

# DETERMINANTS OF BUSINESS SENTIMENT

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## ABSTRACT

Sentiment surveys receive considerable attention because of their potential to serve as indicators of future economic performance. Although business surveys have a relatively longer history than consumer surveys, much of the empirical research on sentiment surveys focuses on the expectations of consumers. However, recent findings suggest that with regard to their predictive ability, business surveys outperform consumer confidence surveys. This paper explores the information contained in a business sentiment survey conducted for a relatively small, regional, Midwestern economy. More specifically, we apply factor analysis techniques to the data in an effort to determine whether and how firm expectations about local economic performance, firm performance, selling prices, labor, capital and access to financing are related to the formation of business sentiment. We find that, in general, expectations about overall firm performance and hiring plans represent a latent process while expectations about average selling prices, local economic performance, and access to financing appear to be influenced by a separate phenomenon. Another interesting finding is that these relationships do not appear to be time invariant. Thus, how firms form expectations appears to take on a dynamic behavior.

## Introduction and Literature Review

Sentiment indexes are widely believed to have predictive content for the performance of the macro economy. Some empirical support for this belief is provided by research findings which indicate that sentiment measures contain information about future changes in the economy beyond what is contained in past values of other available indicators (Potter, 1999).

Interestingly, although business sentiment measures have a relatively longer history than consumer sentiment indexes, much of the empirical research on the predictive content of sentiment indexes centers on consumer sentiment (Carroll, Fuhrer, and Wilcox, 1994; Batchelor and Dua, 1998; Bram and Ludvigson, 1998; Eppright, Arguea, and Huth, 1998; Howrey, 2001). However, recent research suggesting that business sentiment indexes may outperform consumer sentiment indicators in predicting business cycle fluctuations has prompted renewed interest in business sentiment measures (Yew-Kuang, 1992; Bodo, Golinelli, and Parigi, 2000; McNabb and Taylor, 2000; Dunkelberg and Dennis, 2003).

Possible explanations for the predictive content of sentiment indexes are that they represent independent determinants of key macroeconomic variables or that they foreshadow the overall outlook of the economy. According to the first explanation, sentiment is an independent determinant of macroeconomic performance. This implies that changes in “sentiment” cause fluctuations in the economy. In the case of the second explanation, when economic agents are optimistic they provide positive responses about the economy and their sentiment broadly reflects the overall state of the economy but is not necessarily a causal economic force.

In reality, the explanation for the predictive content of sentiment indices is very likely a combination of these two ideas. Consumers and/or producers likely form their expectations based on some set

[of criteria that are usually latent, or unobserved, by the business researcher. These underlying factors represent \(one or more of\) the determinants of the current state of economic conditions. Moreover, if these latent factors are time variant, then the dynamic behavior of these latent factors can be used to predict future economic performance. Identification of these unobserved factors, which are proxied by sentiment indices, consequently becomes of paramount concern.](#)

The purpose of this paper is to explore the information contained in a business sentiment survey conducted for a relatively small, regional, Midwestern economy. More specifically, we apply factor analysis techniques to data obtained from a quarterly business outlook survey from March 2002 to March 2003 in order to determine whether and how firm expectations about local economic performance, firm performance, selling prices, labor, capital and access to financing are related to the formation of business sentiment. We find that, in general, expectations about overall firm activity and hiring plans represent a latent process while expectations about average selling prices, local economic performance, and access to financing appear to be influenced by a separate phenomenon. Another interesting finding is that these relationships do not appear to be time invariant. Thus, how firms form expectations appears to take on a dynamic behavior.

This article proceeds as follows: Section 1 provides a description of the data used in the paper and outlines our empirical methodology. In Section 2 we present the result and discuss the implications of our findings. [Section 3 concludes the paper by summarizing our findings, discussing our study's limitations, and presenting some recommendations for future research.](#)

## Data and Statistical Analysis

The data used in the empirical analysis cover five quarterly business outlook surveys from March 2002 to March 2003. Firms are surveyed to obtain insights about their current situation and expectations outlook. Responses cover a range of variables including capital expenditures, employment, employee compensation, selling prices, and borrowed funds. In addition, firms provide information about their outlook for the local economy and future plans about their level of activity. [Table 1 contains the names and variable definitions for the variables used in our study.](#)

Summary statistics for the survey data used in this study are reported in Table 2. Based on the mean and standard deviation of the six expectation variables for each quarter, the computed coefficient of variation measures indicate that there is relatively greater variability in the expectations of firms about their own activity compared to their outlook for the local economy. A comparison of means across surveys indicates that there are statistically significant differences between the surveys. The proximity of mean and median values in most instances also show that the distribution of responses tended not to be highly skewed. In general, the outlook of firms over the survey quarters tended to move in the direction of a status quo to a worsening perspective.

## Factor Analysis

Based on the information obtained from the survey, six variables are included as indicators in the factor analysis: firms' expectations about the local economy's performance, their own activity in general, hiring plans, plans for capital expenditures and selling prices, and expectations about access to financing. These indicators provide broad coverage of key areas of

current [decision-](#) making based on expectations of future activity. They also incorporate heterogeneity and uncertainty surrounding [decision-making](#) at the firm level.

Table 3 provides information that determines whether the data are appropriate for factor analysis. The results generally support the use of factor analysis, although the different indicators provide mixed evidence about the strength of this support. In Table 3, we see that there are some [strong \(Pearson\)](#) correlations among the different indicators.

The KMO measure of sampling adequacy is greater than the minimum of 0.5, for each quarter considered but only marginally so for the September 2002 survey. The Bartlett test result provides the only strong indication in favor of analyzing the data with factor analysis. Except for the March 2002 survey, the test statistic rejects the null hypothesis (of no significant joint correlation) at better than a five percent level of significance for all the surveys.

Table 4 presents the results of our principal components factoring.<sup>1</sup> In three of the surveys (March 2003, December 2002, and June 2002) only two of the six eigenvalues (or latent factors) have values greater than one. Also, for each of these surveys, the two factors jointly explain over 50 % but less than 60% of the variance in the data. In the September 2002 and March 2002 surveys, three of the six eigenvalues have values greater than one and the three factors jointly account for 67% and 73% of the variance in the data respectively. The results in Tables 5 and 6 show whether and how each of empirical indicators relate to each of those factors. Table 5 gives the

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<sup>1</sup> We also attempted to utilize [principal axis factoring to identify the latent factors](#). Unfortunately, the solution procedure did not converge for every set of surveys. As a result, we will focus on the [principal component-based results in order to maintain consistency of interpretation across each of our data sets](#).

extracted communalities for each indicator. In the case of the March 2003, December 2002, and June 2002 surveys, the two latent factors explain as little as 34 percent and as much as 76 percent of the variation in one of the indicator variables. For the March 2002 and September 2002 surveys, this range is between 46 percent and 83 percent.

Table 6 presents the unrotated and final (rotated) factor loadings [using the Varimax rotation method](#).<sup>2</sup> The final factor loadings for the March 2003, December 2002, and June 2002 surveys indicate that the firm activity outlook and hiring plans variables consistently load very highly on the first factor, but only minimally on the second factor. There is no consistency in the way the remaining variables load in these three surveys. The implication here is that one latent outcome connects anticipated own level activity with the hiring plans of firms. As conditions change, however, there are different forces that influence a second latent outcome.

Further examination of the results in Table 6 shows that the firm activity and hiring variables are positively associated with the first latent factor. The magnitudes of these loadings are also more similar than dissimilar.

The signs and magnitudes of the primary factor loadings for the remaining empirical indicators are slightly less intuitive. These factors are not always positively associated with the second latent outcome and the magnitude of this (marginal) relationship varies across each of the empirical indicators.

## Discussion and Conclusions

The purpose of this paper is to present an exploratory empirical analysis using data on a quarterly business outlook

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<sup>2</sup> Other rotation methods, for example the [Quartimax rotation method](#), provide very similar results.

survey for a relatively small, regional, Midwestern economy. Our primary objective was to identify the number of different latent measures of business sentiment that are inherent in responses provided by business managers. Another objective was to identify which (and how much) each of the empirical indicators commonly used to measure economic activity contribute to each of these underlying factors. The results of our analysis indicate that there are at least two underlying sentiment forces. One of these is explained primarily by the hiring plans as well as planned changes in activity of firms while the other is explained by the remaining empirical indicators.

Our findings present several implications for the analysis of business sentiment. First, it appears that business sentiment is a two-fold phenomenon with the unique characteristics of firms and their immediate to medium term plans represented as one latent process. The other latent process reflects longer terms consideration such as capital expenditure decisions and forces that are impacted by developments in the overall economy. Our findings also indicate that the hiring plans of firms and their own levels of activity contribute relatively evenly to one underlying aspect of the determination of overall business sentiment. However, when evaluating the second latent measure underlying business sentiment, economic agents may want to pay more attention on capital spending plans as well as the outlook for the overall economy.

While our study provides an initial analysis of latent factors in understanding the determination of business sentiment these findings are preliminary, and should

be viewed with caution. However, these limitations also provide some suggestions for future research. One drawback to our study is that our data does not come from the same group of respondents in each quarter. Also, while our data form the basis for an interesting case study, other business sentiment measures for the national economy or other regional economy may obtain different results. Thus, replications of our study that utilize a nationally representative group of respondents would provide a valuable additional to our understanding of the determinants of business sentiment.

Another limitation of our study is one that characterizes the factor analysis literature, in general, namely, that factor analysis identifies how many latent processes there are, but does not specifically identify what those processes represent. Our study, for example, found two major latent factors, one of which was closely associated with each firm's planned future activity and by extension its hiring plans and one that was associated with the remaining expectation indicators that are influenced more by factors beyond an individual firm's control. In the former, we can think of labeling the meaning of the factor as "near to medium" firm-specific plans. However, in the latter, it is not clear what the meaning of this "catch-all" factor really is. And unless those interested in using sentiment indexes can intuitively identify what that factor is, it is difficult to ignore the argument that available aggregate indicators may not represent all the information that can be used to make predictions about future economic performance.

**Table 1: Variable Names and Definitions**

<b>Variable</b>	<b>Definition</b>
Firm	PV that takes a value of 1 if the firm expects firm contraction, 2 for status quo and 3 for expansion
Economy	PV that takes a value of 1 if the firm expects significant local economic contraction, 2 for some local economic contraction, 3 for no local contraction, 4 for some expansion and 5 for significant expectations of local economic expansion
Prices	PV that takes a value of 1 if the firm expects to lower average selling prices, 2 for no change, and 3 for an expected increase in average selling prices
Labor	PV that takes a value of 1 if the firm expects significant contraction of employees, 2 for some employee contraction, 3 for no contraction, 4 for some expansion and 5 for significant expectations of firm labor force expansion
Financing	PV that takes a value of 1 if the firm expects more difficulty in obtaining financing during the next 6 months, 2 for status quo, and 3 for firm expectations of less difficulty in obtaining financing
Capital	PV that takes a value of 1 if the firm expects significant decrease in capital expenditures over the next 6 months, 2 for expectations of the status quo, and 3 for firm expectations of increased capital expenditures over the next 6 months

**Table 2: Basic Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>1st Quartile</b>	<b>Median</b>	<b>3rd Quartile</b>
<b><i>March 2003 Survey</i></b>					
Firm	2.25	0.59	2.00	2.00	3.00
Economy	3.38	0.84	3.00	3.00	4.00
Prices	2.15	0.50	2.00	2.00	2.00
Labor	3.28	0.53	3.00	3.00	4.00
Financing	1.96	0.52	2.00	2.00	2.00
Capital	2.21	0.63	2.00	2.00	3.00
Number of observations		53			
<b><i>December 2002 Survey</i></b>					
Firm	2.42	0.61	2.00	2.00	3.00
Economy	3.37	0.79	3.00	3.00	4.00
Prices	2.29	0.61	2.00	2.00	3.00
Labor	3.31	0.76	3.00	3.00	4.00
Financing	2.00	0.56	2.00	2.00	2.00
Capital	2.19	0.63	2.00	2.00	3.00
Number of observations		52			
<b><i>September 2002 Survey</i></b>					
Firm	2.29	0.52	2.00	2.00	3.00
Economy	3.34	0.65	3.00	3.00	4.00
Prices	2.29	0.58	2.00	2.00	3.00
Labor	3.32	0.65	3.00	3.00	4.00
Financing	2.03	0.63	2.00	2.00	2.00
Capital	2.35	0.63	2.00	2.00	3.00
Number of observations		62			
<b><i>June 2002 Survey</i></b>					
Firm	2.26	0.68	2.00	2.00	3.00
Economy	3.34	0.65	3.00	3.00	4.00
Prices	2.29	0.58	2.00	2.00	3.00
Labor	3.32	0.65	3.00	3.00	4.00
Financing	2.03	0.63	2.00	2.00	2.00
Capital	2.35	0.63	2.00	2.00	3.00
Number of observations		62			

Prices	2.30	0.57	2.00	2.00	3.00
Labor	3.24	0.73	3.00	3.00	4.00
Financing	1.98	0.53	2.00	2.00	2.00
Capital	2.19	0.68	2.00	2.00	3.00

Number of observations      54

**March 2002 Survey**

Firm	2.60	0.49	2.00	3.00	3.00
Economy	3.66	0.64	3.00	4.00	4.00
Prices	2.26	0.59	2.00	2.00	3.00
Labor	3.50	0.63	3.00	3.00	4.00
Financing	1.91	0.57	2.00	2.00	2.00
Capital	2.34	0.59	2.00	2.00	3.00

Number of observations      68

**Table 3: Pearson Correlations (with two-tailed significance levels)**

<b>March 2003 Survey</b>		Firm	Economy	Prices	Labor	Financing	Capital
Firm		1.000	0.357**	0.002	0.452**	0.095	0.484**
Economy		0.357**	1.000	0.092	0.144	0.167	0.140
Prices		0.002	0.092	1.000	0.126	0.023	0.328**
Labor		0.452**	0.144	0.126	1.000	0.249*	0.337**
Financing		0.095	0.167	0.023	0.249*	1.000	-0.093
Capital		0.484**	0.140	0.328**	0.337**	-0.093	1.000
Number of observations		53					
KMO Measure		0.55					
Bartlett Chi-Square Test Statistic (15 dof)		47.26 **					
<b>December 2002 Survey</b>		Firm	Economy	Prices	Labor	Financing	Capital
Firm		1.000	0.366**	-0.233*	0.396**	0.173	0.349**
Economy		0.366**	1.000	-0.142	0.333**	0.265*	0.250*
Prices		-0.233*	-0.142	1.000	-0.112	-0.174	-0.097
Labor		0.396**	0.333**	-0.112	1.000	0.232*	0.452**
Financing		0.173	0.265*	-0.174	0.232*	1.000	0.112
Capital		0.349**	0.250*	-0.097	0.452**	0.112	1.000
Number of observations		52					
KMO Measure		0.74					
Bartlett Chi-Square Test Statistic (15 dof)		39.39 **					
<b>September 2002 Survey</b>		Firm	Economy	Prices	Labor	Financing	Capital
Firm		1.000	0.235*	-0.066	0.299**	0.121	0.179
Economy		0.235*	1.000	-0.004	0.009	0.214*	-0.098
Prices		-0.066	-0.004	1.000	-0.252**	-0.071	0.117
Labor		0.299**	0.009	-0.252**	1.000	0.217*	-0.125
Financing		0.121	0.214*	-0.071	0.217*	1.000	-0.279**
Capital		0.179	-0.098	0.117	-0.125	-0.279**	1.000
Number of observations		62					
KMO Measure		0.51					
Bartlett Chi-Square Test Statistic (15 dof)		28.48 **					
<b>June 2002 Survey</b>		Firm	Economy	Prices	Labor	Financing	Capital
Firm		1.000	0.336**	0.334**	0.561**	0.223	0.470**
Economy		0.336**	1.000	0.216	0.178	0.331**	0.078
Prices		0.334**	0.216	1.000	0.235*	0.018	0.247*



	Labor	0.561**	0.178	0.235*	1.000	0.208	0.331**
	Financing	0.223	0.331**	0.018	0.208	1.000	-0.095
	Capital	0.470**	0.078	0.247*	0.331**	-0.095	1.000
	Number of observations	54					
	KMO Measure	0.68					
	Bartlett Chi-Square Test Statistic (15 dof)	56.15	**				

**March 2002 Survey**

		Firm	Economy	Prices	Labor	Financing	Capital
	Firm	1.000	0.231*	0.008	0.310**	0.247**	0.213*
	Economy	0.231*	1.000	-0.036	0.018	-0.001	-0.049
	Prices	0.008	-0.036	1.000	0.080	-0.063	0.168
	Labor	0.310**	0.018	0.080	1.000	0.125	0.260**
	Financing	0.247**	-0.001	-0.063	0.125	1.000	0.180
	Capital	0.213*	-0.049	0.168	0.260**	0.180	1.000
	Number of observations	68					
	KMO Measure	0.58					
	Bartlett Chi-Square Test Statistic (15 dof)	24.66	*				

\* indicates statistical significance at the 10% level    \*\* indicates statistical significance at the 5% level

**Table 4: Variance Explained**

<b>Initial Eigenvalues</b>				<b>Rotated Eigenvalues</b>			
<b>March 2003 Survey</b>							
				<b>Varimax</b>			
<b>Component</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Component</b>	<b>Total</b>	<b>% Of Variance</b>	<b>Cumulative %</b>
1	2.10	34.97	34.97	1	1.85	30.80	30.80
2	1.19	19.81	54.78	2	1.44	23.98	54.78
3	0.98	16.28	71.06	3			
4	0.88	14.59	85.65	4			
5	0.51	8.46	94.11	5			
6	0.35	5.89	100.00	6			
<b>December 2002 Survey</b>				<b>Rotated Eigenvalues</b>			
				<b>Varimax</b>			
<b>Component</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Component</b>	<b>Total</b>	<b>% Of Variance</b>	<b>Cumulative %</b>
1	2.29	38.17	38.17	1	2.00	33.28	33.28
2	1.02	16.96	55.14	2	1.31	21.86	55.14
3	0.87	14.51	69.65	3			
4	0.72	12.04	81.69	4			
5	0.58	9.61	91.30	5			
6	0.52	8.70	100.00	6			
<b>September 2002 Survey</b>				<b>Rotated Eigenvalues</b>			
				<b>Varimax</b>			
<b>Component</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Component</b>	<b>Total</b>	<b>% Of Variance</b>	<b>Cumulative %</b>
1	1.68	27.99	27.99	1	1.38	23.05	23.05
2	1.24	20.73	48.72	2	1.36	22.71	45.77
3	1.12	18.67	67.40	3	1.30	21.63	67.40
4	0.81	13.58	80.97	4			
5	0.64	10.62	91.59	5			
6	0.50	8.41	100.00	6			
<b>June 2002 Survey</b>				<b>Rotated Eigenvalues</b>			

**Varimax**

Component	Total	% of Variance	Cumulative %	Component	Total	% Of Variance	Cumulative %
1	2.32	38.74	38.74	1	2.10	35.06	35.06
2	1.25	20.84	59.58	2	1.47	24.52	59.58
3	0.86	14.27	73.84	3			
4	0.67	11.13	84.97	4			
5	0.53	8.87	93.85	5			
6	0.37	6.15	100.00	6			

**March 2002 Survey**

**Initial Eigenvalues**

**Rotated Eigenvalues  
Varimax**

Component	Total	% of Variance	Cumulative %	Component	Total	% Of Variance	Cumulative %
1	1.71	28.43	28.43	1	1.65	27.47	27.47
2	1.18	19.62	48.06	2	1.16	19.39	46.86
3	1.02	16.99	65.04	3	1.09	18.18	65.04
4	0.82	13.60	78.64	4			
5	0.69	11.58	90.22	5			
6	0.59	9.78	100.00	6			

**Table 5: Extracted Communalities using Principal Components**  
**Extracted Communalities**

<b>March 2003 Survey</b>	<b>Varimax</b>
Firm	0.642
Economy	0.361
Prices	0.383
Labor	0.535
Financing	0.602
Capital	0.764
<b>December 2002 Survey</b>	<b>Varimax</b>
Firm	0.523
Economy	0.442
Prices	0.590
Labor	0.630
Financing	0.491
Capital	0.632
<b>September 2002 Survey</b>	<b>Varimax</b>
Firm	0.782
Economy	0.677
Prices	0.573
Labor	0.666
Financing	0.594
Capital	0.751
<b>June 2002 Survey</b>	<b>Varimax</b>
Firm	0.734
Economy	0.561
Prices	0.340
Labor	0.544
Financing	0.730
Capital	0.666
<b>March 2002 Survey</b>	<b>Varimax</b>
Firm	0.656
Economy	0.832
Prices	0.743
Labor	0.466
Financing	0.636
Capital	0.569



**Table 6: Factor Matrices**

**Varimax Factor Matrices**

<i>March 2003 Survey</i>	Unrotated		Rotated	
	Factor 1	Factor 2	Factor 1	Factor 2
Firm	0.797	0.084	0.722	0.347
Economy	0.511	0.316	0.601	-0.001
Prices	0.345	-0.513	0.025	0.618
Labor	0.711	0.171	0.695	0.227
Financing	0.254	0.734	0.601	-0.491
Capital	0.716	-0.501	0.347	0.802

**Transformation Matrix**

Factor	1	2
1	0.851	0.525
2	0.525	-0.851

**Varimax Factor Matrices**

<i>December 2002 Survey</i>	Unrotated		Rotated	
	Factor 1	Factor 2	Factor 1	Factor 2
Firm	0.722	0.052	0.658	0.301
Economy	0.660	-0.080	0.540	0.387
Prices	-0.380	0.668	-0.012	-0.768
Labor	0.737	0.293	0.788	0.097
Financing	0.472	-0.518	0.165	0.681
Capital	0.651	0.456	0.790	-0.087

**Transformation Matrix**

Factor	1	2
1	0.877	0.480
2	0.480	-0.877

**Varimax Factor Matrices**

<i>September 2002 Survey</i>	Unrotated			Rotated		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Firm	0.504	0.723	0.073	0.393	0.639	0.468
Economy	0.449	0.145	0.674	-0.157	0.795	-0.142
Prices	-0.436	0.095	0.611	-0.723	0.172	0.144
Labor	0.670	0.151	-0.440	0.795	0.184	-0.032
Financing	0.653	-0.284	0.295	0.194	0.508	-0.546
Capital	-0.397	0.766	-0.076	-0.109	-0.017	0.859

**Transformation Matrix**

Factor	1	2	3
1	0.682	0.635	-0.363
2	0.140	0.374	0.917
3	-0.717	0.677	-0.166

### Varimax Factor Matrices

<i>June 2002 Survey</i>	Unrotated		Rotated	
	Factor 1	Factor 2	Factor 1	Factor 2
Firm	0.854	-0.073	0.794	0.322
Economy	0.528	0.531	0.230	0.713
Prices	0.547	-0.201	0.579	0.069
Labor	0.734	-0.071	0.686	0.270
Financing	0.355	0.777	-0.036	0.854
Capital	0.594	-0.560	0.783	-0.229

#### Transformation Matrix

	Factor 1	Factor 2
1	0.891	0.453
2	-0.453	0.891

### Varimax Factor Matrices

<i>March 2002 Survey</i>	Unrotated			Rotated		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Firm	0.730	-0.332	0.114	0.575	0.527	-0.218
Economy	0.204	-0.663	0.593	-0.059	0.909	0.042
Prices	0.175	0.638	0.552	0.337	-0.081	0.789
Labor	0.666	0.134	0.061	0.669	0.133	0.027
Financing	0.517	-0.165	-0.585	0.471	-0.085	-0.638
Capital	0.625	0.418	-0.063	0.729	-0.164	0.105

#### Transformation Matrix

	Factor 1	Factor 2	Factor 3
1	0.944	0.292	-0.151
2	0.323	-0.736	0.595
3	-0.063	0.611	0.789

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