

## Factors Determining Consumer Sentiment - Evidence from Household Survey Data

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### ABSTRACT

Consumer sentiment is essential in policy-making and consumption forecasting due to the wealth of information contained in such measure. Unfortunately, such information is not clearly identified in the literature. We study the five components of University of Michigan's consumer sentiment index using household survey data from January 1978 to March 2009 in nonparametric ordered choice model. We find that the most important factors affecting consumer sentiment are their own perceptions and expectations on the economic conditions, the effectiveness of government policies, and news reports. After controlling for these factors, demographic characteristics, macroeconomic conditions and forecasts account for little in addition.

### INTRODUCTION

Looking back at the most recent recession, one may find it surprising that the Index of Consumer Sentiment started to fall before April 2007, while the Stock and Watson's monthly GDP estimates started to fall notably from about May 2008. However, this is merely another time when changes in the Index of Consumer Sentiment lead similar changes in the real economy. Such important relationship between consumer sentiment and the real economy, proved repeatedly by the history of our economy, justifies the important role consumer sentiment measures play in business and economic research. However, as is pointed out in Ludvigson (2004), whether consumer confidence surveys contain meaningful independent information about the economy is still largely undetermined, even though work has been done to determine the determinants of consumer sentiment.

The issue of what is captured by consumer confidence measures should be illuminated by an investigation of the factors, which determine sentiment. However, the literature provides a limited discussion of these factors, and offers conflicting evidence. For example, Praet and Vuchelen (1989) and Jennings and McGrath (1994) show that increases in the value of the U.S. dollar affects consumer confidence in the U.S., Germany and France, but not in the U.K. and Italy. They find changes in the U.S. stock market index to affect positively German confidence, but negatively sentiment in the U.K. and to have no effect in France and Italy. Other studies attempt to explain sentiment with general macroeconomic indicators (Lovell, 1975 and Garner 1981), financial assets (Mishkin, 1978) and liabilities or political events (Vuchelen, 2004 and Blood and Phillips, 1995). Throop (1992) shows that a structural

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model for the US. ICS including inflation rate, unemployment rate and short-term interest rates as explanatory variables explains sentiment fairly well in times of usual political and economic activity but collapses around points of extraordinary events such as the Persian Gulf War. Estelami, et al. (2001) focus on consumer price knowledge and find that macroeconomic factors explain considerable proportion of variations. In a more recent study, Ludvigson (2004) investigates the relationship between consumer sentiment measures and consumer spending and suggests that “it is possible that there are more complex, possibly nonlinear, interactions between consumer confidence and economic variables ...”. Vuchelen (2004) shows that “a few well-chosen variables” explain sentiment of Belgian consumers quite well.

In light of these inclusive findings, this paper begins by examining the evidence on the explanatory power of sentiment in models for consumption using monthly data on the University of Michigan’s ICS and on personal consumption expenditures, dis-aggregated into durable, nondurables, and services for the period 1978:01 to 2009:03. We base our nonparametric estimation on a household level survey data and look very closely at the overall explanatory power of our model as well as the incremental explanatory power of each category of independent variables. Unlike previous studies of this issue, which generally uses quarterly data, we use high-frequency monthly data. Since the original ICS is reported monthly, quarterly data will lose much of the variation in sentiment through averaging.

The focus of this paper is the issue of what determines consumer sentiment. All studies on this subject use time series analysis to explain an aggregate measure of consumer sentiment. It should be noted, however, that measures of sentiment are derived from individual survey data, which contain information about consumer expectations and personal characteristics unavailable at the aggregate level. These data can help fully answer the question of what groups of factors affect sentiment, and how much of it is explainable at all. In Section 2, we examine the data used in this study. Section 3 discusses the models and variables, which are grouped into four broad categories. Section 4 focuses on different aspects of the explanatory power of our models. Section 5 shifts attentions to individual factors and identifies the ones that are important and interesting. Section 6 briefly discusses the specification test for our nonparametric model and Section 7 concludes.

## **SURVEY OF CONSUMERS**

The index of consumer sentiment (ICS) was developed by George Katona (1951) as a measure of consumer’s changing attitudes about the business conditions and job prospects, and the Survey Research Center at the University of Michigan has continued to produce it on a regular basis to measure consumer confidence in the United States. The ICS has generally led the U.S. business cycle and the 1990-1991 recession has been widely attributed to a drop in the ICS in the wake of Iraq’s invasion of Kuwait. The SRC’s survey of Consumer Attitudes and Behavior on which the ICS is based, started in 1952, and has been conducted quarterly since 1960 and monthly since 1978. The five questions on which the ICS is based are given below.

*PerFin\_Current*: “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?” Possible responses are: better off; same; worse off. *PerFin\_Expected*: “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?” Possible responses are: better off; same; worse off. *BusCond\_12m*: “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 time, or what?” Possible responses are: good times; good with qualifications; pro-con; bad with qualifications; bad times<sup>1</sup>. *BusCond\_5y*: “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?” Possible responses are: good times; good with qualifications; pro-con; bad with qualifications; bad times. *BuyCond*: “About the big things people buy for their homes such as furniture, refrigerator, stove, television, and things like that. Generally speaking do you think now is a good or a bad time to buy major household items?” Possible responses are: good; pro-con; bad.

Based on the responses to the above five questions, we can compute the balance statistic as follows  
 $(\% \text{ of respondents who answer better or good} - \% \text{ of respondents who answer worse or bad}) + 100$

Then simple average of the five balance statistics is computed to obtain index of consumer sentiment. The ICS is reported relative the base month – February 1960 = 100. For our time series analysis we use monthly data on the ICS dating from January 1978 to March 2009 (375 months). This is the most recent and complete data available to the public at the time this study began.

The design of the survey allows us to extract additional information about individual’s expectations and perceptions of general and personal economic conditions, as well as personal characteristics, which is not contained in the five index questions alone. Specifically, the survey asks questions regarding the individuals’ perception of how the economy has done over the past one year, how the government is doing its job at present, and whether the individual has recently heard any good or bad news about the general economic and political situation in the country. There are also questions about the individuals’ expectations about general economic conditions over the next year, about prices, real income, unemployment, and interest rate on borrowing, all with answers in the three-response framework better/same/worse or up/same/down. There is also information about the respondents’ employment status, education, marital status, gender, race, age, region of residence, household size, and annual income. In addition to the response to the five index questions, we use information on more than 50 other questions to explain response to each of the component questions at the individual level. We used raw data sets from monthly survey, which amounts to a total of 375 months. We have a final sample contains 156,070 observations.

## MODEL AND VARIABLES

As outlined previously, we utilize the information from over 50 questions from the survey of consumers asked consistently throughout the sample period 1978:01 – 2009:03 to analyze the factors, which determine individual responses to each of the five ICS component questions in an ordered response model. In this study we are specifically interested in what are the main determinants of the responses to each question; are they the same for all of the five components; and what effect do they have on the components of sentiment measure. Answering these questions will enable us to better discriminate among the existing hypotheses about the informational content of the ICS.

As stated before, we combine the response, when necessary, so that for all of the five components, we have three different kinds of responses: good / same / bad or up / same / down. This enables us to consider the questions raised before in a unified latent-variable framework. Let  $y_{it}^* = X_{it}\beta + \varepsilon_{it}$ , where the index  $it$  corresponds to individual  $i$  interviewed at time  $t$ , with lower values of  $y^*$  denoting higher optimism, i.e., better/up = 2, same = 1, worse/down = 0, and,  $X_{it} = (E_{it}, I_{it}, M_t, F_t)$  is a vector of variables affecting an individual's level of optimism, in which  $E$  is individual's expectation and perception,  $I$  is a set of variables explaining individual idiosyncrasies,  $M$  is a set of macroeconomic variables and  $F$  is a set of macroeconomic forecasts. The data for  $F$  comes from monthly mean of Blue Chip forecasts. Note that a set of monthly dummy variables are included in the  $I$  category and a dummy variable for whether the economy is in a recession is included in the  $M$  category.

More specifically, for each category *Expectations/Perceptions (E)* category contains individual's perception on overall news, news specifically related to inflation, news specifically related to unemployment, news specifically related to war, current business condition compared with that from one year ago and the performance of government economic policies, as well as individual's expectation of future business conditions, future interest rate, future price level, future real income and future unemployment. *Personal characteristics/idiosyncrasies (I)* category contains individual's age, real per capita family income, racial origin, marital status, education level, gender and location of residence. *Macroeconomics conditions (M)* category contains the levels and percentage changes from previous month of the index of coincident indicators, index of leading indicators, industrial production, S&P 500 index, personal income and purchasing managers' index, as well as the levels of inflation rate, 3-month treasury bill rate, 5-year government bond rate, unemployment rate, along with a dummy variable indicating NBER recession and the standard deviation of the S&P 500 index in the previous month. *Macroeconomic forecasts (F)* category contains monthly mean of Blue Chip forecasts, with one year horizon, of inflation rate, real GDP and unemployment rate.

Given the latent variable  $y^*$ , the observation rule is  $y_{it} = \begin{cases} 0 & \text{if } y_{it}^* < \mu_1 \\ 1 & \text{if } \mu_1 \leq y_{it}^* < \mu_2 \\ 2 & \text{if } \mu_2 \leq y_{it}^* \end{cases}$ , where  $\varepsilon_{it}$  is an

independently distributed error term with distribution function  $F(\cdot)$ . The model can be estimated by maximum likelihood. The likelihood function is given by  $\ln(L) = \sum_{i=1}^N \sum_{j=1}^J (Pr[y_{it} = j])$ . For the error

distribution  $F$ , we consider two types of specification here. Firstly we consider a usual Probit<sup>2</sup> specification, where  $F = \Phi$  is a normal distribution function. Secondly, we consider a nonparametric specification (Stewart, 2003) where the distribution function of the error term is thus given by  $F_K(x) = \frac{\int_{-\infty}^x (\sum_{k=0}^K \gamma_k \varepsilon^k)^2 \phi(\varepsilon) d\varepsilon}{\int_{-\infty}^{\infty} (\sum_{k=0}^K \gamma_k \varepsilon^k)^2 \phi(\varepsilon) d\varepsilon}$ , which is a family of distributions given parameter  $K$ . In this study,  $K$  is chosen for each of the five components separately according to the BIC statistic.

## EMPIRICAL RESULTS

We have discussed the explanatory power of the model and its variation across the five components of the sentiment index and variation over the entire sample period. In this section we focus on the individual factors in each category that has interesting and important impact on the components of sentiment. Table 1 give the regression result of the nonparametric model for each of the sentiment components where marginal effects are reported.

**Table 1:** Marginal Effects of Selected Variables

Variable	PerFin_Current		PerFin_Expected		BusCond_12m		BusCond_5y		BuyCond	
	y=1	y=3	y=1	y=3	y=1	y=3	y=1	y=3	y=1	y=3
GoodNewsOnly			-0.0027	-0.0034	-0.0122	0.0559	-0.0032	0.0100	0.0030	0.0051
BadNewsOnly			-0.0088	-0.0114	0.0117	-0.0543	0.0020	-0.0063	-0.0049	-0.0084
GoodGovt	-0.0059	0.0765	0.0105	0.0130	-0.0001	0.1044	-0.0221	0.1327	0.0164	0.0248
PoorGovt	0.0373	-0.1026	-0.0249	-0.0332	0.0407	-0.1359	0.0495	-0.1164	-0.0222	-0.0430
Grade_9_11	0.0308	-0.0895	-0.0284	-0.0384	0.0073	-0.0372	0.0482	-0.1140	-0.0240	-0.0473
High_School	0.0181	-0.0603	-0.0041	-0.0052	0.0003	-0.0019	0.0215	-0.0585	-0.0001	-0.0002
Some_College	0.0111	-0.0411	0.0123	0.0152	-0.0008	0.0058	0.0044	-0.0135	0.0038	0.0062
White	-0.0087	0.0337	0.0188	0.0248	-0.0060	0.0315	-0.0059	0.0179	0.0177	0.0330
Black	-0.0049	0.0315	0.0858	0.0989	-0.0001	0.0004	0.0244	-0.0653	0.0130	0.0200
Hispanic	-0.0014	0.0070	0.0190	0.0233	0.0031	-0.0178	0.0187	-0.0519	-0.0029	-0.0048
North_Central	0.0014	-0.0066	-0.0223	-0.0297	0.0013	-0.0080			-0.0001	-0.0001
Northeast	0.0068	-0.0272	-0.0285	-0.0385	0.0043	-0.0236			0.0014	0.0023
South	-0.0025	0.0137	-0.0044	-0.0056	-0.0005	0.0035			-0.0014	-0.0024
Male	-0.0031	0.0176			-0.0042	0.0612	-0.0200	0.0977	0.0209	0.0308

LHF variable (y) is shown in the header row. A blank means the variable is not in the regression model. Full results including explanation of variable names, coefficients, significance and other statistics available upon request from the author.

*Expectations and perceptions:* We find that perception of government economic policy has an important role in explaining PerFin\_Current, BusCond\_12m, and BusCond\_5y. On average, the marginal effect of perception of government performance is about 5-7%; meaning that other things being equal, the likelihood of people have a good sentiment is 5-7% higher if they think the government is doing a good job. Interestingly, the effect of this on PerFin\_Expected and BuyCond is much smaller. A possible explanation is that while consumers do think that government economic policy is important to the overall economy and to the change in their own financial situation, they tend not to think of it as an important factor in forming expectation about their own future and making their own purchasing decisions. Meanwhile, we find that the effect on the sentiment is bigger if consumers think the government is doing a poor job than the effect if consumers think the government is doing a good job. We also find that whether consumers have heard any good or bad news mainly affects BusCond\_12m but not the rest of the components, in particular, BusCond\_5y. This may be because of the time-sensitiveness nature of news stories – they mostly focus on what's happening “now” instead of on what's going to happen in a relatively long term. In addition, our result shows that good news has a bigger effect than bad news, somehow contradicting to traditional wisdom that consumers are more sensitive to bad news. The marginal effect of good news on BusCond\_12m is about 6% while that of bad news is around 1%. In the rest of the variables in this category, consumers' perception and expectation of overall economic condition, price level, and real income are the most important factors in terms of magnitude of marginal effects.

*Personal idiosyncrasies:* In terms of racial origin, we find that white consumers generally have higher sentiment, in all five sentiment components, then black consumers, then Hispanics. For example, white consumers are about 2-3% more likely to think that their own financial situations as well as the general economic conditions have been improving and will continue to improve in the future. This number is generally less than 1% (or not statistically significant) for black consumers and Hispanics. In terms of gender, male consumers tend to have higher sentiment, especially for long term expectations – BusCond\_5y, where male consumers are 10% more likely to have higher sentiment or unlikely to have lower sentiment. For other components of sentiment, the marginal effect of being male is generally 2-6%. The level of education also has a significant effect on consumer sentiment, though the effect is not so clear for some components of sentiment. Our result shows that consumers with higher education level have significantly higher sentiment in PerFin\_Current and BusCond\_5y – consumers with a college degree or higher are about 1.5% more likely to have higher sentiment than consumers without high school diploma. For the rest of the sentiment components, the effect of education is not clear. As for residence location, we find that for current personal financial situation PerFin\_Current, consumers residing in the south have higher sentiment then consumers residing in the west and the consumers residing in the northeast have lowest sentiment. For expected personal financial situation PerFin\_Expected and 12-month ahead expectation of business conditions BusCond\_12m, consumers from the west have higher sentiment than consumers from northeast. For the rest of the sentiment components, the effect of location of residence is not clear.

*Macroeconomic variables and forecasts:* Macroeconomic variables and macroeconomic forecasts are generally not so important in determining personal financial situations, both past and expected, PerFin\_Current and PerFin\_Expected, though an increase in unemployment increases consumers sentiment in PerFin\_Current. The rationality behind this seemingly unreasonable result may be that the worse the condition for their peers, the better the consumers feel for themselves, provided that most of them are still employed. As for business conditions, changes in industrial production, forecasted inflation, 5-year government bond rate and unemployment rate has strong effects on BusCond\_12m, while the index of coincident indicators and forecasted unemployment rate strongly affect BusCond\_5y. For example, a 1% increase in industrial production makes consumers 1.13% more likely to think that the overall business condition will be better in one year; a 1% increase in the coincident indicator makes consumers 1.27% more likely to think that business condition will be better in five years. Unemployment also has a strong effect on BuyCond.

*Information content of sentiment:* While the current setting of the model does not permit a statistical test on the information content of consumer sentiment, the above analysis and findings do provide some solid clues. In general, we find that sentiment captures consumers' perception and expectation of economic fluctuations, based on their day-to-day experience (hypothesis 3 and 4). Firstly, variation in the sentiment components can be largely explained by variation in consumer's perception and expectations of their own situation, the information they get from news media as well as the condition of the economy, at least the part of the economy they experience. If sentiment was an unmediated experience, and reflects nothing more than official statistical reports, professional forecasts and noise, as in hypothesis 5, we would expect actual lagged macroeconomic variables and macroeconomic forecasts to be able to explain a large portion of the variation in sentiment on the individual level. However, we find contrary. Moreover, macroeconomic variables and macroeconomic forecasts, by themselves, do not provide sufficiently large explanatory power. Secondly, sentiment is clearly not a direct reflection of political and business news, otherwise, our news variables would be expected to capture a lot more variations than what they do now. Not to mention that even they do capture a lot more variation, they are still the perception of the consumers, i.e., different consumers may interpret the same piece of news differently, especially when such interpretation is used to form expectation of the future. Our results show that new variables generally have less than 2-3% marginal effect, about the same as all other important variables. In particular, news of war, unemployment and inflation do not have any important effects on sentiment components, which make us believe that consumers tend not to overreact to particular word(s) that appear in news report. So it is highly unlikely that one news story containing a particular bad word, e.g., the "r" word – recession would trigger a sudden fall in consumer sentiment. This is supported by the result that good news has larger effect on sentiment compared with bad news. The weak performance of news variables as determinants of sentiment directly contradicts the results of Blood and Phillips (1995), who find that recession related headline news have a significant negative prior influence on ICS, even after accounting for the actual state of the economy. Our findings support the view of Linden (1982) and

Blendon, et al. (1997) that consumers' expectations are formed in "conversations between neighbors over the backyard fence" and are not a direct reflection of media coverage or published statistics (Garner, 1991). Finally, we find a clear difference between consumers' sentiment regarding their own personal situations and the conditions of the overall economy. Their personal situations are more likely to be affected by their demographic characteristics and other idiosyncrasies rather than macroeconomic variables or their forecasts. But macroeconomic variable do greatly affect consumers sentiment on business conditions. Expected business conditions have marginal effects about 4-6% for BusCond\_12m and BusCond\_5y. Expected prices, expected income and expected unemployment situation generally have marginal effects about 1-2% for BusCond\_12m and BusCond\_5y. Expected business condition and expected employment are also important in BuyCond, with marginal effects more than 1%.

We can see that in terms of overall explanatory power, the model explains from 17% to 56% of the total variation. BusCond\_12m – the one-year ahead expectation of the overall business condition is best explained with a pseudo- $\bar{R}^2$  of 55.86% in probit model and 54.50% in nonparametric model. The least well explained variables are PerFin\_Current – personal financial condition compared to a year ago and BuyCond – buying condition for large household items, with a pseudo- $\bar{R}^2$  of around 17-18% for both the probit model and the nonparametric model. Considering that BusCond\_5y – expectation of five year ahead business condition is the second best explained variable with a pseudo- $\bar{R}^2$  about 40% and PerFin\_Expected – expectation of one year ahead personal financial situation is the third best explained variable with a pseudo- $\bar{R}^2$  of about 30-40%, we come to the conclusion that the model explains expectations about the overall economic condition better that it explains expectations about personal situation. This observation is further confirmed by that fact that macroeconomic variables accounts for a larger proportion of variation in explaining overall business conditions. Another finding we get is that in terms of overall explanatory power, the probit model provides a result that is highly consistent with what the nonparametric model provides. The differences in pseudo- $\bar{R}^2$  for four of the five variables are within 1 to 2%, except for PerFin\_Expected. While the probit model explains about 30% of the total variation of this variable, nonparametric model explains about 50%. This obvious increase in explanatory power may be due to the non-normality of the error distribution for this variable.

In terms of the explanatory power of each category of variables, the two models again give highly consistent results. Generally, expectations and perceptions category has the highest incremental explanatory power, ranging from about 10% for BuyCond and PerFin\_Current to 52% for BusCond\_12m. In the rest of the categories, personal idiosyncrasies category plays an important role in explaining PerFin\_Current and PerFin\_Expected, providing pseudo- $\bar{R}^2$  of 8-10% for the former and 5-8% for the later. Macroeconomic variables and macroeconomic forecasts play equally important role in explaining business conditions and buying condition. And not surprisingly, these two categories are more important in explaining BusCond\_12m than the rest two variables. Note that while overall explanatory power for BusCond\_5y is much higher than that for BuyCond, macroeconomic variables and macroeconomic forecasts are much less important in BusCond\_5y. This shows that uncertainty of long-term expectation of



business condition is so large that the variation caused by idiosyncratic factors is much more than variations caused by the variation in the common information set – current and professionally forecasted economic conditions.

## **SUMMARY**

In this study, we focus on the informational content of the Index of Consumer Sentiment, in particular, its five components. Models based on household level survey data are estimated assuming normal error distribution as well as assuming nonparametric distribution. Our results provide some solid clue on how much we can explain variations in the components of consumer sentiment, what are the important factors affecting components of consumer sentiment, and what information consumer sentiment index reflects.

We find that up to 48% of variations in personal sentiment, and up to 56% of variations in sentiment on business conditions can be explained by variables including consumers' perception and expectation of social economic fundamentals, macroeconomic variables and their professional forecasts, and consumers' demographic characteristics such as gender, racial origin, education level, age, and region of residence. Among them, consumers' perception and expectation are the most important category of variables, accounting for 11% to 53% of the total variation in components of sentiment. Macroeconomic variables and forecasts generally provide much lower explanatory power around 5% to 20%, especially for personal sentiment components where they only provide about 3% to 5% explanatory power.

The most important and influential factors affecting components of sentiment at the individual and household level are consumers' expectation of future business conditions and unemployment level, as well as consumers' perception of the performance of government economic policies and news stories. Consumer's response to general questions regarding, for example, the overall business condition contains complex information from all sources and balance statistics constructed for this kind of questions are not easy to interpret. Our results thus suggest the incorporation of the statistics constructed from direct questions about expected unemployment or family income in the sentiment index.

The above finding suggests that the informational content of consumer sentiment is complex yet tractable. The information contained in sentiment measure is neither purely macroeconomic fluctuation nor the tone of news reports delivered by mass media. Rather, different information takes up the role of the principle driving force for different component of consumer sentiment. It is more informative if components of the sentiment index are treated separately in economic and econometric models. When the components are combined, information of the driving force of changes in sentiment may be obscured.

## **ENDNOTES**

1. Responses good time / good with qualifications and bad with qualifications / bad times are grouped together respectively for index construction. Same for the next question.

2. A logit specification is also considered and proved to produce very similar results as that produced by a probit specification. Thus, the result from logit model is omitted from this paper but is available from the authors upon request.

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