Why Does Consumer Sentiment Predict Household Spending?

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The index of consumer sentiment is one of the most watched economic indicators. It is widely believed in both the financial press and academic circles that consumer sentiment has predictive content for household spending. This belief in the predictive content of consumer sentiment is in line with most previous research that indicates the sentiment contains information about future changes in household spending beyond that already contained in past values of other available indicators.

Why does consumer sentiment predict household spending? In an interesting paper, Carroll, Fuhrer, and Wilcox (1994)—denoted hereafter as CFW (1994)—have suggested two possible interpretations of the predictive content of sentiment for household spending. One is that sentiment predicts spending because it is an independent determinant of consumer spending; changes in consumer "attitudes" cause fluctuations in the economy.[1] An alternative interpretation is that sentiment simply foreshadows the overall outlook for the economy: when consumers are optimistic about the outlook for the economy, they give upbeat responses to interviewers. On average, those expectations are validated and spending eventually increases as foreshadowed by sentiment. Sentiment, according to this interpretation, is thus just a reflection of the overall state of the economy without being a causal economic force.

The empirical evidence that can discriminate between these two alternative interpretations of the predictive ability of sentiment for spending is rather limited. CFW (1994) report evidence that favors the first interpretation. In an

The authors would like to thank Robert Hetzel, Marvin Goodfriend, and Roy Webb for many helpful comments. The views expressed herein do not necessarily reflect those of the Federal Reserve Bank of Richmond or the Federal Reserve System.

[1] We use the term *causal* to indicate the presence of Granger causality, meaning that sentiment has incremental predictive content for spending (Engle and Granger 1987).

economy where all consumers are forward-looking and behave according to the standard permanent income model as outlined in Hall (1978), consumption follows a random walk, and hence changes in spending are unforecastable from any past information known to consumers, including the lagged sentiment measures. However, following the suggestion in Campbell and Mankiw (1989, 1990) that some households follow a rule of thumb and set consumption equal to income, CFW (1994) have argued that in an economy containing both types of consumers, sentiment might predict spending without being an independent causal force. When the economic outlook is bright, forward-looking consumers will give optimistic readings on the economy. On average, their optimism will be vindicated and income will rise. When it does, the spending of rule-of-thumb consumers will increase. Thus, by this account, the survey responses of forward-looking households predict the spending of rule-of-thumb households. In order to test this hypothesis, CFW (1994) estimate consumption regressions in which spending depends on lagged sentiment as well as on expected change in current income. The response of consumption to current income is a proxy for the influence of current economic conditions on spending, reflecting the presence of rule-of-thumb consumers. They find that lagged sentiment remains significant in the consumption equation, suggesting that sentiment is a direct determinant of household spending.

In this article, we reexamine the evidence on why sentiment predicts household spending. In most previous research, including that of CFW (1994), the effect of sentiment on spending is investigated under a number of simplifying assumptions. One such key assumption is that there is no habit persistence in consumption. If this assumption is not correct, then current consumption might depend upon lagged consumption, income, and wealth variables. The sentiment measures might then spuriously determine spending, because they are correlated with these other determinants of spending that are omitted from the spending equation. Another key assumption made in previous work is that the real interest rate is constant, thereby ruling out the direct influence of the expected change in the real rate on household spending. Hall (1988) has argued that forward-looking consumers defer consumption in response to high real rates, and hence consumption may follow a random walk once we account for the response of consumption to the expected real rate. We examine whether the results in previous research are robust to changes in the underlying assumptions.

The empirical work presented here covers the sample period 1959Q1 to 2001Q2[2] and indicates that the result in CFW (1994)—showing that sentiment is a direct determinant of spending—is not robust to the consideration of

[2] The sample period covered here differs from the one used in CFW (1994), 1955Q1 to 1992Q3. We begin in 1959 motivated in part by the easy availability of consistent time series data on all the variables used here, including the series on household wealth.

influences of other economic variables on spending. In particular, the results indicate that current consumption is indeed correlated with lagged consumption, income, and wealth variables. Consumption is also sensitive to current changes in income and the level of the real rate. Sentiment has no direct role to play in predicting consumption once its indirect influences in predicting current changes in income and the real rate are accounted for in spending equations. The results indicate that lagged sentiment is significant in predicting current changes in income and the real rate. Together these results favor the second interpretation of why sentiment predicts household spending, which is that sentiment foreshadows current expectations about the economy and the interest rate but has no direct role in actually causing fluctuations in spending.

This article proceeds as follows: Section 1 presents the empirical methodology used for testing the influence of sentiment on spending, and Section 2 presents the empirical results. In Section 3 we discuss the results, and in Section 4 we offer concluding observations.

1. EMPIRICAL MODEL AND METHOD

Permanent Income Hypothesis, Consumption Growth Regression, and Consumer Sentiment

If all consumers in the economy are forward-looking and behave according to the permanent income hypothesis as outlined in Hall (1978), then consumption follows a random walk, changes in current consumption being unforecastable from any lagged information known to consumers, including sentiment. Intuitively, according to the permanent income hypothesis, households consume their permanent income and they form expectations of their permanent income rationally taking into account all available information. To the extent that information is available and relevant to consumption in period $t + 1 (C_{t+1})$, it is already imbedded in C_t. Hence, the difference $C_{t+1} - C_t$ reflects new information regarding permanent income available at time $t + 1$. Since households form their estimates of permanent income rationally, this change in consumption must be uncorrelated with any available information, including lagged sentiment measures.

In order to further explain the random walk implication of the permanent income hypothesis and highlight the underlying assumptions, let us consider an infinitely lived representative consumer who chooses current consumption based on the expected present discounted value of his future income, not just his current income. He maximizes expected discounted utility subject to an intertemporal budget constraint. Let us assume that the utility function maximized by the representative consumer is separable in time and depends only on contemporaneous consumption during each period, as shown in (1)

below:

$$E_t \sum_{t=0}^{\infty} (1+\beta)^{-t} U(C_t), \tag{1}$$

where C is consumption, β is the subjective rate of discount, and E is the expectation conditional on information available at time period t. Equation (1) is the expected discounted utility. Let us assume further that the representative consumer can borrow and lend at the constant real rate of interest (r) and that any amount borrowed—say, in period t—must be repaid in the future by setting consumption below labor income. The consumer is assumed to choose a pattern of consumption and asset holdings in order to maximize the expected discounted utility function (1) subject to an intertemporal budget constraint.[3] The first-order conditions for this problem include

$$E_t U'(C_{t+1})(1+r)/(1+\beta) = U'(C_t), \tag{2}$$

where U' is the marginal utility of consumption. Equation (2) is the Euler consumption equation, which says the expected present value of the marginal utility of consumption tomorrow equals the marginal utility of consumption today.

If we further assume that the real rate of interest equals the consumer's discount factor ($r = \beta$) and that the marginal utility function is linear in consumption, equation (2) reduces to $E_t C_{t+1} = C_t$, which says that consumption today is the optimal forecast of consumption tomorrow. Under the additional assumption that expectations are rational, we can express the above equation in the form of a consumption growth regression, as illustrated in (3):

$$C_{t+1} - C_t = \varepsilon_{t+1}, \tag{3}$$

where ε is a rational forecast error uncorrelated with any information known to the consumer at time t. Equation (3) is Hall's famous hypothesis that under the permanent income hypothesis, change in consumption is unforecastable. Hence, according to this version of the permanent income hypothesis, lagged sentiment should not help predict future consumption growth.[4]

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[3] See, for example, Attanasio (1998) for a simple derivation of the Euler consumption equation.

[4] The random walk result can also be derived using the permanent income hypothesis (PIH) originally proposed in Friedman (1957). The Friedman PIH allows for the presence of a transitory component in measured consumption as well as in measured income. Permanent consumption follows permanent income. In the Friedman PIH, measured consumption is a random walk if permanent income follows a random walk and if there is no transitory component in consumption. In order to explain it further, consider the following time-series representation of the Friedman PIH, as in Falk and Lee (1990): $\dot{C}_t = \dot{C}_{pt} + \delta_t$, $\dot{Y}_t = \dot{Y}_{pt} + \eta_t$, and $\dot{C}_{pt} = \beta \dot{Y}_{pt}$, where $\dot{C}_t$ and $\dot{Y}_t$ are measured consumption and measured income, $\dot{C}_{pt}$ and $\dot{Y}_{pt}$ are permanent consumption and permanent income, and δ_t and η_t are transitory consumption and income. Transitory components are assumed to be white noise disturbances mutually uncorrelated and uncorrelated with the permanent components at all lags and leads. From this formulation, it is quite clear that measured

Consumer Sentiment in Consumption Growth Regressions, Including Expected Income and the Real Rate

The random walk hypothesis developed in Hall (1978) has not done well in empirical tests. Hall himself found that lagged changes in stock prices help predict changes in consumption, while Nelson (1987) showed that consumption growth is correlated with lagged growth in disposable income. In an extension of the basic model, Hall (1988) has argued that consumption is a random walk once any movements in the real interest rate are taken into account. Campbell and Mankiw (1989, 1990), on the other hand, have argued that consumption growth is a random walk once the response of consumption growth to the contemporaneous change in income is taken into account. Those who have empirically investigated the role of consumer sentiment in predicting consumption often find that lagged sentiment does have predictive content for future consumption growth in reduced form regressions, a result inconsistent with the random walk implication of the simple permanent income model.[5]

A possible explanation as to why the random walk implication of the permanent income model has not done well in empirical tests is that some of the underlying assumptions may not be consistent with the data. One key assumption pertaining to the random walk result is that the utility function is time-separable, so that the marginal utility of consumption today depends only upon today's consumption. This assumption rules out the presence of habit persistence in consumption behavior, which may be important in practice. If there is habit persistence in consumption, then current consumption might be correlated with lagged consumption and hence correlated with lagged income and wealth variables (Dynan 1993).

The other key assumptions underlying the random walk result are that the real rate is constant and that all consumers can borrow and lend at the constant real rate. These assumptions may not be valid. The real rate may vary over time, and some consumers may face borrowing constraints and hence may be unable to smooth consumption over time. If some consumers face borrowing constraints, then their consumption may be tied to current, not permanent, income. Campbell and Mankiw (1989, 1990) have argued that some consumers follow a rule of thumb and consume their current income.

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consumption is a random walk if $\delta_t = 0$ for all t and if permanent income follows a random walk. However, consumption may not follow a random walk if there is a serially correlated transitory component in consumption, such as the one that may arise from the presence of serially correlated preference shocks. In that environment, permanent income may not be a random walk (Sargent 1987, 374).

[5] In reduced form regressions, spending is regressed on lagged values of the sentiment and other economic indicators including changes in income, the interest rate, stock prices, and the unemployment rate. See, for example, Leeper (1992), Carrol, Fuhrer, and Wilcox (1994), and Bram and Ludvigson (1998).

In the presence of rule-of-thumb consumers, aggregate consumption may appear sensitive to changes in current income. Other analysts have argued that consumption may also appear sensitive to changes in current income if the marginal utility of consumption depends upon factors other than consumption. For example, Baxter and Jermann (1999) have argued that consumers may substitute between home- and market-produced consumption goods, and hence the marginal utility of consumption may depend upon the labor-leisure choice, in addition to depending upon the level of consumption. Thus, consumption may appear sensitive to changes in current income.

Another interesting scenario in which the random walk result may not hold is outlined in Goodfriend (1992). The Hall model described above is the representative agent model in which the representative agent is assumed to fully know the income process. The aggregate income process is the individual income process, because all agents are assumed to be alike. Goodfriend, however, considers an economy with heterogeneous agents, where agents have individually specific income processes that may differ from the aggregate income process. If there is complete information about the aggregates, the random walk result holds at the aggregate level. However, if agents do not have contemporary information on the aggregate income, as is the case in practice since the aggregate income data are released with a lag, then aggregation yields a consumption equation that violates the random walk result. In particular, consumption is correlated with changes in lagged income. Intuitively, in the absence of contemporary information on the aggregate income, agents cannot distinguish between aggregate and relative shocks affecting their individual incomes. As a consequence, if there is an aggregate income shock, it may partially be interpreted as a shock to the individual-specific component of individual labor income. If the individual-specific component is less persistent than the aggregate component, then agents will fail to adjust their permanent incomes appropriately, and hence consumption observed will not move too much. However, in subsequent periods, as information on the aggregate income becomes available and the effect on actual income is observed to persist, consumption will adjust fully and will appear sensitive to lagged changes in actual income.[6]

In view of the considerations listed above, we examine the predictive content of sentiment for future changes in consumption using consumption growth regressions that allow for the lagged influences of other economic determinants of spending on current consumption. In particular, we consider

[6] Pischke (1995) extends Goodfriend's argument to the economy in which agents have no information on economy-wide variables.

consumption growth regressions of the form

$$\dot{C}_t = a + \lambda_y E_{t-1}\dot{Y}_t + \lambda_r E_{t-1} r_t + \sum_{s=1}^{k} b_s Z_{t-s} + \sum_{s=1}^{k} c_s S_{t-s} + \varepsilon_t, \quad (4)$$

where $E_{t-1}\dot{Y}_t$ is income growth expected for period t conditional on information at $t-1$; $E_{t-1}r_t$ is the real interest rate expected for period t conditional on information at $t-1$; Z is a set of control variables containing lagged values of consumption and other plausible economic determinants of spending; and S is an index of consumer sentiment. Equation (4) allows for the possibility that consumption is sensitive to current income growth as well as to the real rate. Furthermore, equation (4) also allows for the possibility that consumption is correlated with lagged values of economic factors (Z) other than consumer sentiment. For example, as indicated before, lagged consumption or other variables might enter directly into the consumption equation if there is habit persistence in consumption behavior or if the marginal utility of consumption depends upon factors other than the level of consumption.

In equation (4) consumer sentiment may help forecast consumption growth through two channels. The first channel is an indirect one: lagged sentiment helps predict consumption growth in period t because it is instrumental in predicting current income growth and the level of real interest rate for period t. The other channel is a direct one: lagged sentiment directly enters the consumption equation (4). It is possible that lagged sentiment may help predict consumption growth through both channels. CFW (1994) use the evidence on the presence of these two channels to distinguish between the two interpretations of why sentiment helps predict consumption growth. Sentiment may be considered an independent determinant of consumer spending if it directly enters the consumption equation (all $c_s \neq 0$ in (4)). In contrast, sentiment may be considered a passive predictor of spending because it just foreshadows current economic conditions. In this interpretation, lagged sentiment no longer directly enters the consumption equation (4) once its role as a predictor of current income and the real rate is allowed for in the consumption equation (all $c_s = 0$, but λ_y, $\lambda_r \neq 0$ in (4)). In this interpretation, sentiment is a predictor of household spending without being an independent causal force.

In previous research the predictive content of sentiment for household spending has been investigated using restricted versions of (4). For example, CFW (1994) investigate the role of sentiment using an aggregate consumption equation of the form

$$\dot{C}_t = a + \lambda_y E_{t-1}\dot{Y}_t + \sum_{s=1}^{k} c_s S_{t-s} \quad (5)$$

and find that sentiment enters the consumption equation directly. This empirical evidence is suspect. This specification of the consumption equation implicitly assumes that lagged values of consumption and other economic

variables do not enter the consumption equation directly. Moreover, consumption is assumed to be insensitive to the expected real rate. If other relevant variables are omitted from the consumption equation, then lagged sentiment may spuriously appear to predict consumption. Others have investigated the role of sentiment using reduced form consumption regressions of the form given below in (6) (Bram and Ludvigson 1998):

$$\dot{C}_t = a + \sum_{s=1}^{k} b_s Z_{t-s} + \sum_{s=1}^{k} c_s S_{t-s} + \varepsilon_t. \tag{6}$$

In this specification, even though there is a set of control variables including lagged values of consumption and other plausible economic determinants of spending, such as interest rates and income, consumption is still assumed to be insensitive to current income and the real rate. In view of these considerations, we reexamine the role of sentiment using instead the consumption equation (4).

Data, Estimation, and the Issue of Constancy of Second Moments

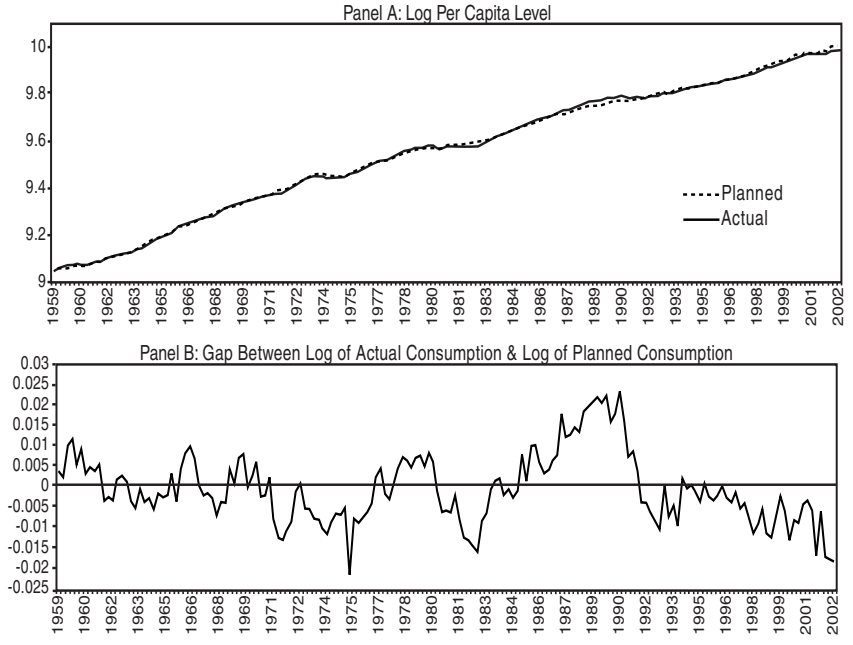
We investigate the role of sentiment in predicting spending using consumption equations of the form (4) and estimated using quarterly data over 1959Q1 to 2001Q2.[7] Consumption is measured as per capita consumption of nondurables and services, in 1996 dollars (C). Labor income is measured as disposable labor income per capita, in 1996 dollars (Y).[8] The real rate (r) is measured as the three-month Treasury bill rate minus the contemporaneous inflation rate; the latter is measured by the behavior of the consumption expenditure deflator. The index of consumer sentiment used here is the Expectations Component of the University of Michigan Sentiment Index.[9] The additional variables (Z) considered here include past values of consumption growth and the lagged

[7] The quarterly data used are of vintage 2002. We truncate the sample in 2001Q2 so that our results would not be affected by recent developments pertaining to terrorism or the war in Iraq.

[8] As in most previous research, we present results using disposable labor income rather than disposable personal income that also includes property income. The evidence in previous research is consistent with the presence of a different marginal propensity to consume out of labor and property incomes. Since the empirical work here includes the lagged residual from the cointegrating regression that includes labor income and wealth, the consumption regression indirectly captures the influence of property income. Labor income is defined as wages and salaries + transfer payments + other labor income – personal contributions for social insurance – taxes. Taxes are defined as [wages and salaries/(wages and salaries + proprietor's income + rental income + personal dividends + personal interest income)] personal tax and nontax payments.

[9] We use the Expectations Component because we are interested in examining the impact of beliefs about future economic conditions on current spending. For robustness, we do examine results using the Total Index. The results with the Total Index are qualitatively similar to those with the Expectations Component (see, for example, row 6 of Table 1). See the Appendix for the list of questions included in the sentiment surveys.

Figure 1 Cointegrating Regression: Actual and Planned Consumption



residual from the cointegrating regression estimated using levels of per capita consumption, labor income, and household net worth. The evidence in Mehra (2001) indicates that consumer spending is cointegrated with labor income and household wealth and that changes in current consumer spending depend in part upon lagged income and wealth variables through the error-correction term (Engle and Granger 1987). The lagged residual from the cointegrating regression, when included in the consumption equation of the form (4), captures in a parsimonious way the response of current consumption to lagged values of income and wealth variables. Wealth used in this cointegrating relationship is measured as per capita net worth of households, in 1996 dollars.

Equation (7) below reports the cointegrating regression estimated using real, per capita consumer spending, labor income, and household net worth over 1959Q1 to 2001Q2:

$$C_t = \underset{(21.4)}{3.7} + \underset{(46.1)}{.51}\, Y_t + \underset{(6.1)}{.07}\, W_t + \underset{(21.7)}{.002} T, \tag{7}$$

where all variables are in their natural log levels and where Y is per capita labor income; W is per capita household net worth; and T is a linear time trend. Parentheses below coefficients contain t-values corrected for the presence of

serial correlation and heteroscedasticity.[10] All variables appear with theoretically expected signs and are significant. Panel A in Figure 1 charts the (log) level of actual consumer spending and the level predicted by the cointegrating regression (7), and Panel B charts the gap between actual and predicted levels, which is the residual from the cointegrating regression (7). As can be seen in Figure 1, the actual and predicted consumption series move quite closely and the gap variable appears stationary over the sample period. In the consumption growth regression (4), the residual series is one of the variables that appear in the set Z.

The consumption growth regressions like (4) and (5) relate consumption to expected values of income growth and the level of the real rate and have been estimated using instrumental variables methods and assuming that expectations are rational (Hall 1988; Campbell and Mankiw 1989). Under the assumption of rational expectations, consumers take into account all known information in forming their expectations, and the forecast error is uncorrelated with any lagged information. Hence, period $t-1$ values of information variables are valid instruments. Hall (1988), however, notes that if the frequency with which consumption decisions are taken is higher than the frequency of observations (quarterly in our case), then under some assumptions the residuals of equations may have the first-order moving average structure. In that case, valid information for instruments will be any information dated $t-2$ or earlier. We follow Hall in using instruments lagged $t-2$ and before. The fact that aggregate data on income are available with a one-period lag also implies that period $t-2$ values will be in the information set of consumers (Goodfriend 1992). The instruments used are a constant, four lagged values of consumption growth, change in the unemployment rate, change in the real rate, and the level of the index of consumer sentiment. Following Campbell and Mankiw (1989), we also report the test of overidentifying restrictions, which is a test of the hypothesis that the instruments used are uncorrelated with the residual of the consumption equation.[11]

The consumption regression (4) relates consumption to income growth and the real rate among other factors. This regression assumes that second moments measuring volatility of economic variables are constant, implying that consumption is unaffected by second moments of expected income and the real rate. Mehra (2003) has recently argued that over the sample period (1959Q1 to 2001Q4) consumption is correlated negatively with the second moment of the real rate, which measures interest rate volatility. If the consumption equation

[10] The reported t-values have been correcting allowing for the presence of fourth-order serial correlation, as indicated by the underlying estimated autocorrelation coefficients.

[11] This test is performed by regressing the residual from the instrumental variables regression on the instruments, and then comparing T times the R-squared from this regression, where T is sample size, with the chi-squared distribution with $(K-1)$ degrees of freedom, K being the number of estimated parameters (Campbell and Mankiw 1989).

is estimated ignoring the presence of this negative correlation between consumption and interest rate volatility, then the estimated interest rate coefficient (λ_r) that measures the response of consumption to the expected real rate is biased downward. In view of such evidence, the consumption growth regression (4) is estimated including the interest rate volatility variable in a nonlinear fashion. In particular, the consumption regression is estimated including the interest rate volatility variable interacting with the real interest rate.[12]

2. EMPIRICAL RESULTS

Table 1 presents instrumental variables estimates of the consumption growth regressions like those in (4) and (5) for the full sample period, 1959Q1 to 2001Q2. Row 1 presents the consumption equation estimated including only current income growth as in Campbell and Mankiw (1989). The maintained hypothesis here is that consumption follows a random walk once we account for the sensitivity of consumption to current income, arising as a result of the presence of rule-of-thumb or liquidity-constrained consumers. χ_1^2 is a chi-square statistic that tests the hypothesis that the four lagged values of the sentiment measure are not jointly significant when included in the estimated consumption equation given in row 1. χ_2^2 is a chi-square statistic that tests the hypothesis that the four lagged values of the sentiment measure used in the prediction equation for current income growth are not jointly significant. χ_2^2 is large, suggesting that lagged sentiment contains information about current income growth. However, χ_1^2 is also large, implying that sentiment continues to have a predictive content for household spending, even after one accounts for its indirect role in predicting current consumption through the expected income channel. This result is qualitatively similar to the one in CFW (1994), interpreted to mean that sentiment is a direct determinant of consumer spending.

Row 2 in Table 1 estimates the consumption equation including expected income growth as well as the lagged residual from the cointegrating regression (7) that is estimated using levels of consumption, income, and wealth variables.

[12] The evidence in Mehra (2003) also indicates that the period from 1979 to the early 1980s accounts for the presence of negative correlation between consumption and interest rate volatility found in the full sample. This subperiod coincides with the Fed aggressively raising real rates in order to fight inflation. The increased volatility that accompanied the high level of real rates may have led to increased uncertainty about future real rates, deterring substitution of consumption in time. In view of this consideration, we further restrict the interactive interest rate volatility variable to take nonzero values only over the subperiod 1979Q3 to 1984Q4. However, results are qualitatively the same if the interactive variable is entered without the dummy as above (see Mehra 2003).

Table 1 Testing the Predictive Content of Sentiment

$$\dot{C}_t = a + \lambda_y E_{t-1}\dot{Y}_t + \lambda_r E_{t-1} r_t + b_o LRC_{t-1} + \sum_{s=1}^{k} b_s \dot{C}_{t-s} + \lambda_{rr}(r^* Vol)_t \qquad \textbf{(A)}$$

Row	λ_y	λ_r	b_o	Σb_s	λ_{rr}	χ^2_1	χ^2_2	χ^2_3	$\bar{R}^2$	p-value for overidentifying restrictions
1	0.53 (5.9)					14.7*	10.8*		0.03	0.14
2	0.57 (6.3)		−0.37 (2.0)			3.21	11.5*		0.01	0.61
3	0.49 (5.7)	0.20 (1.8)	−0.58 (3.5)		−0.37 (2.4)	3.2	12.8*	23.1*	0.20	0.84
4	0.32 (2.3)	0.19 (2.1)	−0.60 (3.7)	0.32 (1.6)	−0.27 (2.1)	0.71	12.7*	23.0*	0.46	0.91
5[a]	0.26 (3.3)	0.16 (1.9)	−0.71 (5.2)	0.39 (4.5)	−0.37 (3.3)	1.5	12.7*	60.5*	0.49	0.78
6[b]	0.33 (2.3)	0.22 (2.3)	−0.58 (3.5)	0.33 (1.7)	−0.28 (2.0)	1.8	8.3*	15.1*	0.44	0.95

Notes: The coefficients reported above are instrumental variables estimates of the consumption equation (A) over 1962Q1–2001Q2. $\dot{C}$ is consumption growth; $\dot{Y}$ is income growth; r is the real rate; $(r^* Vol)$ is the real rate interacting with the interest rate volatility variable; and LRC is the residual from the cointegrating regression (7) of the text. The instruments used are a constant, four lagged values of consumption growth, change in the unemployment rate, the real rate, consumer sentiment, and the lagged residual from the cointegrating regression. Instruments are dated period $t-2$ and earlier. χ^2_1 is the chi-square statistic that tests the hypothesis that four lags of consumer sentiment when included in the pertinent consumption equations are zero. χ^2_2 and χ^2_3 are chi-square statistics that test the joint significance of coefficients that appear on four lags of sentiment in the first-stage regressions for income and the real rate. The test for overidentifying restrictions tests whether the instruments used are correlated with the residual of the estimated consumption equation.

[a] Instruments are dated $t-1$ and earlier.

[b] Sentiment measure used is the Total Component of the University of Michigan Sentiment Index.

* Significant at the 0.05 level.

The lagged residual is significant in the estimated consumption equation, suggesting that current consumption is directly correlated with lagged income and wealth variables. Consumption is still sensitive to current income growth, and sentiment remains significant in predicting changes in current income (see the t-value on expected income and the chi-square statistic χ^2_2 in row 2, Table

1). However, sentiment no longer directly enters the estimated consumption equation (see the statistic χ_1^2 in row 2, Table 1). This result suggests that sentiment is not a direct determinant of household spending. Together these results suggest that since consumption is directly correlated with lagged income and wealth variables, their exclusion from the estimated consumption equation spuriously generates the result that sentiment is a direct determinant of household spending.

Row 3 in Table 1 estimates the consumption equation including expected income, the real rate, and the lagged residual from the cointegrating regression. As can be seen, consumption is sensitive to the expected real rate as well as to expected income (see t-values on these variables in row 3, Table 1). The lagged residual is also significant in the estimated consumption equation. However, the chi-square statistic χ_1^2 is small, implying that sentiment does not enter directly into the estimated consumption equation. χ_3^2 is the chi-square statistic that tests the hypothesis that lagged sentiment is not significant in predicting the real rate. This statistic is large, suggesting that sentiment does happen to contain information about current real rates.

In the consumption regressions discussed above, including the lagged residual from the cointegrating regression captures the dependence of current consumption on lagged income and wealth variables. The results do not change if the consumption equation is estimated including also lagged consumption growth. Row 4 of Table 1 reports the consumption regression estimated including three lagged values of consumption, in addition to the lagged residual of the cointegrating regression. As can be seen, the estimates are still consistent with the basic result: sentiment is not an independent determinant of consumer spending.

Row 5 in Table 1 presents the consumption equation estimated using instruments dated $t - 1$ and earlier. The estimated coefficients that appear on various variables change to a certain degree. However, the estimates still are consistent with the basic result that lagged sentiment is not a direct determinant of spending once we control for the influences of current income, the real rate, and other lagged income and wealth variables on spending. The results do not change if a consumption equation similar to the one in row 4 is estimated using instead the University of Michigan Total Sentiment Index (see row 6 in Table 1).

3. DISCUSSION OF RESULTS

The empirical work indicates that consumer sentiment has predictive content for future changes in income and the real rate.[13] However, sentiment has

[13] An additional table containing these first-stage regressions is available upon request from the authors.

no predictive content for consumption once we control for the influences of income and the real rate on consumption that work through the contemporaneous income and interest rate channels. Together these results suggest that sentiment is not a direct determinant of spending. One possible interpretation of these results based on Goodfriend's (1992) model discussed above is that sentiment surveys enable households to discriminate better between aggregate and relative shocks affecting their individual labor incomes, as sentiment surveys are available before data on the direct determinants of aggregate income are released. By sharpening the assessment of the current aggregate income and hence the aggregate shock, sentiment surveys enable more and more households to adjust their individual permanent incomes appropriately, thereby bringing consumption more in line with permanent income. If consumer sentiment surveys do help in this signal processing, then one would expect a diminished role of lagged income and hence lagged sentiment measures in predicting current consumption at the aggregate level. Hence, one may find that sentiment has no direct role in determining spending once one controls for the direct influence of current aggregate income on spending.

The fact that sentiment measures are so eagerly awaited and watched both in the financial press and by many serious economic analysts suggests they may be useful in sharpening the assessment of agents for the current state of the economy as measured by the behavior of aggregate income. The empirical result here indicating that sentiment measures lose their statistical significance in predicting current spending once one controls for the influences of the current state of the economy on spending suggests that these sentiment measures may have value as a summary statistic for the future course of consumption.

4. CONCLUDING OBSERVATIONS

Consumer sentiment might help predict household spending, either because sentiment is an independent determinant of spending or because it foreshadows current economic conditions. In order to distinguish empirically between these two interpretations of the predictive content of sentiment, we estimate the consumption equation that nests both these interpretations. In particular, consumer spending is assumed to be sensitive to current income and the real rate, in addition to depending upon lagged spending, income, wealth, and sentiment variables. The response of spending to current income and the real rate is a proxy for the influences of current economic conditions on spending, whereas the response of spending to lagged sentiment is a proxy for the direct influence of sentiment on spending. In previous research the predictive content of sentiment has generally been investigated using consumption equations without controlling for the sensitivity of current consumption to the expected

real rate and lagged income and wealth variables. The results here indicate that lagged sentiment has no direct role in predicting spending once we control for the direct influences of current income, the real rate, and other lagged determinants on spending.

Another interesting result is that consumer sentiment does have predictive content for future changes in income and the real rate, suggesting that sentiment measures are useful as a good barometer of the near-term course of the economy and hence consumption. Since in real time consumer sentiment measures are released before aggregate data on the current state of the economy are available, sentiment measures may be helpful in assessing the near-term direction of the economy. This may explain why sentiment measures are so eagerly awaited in the financial press and by many economic analysts.

APPENDIX: QUESTIONS IN THE MICHIGAN SURVEYS OF CONSUMERS

The University of Michigan publishes an overall index of consumer sentiment and two component indices measuring current economic conditions and consumer expectations. The overall index is based on answers to five survey questions, presented below. Two of the survey questions are used to calculate the current conditions component, and three questions underlie the expectations component.

Current Economic Conditions

Component Questions

Q_1 = "We are interested in how people are getting along financially these days. Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?"

Q_2 = "About the big things people buy for their homes—such as furniture, a 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?"

Expectations

Component Questions

Q_3 = "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?"

Q_4 = "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?"

Q_5 = "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 5 years or so, or that we will have periods of widespread unemployment or depression, or what?"

For details on the underlying methodology, see the papers, including the one by Richard T. Curtin, available at the public access Web site of the Institute for Social Research: http://www.sca.isr.umich.edu/.

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