

Consumer Sentiment:

The Economy's Crystal Ball?

Talla Saghafi

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Advisor: Professor Martha Starr

Introduction

Consumer sentiment is a crucial economic indicator for projecting inflation, retail sales, unemployment, and other factors within the economy. If consumers do not believe that the economy will improve, they will choose to keep their spending levels modest, making it difficult for a weak economy to exit from a recession. Because personal consumption represents 70% of real GDP, fluctuations in consumer sentiment play a central role in overall growth.

Consumer psychology and its relation to consumer spending have been extensively researched and many studies show that there is a positive relationship between consumer sentiment and consumption. However, very few studies have investigated whether the various sub-components of the monthly Index of Consumer Sentiment, released by the University of Michigan, vary in their predictive *crystal ball* power. Thus, it is important to see the relationship of the specific core components to other economic indicators. For example, which opinion has a greater predictive value for future levels consumption: a consumer's belief on the business conditions in the next 12 months or their perception of their current financial state? Therefore, this study examines how the specific components of the University of Michigan's Index of Consumer Sentiment affect personal savings, unemployment rate, core and headline inflation, personal disposable income, and personal consumption expenditures, by implementing Granger causality tests and Vector Autoregressive (VAR) models.

Literature Review

Two-thirds of GDP is made up of Personal Consumption Expenditures. Fluctuations in consumer sentiment can have significant effects on the global economy. This was evident during the Gulf War when U.S. involvement in Iraq caused consumer confidence to decrease, causing the United States to go into a recession.¹ Therefore, it is crucial to monitor households' confidence in the economy as it provides valuable insights into likely changes in their spending habits.

Because of its great significance in the economy's well-being, existing literature on the subject of consumer sentiment and consumer spending is vast. Many different studies have found that consumer sentiment does in fact have predictive power for consumer spending. John Matusaka and Argia Sbordone estimate that about 13-26 percent of variations in GDP can be attributed to consumer sentiment.² Others have studied the impact of consumer sentiment on certain categories of spending.³ Fluctuations in consumer sentiment significantly affect the purchase of durable goods, goods that do not wear out within three years, such as cars, refrigerators, stoves, etc. In this current recession, it has been increasingly important to monitor consumers' willingness to purchase durable goods, which would convey that consumers' are more comfortable with their financial situations and are able to make bigger purchases, contributing to the economy's recovery.

There is also literature on explaining what causes changes in consumer sentiment. For example, Martha Starr finds that news shocks cause consumer sentiment to change.⁴ Most consumers get their news about economic conditions from the media and therefore are greatly

¹Throop, "Consumer Sentiment: Its Causes and Effects"

² Howrey, "The Predictive Power of the Index of Consumer Spending"

³ Mishkin, "Consumer Sentiment and Spending on Durable Goods"

⁴ Starr, "Consumption, Sentiment, and Economic News"

affected when undesirable news is delivered about the economy. Negative news on the economy has a greater effect than positive news since negative news is often the lead story of prime time news.

Therefore, many studies have proven that consumer sentiment can predict consumer spending, and various indicators such as political changes, economic changes, and the media can all cause consumer sentiment to change. However, very few studies have been done on the different aspects of within consumer sentiment. The Index of Consumer Sentiment is based on five separate components, ranging from a consumer's financial situation to their desire to buy durable goods. Therefore, this study seeks to understand which components of consumer sentiment are most important in monitoring and have the greatest predictive power on consumer spending.

Background

The index used in this assessment was the University of Michigan's Survey of Consumer Sentiment. The Survey of Consumer Sentiment is conducted monthly and is a "near-real-time assessment of consumer attitudes on the business climate, personal finance, and shopping."⁵ The surveys are phone interviews conducted over the weekends to a total of 500 individuals. In any given month, 40% of the individuals are consumers who had been interviewed before, while 60% are new to the survey. Respondents are asked various questions about their own financial situation as well as news they had heard about current economic conditions.⁶ The following five core questions calculate the overall measure of consumer sentiment:

⁵ Baumohl, 97

⁶ University of Michigan: Survey of Consumer Sentiment, <http://www.sca.isr.umich.edu/documents.php?c=i>

Variable Name	Question Wording
Current Financial Situation	"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?"
Expected Financial Situation	"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?"
Business Conditions in 12 Months	"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?"
Business Conditions in 5 Years	"Looking ahead, which would you say is more likely--that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?"
Buying Conditions for Durable Goods	"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 bad time for people to buy major household items?"

The University of Michigan uses these questions to calculate an index that is then used to produce an overall index of consumer sentiment as well as an expected index of consumer sentiment.

The indices of these components will be used as a basis in my research as well as their relationship to personal savings, unemployment, personal consumption expenditures, personal disposable income, and core and headline inflation. Consumers' psychology is greatly affected by changes in the labor market as well as price changes, and is often expressed as a concern in

surveys. Therefore, it is also important to look at the relation of consumer sentiment to inflation and unemployment. Personal consumption varies inversely with personal savings. It is very likely that when consumer sentiment decreases, personal savings rate rises. This is evident in the dataset. Thus, it is important to also look at the relation of consumer sentiment to the personal savings rate. These various factors are essential to look at to see their association with the aspects of consumer sentiment.

Data

The data used for the analysis are monthly and cover the period from January 1978 to March 2009. Variables and data sources are defined in Table 1. Figure 1 provides basic time-series charts of the data. It is evident that the five core components for consumer sentiment, change in personal consumption expenditures, and change in personal disposable income have faced volatile fluctuations over the period of 1978-2009. The graphs demonstrate similar positive and negative downturns throughout the examined period.

For example, in 1991, there are significant declines in several components of consumer sentiment at the same time as in personal consumption expenditures drop. This is correlated with the 1991 recession and the issue discussed by Adrian Throop above the U.S. invasion of Iraq in 1991 led to an increase in oil prices, which boosted in headline inflation and drove consumer sentiment down. However, from the data it is evident that all of the components of consumer sentiment did not take a dip with the onset of the Gulf War. For example, current personal finances and buying conditions for durable goods did not decrease as significantly as the other components. The components that were most affected by the onset of the Gulf War appear to be the business conditions in 12 months and 5 years, as well as the consumers' expected personal finances, probably reflecting their fear that oil prices would increase, as they did.

From the data it is evident that the civilian unemployment rate tends to take awhile to decline following a recession. In 1981, sentiment for business conditions for 12 months and 5 years were very low, while unemployment remained at around 6%. However, in 1984, unemployment skyrocketed to above 10%. This shows that unemployment rates continue to increase even when the economy shows signs of recovery, as we also see in the current recession.

In the time-series charts, it is also apparent that consumer sentiment for business conditions in 12 months and 5 years decreased in 1978-79, while the change in personal consumption expenditures decreased in 1980-81. Although no causal inference can be drawn from the data, it is still very apparent that declines in consumer sentiment occur roughly right before declines in personal consumption, making it appear that some components of the Index of Consumer Sentiment do in fact have a predictive power over consumption.

Personal savings rate varies inversely with personal consumption. In periods when personal consumption is high, personal savings is low. This is also evident with fluctuations in consumer sentiment. Therefore, when consumers have a bleak outlook on business conditions in 12 months, they increase their savings rate; thus, consumer sentiment appears to also vary inversely with personal savings.

Granger Causality Tests

The Granger causality is one method to understand the interrelationships between the components of consumer sentiment and personal savings rate, unemployment, consumer spending and inflation. Granger causality tests indicate whether lagged values of one variable X are valuable for predicting future changes in another variable Y. The tests were run using both

12 and 24 month lags to take into account uncertainties about the relevant time frame. Results are shown in Table 2, 3, and 4.

It is important to recognize that many of the factors within the Index of Consumer Sentiment have an impact on each other. For example, the question concerning business conditions in the next 12 months affects how respondents answer the question on business conditions in the next 5 years. Also, consumers relate their current personal finances to expected personal finances. Thus, the purpose of the Granger causality test was to see the different indicators in their lone state and its causal relationship with other economic indicators, without the impact of the other sentiment components.

In both the models we see that there is a causal relationship with many of the components of consumer sentiment to the consumer spending (*see Table 2*). Changes in personal consumption expenditures and consumer sentiment on buying conditions both mutually cause changes in one another. Personal consumption expenditures also Granger cause consumers' current and expected financial situation. And although current and expected personal finances do not cause changes in personal consumption expenditures, they do cause changes in disposable personal income. This is to be expected because consumers' current financial situation would impact their income in the short term, 12 lag time period, as well as impact their expected financial situation in the 12 and 24 time lags. As their finances change, it is expected to see a change in disposable income.

Consumers' beliefs about business conditions for the next 12 months do in fact cause changes in personal consumption expenditures in both the 12 and 24 lag periods (*see Table 2*). This is expected because consumers will change their consumption to match the predicted business conditions for the next 12 months. Changes in personal consumption expenditures also

cause changes in what consumers expect for the next 12 months of business conditions in the 12 lag model. Thus, consumer psychology appears to affect consumption spending in both short and long run perspective.

Consumers' confidence in business conditions in 5 years also causes changes in personal consumption expenditures in the 12 lag model (*see Table 2*). This information is crucial in that it shows that consumers' faith in business conditions for the next 5 years impacts their consumption habits during the 12 lag model. However, unlike the question concerning business conditions in 12 months, changes personal consumption expenditures do not Granger cause business conditions in 5 years. Therefore, personal consumption expenditures today have no impact on what consumers believe economic conditions will be like in 5 years, yet their confidence in the economy in 5 years does have an effect on personal consumption expenditures.

It was interesting to note that the components of consumer sentiment have no effect on the personal savings rate (*see Table 3*). This is a bit anomalous because personal consumption would seem to be inversely related to personal savings. However, there is no assurance of an inverse relationship between personal consumption and the personal savings rate, as both may rise as long as the level of consumption rises less rapidly than that of saving. Moreover the saving rate fluctuates considerably from month-to-month, making it difficult to detect whether it is systematically affected by sentiment. Thus, none of the Granger causality tests showed any significant effect of consumer sentiment measures on personal savings.

The significance of business conditions in 12 months versus 5 years becomes even more apparent when looking at unemployment (*see Table 4*). Unemployment does cause changes in consumers' belief for business conditions in the next 12 months in the 12 lag period and vice versa and unemployment remains to be a causal factor for business conditions in the next 12

months in the 24 lag period; however, consumers' expectations for business conditions in 5 years has an impact on unemployment in the 24 lag period, while their expectations for 12 months does not. This is to be expected because when consumers are asked what they think of economic conditions in the next 12 months, they are only thinking in the short term. Unemployment has a significant lag time, taking longer to rise or decrease than other variables. Therefore, it would be very difficult for consumers to see how business conditions in the next 12 months would cause changes in unemployment in the 24 lag period, but they could make some predictions on how the economy might change in the next 5 years, with unemployment having enough time to change within that time period.

The question concerning durable goods seems to have an effect on inflation, core and headline, in the 24 lag period (*see Table 4*). This is to be expected because the increase in durable goods purchase would cause the price level to increase. Buying conditions also causes changes in unemployment and vice versa in the short and long run. Therefore, an increase in unemployment might make some consumers wary about purchasing expensive, long lasting goods. At the same time, an increase in confidence in purchasing durable goods would cause a change in the labor market, conveying the sign that more people can afford such goods.

The question on current and expected personal finances causes changes in core inflation (*see Table 4*). This causal relationship would not be evident in headline inflation, which includes the price of oil. The price of oil moves independently of consumer expectations. Expected personal finances also causes changes in unemployment. Thus, if consumers believe their financial situations are instable in a difficult economy, they most likely will see changes in the labor market, which is consistent with economy theory.

In sum, the Granger causality test reveals that not all of the sub-components of consumer sentiment have an impact on personal consumption expenditures. The 5 core segments of sentiment each impact economic indicators differently. For example, consumers' current and expected financial situations cause changes in unemployment and inflation, while consumers' confidence on business conditions in the next 12 months and 5 years causes changes in personal disposable income and personal consumption expenditures. Therefore, because the Granger causality test is only bivariate, it is difficult to see the interconnections between the multiple variables affecting changes in consumer sentiment and consumer spending. Thus, the vector autoregressive analysis will be able to provide more substantial information on the data.

VAR Analysis

VAR analysis estimates a system of autoregressions in which all variables are potentially endogenous. A VAR analysis includes a constant term, but not always a trend term. It was difficult to decide whether to include the trend term or not because it was statistically significant for at least one of the estimated coefficients in the first estimated model. The model proved to be stable with and without the trend term, but because the trend term was statistically significant for some of the terms, the model includes the trend term. It was also difficult to choose the lag length since the Akaike Information Criterion (AIC) and the Schwartz Information Criterion (SIC), the tests most people rely on, showed different results. The model that proved to have no roots outside the unit circle, making it stable, was a model with a trend term and lag length of 2.

Figures 2, 3, and 4 show the estimated impulse response functions from the VAR analysis. Each panel in the figure shows how the given variable Y is estimated to change over time in response to an unanticipated shock in variable X. The change is unanticipated in the sense that it would not have been predicted econometrically, that is, given the dynamics of the

system that were at work at the time and the usual interrelationships between the variables in the system. The solid line traces out the impulse response itself; the dashed lines around the solid line show the 95% confidence interval around the estimated trajectory (i.e. there is a 95% chance that the true trajectory lies within those bounds.) VAR can forecast changes in the variables as it account its past values. The impulse response outlines predicted future values of the variable that received a surprise shock. The positive “shock” is the change in the variable that would not have been predicted given the other endogenous variables in the model.

Positive shocks to the core indices of consumer sentiment caused a change in personal consumption expenditures in many examples (*see Figure 2*). An increase in consumer confidence for expected and current personal finances results in an increase in personal consumption in the short run. Positive shocks to business conditions in the next 5 years also caused an increase in personal consumption in the short run, up to 10 months after the shock. Interestingly, the component that caused the greatest response to personal consumption expenditures was consumers’ expectations for business conditions in the next 12 months. The Granger Causality showed that personal consumption expenditures and consumers’ confidence in business conditions for the next 12 months had a mutually causal relationship. However, the impulse response shows that positive shocks to business conditions in the next 12 months causes a greater change and increase in personal consumption expenditures, than does a positive shock to personal consumption. Buying conditions for durable goods do not seem to have a statistically significant relationship with personal consumption expenditures, in that a positive shock to buying conditions does not change personal consumption expenditures. This differs from much of existing literature, which looks to consumers’ confidence in durable goods as a sign to see if situations in the economy will improve. The impulse response showed that a positive shock to

personal consumption causes a change to consumer sentiment on buying conditions, but not the other way around.

The impulse response shows a similar finding to that of the granger causality tests in regards to the relationship between the personal savings rate and the different components of consumer sentiment (*see Figure 3*). The statistical significance of the response of personal savings to positive shocks to the components of consumer sentiment is marginally significant in only a few cases. An increase in consumers' confidence on business conditions in the next 12 months leads to a borderline increase in personal savings rate in the next 15-25 months. 15-25 months is out of the scope of the question which only asks about the next 12 months. Perhaps some consumers do increase their consumption in the short run if there is a positive shock to business conditions in the next 12 months, but then begin to increase their savings after the positive shock is over. It also appears that if there is a positive shock to buying conditions for durable goods, consumers will increase their savings rate in the short run, making the response statistically significant for a period of about 12 months. This is accurate in that consumers will want to save their disposable income to purchase a durable good, seeing as economic conditions are stable to purchase durable goods. Positive shocks to expected and current personal finances lead to borderline statistically significant result in personal savings between the 20-30 months.

Positive shocks to the core sentiment components lead to statistically significant responses in the unemployment rate (*see Figure 4*). A positive shock to current and expected personal finances led to a decrease in unemployment after 10 months with current finances, and 15 months with expected finances. This is to be expected for if consumers' financial situations improved, it would be expected to see a decrease in unemployment within the labor market. The 10 month lag time is also expected because the labor market has a higher lag time than other

indicators. An unexpected positive shock to business conditions in the next 12 months leads to a significant decrease in unemployment after 5 months, remaining consistent to about 30 months. Therefore, if consumers believe there will be an improvement in economic conditions in the next 12 months, the labor market will see a decrease in the unemployment rate after a period of 5 months. A positive shock to the question regarding business conditions in 5 years will see a minimal decrease in the unemployment rate, but after about 20 months. The component that has the greatest affect of decreasing the unemployment rate in the short run was the question regarding buying conditions for durable goods, which showed to be statistically significant after a period of 2 months.

Positive shocks to inflation caused changes in many of the consumer sentiment variables (*see Figure 4*). For example, an increase in inflation raised fears for consumers' and decreased the likelihood of buying durable goods significantly 5 months after the shock to a period of 20 months. An increase price level and consumers' fear of rising oil prices is often cited as a grave concern in the University of Michigan's Index of Consumer Sentiment. This is to be expected because a majority of news and media focus on changing gas prices as well as changes in the prices of other goods, and as stated earlier, according to the study by Martha Starr, consumers have a greater response to negative news than positive news. Positive shocks to core and headline inflation were also marginally significant with expected and current financial situations, causing a slight decrease in the short term. However, core inflation had a greater impact on causing changes in consumer sentiment than headline inflation, which is a bit unexpected, seeing as consumers often cite oil prices as their grave concern for increasing inflation. It also appears that shocks to the components of consumer sentiment were not statistically significant in causing changes in inflation. This result is expected for headline inflation because changes in the price

of oil are not impacted by consumer psychology, but rather the supply and demand conditions as a whole. However, it would be expected to see a statistically significant relationship for a positive shock to consumer sentiment causing a change in response for core inflation because a fear of inflation today will cause price levels to rise tomorrow.

Most of the components of consumer sentiment did not show to have a statistically significant relationship with disposable personal income (*see Figure 4*). However, an increase in consumers' opinion of business conditions in the next 12 months causes a sharp increase in disposable income after a few months, decreasing after months. The question regarding business conditions in 5 years also appears to have causal relationship with disposable income, causing an increase after 5 months, but not as significant as the question regarding business conditions in 12 months. A positive shock to expected personal finances is more statistically significant in causing an increase in disposable income than consumers' sentiment on current finances, which showed a marginal statistically significant relationship.

Conclusion

In conclusion, the VAR and Granger Causality tests showed that some of the components of the Index of Consumer Sentiment were more influential in predicting changes in personal consumption than the other components. Each question seemed to be most directly related to various economic indicators. For example, the question on buying conditions proved to have a causal relationship for unemployment and inflation in both the Granger Causality as well as the VAR. However, the question on buying conditions did not have a statistically significant relationship with personal consumption expenditures in the VAR. This differs from many theories who believe consumers' positive attitude towards durable goods is a crucial sign for recovery. The question concerning business conditions in the next 12 months was most

positively correlated with personal consumption expenditures in the VAR. As noted, the personal savings rate did not have a statistically significant relationship with the components of consumer sentiment, potentially due to the high level of variation in the savings rate from month-to-month. Thus, the study proved that the various factors of consumer sentiment are important in predicting changes in the different economic indicators, and that it is most important to monitor consumers' responses to the question on business conditions in the next 12 months in forecasting future trends in consumer spending.

Table 1: Variable Definitions and Data Sources

Variable	Definition	Data Source
CH_PCE	Year-over-year percent change on real personal consumption spending, billions of chained 2005 US dollars, SA	Bureau of Economic Analysis
CH_DPI	Year-over-year percent change on real personal disposable income, billions of chained 2005 US dollars, SA	Bureau of Economic Analysis
INFL_C	Year-over-year percent change in the consumer price index for all urban consumers, excluding food and energy	Bureau of Labor Statistics
INFL_C	Year-over-year percent change in the consumer price index for all urban consumers, including food and energy	Bureau of Labor Statistics
UNEMPL	Civilian Unemployment rate (%), SA	Bureau of Labor Statistics
PFE	Expected Personal Finance	University of Michigan Index of Consumer Sentiment
PFC	Current Personal Finance	University of Michigan's Index of Consumer Sentiment
BUYC	Buying Conditions for durable goods (refrigerators, cars, houses, etc.)	University of Michigan's Index of Consumer Sentiment
BC_12	Business Conditions for the next 12 months	University of Michigan's Index of Consumer Sentiment
BC_5	Business Conditions for the next 5 years	University of Michigan's Index of Consumer Sentiment
PS	Personal Savings Rate	Bureau of Economic Analysis

Table 2: Results of Bivariate Tests with Personal Consumption

Null Hypothesis	Number of Lags	
	12	24
BC_12 does not Granger Cause CH_PCE	0.0011	0.2171
CH_PCE does not Granger Cause BC_12	0.0402	0.0017
BC_5 does not Granger Cause CH_PCE	0.0179	0.9145
CH_PCE does not Granger Cause BC_5	0.7096	0.1098
PFC does not Granger Cause CH_PCE	0.2843	0.4766
CH_PCE does not Granger Cause PFC	0.0030	0.0257
PFE does not Granger Cause CH_PCE	0.0490	0.0797
CH_PCE does not Granger Cause PFE	0.0219	0.0684
BUYC does not Granger Cause CH_PCE	0.0386	0.4104
CH_PCE does not Granger Cause BUYC	7.E-07	5.E-05

Table 3: Results of Bivariate Tests with Personal Savings

Null Hypothesis	Number of Lags	
	12	24
BC_12 does not Granger Cause PS	0.4720	0.3176
PS does not Granger Cause BC_12	0.3093	0.6428
BC_5 does not Granger Cause PS	0.9226	0.1292
PS does not Granger Cause BC_5	0.2906	0.9843
BUYC does not Granger Cause PS	0.2643	0.1547
PS does not Granger Cause BUYC	0.2022	0.4605
PFC does not Granger Cause PS	0.4795	0.5220
PS does not Granger Cause PFC	0.2433	0.2137
PFE does not Granger Cause PS	0.2940	0.4784
PS does not Granger Cause PFE	0.9666	0.5689

Table 4: Results of Bivariate Granger Causality Tests with other Economic Indicators
The following were shown to be statistically significant at 5% level:

Null Hypothesis	Number of Lags	
	12	24
UNEMPL does not Granger Cause BC_12	0.0060	0.0388
BC_12 does not Granger Cause UNEMPL	0.0041	
UNEMPL does not Granger Cause BC_5	0.0222	
BC_5 does not Granger Cause UNEMPL	0.0044	0.0189
PFC does not Granger Cause UNEMPL	0.0022	0.0012
PFE does not Granger Cause UNEMPL	0.0021	0.0034
PFC does not Granger Cause CH_DPI	2.E-05	
PFE does not Granger Cause CH_DPI	0.0012	0.0293
BC_5 does not Granger Cause CH_DPI	4.E-05	0.0031
BC_12 does not Granger Cause CH_DPI	2.E-06	0.0072
BUYC does not Granger Cause INFL_C		0.0112
BUYC does not Granger Cause INFL_H		0.0257
BC_12 does not Granger Cause INFL_C		0.0043

Figure 1: Time-Series Charts for the Variables used in the Analysis, 1978-2009

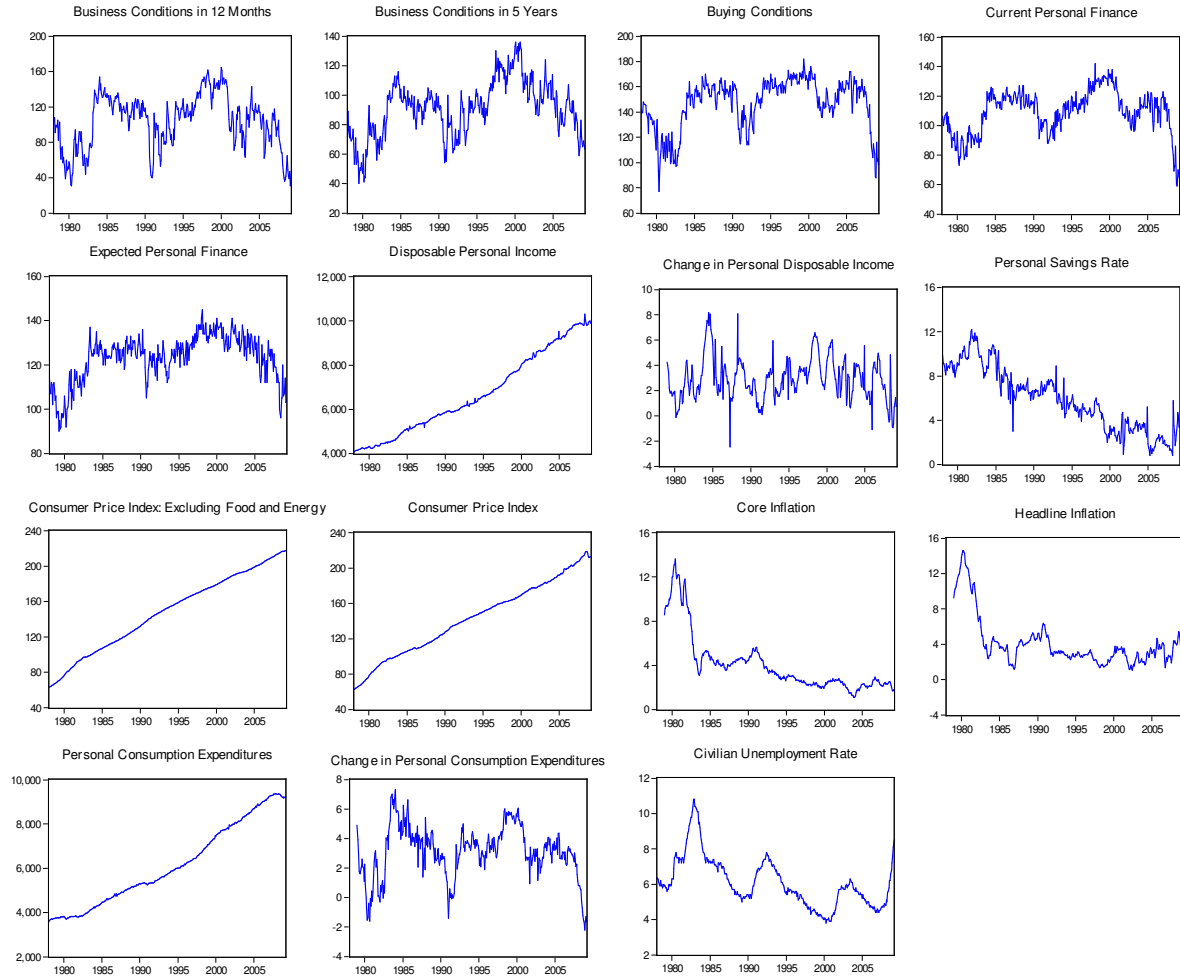


Figure 2: Impulse Response from VAR for Changes in Personal Consumption and the Subcomponents of Consumer Sentiment

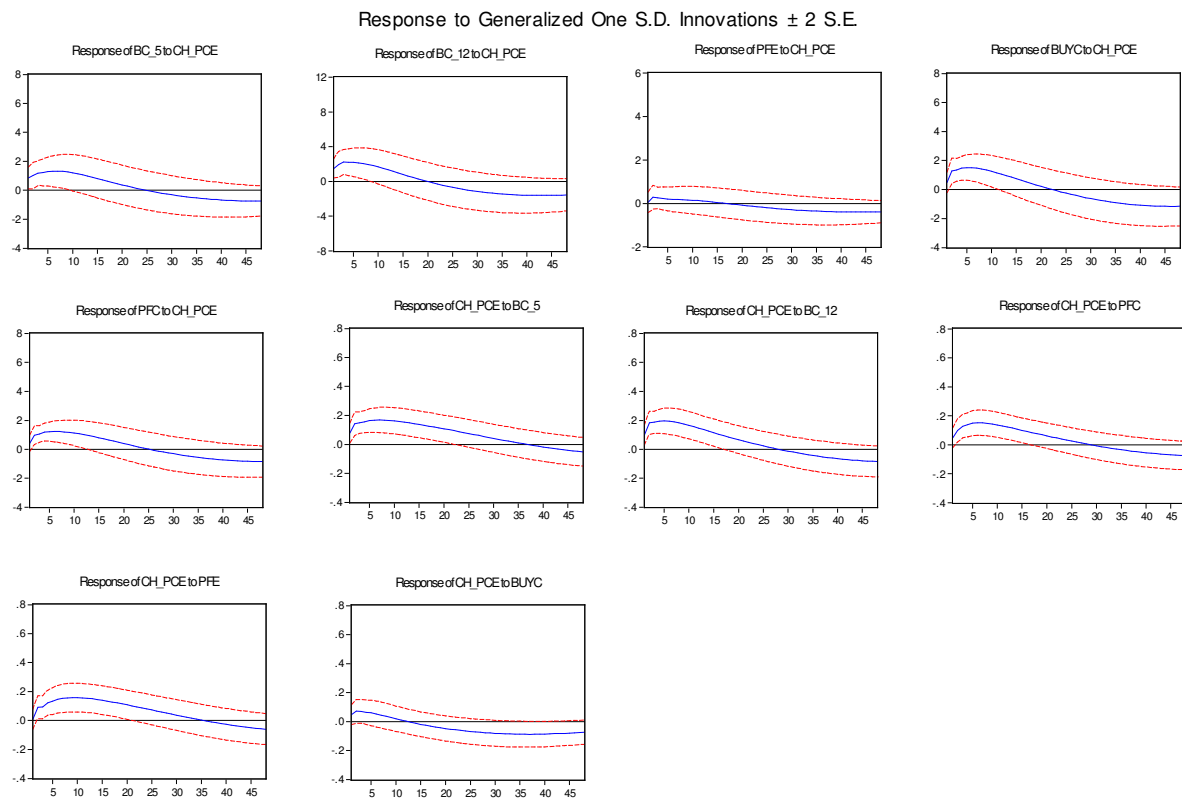


Figure 3: Impulse Response from VAR for Changes in Personal Savings and the Subcomponents of Consumer Sentiment

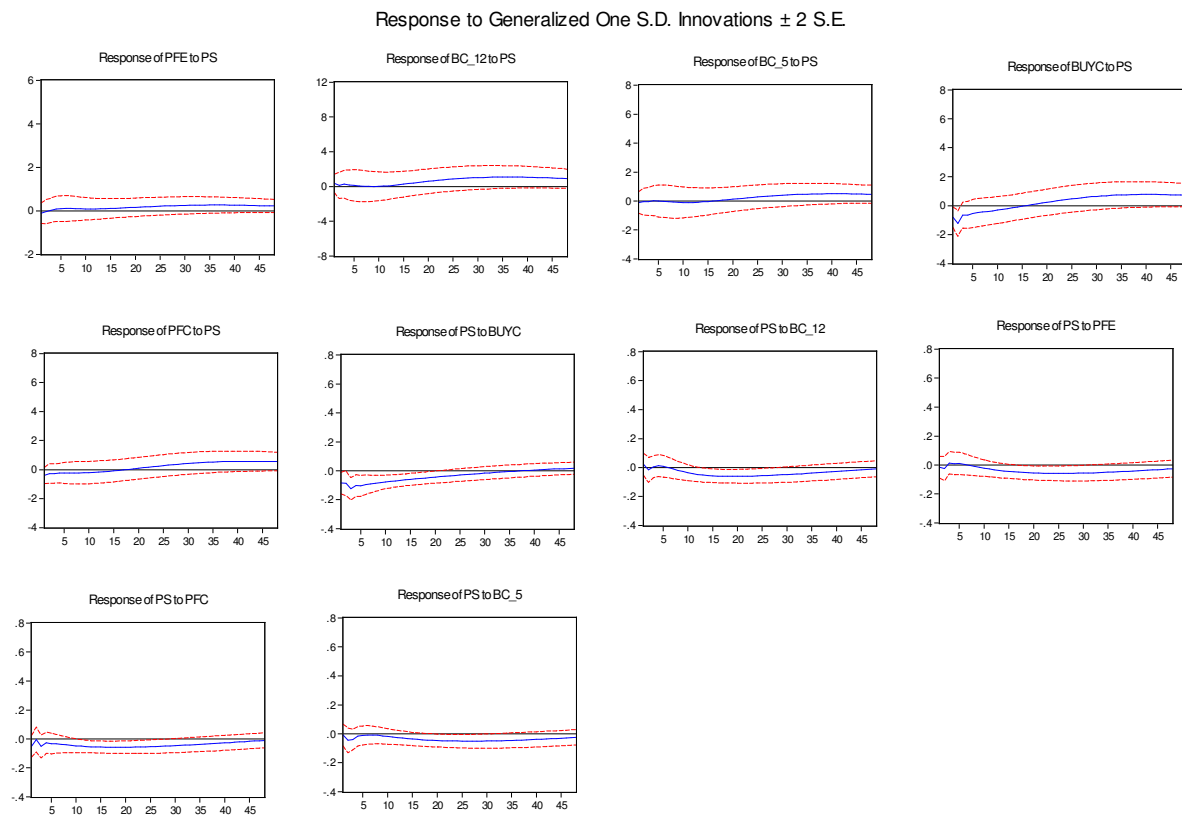
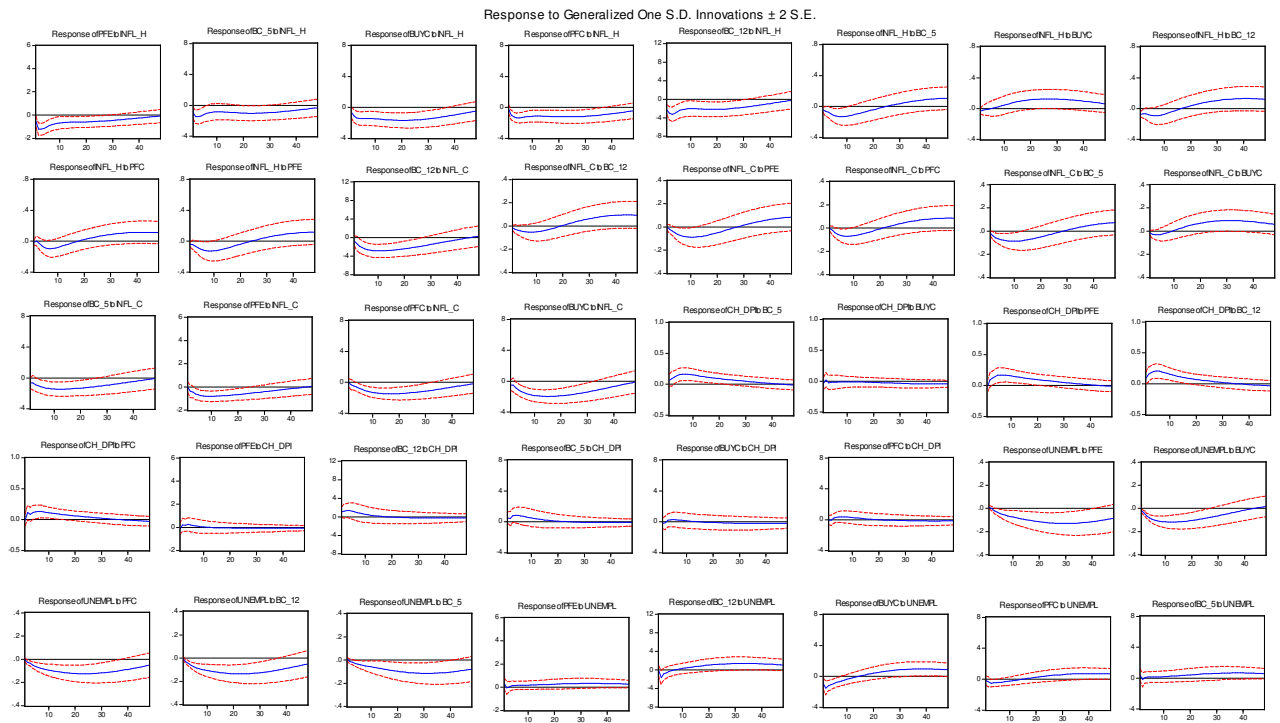


Figure 4: Impulse Response from VAR for Changes in Other Economic Indicators and the Subcomponents of Consumer Sentiment



Appendix 1: VAR Root Structure

Roots of Characteristic Polynomial

Endogenous variables: CH_PCE CH_DPI PS INFL_H
INFL_C UNEMPL BC_12 BC_5 BUYC PFC PFE

Exogenous variables: C @TREND

Lag specification: 1 2

Date: 11/06/09 Time: 13:00

Root	Modulus
0.983215 + 0.050925i	0.984533
0.983215 - 0.050925i	0.984533
0.916140	0.916140
0.890622	0.890622
0.767660 + 0.093767i	0.773365
0.767660 - 0.093767i	0.773365
0.682895 + 0.055359i	0.685135
0.682895 - 0.055359i	0.685135
0.668010	0.668010
0.532829 + 0.113519i	0.544788
0.532829 - 0.113519i	0.544788
0.491669	0.491669
-0.376377 + 0.018399i	0.376826
-0.376377 - 0.018399i	0.376826
-0.303883 + 0.108877i	0.322799
-0.303883 - 0.108877i	0.322799
0.233530	0.233530
-0.221085 + 0.072366i	0.232627
-0.221085 - 0.072366i	0.232627
-0.211095	0.211095
0.010030 + 0.163321i	0.163629
0.010030 - 0.163321i	0.163629

No root lies outside the unit circle.

VAR satisfies the stability condition.

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