

# **TURNS IN CONSUMER CONFIDENCE: AN INFORMATION ADVANTAGE LINKED TO MANUFACTURING**

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## **ABSTRACT**

This research investigates a possible source of private information advantage in consumer confidence indicators. The link between consumer confidence and the manufacturing sector is examined utilizing comparisons of the US national-level Index of Consumer Sentiment and two identically constructed confidence indices from i.) a key manufacturing state and ii.) a non-manufacturing state. Granger causality analysis shows that the manufacturing state's confidence index leads the national index, while the non-manufacturing state's confidence index lags it. Factors significantly influencing confidence include percentage manufacturing employment, equity markets indicators, and disposable income. Fitting a simple consumption function to confidence measures for the national level and the two different states shows the strongest relationship to be in the manufacturing state.

# URNS IN CONSUMER CONFIDENCE: AN INFORMATION ADVANTAGE LINKED TO MANUFACTURING

## 1. Introduction

Much effort has gone into the search for early signals of changes in economic activity. One focus has been on the role of consumer confidence indices. While these indices have been shown to have predictive power for future changes in consumer spending, questions remain about how they work in this regard. Previous work has put attention on whether a change in consumer confidence itself can be a cause of changes in consumption, or whether it rather reflects underlying changes in economic fundamentals which then in turn cause consumption to change. If the latter explanation of the predictive power of confidence for consumer spending is correct, then the question becomes *what types* of private information are confidence measures capturing that are not detectable in other published macro data.

A second avenue of search for the earliest possible signals of change has focused attention on the manufacturing sector, and three of the ten components of the U.S. Index of Leading Indicators are related to manufacturing.<sup>1</sup> Consumer confidence also has a place among the components of the official Leading Indicators and is thus believed to contribute information above and beyond what can be found in solely manufacturing indicators.<sup>2</sup> However, the possibility of a link between the formation of consumer confidence and the manufacturing sector has not, however, to our knowledge been examined; and this appears to be the natural next step in trying to understand and capture

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<sup>1</sup> These are average weekly manufacturing hours, manufacturers' new orders for consumer goods and materials, and manufacturers' new orders for non-defense capital goods.

<sup>2</sup> The expectations component of the University of Michigan's Index of Consumer Sentiment is one of the 10 elements in the U.S. Index of Leading Indicators.

the earliest signal of changing economic circumstances. In this paper, we use relatively unexploited data to investigate this link and present evidence that earlier changes in consumer confidence can be found by examining areas where a high percentage of total employment is found in the manufacturing sector. These findings lend support to the school of thought which posits that confidence works at least in part by reflecting other fundamental changes in the economy which are then detected by consumers before they find their way into official government statistics.

The consumer information advantage in manufacturing regions is examined with a unique comparison of three data sets. We compare a U.S. national-level consumer confidence index with similar indices computed independently by separate survey units in two U.S. states with quite different economic landscapes – one a key manufacturing state and one a state with relatively little manufacturing industry. In what follows, we use Granger causality analysis to show that consumer confidence in the manufacturing state “leads” national-level confidence, while consumer confidence in the non-manufacturing state “lags” national-level confidence. We next investigate the influence of various economic phenomena on confidence at the different levels and discuss critical elements in the earlier signal to consumers which arises from the manufacturing sector. Finally, we examine the relative abilities of consumer confidence measures in the manufacturing and non-manufacturing states and at the national level to predict consumption in the period from November, 1996 through April, 2002. While both confidence indices show a significant association with consumption, the results for the manufacturing state are found to be stronger.

## 2. Background

### 2.1 Previous Research on Confidence

The oldest continually-running measure of consumer confidence is the monthly Index of Consumer Sentiment (ICS), computed by the Survey Research Center of the University of Michigan. Another national level index using slightly different methodology is put out monthly for the U.S. by the Conference Board.<sup>3</sup> Recent empirical studies of the relationship between consumer confidence and consumption and/or income using U.S. data have produced somewhat varied results, although overall they confirm a connection. Most U.S. studies use the ICS, which has a longer history. These include Carroll, Fuhrer, and Wilcox (1994), who find that lagged values of sentiment can explain about 14 percent of the variation in the growth of real consumption in the U.S. over a 40-year period beginning in 1954, with at least some part of the impact probably not merely a reflection of income. Souleles (2002) also finds that sentiment can be useful in forecasting future consumption, and in addition, that cross-sectional variation in confidence can be informative. In particular, he finds that those questions asking specifically about the household condition do better than those asking about the general economy. Other researchers have focused on the confidence-income link. Matsusaka and Sbordone (1995) use the ICS with Granger causality analysis and find that confidence did Granger-cause GNP in the U.S. from 1953 to 1988. They estimate that 13-26 percent of variations in GDP can be attributed to consumer confidence. Howery (2002) also finds that the ICS is a significant predictor of the rate of growth of GDP and produces a discernible increase in the accuracy of one-to-four-quarter-ahead forecasts of

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<sup>3</sup> The Conference Board Index has a 6-month time horizon, as opposed to the 1-year and 5-year horizon of Michigan's index, and it is also more heavily weighted toward employment conditions. To our knowledge, there are no state counterparts to the Conference Board Index.

the probability of recession. He finds that its performance with regard to forecasting consumption is more modest, especially if the values of personal consumption and disposable income for the first month of quarter are known. However, as Souleles (2002) and Leeper (1992) point out, one advantage of the confidence data is that they are released well ahead of consumption and income data, a point also made by Goh (2003) with regard to confidence measures in New Zealand. Further information has been contributed by Ivanova and Lahiri (2001), who show that the ICS does better at predicting consumption in volatile economic/political periods with high uncertainty. Mehra and Martin (2003) use the ICS to examine competing explanations of *why* consumer sentiment can predict household spending and favor the view that sentiment indicators foreshadows current expectations about the real economy and the interest rate rather than the interpretation that consumer sentiment itself causes spending. Dominitz and Manski (2004) have recently focused attention on the individual components of consumer confidence measures and have suggested modifications to the set of questions which they feel would improve their predictive power.

Both the ICS and the Consumer Confidence Index put out by the Conference Board have been examined by Bram and Ludvigson (1998), Garner (2002), and Ludvigson (2004). Bram and Ludvigson find the Conference Board's measure of consumer attitudes is stronger in forecasting most categories of spending. Looking at consumer confidence after the September 11 attacks, Garner finds that both indices maintained a fairly normal relationship to other economic indicators during this period, and concludes that the such indices can be useful for assessing the impact of unique events. Ludvigson finds that confidence does have predictive power for consumption

growth but raises questions about the mechanisms by which they exert an influence.

Studies in Europe have found a consistent connection between confidence and economic activity. Acemoglu and Scott (1994) examine confidence in the UK using the monthly Gallup Consumer Confidence Indicator commissioned by the EEC. They find that this indicator predicts current and future consumption over and above standard macroeconomic variables and are led to reject the Rational Expectations Income Hypothesis since confidence is a leading indicator of consumption. Mourougane and Roma (2002) conclude that the European Commission Economic Sentiment Indicator (a broad measure which contains consumer confidence) is useful in forecasting real GDP growth rates in the short-run in Belgium, Germany, France, Italy, and the Netherlands. Hüfner and Schreöder (2002) analyze four different sentiment indicators for Germany and find the sentiment indicators can lead growth rates of German industrial production by 5-6 months. Similarly, the results of Berg and Bergstrom (1996) for confidence measures in Sweden shows that they have explanatory power for the growth rate of consumption in that country.

## **2.2 Manufacturing and Non-Manufacturing States**

Following the trend towards more regionally-based analysis, many of the larger states in the U.S. now compute their own consumer confidence indices based on surveys of their state populations. The present research utilizes the separate state-level Consumer Confidence Indices of Ohio (OCCI) and Florida (FCCI), which are computed from independent data taken by survey units in those states on a monthly basis. These states

construct their confidence indices in an identical fashion to the ICS, and therefore they are directly comparable to the national index.<sup>4</sup> The survey methods used for ICS are well documented,<sup>5</sup> and the OCCI and FCCI are based upon similar methods on samples in those respective states. (Details on these indices and the surveys they are based upon are given in Appendix B). Monthly data for all three confidence indices examined here cover the period November 1996 – April 2002.

Ohio is a major manufacturing state, while Florida has a much smaller manufacturing base. Table 1 below shows that in Ohio, the ratio of manufacturing employment to total employment – henceforth referred to as the “manufacturing employment concentration” – is almost 44 percent greater than the manufacturing employment concentration in the nation as a whole. In Florida, on the other hand, the manufacturing employment concentration is 56 percent lower than at the national level. Thus these two states provide an excellent opportunity to test the impact of a manufacturing environment on consumer confidence.

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<sup>4</sup> These state-level surveys randomly sample about 500 respondents monthly. The national-level ICS also samples about 500 subjects, but it is based on a rotating panel sample, which reduces the required sampling size. Since the ICS covers all states, the amount of information coming from the high-concentration manufacturing states is relatively small at the aggregate level.

<sup>5</sup> *Surveys of Consumers*, Survey Research Center, University of Michigan, Ann Arbor, Michigan.



**Table 1: Percent Manufacturing Employment\***

Region	Ratio of Manufacturing Employment to Total Employment
National	12.85 %
Manufacturing State (Ohio)	18.44
Non-Manufacturing State (Florida)	5.68

\* Data are from April 2002.

### 3. Empirical Analysis: Leading and Lagging States

#### 3.1 Granger Causality

In order to determine the leading or lagging status of the state level indices, we use Granger causality analysis. This analysis shows how much of the current variable Y is explained by the past values of Y and whether adding lagged values of X can improve the forecast of Y. Thus for our analysis

$$Y_t = \alpha + \sum_{j=1}^L (\beta_j Y_{t-j} + \delta_j X_{t-j}) + \varepsilon_t,$$

where  $Y_t$  is consumer confidence of a particular area and  $X_t$  is consumer confidence in a different area.

Table 2 presents the Granger causality test results for the national level and the manufacturing and non-manufacturing states (Ohio and Florida respectively), using lags of up to 4 months.<sup>6</sup> We find that the OCCI has strong predictive power for the national-level consumer confidence index, the ICS. Hence the hypothesis that OCCI does not Granger cause ICS is strongly rejected. On the other hand, ICS has little predictive

<sup>6</sup> Here we utilize readings for all three indices for the period November, 1996 through April, 2002. All data used here are monthly, and each lag represents one month.

power for OCCI, and the hypothesis of no Granger causality is accepted at the 5 percent level. When we repeat the same test using data from Florida (FCCI) instead of Ohio, the results show that FCCI has no predictive effect on ICS, but ICS has predictive power for FCCI. Hence Ohio leads the nation in its consumer confidence trends by up to 4 months, while Florida lags it up to 3 months.<sup>7</sup>

**Table 2: Causality Between National and State-Level Indices: Leading and Lagging States – F-Statistics\***

	Number of Monthly Lags			
	1	2	3	4
OCCI does not Granger cause ICS	16.45**	7.50**	4.62**	3.38**
ICS does not Granger cause OCCI	3.26*	1.13	0.91	0.88
FCCI does not Granger cause ICS	0.045	1.40	1.26	0.77
ICS does not Granger cause FCCI	7.23**	3.53**	2.53**	2.02*

Data period: monthly, Nov. 1996 – April 2002; National = ICS; Ohio = OCCI; Florida = FCCI  
 \*\*Significant at 5 percent level, \*Significant at 10 percent level

### 3.2 POSSIBLE FACTORS IN THE TURNS OF CONFIDENCE

Having established regional differences, we now turn to a more detailed investigation of factors in the different settings which may provide private information signals to consumers and hence influence their change of attitude. We do this by examining four categories of possible factors, again using Granger causality tests. Table 3 below presents our results for the three levels considered here (i.e., national, leading, and lagging states) for lags up to four months.

<sup>7</sup> The Akaike and Schwarz criteria suggest that the optimum number of lags for this investigation is one. We have included lags up to 4 months for reference.

***(a) Manufacturing Employment Concentration***

First we see from Table 3 that the manufacturing employment concentration (i.e., the ratio of manufacturing employment to total employment) has a significant impact on confidence in the leading state after a lag of only one month. At the national level, where the manufacturing employment concentration is lower, the impact shows up only after a three-month lag. In the lagging state (with the lowest percentage of manufacturing employment), manufacturing employment concentration is not found to influence confidence even after four lags.

There are several possible explanations for the information advantage from manufacturing. First, it is likely that the kinds of information that come from the manufacturing sector and that are known to foreshadow changes in general economic activity act quicker on a consumer population that is geographically closer to its source. In addition, at a deeper level, recent research on opinion formation indicates that there may be more than a time lag in transmission that is involved because there is also a fundamental issue of *salience*. Weatherford (1983), Books and Prysby (1995, 1999), Horner (2003) and others have found that local information has greater salience for individuals than national or non-local regional information – probably because it is more easily verifiable. Another element that could be at play here is that layoff may be more visible and may have a bigger impact on a population if it occurs at a manufacturing plant where traditionally large numbers of employees have been concentrated. Likewise, renewed hiring at a large manufacturing plant is likely to generate considerable attention. Finally, even before actual layoff occurs, individuals in manufacturing areas observe changes in their local industries that give clues about the likelihood of future layoff.

**Table 3: Granger Causality Analysis of Factors  
Influencing Consumer Confidence: F-Statistics**

	<u>National Level</u>				<u>Leading State</u>				<u>Lagging State</u>			
	Number of Monthly Lags											
	1	2	3	4	1	2	3	4	1	2	3	4
Ratio of Mfg. Employment to Total Employment	2.56	1.41	2.23*	1.46	3.68*	1.96	1.06	0.95	1.86	1.76	1.75	1.81
<i>Equities Market Variables</i>												
Dow Jones	0.95	4.15**	3.89**	2.34*	1.61	3.26**	2.17*	1.57	0.19	3.31**	2.59*	1.85
Nasdaq	0.001	2.09	4.99**	3.57**	0.02	11.5**	10.2**	7.50**	0.56	1.85	3.50**	2.64**
S&P	0.43	4.15**	6.42**	4.40**	0.83	5.18**	5.29**	3.57**	0.02	3.76**	6.04**	0.002
<i>Interest Rate Variables</i>												
Discount Rate	0.12	0.52	0.26	0.20	0.12	1.44	0.88	0.56	0.24	0.61	0.69	0.75
Prime Rate	0.25	0.94	0.88	0.68	0.21	1.16	0.68	0.49	0.14	0.20	0.98	0.72
30-Yr. Mortgage Rate	0.32	1.92	1.13	1.45	0.001	0.16	1.44	1.04	0.47	0.35	0.13	0.02
Disposable Income	3.69**	2.63*	2.47*	1.98	3.61**	2.14	1.29	1.01	1.81	1.29	0.67	0.51

Employment variables are state level; other variables are national level. Data period: monthly, Nov. 1996 – April 2002

\*\*Significant at 5 percent level; \*significant at 10 percent level.

Hence for all of these reasons, consumers in areas with high manufacturing concentration may have an earlier signal of change on which to base their assessments of future economic trends.

***(b) Equities Markets***

There has been also much discussion of the association of the performance of equities markets with consumer confidence (Otoo, 1999; Fisher and Statman, 2002; Lemmon and Portniaguina, 2003). Previous research has generally concluded that stock prices do influence confidence, although there is a debate over whether this operates through a wealth effect or as a prediction of the future of the overall economy. The three equities market indices included in our analysis – the Dow Jones Industrial Average, the Nasdaq, and Standard & Poors – show a fairly consistent pattern of impact on consumer confidence at all levels. This is not unexpected since information about equities markets via various news media is equally available in all areas of the country. However, it is difficult to draw any conclusions beyond this. (See Wu, et. al, (2000) for a detailed examination of the effects of media reporting and consumer confidence.)

***(c) Other Variables***

The three interest rate variables that we examine – the discount rate, the prime rate, and the 30-year mortgage rate – show no impact on consumer confidence at any level. Finally, we find that real disposable national income shows significance at both the national and leading-state levels.

#### 4. THE EFFECTS OF CONFIDENCE ON CONSUMPTION

Ultimately consumer confidence is of interest because it is believed to have ability to predict consumer spending. Hence we want to search for regional differences in this arena also by comparing fits of a consumption function for the national level and the leading- and lagging-state levels. We use a simple model commonly used by other researchers following Carroll, Fuhrer, and Wilcox (1994) as given below.

$$\Delta \log (C_t) = \alpha_0 + \beta_1 \text{Confidence}_{t-1} + \varepsilon_i$$

We fit this model separately for the national level and for the leading and lagging states using monthly data and monthly lags for confidence. Since monthly consumption data are only available on the national level, we use national-level consumption in all fits. However, this does not imply that we assume the confidence of consumers in a particular state in itself would disproportionately influence national-level consumption. Rather the finding reported in Table 4 of an association of national consumption with the leading state's confidence index demonstrates that its index is faithfully reflecting real national economic conditions.

In Table 4 below we present the results of fitting the consumption function for the entire period from November 1996 through April 2002 using one to four monthly lags. The results show that confidence has a significant positive impact on consumption both at the national level and for the leading state of Ohio, but not in the lagging state of Florida. Both the national confidence index and the Ohio index are significant predictors of consumption with one lag, but the results for Ohio are stronger. The Ohio results are significant at the 5 percent level, and the national results are significant at the 10 percent

level. Neither index is significant beyond two lags. These findings suggest that confidence readings from a manufacturing state may reflect real economic conditions with less noise than the national confidence index. Based on the results with one lag, the incremental effect of a one-point increase in consumer confidence on the annual growth rate of real consumption is found to be as follows: 0.06 % ( $t = 1.77$ ) for the national confidence; 0.07 % ( $t = 2.31$ ) for Ohio confidence; and 0.05% ( $t = 1.17$ ) for Florida confidence.

As a final example of the various types of phenomena that may contribute to the stronger relationship between confidence and consumption in a manufacturing state, let us consider the effect of external shocks. In the period following the 9/11 terrorist attacks, confidence in Ohio maintained a more normal relationship to real economic conditions than the national-level index, as can be seen in Appendix A where we plot both indices for the last two quarters of 2001. This helped to dampen the impact of the 9/11 shock on the basic association of consumption to confidence in Ohio.

**Table 4: Estimating Real Consumption as a Function of Consumer Confidence Index**

<b>Number of Lags</b>	<b>F-Statistic</b>	<b>R<sup>2</sup></b>
<b>National (ICS)</b>		
1	3.15*	0.05
1 to 2	2.04	0.06
1 to 3	1.50	0.07
1 to 4	1.09	0.07
<b>Ohio (OCCI)</b>		
1	5.31**	0.08
1 to 2	2.76*	0.08
1 to 3	1.99	0.09
1 to 4	1.49	0.09
<b>Florida (FCCI)</b>		
1	1.36	0.02
1 to 2	1.07	0.03
1 to 3	0.94	0.05
1 to 4	0.70	0.05

\*\* Significant at 5 percent; \*Significant at 10 percent level

Consumption data: Bureau of Economic Analysis, Nov. 1996 – April 2002.

Note: This table reports the results of implementing a test of Robert E. Hall's (1978) random-walk hypothesis. The procedure is applied to the monthly data using 1 to 4 lags of the confidence index in Ohio, Florida, and at the national level. The dependent variable is the first difference of the log of real consumption.

## 5. SUMMARY AND CONCLUSIONS

Much research has shown that early signals of changes in the economy can be found in two sources: (a) consumer confidence measures and (b) indicators from the manufacturing sector. Both types of information are included in the U.S. Index of Leading Indicators. This paper has investigated the link between consumer confidence and manufacturing with a unique comparison of three separate consumer confidence indices: the national level Index of Consumer Sentiment and two independent, identically constructed state-level consumer confidence indices. One is from a key manufacturing



state (Ohio), and one is from a state with relatively little manufacturing industry (Florida). Using Granger Causality analysis, we find that confidence in the manufacturing state leads national confidence, while confidence in the non-manufacturing state lags national confidence. These findings support the view that consumer confidence predicts consumption by reflecting private information on underlying economic conditions rather than in itself being a cause of consumption patterns. The earlier clues possessed by individuals in manufacturing areas, including issues of information transmission and salience, have also been discussed.

We present results of further investigations which identify specific factors influencing confidence at the different levels. Changes in the ratio of manufacturing employment to total employment have an earlier impact in the leading, manufacturing state. Stock market indicators affect confidence at all levels fairly evenly. Interest rate changes are not found to be significant at any level for up to four monthly lags.

Finally, we have fit a commonly used consumption function to test the impact of consumer confidence measures on consumption at the national level and in the leading and lagging states. Confidence is found to be a significant predictor of consumption at both the national level and in the leading state. However, the association is stronger in the leading state with the higher manufacturing concentration.

Several implications emerge from this study. First, it emphasizes the importance that disaggregate data can play in macroeconomic research and reaffirms the need for more regionally-based analysis, since subtle phenomena can easily be overlooked in aggregate data. Second, although manufacturing has been downplayed in research agendas in recent years as its employment has dwindled, nevertheless our findings show

that much valuable private consumer information resides in that sector. Especially during periods of external shocks, the private consumer information contained in the manufacturing sector can be a more stable guide to the real economy. For some types of investigations therefore, it might be useful to apply sampling and/or weighting techniques designed to capture the special information from manufacturing.

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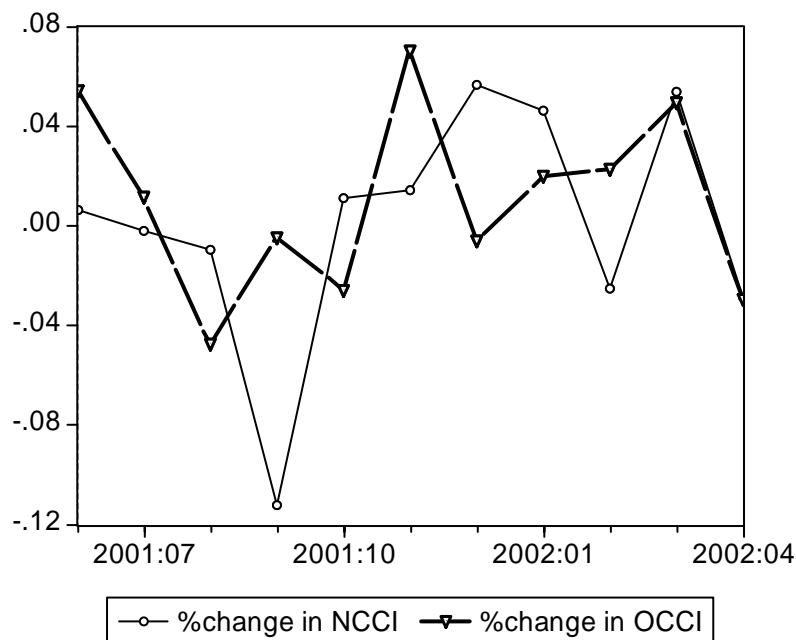
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## APPENDIX A

### Consumer Confidence and the External Shock of 9/11

The diagrams below show the trend of consumer confidence for the period June 2001 through April 2002 for both the national level and Ohio. Garner (2002) has analyzed the behavior of both the ICS and the Conference Board national consumer confidence index after 9/11 and concludes that overall the indicators showed basic resilience and had begun their recovery by the end of 2001. At the national level, using the ICS, confidence began to decline in August but dropped sharply to its low point in September, roughly coincident with the actual terrorist attacks. Confidence in the manufacturing state, on the other hand, maintained a more normal relationship to the real economy throughout the entire period. Ohio confidence had begun its descent in July, 2001, dropped more slowly to its bottom point in October, and had recovered sharply by November of that year.



## **APPENDIX B**

### **Details of the Survey**

The two state-level data sets for this research were collected in monthly household telephone surveys administered by (1) the Ohio State University Center for Survey Research and (2) the Bureau of Economic and Business Research at the University of Florida. Both units use the latest technology available in the survey area. A statewide random sample is taken each month, and the final sample size is at least 500. The Random-Digit-Dialing method of sample selection is used to select a statewide sample. To account for possible non-response error, the results are weighted to take into account the number of telephone lines in each household and to adjust for variations in the sample from the state population related to demographic characteristics. Questions on the Ohio and Florida surveys concerning consumer confidence are identical in wording and are asked in an identical manner to those administered by the University of Michigan in its Surveys of Consumers. The confidence indices are computed from the responses to five separate survey questions. These five questions elicit: (1) current personal financial condition compared to one year ago; (2) expected personal financial condition 12 months hence; (3) expectations for business conditions in the country as a whole during the next 12 months; (4) expectations for business conditions in the country as a whole during the next 5 years; and (5) whether it is currently a good time to buy major household items. To compute the index, for each question the percentage of respondents giving unfavorable replies is subtracted from the percentage giving favorable replies, ignoring neutral responses, and summed. The resulting figure is divided by the comparable national base period sum so that the indices may be appropriately compared.