly consumption growth, in a variety of expenditure categories. Lagged values of both the Conference Board and Michigan overall index explain about 15 percent of the one-quarter-ahead variation in total personal consumption expenditure growth. The probability that this explanatory power was generated by chance is very small,

<sup>3</sup> The growth in spending on durable goods may be positively autocorrelated, with the error term following a first-order moving-average process (Mankiw, 1982). Such first-order autocorrelation in the error term could cause the error term to be correlated with the one-period-lagged endogenous variable, a condition that could skew in-sample statistical tests of the joint marginal significance of the explanatory variables (the reported  $p$ -values). To address this problem, I explicitly model the error term, as an MA(1) process in the in-sample regressions.

Table 2

**Forecasts of Consumption Growth by Consumer Confidence Indicators**

<i>Real personal consumption expenditure</i>	<i>Michigan index</i>	<i>Conference Board index</i>	<i>Both</i>
	Overall index		
Total	0.147	0.150	0.197
Conference Board	—	(0.008)	(0.082)
Michigan	(0.002)	—	(0.040)
Motor vehicles	0.021	0.036	0.052
Conference Board	—	(0.109)	(0.036)
Michigan	(0.066)	—	(0.067)
Goods, excluding motor vehicles	0.196	0.133	0.211
Conference Board	—	(0.011)	(0.208)
Michigan	(0.001)	—	(0.003)
Services	0.096	0.137	0.137
Conference Board	—	(0.007)	(0.008)
Michigan	(0.010)	—	(0.150)
Durables, excluding motor vehicles	0.174	0.084	0.231
Conference Board	—	(0.016)	(0.002)
Michigan	(0.000)	—	(0.000)
	Expectations component		
Total	0.158	0.211	0.200
Conference Board	—	(0.000)	(0.069)
Michigan	(0.002)	—	(0.593)
Motor vehicles	0.023	0.057	0.040
Conference Board	—	(0.006)	(0.054)
Michigan	(0.040)	—	(0.453)
Goods, excluding motor vehicles	0.193	0.157	0.186
Conference Board	—	(0.024)	(0.817)
Michigan	(0.002)	—	(0.016)
Services	0.098	0.207	0.197
Conference Board	—	(0.000)	(0.000)
Michigan	(0.006)	—	(0.709)
Durables, excluding motor vehicles	0.153	0.081	0.146
Conference Board	—	(0.138)	(0.526)
Michigan	(0.001)	—	(0.006)

*Source:* Author's calculation.

*Notes:* The table reports the adjusted  $R^2$  statistic from the forecast of consumption growth with four lags of the confidence measures and a dummy variable for the 1990–1991 recession;  $p$ -values for the joint marginal significance of the lags of the confidence measures appear in parentheses. Hypothesis tests were conducted using a heteroskedasticity and serial correlation robust covariance matrix. The sample covers the period from the first quarter of 1968 to the fourth quarter of 2002.

less than 1 percent. The expectations component of each index exhibits even more predictive power. For example, the Conference Board's expectations component explains more than 20 percent of the variation in next quarter's total consumer expenditure growth; similarly, Michigan's expectation's component explains 19 percent of the variation in next quarter's expenditures on goods (excluding

motor vehicles). Thus, the evidence from in-sample regressions suggests that measures of consumer confidence—taken alone—have important predictive power for quarterly consumer expenditure growth. The next question is whether confidence measures contain predictive information that is not already contained in a standard set of baseline economic indicators.

Here, I use the same baseline indicators that are common in previous work on the predictive power of consumer confidence surveys, like Carroll, Fuhrer and Wilcox (1994) and Bram and Ludvigson (1998). The baseline indicators are lagged values of the dependent variable, labor income growth, the (log) first difference of the real stock price and the first difference of the three-month Treasury bill rate. Labor income is defined as wages and salaries plus transfers minus personal contributions for social insurance, as it appears in the quarterly components from the Department of Commerce's National Income and Product Accounts. Stock prices are quarterly averages based on the Standard and Poor's 500. The interest rate is the quarterly average based on the three-month Treasury bill rate, reported monthly by the Board of Governors of the Federal Reserve System. Nominal labor income and the Standard and Poor's 500 index are deflated by the personal consumption expenditure implicit price deflator, as reported quarterly in the National Income and Product Accounts. Four lags of each of these variables are used in the benchmark regression.

The stock price and Treasury bill rate data are included because other researchers have argued that the information contained in consumer survey indicators should be assessed relative to that contained in financial indicators. For example, Leeper (1992) argues that consumer sentiment may have predictive power for spending because consumer surveys are made available on a more timely basis than other economic indicators such as income and consumption data. However, he notes that financial market indicators are available on an almost continuous basis and may contain much of the same information captured by consumer sentiment. Indeed, Leeper finds that consumer attitudes are only weakly correlated with variables such as unemployment and industrial production once financial indicators are included.

Table 3 reports the results of this baseline model, without consumer confidence indicators. For each category of consumption, the table presents the sum of the coefficients on the lags of each baseline variable and  $p$ -values for the joint marginal significance of the lags of each variable in parentheses. The sum of the coefficients on the four lags of each variable estimates the long-run effect of the variable on consumption growth. The long-run impact of most variables has the expected sign. Consumption growth is positively related to lagged consumption growth in every category of consumer expenditure studied, while lagged interest rates have a small negative effect on future consumption. Interestingly, the inclusion of the consumption and interest rate variables appears to reduce the statistical significance of the income and stock market variables in forecasting consumer expenditure growth on services, durable goods, excluding motor vehicles, and all goods, excluding motor vehicles.

To determine whether consumer sentiment contains additional information about future consumer spending, a measure of consumer confidence can be added

Table 3  
**Baseline Forecast of Consumption Growth**

<i>Predicted variables</i>	<i>Four lags of consumption</i>	<i>Four lags of income</i>	<i>Four lags of Treasury Bill rate</i>	<i>Four lags of S&amp;P 500</i>	$\bar{R}^2$
Total	0.76 (0.000)	0.02 (0.37)	-0.003 (0.002)	0.002 (0.01)	0.31
Motor vehicles	0.56 (0.02)	0.15 (0.62)	-0.021 (0.022)	0.008 (0.007)	0.26
Goods, excluding motor vehicles	0.55 (0.003)	0.15 (0.66)	-0.004 (0.027)	0.015 (0.37)	0.23
Services	0.97 (0.000)	0.01 (0.047)	-0.0004 (0.000)	-0.004 (0.21)	0.40
Durable goods, excluding motor vehicles	0.79 (0.000)	0.21 (0.86)	-0.007 (0.000)	0.02 (0.24)	0.25

*Source:* Author's calculations.

*Notes:* The table reports the sum of the coefficients on the lags of the variable indicated; the probability that the variable can be excluded from the prediction equation appears in parentheses. Hypothesis tests were conducted using a heteroskedasticity and serial correlation robust covariance matrix. The column labeled " $\bar{R}^2$ " reports the adjusted  $R^2$  statistic for each regression. The sample covers the period from the first quarter of 1968 to the fourth quarter of 2002. S&P = Standard and Poor's.

to the baseline regression in Table 3. Consumer confidence is measured by either the Michigan or the Conference Board overall index, or the expectations component of each overall index. As before, I do not report results for the present situation component, but a dummy variable for the 1990–1991 recession is included in the regression. Table 4 presents forecasting results from adding four lags of one of these consumer confidence measures to the baseline set of predictive variables for consumption growth. The table reports the *increment* to the adjusted  $R^2$  that results from augmenting the baseline regression to include each of the attitudinal indicators. For example, if the increment to the adjusted  $R^2$  from adding the four lags of some measure of confidence is  $X$  percent, the confidence augmented regression predicts about  $X$  percent more of the variation in the next quarter's consumption growth than do the baseline predictive indicators. Again, the probability that the confidence indexes can be excluded from the forecasting equation appears in parentheses.

The results indicate that both the Michigan and Conference Board overall indexes have modest incremental forecasting power for total personal consumer expenditure growth. For the Michigan survey, the lagged values of consumer sentiment increase the adjusted  $R^2$  index by 5 percent, while adding the last four quarters of data from the Conference Board's overall confidence index to the baseline equation predicts an additional 7 percent of the variation in the next quarter's consumption growth. Including both indexes in the set of baseline indicators allows the regression to explain an additional 10 percent of the variation

Table 4

**Forecast of Consumption Growth, Augmented by Consumer Confidence Indicators**

<i>Real personal consumption expenditure</i>	<i>Michigan index</i>	<i>Conference Board index</i>	<i>Both</i>
	Overall index		
Total	0.05	0.07	0.10
Conference Board	—	(0.004)	(0.013)
Michigan	(0.012)	—	(0.026)
Motor vehicles	-0.05	-0.06	0.09
Conference Board	—	(0.114)	(0.001)
Michigan	(0.008)	—	(0.007)
Goods, excluding motor vehicles	0.03	0.05	0.05
Conference Board	—	(0.028)	(0.046)
Michigan	(0.106)	—	(0.284)
Services	-0.10	-0.08	0.01
Conference Board	—	(0.242)	(0.000)
Michigan	(0.082)	—	(0.000)
Durables, excluding motor vehicles	0.02	0.04	0.03
Conference Board	—	(0.146)	(0.109)
Michigan	(0.092)	—	(0.462)
	Expectations component		
Total	0.03	0.05	0.06
Conference Board	—	(0.087)	(0.047)
Michigan	(0.046)	—	(0.201)
Motor vehicles	0.04	0.04	0.05
Conference Board	—	(0.044)	(0.102)
Michigan	(0.018)	—	(0.055)
Goods, excluding motor vehicles	0.01	0.06	0.06
Conference Board	—	(0.038)	(0.013)
Michigan	(0.257)	—	(0.177)
Services	-0.10	-0.09	0.02
Conference Board	—	(0.143)	(0.000)
Michigan	(0.117)	—	(0.001)
Durables, excluding motor vehicles	0.01	0.11	0.10
Conference Board	—	(0.233)	(0.024)
Michigan	(0.172)	—	(0.359)

*Source:* Author's calculations.

*Notes:* The table reports the increment to the adjusted  $R^2$  statistic from adding four lags of the confidence measures;  $p$ -values for the joint marginal significance of the lags of the confidence measures appear in parentheses. Hypothesis tests were conducted using a heteroskedasticity and serial correlation robust covariance matrix. The sample covers the period from the first quarter of 1968 to the fourth quarter of 2002.

in next period's total personal consumer expenditure growth.<sup>4</sup> The bottom half of Table 4 shows the predictive power of each index's measure of consumer expectations. Interestingly, the expectations index of each survey appears to have less forecasting power for total expenditure growth than does the overall index.

The results from the components of consumer spending are also mixed. For motor vehicle spending, the overall indexes taken individually actually weaken the predictive power of the baseline equation, but when *both* overall indexes are included, however, or when only the expectations component of either index is included, measures of consumer confidence have forecasting power for spending on motor vehicles. For spending on services and durable goods (excluding motor vehicles), lagged values of either Michigan's or the Conference Board's overall index or their expectations component generally add little explanatory power to the consumption growth regressions. For services spending growth, the incremental adjusted  $R^2$  is negative when either the Michigan or the Conference Board overall index is included, suggesting that including lagged measures of consumer attitudes in the baseline model weakens its predictive capacity. The Conference Board index does help to forecast growth in the goods (excluding motor vehicles) category, but again the improvement is quite modest, although statistically significant. Neither the Michigan expectations component nor the Michigan overall index is a statistically significant marginal predictor of expenditure on goods (excluding motor vehicles), but when both the Michigan and Conference Board expectations component are included as predictive variables, the fraction of next quarter's expenditure growth that is explained rises by a fairly large 10 percent, with the Conference Board variables strongly statistically significant.

In summary, the results on the predictability of consumer attitudes for consumer spending are somewhat mixed. For total consumer expenditures, there is modest incremental information about the future path of spending in both the Michigan and Conference Board indexes, and including both surveys' measure of expectations delivers fairly strong predictability of expenditure growth on goods (excluding motor vehicles). For other expenditure categories, however, the results are generally weaker, and for some categories of expenditure the inclusion of confidence indicators actually weakens the statistical relation between contemporaneous indicators and future consumer spending.

### **Other Empirical Connections from Consumer Confidence to Consumption**

The analysis above uses historical data on consumption and income. Historical data on consumption and income become available as advanced estimates only with

<sup>4</sup> Although these regressions are the same as those carried out and reported in Bram and Ludvigson (1998), the results reported here differ because of the inclusion of new data. In a sample that ended in the third quarter of 1996, Bram and Ludvigson found that the Conference Board Index substantially outperformed the Michigan index in forecasting total consumer expenditures. Here, in data ending in the fourth quarter of 2002, the difference between the two indicators is found to be much more modest.

a one-month delay, and are subsequently revised twice over the following two months, with occasional “benchmark revisions” done approximately every five years. It thus leaves open questions about whether consumer confidence might be useful as a real-time predictor.<sup>5</sup>

Some researchers have used historical data to explore the possibility that consumer confidence measures may improve forecasts because observations on sentiment for the first month of the quarter are available to predict the advanced estimate of the full-quarter value of consumption. Howrey (2001) and Slacalek (2003) recognize that this timing advantage of consumer confidence data is a benefit to real-time forecasters who are often charged with predicting the actual releases of consumer spending data. For example, if one wanted to forecast the advanced quarterly estimate of consumer expenditure growth from the Bureau of Economic Analysis, available with a one-month delay, one could use the *contemporaneous* value of consumer confidence as a predictive variable, since it is available within the month. Slacalek (2003) finds that both measures of consumer confidence have statistically significant out-of-sample forecasting power for three-month consumption growth. Howrey (2001) also finds that the first-month value of Michigan’s Index of Consumer Sentiment is a statistically significant predictor of the full-quarter value of several categories of consumption growth, but once the values of personal consumption expenditure and disposable income for the first month of the current quarter are known, the statistical significance of the sentiment index disappears. Although this approach explicitly takes into account the timing advantage of consumer confidence indexes over other indicators in real-time-forecasting exercises, it still relies on historical data that has been revised, rather than real-time data.

To assess the real-time forecasting power of consumer surveys for consumption would require the construction of a real-time data set, a laborious task demanding tedious amalgamation of thousands of data points from the historical archives of data collection agencies. A real-time data set of several macroeconomic series has been amassed by researchers at the Federal Reserve Bank of Philadelphia and by Dean Croushore at the University of Virginia, but no formal statistical study of the real-time forecasting power of consumer confidence indexes has yet been completed.<sup>6</sup>

It is natural to ask if surveys of consumer attitudes forecast the spending of households actually surveyed, rather than merely capturing the broad economic trends in aggregate consumption data. To address this question, Souleles (2003)

<sup>5</sup> One can simulate the real-time forecasting process using historical data by performing out-of-sample forecasts of consumer expenditure growth. For example, one could estimate the forecasting model on an initial subset of the whole sample and then perform a series of one-step-ahead forecasts. Such out-of-sample procedures are subject to caveats, however, because they are known to be considerably less powerful than in-sample procedures at detecting true predictability (Inoue and Kilian, 2002).

<sup>6</sup> However, Lovell (2001) points out that the preliminary data errors have likely decreased over time, implying that the historical gap between real time data and the most recent revisions will overstate the errors in future preliminary observations.

analyzed the household-level data that underlies the Michigan Index of Consumer Sentiment, a data set called the Michigan Survey of Consumer Attitudes and Behavior. The CAB contains the answers each household gave to the five questions that comprise the Michigan Index of Consumer Sentiment. To study how sentiment is related to spending, Souleles uses the most comprehensive household-level data set on consumer expenditures, the Consumer Expenditure Survey, which also contains a rich set of household demographic indicators. Souleles links the household-level sentiment data with consumer spending by imputing the sentiment levels of households who participated in the Consumer Expenditure Survey from demographically similar households who participated in the survey of Consumer Attitudes and Behavior. Using the imputed values of sentiment, Souleles finds that consumer confidence is useful in forecasting the one-quarter-ahead consumption of individual households, even controlling for lagged consumption growth, other household characteristics and several macroeconomic variables.

Finally, other consumer survey questions may play a role in forecasting household expenditure. Carroll and Dunn (1997) study the University of Michigan's Unemployment Expectations Index, constructed by forming the fraction of consumers surveyed who thought unemployment would rise over the next twelve months minus the fraction who thought unemployment would fall. Carroll and Dunn find that higher unemployment expectations predict lower consumer spending, even controlling for the movement in consumption that could be attributed to predictable movements in labor earnings.

### **What Economic Concept Does Consumer Confidence Measure?**

Does the output of consumer confidence surveys correspond to any well-defined economic concept that would help explain the modest predictive power of consumer attitudes? This section considers two possible economic interpretations: that the indexes reflect precautionary savings motives or that the indexes capture household expectations of future income or wealth.

#### **Consumer Confidence and Precautionary Saving**

If higher consumer confidence levels capture reduced uncertainty about the future and therefore diminished the precautionary motive for saving, then higher consumer confidence should be associated with a higher level of consumption today, relative to tomorrow. All else equal, this means lower consumption *growth* going forward. Thus, if precautionary motives drive consumer sentiment, consumption growth measured from today to tomorrow should be negatively correlated with consumer sentiment today. This result is not what is found here, nor in previous studies like Carroll, Fuhrer and Wilcox (1994) or Bram and Ludvigson (1998). Instead, the sum of coefficients on the lagged consumer confidence measures in the forecasting regressions reported above is almost always greater than zero, indicating a positive rather than negative

correlation between sentiment and future spending growth. Thus, a simple model of precautionary saving cannot explain the sentiment-spending correlation documented above.

Interestingly, one empirical study using micro data finds the opposite result. Using the Michigan Survey of Consumer Attitudes and Behavior (CAB), the household-level data that underlies the Michigan Index of Consumer Sentiment, Souleles (2003) reports that higher confidence is correlated with less saving (lower consumption growth), consistent with precautionary motives. It's possible that the discrepancy between the micro-level and macro-level results is attributable to some sort of aggregation bias, but without a detailed study of the relation between the individual and aggregate survey responses, the possibility remains speculative.

### **Confidence and Expectations of Future Income or Wealth**

Another interpretation of consumer confidence surveys is that they primarily capture household expectations of future income or wealth. Of course, under the general version of the permanent income hypothesis, consumption should change because of unexpected rises in permanent income. However, higher confidence levels could be related to future consumption growth if households are liquidity constrained so that greater income is closely tracked by greater consumption, or if some households follow a "rule-of-thumb" of consuming some fraction of their current income every period (Campbell and Mankiw, 1989).

To assess this interpretation, we should first investigate the possibility that confidence surveys forecast quarterly income and wealth growth. Table 5 reports the results of several forecasting regressions. The dependent variables are labor income growth (defined in the same way as in Table 2), the growth of wealth as measured by Federal Reserve data on stock market wealth or nonstock wealth;<sup>7</sup> and the excess return on the Standard and Poor's 500 stock market index, measured as returns to the Standard and Poor's 500 index minus the three-month Treasury bill rate. The explanatory variables were four lags of either the Conference Board or Michigan measure of consumer confidence or consumer expectations, in each case controlling for lags in the dependent variable. Four lags each of the dependent variable were included in each regression.

As above, the table reports the increment to the adjusted  $R^2$  statistic from

<sup>7</sup> A complete description of the Federal Reserve wealth data may be found at (<http://www.federalreserve.gov/release/Z1/Current/>). Briefly, total wealth is household net worth in billions of current dollars, measured at the end of the period. Stock market wealth includes direct household holdings, mutual fund holdings, holdings of private and public pension plans, personal trusts and insurance companies. Nonstock wealth includes tangible/real estate wealth, nonstock financial assets (all deposits, open market paper, U.S. Treasuries and Agency securities, municipal securities, corporate and foreign bonds and mortgages) and also includes ownership of privately traded companies in noncorporate equity and other. Subtracted off are liabilities, including mortgage loans and loans made under home equity lines of credit and secured by junior liens, installment consumer debt and other.

Table 5

**Forecast of Income Growth, Wealth Growth and Excess Return Augmented by Consumer Confidence Indicators**

<i>Predicted variable</i>	<i>Michigan index</i>	<i>Conference Board index</i>	<i>Both</i>	$\bar{R}^2$
Overall index				
Income growth	0.07	0.07	0.06	0.11
Conference Board	—	(0.004)	(0.445)	
Michigan	(0.002)	—	(0.410)	
Stock wealth	0.004	0.03	0.04	-0.03
Conference Board	—	(0.175)	(0.071)	
Michigan	(0.302)	—	(0.337)	
Nonstock wealth	0.05	0.03	0.04	0.24
Conference Board	—	(0.050)	(0.413)	
Michigan	(0.081)	—	(0.300)	
Excess return	0.004	0.05	0.07	-0.01
Conference Board	—	(0.211)	(0.047)	
Michigan	(0.465)	—	(0.308)	
Excess return	0.01	0.03	0.04	0.07
Conference Board	—	(0.422)	(0.135)	
Michigan	(0.384)	—	(0.257)	
CAY	(0.000)	(0.001)	(0.001)	
Expectation component				
Income growth	0.07	0.12	0.10	0.11
Conference Board	—	(0.000)	(0.027)	
Michigan	(0.001)	—	(0.687)	
Stock wealth	0.02	0.01	0.02	-0.03
Conference Board	—	(0.132)	(0.108)	
Michigan	(0.163)	—	(0.120)	
Nonstock wealth	0.05	0.05	0.07	0.24
Conference Board	—	(0.006)	(0.240)	
Michigan	(0.035)	—	(0.183)	
Excess return	0.02	0.03	0.05	-0.01
Conference Board	—	(0.097)	(0.061)	
Michigan	(0.313)	—	(0.126)	
Excess return	0.01	0.02	0.04	0.07
Conference Board	—	(0.303)	(0.116)	
Michigan	(0.311)	—	(0.102)	
CAY	(0.001)	(0.002)	(0.001)	

*Source:* Author's calculation.

*Notes:* The table reports the increment to the adjusted  $R^2$  statistic from adding four lags of the confidence measures for income growth, stock and nonstock wealth growth and excess return;  $p$ -values for the joint marginal significance of the lags of the confidence measures and CAY appear in parentheses. Hypothesis tests were conducted using a heteroskedasticity and serial correlation robust covariance matrix. The column labeled " $\bar{R}^2$ " reports the adjusted  $R^2$  statistic for the predictive regression excluding consumer confidence. The sample covers the period from the first quarter of 1968 to the fourth quarter of 2002.

including the lagged confidence measures to a regression of future income or wealth on lagged values of the dependent variable. The  $p$ -values for the joint marginal significance of the lags of each variable, which appear in parentheses, give the probability that the confidence measure can be excluded from the forecasting equation for income or wealth growth.

The results from Table 5 suggest that consumer confidence has some forecasting power for future labor income growth. The lagged values of both Michigan's measure of consumer sentiment and the Conference Board's measure of consumer confidence increase the adjusted  $R^2$  index by 7 percent, and the statistical probability that these variables have no predictive power for labor income growth is estimated to be less than 1 percent. By contrast, neither measure on its own has statistically significant predictive power for stock market wealth growth. Nevertheless, some evidence exists that consumer attitudes lead the stock market. When both the Michigan and Conference Board index are included in a predictive regression for the one-quarter-ahead excess return on the Standard and Poor's 500 stock market index, the measures together explain about 7 percent of next quarter's stock return and lags of the Conference Board measure are jointly statistically significant at better than the 5 percent level.

This result is not, however, robust to the inclusion of a proxy for the log consumption-wealth ratio, denoted CAY, shown in the last row of each panel.<sup>8</sup> CAY is equal to the log of nondurables and services consumption minus a linear combination of the log of labor income and the log of household asset wealth. This variable can be thought of as a proxy for the log consumption-aggregate wealth ratio, where aggregate wealth includes human capital. Labor income is included as a proxy for the trend movements in unobservable human capital, and the linear combination of log labor income and log asset wealth serves as a proxy for the trend movements in log aggregate wealth. CAY has been found to be a strong forecaster of quarterly excess returns on the aggregate stock market (Lettau and Ludvigson, 2001). In this regression, CAY drives out the sentiment variables, implying that whatever information is in sentiment about future stock returns is better captured by the consumption-wealth proxy CAY.

Finally, both measures of consumer attitudes have some forecasting power for non-stock market wealth (primarily housing and nonstock financial wealth). The Conference Board and the Michigan expectations component, for example, predict about 5 percent more of next quarter's fluctuations in non-stock market wealth growth.

In summary, the results from Table 5 suggest that consumer confidence has

<sup>8</sup> The coefficients of the linear combination of log labor income and log asset wealth in CAY are estimated using a dynamic least squares procedure. See Lettau and Ludvigson (2001, 2004) for details. CAY is not included as a control in the nonstock wealth regressions because it has no forecasting power for future nonstock wealth (Lettau and Ludvigson, 2004).

modest but statistically significant predictive power for future labor income growth and non-stock market wealth growth. Can this predictive power explain the forecastability of consumption growth by measures of consumer attitudes? In other words, does consumer confidence matter for future consumption only because it predicts future income and wealth growth, which in turn determine future consumer spending growth?

For labor income, this question was addressed by Carroll, Fuhrer and Wilcox (1994). They used a two-stage approach. In the first stage, income and/or nonstock wealth growth can be predicted by lags of consumption growth, labor income growth, the Standard and Poor's 500 price index return, a Treasury bill rate *and* one of the consumer confidence measures studied above. The forecasted values of labor income and nonstock wealth growth are saved. In the second stage, measures of consumption growth are regressed on the forecasted values of labor income growth and/or nonstock wealth growth, as well as the same lagged values of consumer confidence that were used in the first stage. If the consumer confidence measures only matter for future consumption because they forecast future labor income or wealth growth, they should display no incremental predictive power for consumption growth in the second stage regression.

However, Carroll, Fuhrer and Wilcox find that the forecasting power of consumer confidence cannot be entirely attributed to its predictive power for labor income growth. I updated their data on labor income to the present, carried out their calculations and also carried out a parallel exercise using data on nonstock wealth. The general pattern is that consumer sentiment again has predictive power for consumption growth above and beyond its ability to forecast labor income and/or nonstock wealth. In short, the information about expenditures in consumer attitudes is largely independent of the information in the predictable movements of household's resources.

In summary, to the extent that measures of consumer attitudes have genuine forecasting power for consumption, the explanation for such a relation remains unclear. Measures of consumer confidence do forecast future changes in labor earnings and non-stock market wealth, but measures of consumer attitudes appear to be directly related to future consumption growth, not just indirectly through their predictive power for household income or wealth. Carroll, Fuhrer and Wilcox (1994) rule out other explanations for why sentiment forecasts aggregate spending growth, including a simple model of habit formation. The question of why consumer attitudes help predict future consumption growth remains a puzzle.

## **Concluding Remarks**

The preceding investigation has focused only on the consumer spending-consumer confidence relation, but other researchers have explored the relation between consumer confidence and broader measures of economic activity. Mishkin (1978) focuses on the interrelation between household investment and

consumer sentiment. Matsusaka and Sbordone (1995) find a relation between the Michigan Index of Consumer Sentiment and GDP growth. Of course, the results in these papers and those presented here raise the question of whether confidence measures serve mainly as proxies for some other fundamental variable that contributes to business cycle fluctuations. The difficulty with assessing this concern is that we don't know what those other fundamentals might be. In assessing the incremental predictive power of consumer confidence measures, the best researchers can do is to rely on including, as control variables, those determinants of household spending that are both suggested by economic theory and empirically observable.

The discussion above has also focused on the question of whether consumer confidence forecasts consumption; much less research has been done on what causes movements in consumer confidence itself. For example, Fuhrer (1993) finds that 70 percent of the variation in Michigan's Index of Consumer Sentiment can be explained by variation in national income, the unemployment rate, inflation and real interest rates. Nevertheless, Fuhrer also finds that some of the movement in consumer attitudes cannot be explained with broad economic aggregates. It is possible that there are more complex, possibly nonlinear, interactions between consumer confidence and economic variables, such as the stock market or unemployment. More work, both theoretical and empirical, is needed to understand the simultaneous relation between household attitudes and household spending.

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## References

- Bram, Jason and Sydney C. Ludvigson.** 1998. "Does Consumer Confidence Forecast Household Expenditure? A Sentiment Index Horse Race." *Federal Reserve Bank of New York: Economic Policy Review*. June, 4:2, pp. 59–78.
- Campbell, John Y. and N. Gregory Mankiw.** 1989. "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," in *NBER Macroeconomics Annual*. Oliver Blanchard and Stanly Fischer, eds. Cambridge: MIT Press, pp. 185–216.
- Carroll, Christopher D. and Wendy E. Dunn.** 1997. "Unemployment Expectations, Jumping (S,s) Triggers, and Household Expectations," in *NBER Macroeconomics Annual*. Benjamin S. Bernanke and Julio Rotemberg, eds. Cambridge: MIT Press, pp. 165–229.
- Carroll, Christopher D., Jeffrey C. Fuhrer and David W. Wilcox.** 1994. "Does Consumer Sentiment Forecast Household Spending? If So Why?" *American Economic Review*. December, 84:5, pp. 1397–408.
- Curtin, Richard.** 2002. "Surveys of Consumers: Theory, Methods, and Interpretation." Paper written for the NABE 44<sup>th</sup> Annual Meeting, September 30.
- Curtin, Richard, Stanley Presser and Eleanor Singer.** 2000. "The Effects of Response Rate

Changes on the Index of Consumer Sentiment.” *Public Opinion Quarterly*. 64:4, pp. 413–28.

**Curtin, Richard, Stanley Presser and Eleanor Singer.** 2003. “Recent Response Rate Changes on the Michigan Survey of Consumer Attitudes.” Working paper, Survey Research Center, University of Michigan.

**Fuhrer, Jeffrey C.** 1993. “What Role Does Consumer Sentiment Play in the U.S. Macroeconomy?” *New England Economic Review*. January/February, pp. 32–44.

**Greenspan, Alan.** 2002. “Remarks to the Bay Area Council Conference.” San Francisco, California, January 11; Available at <http://www.federalreserve.gov/boarddocs/speeches/2002/20020111/default.htm>.

**Howrey, E. Philip.** 2001. “The Predictive Power of the Index of Consumer Sentiment.” *Brookings Papers on Economic Activity*. 1, pp. 175–216.

**Inoue, Atsushi and Lutz Kilian.** 2002. “In-Sample or Out-of-Sample Tests of Predictability: Which One Should We Use?” Working paper, University of Michigan.

**Keynes, John Maynard.** 1936. *The General Theory of Employment, Interest, and Money*. New York: Harcourt, Brace.

**Leeper, Eric M.** 1992. “Consumer Attitudes: King for a Day.” *Federal Reserve Bank of Atlanta Economic Review*. July/August, 77:3, pp. 1–16.

**Lettau, Martin and Sydney C. Ludvigson.** 2001. “Consumption, Aggregate Wealth, and Expected Stock Returns.” *Journal of Finance*. 56:3, pp. 815–49.

**Lettau, Martin and Sydney C. Ludvigson.** 2004. “Understanding Trend and Cycle in Asset Values: Reevaluating the Wealth Effect on Consumption.” *American Economic Review*. Forthcoming.

**Lovell, Michael C.** 2001. “Discussion of ‘The Predictive Power of the Index of Consumer Sentiment.’” *Brookings Papers on Economic Activity*. 1, pp. 208–13.

**Mankiw, Gregory.** 1982. “Hall’s Consumption Hypothesis and Durable Goods.” *Journal of Monetary Economics*. 10:3, pp. 417–25.

**Matsusaka, John G. and Argia M. Sbordone.** 1995. “Consumer Confidence and Economic Fluctuations.” *Economic Enquiry*. 33:2, pp. 296–318.

**Mishkin, Frederic S.** 1978. “Consumer Sentiment and Spending on Durable Goods.” *Brookings Papers on Economic Activity*. 1, pp. 217–32.

**Slacalek, Jiri.** 2003. “Forecasting Consumption.” Working paper, Johns Hopkins University.

**Souleles, Nicholas.** 2003. “Expectations, Heterogeneous Forecast Errors, and Consumption: Micro Evidence From the Michigan Consumer Sentiment Surveys.” *Journal of Money, Credit, and Banking*. Forthcoming.