SMALL BUSINESS INDICATORS OF MACROECONOMIC ACTIVITY

October 2003

William C. Dunkelberg

Jonathan A. Scott

William J. Dennis, Jr.
# Table of Contents

List of Exhibits ................................................................. .iv  
Executive Summary ......................................................... 1  
Introduction ................................................................. 2  
Indicators ................................................................. 5  
1. Employment, Unemployment and Labor Markets. ....................... 5  
   A. Unemployment ....................................................... 6  
   B. Labor Compensation ............................................... 8  
2. Inflation ............................................................... 10  
3. Business Inventories ................................................... 13  
4. Capital Expenditures ................................................... 16  
5. Capital Markets ......................................................... 18  
6. Real GDP Growth ....................................................... 21  
7. Other Indicators ......................................................... 24  
Concluding Observations ................................................... 26  
Bibliography and Related Reading ........................................... 27  
Appendix 1: Principal Component Analysis of the Index of Small Business Optimism ......................................................... 28  
Appendix 2: Small Business Economic Trends Questionnaire ............... 30
LIST OF EXHIBITS

Exhibit 1.1 – Predicted and Actual Change in Private Sector Employment ............6
Exhibit 1.2 – Predicted and Actual Unemployment Rate .............................7
Exhibit 1.3 – Predicted and Actual Change in the Employment Cost Index ...........9
Exhibit 2.1 – Predicted and Actual Change in the CPI ...............................11
Exhibit 2.2 – Predicted and Actual Change in the Core CPI ...........................12
Exhibit 3.1 – Predicted and Actual Change in Inventory Investment .................14
Exhibit 4.1 – Predicted and Actual Change in Capital Outlays for Private Fixed Investment ..................17
Exhibit 5.1 – The Federal Reserve’s Senior Loan Officer Survey and NFIB’s “Credit Harder” ..................19
Exhibit 5.2 – Predicted and Actual Credit Market Tightness .........................20
Exhibit 6.1 – Percent Change in GDP .................................................22
Exhibit 6.2 – Predicted and Actual Change in GDP ..................................22
Exhibit 6.3 – Explanatory Power of Index Components ...............................23
Exhibit 7.1 – NFIB, University of Michigan, and Conference Board Indices ...........24
Exhibit A1.1 – Correlation Matrix of Variables in Small Business Optimism Index and GDP ..................28
Exhibit A1.2 – Principal Component Analysis: Small Business Optimism Index .........29
Exhibit A1.3 – Principal Components: Small Business Optimism Index .............29
EXECUTIVE SUMMARY

- NFIB has collected data on the economic performance of small businesses and their owners’ economic expectations for 30 years. Given that small firms compose a large share of the American economy, they are impacted by the same economic forces and conditions as their larger counterparts, and their flatter structure allows information to reach the decision-maker more quickly (arguably), the experiences and expectations of their owners should provide timely insight into the future course of national economic activity.

- The objective of this monograph is to empirically assess how well NFIB’s small business economic data forecast changes in highly visible measures of macroeconomic activity such as employment, inflation, investment and real GDP growth.

- NFIB’s small business indicators forecast the level of unemployment four to five months in advance with remarkable accuracy. The small business data also anticipate changes in the Bureau of Labor Statistics’ Employment Cost Index modestly well 10 to 11 months in advance.

- The NFIB measures predict changes in price levels very well whether measured by the Consumer Price Index (CPI-U), core CPI or the GDP deflator, and are particularly precise during volatile periods. The predictive model can explain about 80 percent of the variance in price level change (depending on the measure of prices used).

- Business inventories are notoriously difficult to forecast. Small business data could be used with considerable reliability to forecast change in inventory levels until the inventory run-up in the late 1990s and its subsequent bust in the 2000s. The performance of the large firm dominated telecommunications industry and manufacturing during the period degraded the performance of the NFIB indicators.

- NFIB indicators perform reasonably well anticipating changes in capital spending.

- Small-business owners sense changes in credit market conditions with a long lag.

- The 10 variable INDEX of Small Business Optimism forecasts changes in GDP and related measures with reasonable accuracy. The NFIB INDEX predicts these changes considerably better than the Leading Indicators, the University of Michigan Consumer Confidence Index, or the Conference Board Index.

- The NFIB small business indicators have considerable practical value: they provide accurate forecasts, particularly for the unemployment rate and changes in prices, and also forecast other economic phenomena such as changes final sales quite well. They are available months before preliminary official numbers, let alone final official figures. They are not subject to revision.
INTRODUCTION

The National Federation of Independent Business (NFIB) began economic surveys of its membership (about 350,000 firms) in 1973. Since that time, a virtually identical three-page questionnaire has been mailed to a sample of NFIB’s small-business owner members on a regular basis. From October of 1973 through 1985, a random sample of the NFIB membership list was selected and a survey form was mailed to them on the first day of every quarter. This mailing was followed by a second about 10 days later. Since January 1986, the same procedure has been followed monthly rather than quarterly. Responses are collected for about 25 days and duplicates are purged. The yield is 1,300 to 1,800 responses in the first month of each quarter and 500 to 700 responses in the following two months. A monthly report based on the findings from the survey, Small Business Economic Trends, is available from NFIB in both electronic (nfib.com/research) and printed forms.

Many private forecasters as well as government agencies use these small business survey data to obtain a better understanding of emerging trends in the economy. But there has not been a comprehensive, published analysis in the last 20 years that assesses the predictive ability of these data. The objective of this monograph is to assess how well the NFIB survey data lead changes in highly visible measures of macroeconomic activity such as employment, inflation, investment, and real GDP growth.

Because small firms make up such a large fraction of the total economy, it is logical to look to indicators of their collective economic health as reliable indicators of the entire economy’s performance. This argument is reinforced by the notion that the same basic economic forces impact all firms, large or small. Federal Reserve policy, tax-based fiscal policy, shifts in consumer spending, for example, all affect businesses of every size. Therefore, owners of small firms should experience the same economic forces that are experienced by the managers of large firms. The sectoral composition of “large” and “small” firms does differ, with manufacturing


2 A copy of the current questionnaire is included in Appendix 2.

3 The “small business sector” of the economy is estimated to produce 50 percent of the private Gross Domestic Product (GDP) and employ more than half of the private sector labor force. Small business is also credited with producing the bulk of net new jobs created in the U.S. economy. See, www.sba.gov/advo/stats for the latest statistics on the contributions of small business to the American economy.

4 It is argued that the owners of small firms with flatter organizations might sense changes in economic conditions more quickly than their counterparts in large firms, making indicators of the economic health of small firms relatively more responsive to changes in the economic climate.
dominated by larger firms and construction and many services dominated by small firms. Large firms are heavily involved in international trade while small firms are domestically focused. So, from time to time, the economic fortunes of large and small firms may collectively diverge. But, if the same fundamental economic forces impact all firms, large and small, these differences should not seriously compromise the usefulness of small business based indicators for economic analysis.

The NFIB membership reasonably reflects the small-business population. However, members tend to be somewhat older and over-represented in the Midwestern, Plains, and Mountain states. Nevertheless, indicators based on surveys of non-representative samples of economic agents can provide reliable indicators of economic activity. As long as sample frame and response biases are stable over time, thereby not disturbing the relationship between changes in the indicators and changes in the economic activity measures of interest, the indicators will be reliable predictors. Therefore, the practical value of data from the NFIB surveys are that: (1) they are not subject to revision since they are taken at one point in time; (2) they can be empirically related to changes in macroeconomic indicators that are historically correct (after all revisions are in) and, (3) the sample of units included need not be representative of all units in the population nor do all units in the sample need to respond to the survey.

The demographic distributions of the NFIB sample appear to have remained reasonably stable over time. The best example is employee size data. Today’s employee size distribution is virtually identical to that recorded in the early days of the survey. Somewhat over 40 percent in both time periods employ five or fewer including the owner(s), about seven percent had 40 employees or more. There is a major exception to this stability. Industry distribution has changed dramatically. Retailers represented over one-third of the NFIB respondent population in the 1970s, but less than one in four currently. The narrowly-defined services population has moved sharply in the opposite direction. This change in the NFIB sample reflects the change occurring in the entire business population. Relative to the population therefore, the NFIB sample appears reasonably steady. That means any bias in the NFIB sample should not disturb the relationship between changes in the indicators and changes in the economic activity of interest.

In the following sections, the contribution of the NFIB indicators to the prediction of dependent variables of interest is quantified using multiple regression analysis. For simplicity, standard errors are not presented in the equations below. All variables are significant at the 95 percent level unless otherwise indicated. No specific theory, such as that underlying the consumption function in macroeconomics, is behind the equations. Still, many of the NFIB indicators have strong theoretical counterparts such as those described by the generalized stock adjustment model. The analysis is a quantification of the parameters of empirical relationships that would be observed in the use of the NFIB measures as leading indicators. If the relationship between the economic variable and the NFIB indicator is reasonably stable, it becomes possible to make quantitative estimates or predictions of the values of the economic variables based on the NFIB survey results.


2 Many research papers report varying levels of significance for estimates of coefficients, such as notations indicating 90 percent, 95 percent and 99 percent levels of significance. In this monograph, one level of significance is applied to all estimates. Except where noted, all coefficients are significant at the 95 percent level, one tail test, since the expected sign is always known. All equations are estimated using data from 1974:1 to 2003:2 unless otherwise indicated.
The quarterly survey data used in this analysis are collected in the first month of each quarter — January, April, July and October. This timing builds in an implicit “lead” of at least one to two months into a forecast. For example, if the January survey predicts the dependent variable of interest, say GDP growth, in the empirical relationship on a concurrent basis, then it actually predicts the value of the dependent variable for January, February and March. If NFIB data lead one-quarter, then the January survey anticipates the second quarter (April - June) value of the dependent variable. Thus, the NFIB survey data lead the GDP growth number by two months plus the number of lagged quarters. Furthermore, the value of the dependent variable may not be officially known (first estimate) for several weeks after the end of the quarter. That means the NFIB data lead the variable of interest’s official release, sometimes by several quarters.

Leads are denoted by negative subscripts on the variables. A subscript of -1 means that the NFIB data lead by one quarter (plus the built-in two months discussed above), -2 by two quarters (plus the two months), and so on. The forecasting literature often refers to such a relationship as a “lag,” meaning that the current value of the variable to be predicted is empirically determined by an earlier value of the NFIB variable. If the first quarter reading of the NFIB variable determines the second quarter value of the change in GDP, this is a “lag” in the equation, \( \%\Delta GDP = a + b \text{NFIB}_{-1} \). The percentage change in GDP depends on the value of the NFIB variable in the prior quarter. Thus, changes in GDP in the current period depend on changes in the NFIB variables in earlier periods and the NFIB variables lead changes in GDP. This lead is represented by a “lag” of the NFIB variable in the equation, meaning that values of the NFIB variables occur before the relevant value of the dependent variable of interest.
INDICATORS

1. EMPLOYMENT, UNEMPLOYMENT AND LABOR MARKETS

Because small firms play such a critical role in the job creation process, the NFIB employment measures should have a strong relationship to measures of aggregate employment growth and other labor market indicators. Two survey measures are used to explain variations in employment, the net percent of owners who report plans to expand total employment at their firms (HIREPLN) and the percent of owners who report at least one hard-to-fill job opening (JOBOPEN). The premise underlying the first measure is that the larger the percent of owners planning to expand total employment in the months following the survey, the larger the expected employment growth in the current and future periods.

A high level of unfilled job openings indicates disequilibrium between the desired level of employment at the firm and its actual level. This disequilibrium takes time to resolve (collecting applications, interviewing candidates, etc.). When the percent of owners reporting one or more hard-to-fill job openings is high, owners have more difficulty getting employees. Thus, the premise underlying the second measure is that, other things equal, the percent of owners with hard-to-fill job openings will be negatively associated with the growth in employment.

Two commonly used measures of growth in total employment are the quarterly change in total employment ($\Delta EMPT$) and the quarterly change in private sector employment ($\Delta EMPP$). NFIB’s hiring plans indicator (HIREPLN) performs as expected, with a higher net percent of firms planning to expand employment associated with stronger growth in employment over the survey period. The percent of owners with hard-to-fill openings (JOBOPEN) also performs as expected, as higher percentages with an opening mean it is harder to recruit

---

7 The survey question for HIREPLN data reads: “In the next three months, do you expect to increase or decrease the total number of people working for you?”

8 The survey question for JOBOPEN data reads: “Do you have any job openings that you are not able to fill right now?”

9 The net percent of employers planning to increase total employment will be smaller than the number of firms hiring new employees, since many firms will be replacing workers, leaving total employment unchanged. They might hire workers, but terminate even more workers, reducing total employment. In recent surveys, between 45 percent and 50 percent of the owners report looking for at least one employee each month.

10 The tighter the job market, the higher the percent of owners who will report hard to fill job openings. The link to employment gains is less clear, since hard to fill openings appear to be linked to the availability of skilled workers. The question asks about “qualified” workers and most hires are replacement workers, not hires that expand total employment, making results more difficult to interpret. Even with a lag, higher levels of past job openings are still negatively related to employment growth in the current period.
employees. But these indicators, individually and jointly, do not predict well the change in the level of employment (Equation 1.1). The NFIB variables perform better when predicting private sector employment changes as might be expected (Equation 1.2). Still, neither equation forecasts changes in employment levels well, with or without leads. Small-business owners simply fail to anticipate the very large changes (volatility) in employment. The predicted change in total employment from Equation 1.1 is plotted against the actual change in Exhibit 1.1.

$$\Delta EMPT = 1.57 + .18 HIREPLN - .08 JOBOPEN \quad R^2 = 13\%$$

$$\Delta EMPP = 1.59 + .27 HIREPLN - .11 JOBOPEN \quad R^2 = 20\%$$

Exhibit 1.1

**Predicted and Actual Change in Private Sector Employment, 1974:1 — 2003:2**

A. UNEMPLOYMENT

Although the change in employment is not well anticipated by the NFIB labor market measures, the national unemployment rate (UNE) as reported monthly by the Bureau of Labor Statistics (BLS) is accurately predicted by the same two variables. Apparently these variables capture shifts in the balance between movements into and out of the labor force (changes in the labor force participation rate) and the creation and destruction of jobs. The best fit is obtained with NFIB variables leading by one-quarter. Strengthening hiring plans produce an increase in employment, but not necessarily a decrease in unemployment. Unemployment additionally depends on the labor force participation rate meaning that employment and the unemployment rate can — and often do — move in the same rather than opposite directions. Rising reports of hard-to-fill job openings indicate a reduced unemployment rate [Equation 1.3]. The plot of the predicted unemployment rate based on Equation 1.3 against the actual unemployment rate is shown in Exhibit 1.2.

$$UNE = 10.22 - .04 HIREPLN, - .17 JOBOPEN, \quad R^2 = 72\%$$
The percentage change in total (or private, non-farm) employment has a much higher variance than the unemployment rate. This volatility explains at least in part the difference in predictive power of the independent variables. Larger firms contribute substantially more to the volatility in total employment over the business cycle than do small firms. It is less likely, therefore, that the employment decisions of small business owners would anticipate well the changes in total employment. However, owners do sense “tightness” in their local labor markets and, collectively, do a very solid job of anticipating changes in the unemployment rate over the business cycle.

Exhibit 1.2

Predicted and Actual Unemployment Rate, 1974:1 — 2003:2

The Help Wanted Index (HWI) should be highly correlated with the percent of owners reporting hard-to-fill job openings and the strength of hiring plans. The NFIB variables do carry the expected sign when regressed against the Index, but explain only 32 percent of the variation in it [Equation 1.4]. Small employers often use employee networks (hiring friends, family members, etc.) to locate, screen and qualify employees, not want ads or employment agencies. If larger firms with more formal personnel departments are more likely to use help wanted ads and have more cyclical employment, the correlation would be expected to be weak.

\[
\text{HWI} = 54.92 + 0.47 \text{HIREPLN} + 0.94 \text{JOBOPEN} \quad R^2 = 32\%
\]


B. LABOR COMPENSATION

The major cost incurred by small business is usually labor, although changes in labor costs are less volatile than changes in energy or other business costs. Overall, the path of labor costs drives the price level because firms that cannot cover labor costs will fail. Since April 1982, the NFIB survey has asked a series of questions about past and planned labor cost changes in addition to the indicators of the demand for labor.

WAGEUP is the net percent of owners reporting that they raised labor compensation in the prior three-month period; PLNWAGE is the net percent of owners planning to increase compensation during the next three-month period. Both are seasonally adjusted. WAGEUP and PLNWAGE are direct measures of actual and anticipated changes in labor compensation (wages and benefits). These variables should have a positive relationship to macro measures of labor compensation, but they should occur prior to (lead) actual events because implementation of compensation changes takes time (especially benefit changes).

JOBOPEN and HIREPLN, described above, are measures of the strength of the demand for labor and tightness in the labor market. Both should be positively related to measures of labor cost (wages and benefits).

The level of the Bureau of Labor Statistic’s Employment Cost Index (ECI) is well anticipated by the NFIB data. Hiring plans and job openings explain 59 percent of the variation in the ECI with a two-quarter lead [Equation 1.5]. Similarly, reports of past and planned changes in employee compensation (WAGEUP and PLNWAGE) explain 58 percent of the variation in the ECI, but with a three-quarter lead [Equation 1.6]. Although the fit of the equations is fairly good, the ability of the NFIB variables to predict the ECI outside of the sample period is compromised by differences in the two methodologies. The ECI is an unbounded trend variable that continually rises, sometimes faster, sometimes more slowly, while the NFIB variables are percentages that move within a limited range. Equation 1.7 uses the percentage change in the ECI as the dependent variable [Exhibit 1.3]. The explanatory power of a difference or percentage change equation is always lower since the advantage of a time trend’s presence is eliminated. However, Equation 1.7 does a fair job anticipating directional changes (with a three quarter lead), though it does not capture the size of the fluctuations in the ECI.

[1.5] $ECI = 50.00 + .82 HIREPLN_t + 2.64 JOBOPEN_t$ $R^2 = 59$

[1.6] $ECI = 88.39 + 4.72 WAGEUP_t - 4.69 PLNWAGE_t$ $R^2 = 58$

[1.7] $(\% \Delta ECI) = 1.78 - .04 WAGEUP_t + .17 PLNWAGE_t$ $R^2 = 24$

Italicized numbers are not significant at the .95 level.

Overall, the NFIB labor market indicators are highly correlated with two of three important macro labor market variables. Movements in the ECI can be reasonably well anticipated with the NFIB survey measures while the unemployment rate is very well anticipated by them. The lead-time in the “best fit” relationships makes the survey measures particularly useful indicators of future economic developments as measured by popular government labor market statistics.

---

13 The survey question for the WAGEUP data reads: “Over the past three months, did you change average employee compensation (wages and benefits but NOT Social Security, U.C. taxes, etc.)?”

14 The survey question for PLNWAGE data reads: “Do you plan to change average employee compensation (wages and benefits but NOT Social Security, U.C. taxes, etc.) during the next three months?”
Exhibit 1.3

Predicted and Actual Change in the Employment Cost Index
1985:1 — 2003:2
2. INFLATION

Along with “full employment,” inflation is the major concern of economic policy. Two survey questions address this economic phenomenon: reported changes in average selling prices over the past three months (PASTP) and reported plans for raising selling prices in the next three months (PLANP). The variable PASTP is the percent of owners who report raising average selling prices less the percent who report lowering prices (the net percent, seasonally adjusted). PASTP should impact current Consumer Price Index (CPI) changes, since price changes implemented in the three months prior to the survey will impact price measures in the current period. PLANP, the percent of owners planning to increase average selling prices less the percent planning to reduce average selling prices, should lead the CPI measures. Plans from the prior quarter should show up as changes in prices during the current period.

The NFIB survey also asks for the actual magnitude of past and planned price changes in categorical classifications. During periods of rapid price changes, movements in the tails of the distribution of reported price changes should have an important impact on changes in the average price level. The information in the tails of the distribution, that is to say, the incidence of extremely high or extremely low reports of actual and planned selling price changes, adds substantial predictive content. The findings also suggest that the process of inflation is gradual. The R² statistics on the equations with longer lead structures (not shown) do not deteriorate substantially as the leads are lengthened. Thus, plans to raise prices expressed several quarters earlier or reports of actual changes in average prices in recent past quarters appear to take some time to feed into the CPI.

PASTP>5 is the percent of firms reporting average price hikes of five percent or more in the past three months, and PLNP>5 is the percent of firms planning to raise prices by an average of 5 percent or more in the next three months (not seasonally adjusted). ∆%CPI is the annualized percentage change in the headline Consumer Price Index. As shown in Equation 2.1, the NFIB price measures anticipate most of the quarterly variation in the CPI. Exhibit 2.1 plots the predicted quarterly CPI inflation rate against the actual percentage change in the CPI.

\[
\%\Delta CPI = -0.20 + 0.07 \text{PASTP} + 0.08 \text{PASTP}>5 + 0.23 \text{PLANP}>5 \quad R^2 = 78\%
\]

15 The survey question for PASTP data reads: “How are your average selling prices now compared to three months ago?”

16 The survey question for PLANP data reads: “In the next three months, do you plan to change the average selling prices of your goods and services?”

17 The categories reported are: (1) less than 1%; (2) 1-1.9%; (3) 2-2.9%; (4) 3-3.9%; (5) 4-4.9%; (6) 5-7.9%; (7) 8-9.9%; (8) 10% or more.
Converting these coefficients into Beta Coefficients (denoted $β$), the most important variable in the model is PASTP ($β = 0.41$), followed by PLANP>5 ($β = 0.34$), and finally, PASTP>5 ($β = 0.21$). Reported past changes are major determinants of the percentage change in the CPI for the current period. But plans to change prices, leading one quarter, also exert a heavy influence on the current period inflation measure.

\[
\text{EXHIBIT 2.1} \quad \text{PREDICTED AND ACTUAL CHANGE IN THE CPI,} \quad 1974:1 — 2003:2
\]

Substituting the core CPI, $\%\Delta\text{CORECPI}$, for the $\%\Delta\text{CPI}$, to eliminate the volatile energy and food components of the CPI, produces a similar relationship [Equation 2.2]. The NFIB variables were not able to capture the decline in the CPI in the 1980s due to energy price declines, but did capture the tumble in the CPI in 2002. Excluding energy and food, the NFIB measures perform well in the late 1980s, but still predict a major deceleration in the inflation rate in 2002 that does not appear in the Core CPI (see Exhibits 2.2 and 2.3).

\[
\text{[2.2]} \quad \%\Delta\text{CORECPI} = -1.15 + 0.09 \text{PASTP} + 0.32 \text{PASTP}>5 + 0.06 \text{PLANP}>5, \quad R^2=79\%
\]

\* While regression coefficients cannot be compared to determine which is the most important predictor in an equation, standardized regression coefficients can be compared. Standardized coefficients can be computed as follows: Beta Coefficient = (Regression Coefficient x Standard Deviation of X)/Standard Deviation of Y. If all variables in a regression are converted to standard normal variables, the resulting coefficients are Beta Coefficients.
Two other important measures of inflation, based on the GDP deflator (\(\% \Delta GDP\text{DEFLATOR}\)) and the Personal Consumption Expenditures deflator (\(\% \Delta PCE\text{DEFLATOR}\)), are also well anticipated by NFIB owner reports of past and planned future price changes. Equations 2.3 and 2.4 illustrate how well the NFIB survey measures anticipate changes in these popular inflation measures.

\[
\begin{align*}
\% \Delta GDP\text{DEFLATOR} &= -1.74 + .10 \text{PASTP} + .24 \text{PASTP}>5 + .08 \text{PLANP}>5 \quad R^2 = 81\% \\
\% \Delta PCE\text{DEFLATOR} &= -1.71 + .07 \text{PASTP} + .22 \text{PASTP}>5 + .12 \text{PLANP}>5 \quad R^2 = 80\%
\end{align*}
\]

When the time period is shortened to exclude the volatile 1970s, the variables reflecting the tails of the distribution become insignificant and PASTP and lagged PLANP explain the same fraction of the variance in the CPI. Excluding the 1970s [Equation 2.5] reduces the \(R^2\) to 75 percent and the tail variables are not significant. From 1990 to 2002, the \(R^2\) falls to 41 percent [Equation 2.6]. Though the "noise" remains, there is much less predictable variance in the price measures during the 1990s and into 2000 compared to prior decades. The coefficients in the three regressions covering the various sample periods are consistently similar, suggesting that if inflationary forces were to reappear, the model based on NFIB survey responses would quickly pick it up.

\[
\begin{align*}
\% \Delta CPI &= -.70 + .125 \text{PASTP} + .152 \text{PLANP} \quad [1980-2002] \quad R^2 = 75\% \\
\% \Delta CPI &= -.14 + .095 \text{PASTP} + .126 \text{PLANP} \quad [1990-2002] \quad R^2 = 41\%
\end{align*}
\]

Overall, small-business owner reports of past and planned price changes do a very good job of anticipating inflation. Reports of actual price changes in prior months and plans to raise prices in the current quarter expressed in the previous quarter both make substantial contributions to the anticipation of changes in the various price indices.
3. BUSINESS INVENTORIES

Changes in non-farm business inventories are notoriously difficult to predict. These changes are the direct result of owner decisions to actively increase or decrease inventories, and of consumer (customer) decisions to buy more or buy less in a given period of time. Mismatches between these two sets of decisions can produce wide swings in business inventories. The basic model in macroeconomics for examining inventory investment is the stock adjustment model: the desired stock of inventories depends on expected sales in the future period, the cost of holding inventories, and the ratio of inventory to sales that is desirable for that particular type of business. Comparing the desired stock to the stock on hand produces a gap that, if positive, must be closed by additional inventory accumulation and, if negative, must be closed by reducing inventories.

The net percent of owners characterizing their current stocks as “too low” (INVSAT) is a direct proxy for the gap between desired and actual stocks. The percent of owners planning to intentionally add to inventory stocks (INVPLN) is driven directly by the pervasiveness among small businesses of a gap between desired and actual inventory stocks.20

Equation 3.1 relates the actual change in business inventories (∆INV) as reported in the National Income and Product Accounts to the NFIB survey measures of inventory satisfaction (INVSAT), the net percent of owners reporting that current holdings are too low, and inventory plans (INVPLN), the net percent of owners planning to intentionally increase inventory holdings. The best model incorporates a lead of one quarter for the NFIB measures. A plot of the actual and predicted values from Equation 3.1 is shown in Exhibit 3.1.

\[
3.1 \quad \Delta INV = 19.41 + 2.41 \text{INVSAT}_t + 4.01 \text{INVPLN}_t \quad \text{R}^2 = 32\%
\]

19 The survey question for INVSAT data reads: “At the present time, do you feel your inventories are too large, about right, or inadequate?”

20 The survey question for INVPLN data reads: “Looking ahead to the next three to six months, do you expect on balance, to add to your inventories, keep them about the same, or decrease them?”
EXHIBIT 3.1
PREDICTED AND ACTUAL CHANGE IN INVENTORY INVESTMENT, 1974:1 — 2003:2

The NFIB inventory model tracks changes in business inventory fairly well, except for the period 1997-2002 where it consistently underestimates the buildup of inventories and then misses the dramatic reduction in 2002. This poor performance in 1997-2002 may be the result of inventory changes confined to sectors of the economy that are dominated by large firms, such as manufacturing and telecommunications. As the economy had experienced “disinflation” for two decades, small-business owners certainly expected no gain from inventory building in anticipation of rising prices. Re-estimating the equation through 1997 provides virtually identical coefficients, but much higher explanatory power [Equation 3.2]:

\[
\Delta \text{INV} = 20.5 + 2.35 \text{INVSAT}_{-1} + 3.05 \text{INVPLN}_{-1}
\]

\[R^2 = 42\%
\]

Economic growth faltered substantially in the second half of 2000, signaling an end to the frenetic growth that typified the last half of the decade. Large excess inventory holdings were one result. Cash flow also came under pressure and the gap between S&P reported operating profits and NIPA profit measures diverged. This helped trigger record reductions in inventories, apparently mostly among larger firms. However, as of March 2003, NFIB owners for 24 straight months more often reported reductions than additions to inventory holdings. (There were 41 consecutive months of net reductions in the 1990-91 recession.) The preceding four months, beginning in December, 2000, saw the net percent adding to inventory at either one or zero percent. Unable to raise prices, the carrying costs of inventory (the nominal interest rate

---

Adding a dummy variable for this period, 0 through 1996, +1 from 1997-2000 and –1 from 2000 through 2002, raises the \(R^2\) for the equation to .61.

During the last half of the decade, reported pro forma operating profits for the S&P 500 grew substantially faster than NIPA profit measures. This divergence supported the unprecedented rise in equity markets. Although closing, the gap still persists. Part of the process of dealing with the need for liquidity, masked by pro forma accounting when the economy weakened, was a massive liquidation of inventory.
minus the inflation rate) became positive and, in some industries, substantial. These factors triggered a record decumulation of inventory no longer needed to support economic growth, growth that slowed dramatically in the second half of 2000. The predictive power of the model was substantially degraded by events during this boom and bust period, a period that included the largest period of inventory liquidation in modern economic history.

Beginning in the fourth quarter of 1982, NFIB began asking about actual inventory changes in the preceding 3-month period. ACTUAL is the seasonally adjusted net percent of firms reporting an increase in inventory holdings over the past three months.\(^23\) There is no lead for this variable as it reports actual behavior in the months preceding the survey. Adding this variable to the inventory satisfaction variable and the inventory plans variable yields an improved fit [Equation 3.3]:

\[
\Delta \text{INV} = 19.0 + 3.94 \ \text{INVSAT}_t - 1 + 3.84 \ \text{INVPLN}_t - 1 + 4.24 \ \text{ACTUAL} \quad R^2 = 50\%
\]

Considering the volatility of inventory investment in the NIPA accounts, this equation explains well the actual dollar amount of inventory investment. Since NFIB members cover all sectors (NAICS) of the economy, better measures of inventory behavior for predictive purposes might be obtained by selecting firms to include in the creation of the survey indicators that are from inventory intensive sectors, such as manufacturing and wholesale. However, sample size considerations prevent creation of industry based indicators.

\(^{23}\) The survey question for ACTUAL data reads: “During the last three months, did you increase or decrease your inventories?”
4. CAPITAL EXPENDITURES

Although individual small firms rarely make massive capital outlays, the accumulation of small outlays by six million small-business employers can have a substantial impact on aggregate capital spending in the U.S. The median outlay for NFIB members is $20,000 (in the prior six months), typically reported by 55 percent to 70 percent of the owners from quarter to quarter. One percent of the owners typically report outlays in excess of $500,000 (in the prior six months).

The relationship between gross private domestic investment (CAPX%) and the NFIB indicators CXPLAN, the percent of owners planning capital outlays in the next three to six months, and CXPAST, the incidence of past capital spending, is not particularly strong [Equation 4.1]. Incorporating leads does not improve the $R^2$. The results fit the predictions that would follow from a typical capital stock adjustment model: higher levels of past spending (CXPAST) are associated with lower levels of spending in the current period since the prior expenditures brought the actual stock closer to that desired by owners. The higher the percent of owners reporting that they planned outlays in future months (CXPLAN), the higher the actual level of expenditures in the months following the survey, an indication that the desired stock of capital must have risen relative to current capacity.26

Narrowing the definition of investment spending improves the fit. The major gain comes from the shift from the gross private domestic investment measure (CAPX%) to a measure of private fixed investment (PRIVFIXED% or NONRESPRIVFIX%) or equipment only (NONRESEQUIP%) [Equations 4.2, 4.3 and 4.4]. All equations are estimated beginning with 1979, the first year that past expenditure data are available.

| Equation | Constant | CXPLAN | CXPAST | $R^2$
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[4.1] CAPX%</td>
<td>4.18</td>
<td>2.16</td>
<td>-1.22</td>
<td>12%</td>
</tr>
<tr>
<td>[4.2] PRIVFIXED%</td>
<td>-10.17</td>
<td>1.74</td>
<td>-.73</td>
<td>31%</td>
</tr>
<tr>
<td>[4.3] NONRESPRIVFIX%</td>
<td>-27.20</td>
<td>1.50</td>
<td>-.28</td>
<td>32%</td>
</tr>
<tr>
<td>[4.4] NONRESEQUIP%</td>
<td>-16.61</td>
<td>1.80</td>
<td>-.62</td>
<td>28%</td>
</tr>
</tbody>
</table>

Italicized numbers are not significant at the .95 level.

The survey question for CXPLAN data reads: Looking ahead to the next three to six months, do you expect to make any capital expenditures for plant and/or physical equipment?24

The survey question for CXPAST data reads: During the last six months has your firm made any capital expenditures to improve or purchase equipment, buildings or land?25

The capital stock adjustment model specifies that expenditures in a given period are proportional to the gap between the actual stock of capital on hand and the “desired stock” based on expected sales for example. Past expenditures raise the actual stock and, other things equal, lower the gap between desired and actual stocks. Plans to make expenditures, given the stock, reflect a larger gap, likely due to an increase in the desired stock of capital driven by more optimistic expectations for sales and demand.26
Profitability is an important determinant of capital spending in most macroeconomic models. Adding the net percent of owners reporting that earnings in the prior quarter were higher than in the quarter before (EARN\(^7\)) adds explanatory power and leaves the other coefficients fundamentally unchanged in most cases. Again, narrowing the definition of capital spending to fixed investment measures, with or without residential structures [Equation 4.5 vs. 4.6 or Equation 4.5 vs. 4.7], improves the explanatory power of the equation as does a focus on equipment [Equation 4.8]. The predictions from Equation 4.6 are shown in Exhibit 4.1.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Constant</th>
<th>CXPLAN</th>
<th>CXPAST</th>
<th>EARN</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[4.5] CAPX%</td>
<td>24.02</td>
<td>1.40</td>
<td>-1.01</td>
<td>.47</td>
<td>15%</td>
</tr>
<tr>
<td>[4.6] PRIVFIXED%</td>
<td>-4.21</td>
<td>1.51</td>
<td>-.67</td>
<td>.14</td>
<td>32%</td>
</tr>
<tr>
<td>[4.7] NONRESPRIFFIX%</td>
<td>-20.09</td>
<td>1.21</td>
<td>-.20</td>
<td>.18</td>
<td>33%</td>
</tr>
<tr>
<td>[4.8] NONRESEQUIP%</td>
<td>-7.39</td>
<td>1.45</td>
<td>-.32</td>
<td>.21</td>
<td>31%</td>
</tr>
</tbody>
</table>

Exhibit 4.1
PREDICTED AND ACTUAL CHANGE IN CAPITAL OUTLAYS ON PRIVATE FIXED INVESTMENT, 1979:1 — 2003:2

Restricting the estimation period to 1990-2002 provides much the same results [Equations 4.9 – 4.12]. Though greater variability in capital spending appeared in the 1970s than in later periods, the stability of the equations suggest that the NFIB contribution to anticipating changes in capital spending has changed little over time.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Constant</th>
<th>CXPLAN</th>
<th>CXPAST</th>
<th>EARN</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[4.9] CAPX%</td>
<td>20.30</td>
<td>1.56</td>
<td>-.06</td>
<td>.28</td>
<td>11%</td>
</tr>
<tr>
<td>[4.10] PRIVFIXED%</td>
<td>-17.12</td>
<td>1.36</td>
<td>-.40</td>
<td>.01</td>
<td>29%</td>
</tr>
<tr>
<td>[4.11] NONRESPRIFFIX%</td>
<td>-15.25</td>
<td>1.37</td>
<td>-.36</td>
<td>.24</td>
<td>39%</td>
</tr>
<tr>
<td>[4.12] NONRESEQUIP%</td>
<td>-11.78</td>
<td>1.14</td>
<td>-.28</td>
<td>.18</td>
<td>22%</td>
</tr>
</tbody>
</table>

\(^7\) The question asked was: "Were your net earnings or "income" (after taxes) from your business during the last calendar quarter higher, lower, or about the same as they were for the quarter before?"
5. CAPITAL MARKETS

Most small firms rely primarily on the entrepreneur’s own savings or those of friends and relatives to finance their formation. Once a business is operating, however, the cost and availability of capital through conventional credit markets usually becomes critical. The NFIB survey asks about the ease an owner experienced obtaining the most recent loan relative to attempts in the prior quarter (CREDHARD).\textsuperscript{28} CREDHARD is the net percent of owners who say that it was “harder” to get the loan on the most recent attempt. Aggregated over all business owners borrowing short-term, the result serves as a proxy for the tightness of monetary policy in the months prior to the survey. The demand for short-term credit varies substantially over the period of analysis, from a high of 53 percent in 1979 to a low of 29 percent in 1999. To adjust for this, CREDHARD/BOR is CREDHARD normalized by the percent of firms reporting that they borrow on a regular basis (BOR).

Monetary policy is implemented through bond market transactions conducted by the Federal Reserve in New York. Thus, the first banks to “feel” a change in policy should be the money center banks. The Federal Reserve surveys senior loan officers in about 50 money center banks and ascertains the percent of these loan officers who report “tightening” or “loosening” the lending standards for “small” firms, presumably in response to changes in market conditions created by the Fed or permitted by Fed policy. These changes in credit market conditions are transmitted to the remaining 8,000 plus commercial banks, ultimately being reflected in NFIB owner reports of “easier” or “harder” credit conditions. The percent of money center bank senior loan officers who report tightening lending conditions for small businesses (net of those reporting easier terms) is used as a predictor to explain variations in the NFIB data on “harder to get the last loan.” With little theoretical guidance other than “long and variable lags” in monetary policy, lags of varying lengths are tested looking for the highest $R^2$. The $R^2$ peaks in both regressions with a 17 quarter lag (over four years!). The coefficient and the $R^2$ peak simultaneously (Exhibit 5.1).

\begin{align*}
\text{[5.1]} \quad \text{CREDHARD/BOR} &= 9.40 + 0.18 \text{ FED}_{-17} \\
\text{[5.2]} \quad \text{CREDHARD} &= 3.32 + 0.07 \text{ FED}_{-17} \\
\text{\textit{R}^2} &= 34\% \\
\text{\textit{R}^2} &= 35\%
\end{align*}

\textsuperscript{28} The CREDHARD question asked is “If you borrow regularly (at least once every three months) as part of your business activity, how does the interest rate paid on your most recent loan compare with that paid three months ago? Are these loans easier or harder to get than they were three months ago?”
Plots of the predicted percent of owners who reported credit "harder" to get are shown in Exhibit 5.2. (The period over which forecasts are available is limited due to the availability of Fed data and the 17 quarter lag). In simple terms, this relationship indicates that changes in credit availability reported by senior loan officers of money center banks take 17 quarters to have their maximum impact on credit availability for small-business owners. Since policy transmission effects are not one quarter events, a more complex distributed lag model that incorporates many past quarterly observations on loan officer reports may produce higher explanatory power. But, it would not alter the conclusion that small-business borrowers detect tighter or easier borrowing conditions long after money center banks implement such policy changes in response to market conditions. Unfortunately, Fed Loan Officer survey data are not available during the volatile 1970s and early 1980s (see Exhibit 5.2). However, even in the "tame" credit markets of the 1990s, the relationship between the Fed survey and CREDHARD with a 17 quarter lag is clear (Exhibit 5.2). If this relationship is any commentary on the span between the time money center banks sense a change in market conditions and when it filters out to the smaller and rural banks in the system, lags are long indeed, and variable, reaching the most sophisticated banks first and the small banks last.
Exhibit 5.2

Credit Market Tightness
6. **Real GDP Growth**

The most widely reported indicator derived from the NFIB survey is the Index of Small Business Optimism (INDEX). The ten questions included in the INDEX have been part of the questionnaire since October 1974. They include:

- Good Time for Small Business Expansion (GTEX)\(^{29}\)
- Outlook For The Economy: Better Or Worse (EXBUS)\(^{30}\)
- Net Earnings Trends: Higher Or Lower (EARN)\(^{31}\)
- Expected Real Sales Volume: Higher Or Lower (EXSALES)\(^{32}\)
- Plans To Increase/Decrease Employment (HIREPLN)
- Job Openings Not Able To Fill (JOBOPEN)
- Current Inventory Satisfaction: Too High Or Low (INVSAT)
- Planned Inventory Change: Increase or Decrease (INVPLN)
- Expected Change In Credit Market Conditions: Easier or Harder (EXCRED)\(^{33}\)
- Planned Capital Expenditures (CXPLAN)\(^{34}\)

Most of the questions used to construct the INDEX are symmetric, such as whether the owner expects the economy to be “better” or “worse” in the next six months or plans to "increase" or "decrease" the total number of people working for the firm. For these seven questions, a “balance” variable (or diffusion index) is formed. The percent of unfavorable responses ("worse," "reduce") is subtracted from the favorable responses ("better," "increase") to provide a net percent. For the three other questions, only the percent of owners offering an affirmative answer is included, for example, the percent planning capital spending or reporting that the current period is a good time for small business expansion. Some variables have strong seasonal patterns such as hiring plans, though others have little or none, such as capital spending plans or expected credit conditions. All 10 variables are seasonally adjusted. The INDEX is computed as the sum of the 10 seasonally adjusted components plus 100 to keep the INDEX from becoming negative. Finally, the INDEX is based to its average value in 1986 (1986=100), the middle of the 1980s expansion.

\(^{29}\) The question asked is: “Do you think the next three months will be a good time for small business to expand substantially?”

\(^{30}\) The question asked is: “About the economy in general, do you think that six months from now general business conditions will be better than they are now, about the same or worse?”

\(^{31}\) The question asked is: “Were your net earnings or “income” (after taxes) from your business during the last calendar quarter higher, lower, or about the same as they were the quarter before?”

\(^{32}\) The question asked is: “Overall, what do you expect to happen to the real volume (number of units) of goods and/or services that you will sell in the next three months?”

\(^{33}\) The question asked is: “Do you expect to find it easier or harder to find your required financing during the next three months?”

\(^{34}\) The surveys began in October, 1973. This question was added a year later and consequently, the INDEX is available from 1974:Q4 with this question included.
Perhaps the most important indicator of an economy’s overall economic health is growth in the Gross Domestic Product (GDP). Two GDP measures are used to assess the INDEX’s forecasting capacity, the percentage change in real GDP quarter-to-quarter (annualized), %∆GDP, and the quarter-over-quarter change in real GDP (from 1st quarter to 1st quarter, etc.), %∆GDPQQ.

The quarterly percentage change in GDP is quite volatile (Exhibit 6.1) and the INDEX does not do particularly well explaining the actual magnitude of the change [Equation 6.1]. The predicted values are plotted against the actual quarterly change in real GDP in Exhibit 6.2. Note in Exhibit 6.2 how poorly the NFIB indicator forecasts the wild ride of the late 1970s and early 1980s. Even the extremes of the more docile 1990s are not well anticipated, but the major directional trends are.
The INDEX does a better job predicting %ΔGDPQQ because %ΔGDPQQ smoothes the volatility of GDP growth. The good news is that the less volatile measure more accurately reflects the path of real economic activity [Equation 6.2]. However, it is also more difficult to interpret year-over-year equations in a quarterly forecasting context. The best prediction for growth over any 4-quarter period is obtained using the survey results from the middle of the period.35 Thus, calendar year growth is best predicted using the July survey (the “third quarter” survey in the NFIB sequence).

$$\begin{align*}
[6.1] \text{%ΔGDP} &= -47.75 + .51 \text{ INDEX} \\
[6.2] \text{%ΔGDPQQ} &= -36.11 + .40 \text{ INDEX}_t
\end{align*}$$

$$R^2 = 37\%$$
$$R^2 = 51\%$$

Final domestic sales (%ΔFSALES) as a dependent variable produces a better fitting model than GDP. The R² in Equation 6.3 is substantially higher than in the GDP equation, 6.1. The coefficients on INDEX in the GDP and the Final Sales equations are very close even though the R² is much higher in the Final Sales equations.

$$\begin{align*}
[6.3] \text{%ΔFSALES} &= -45.27 + .49 \text{ INDEX} \\
[6.4] \text{%ΔFSALESQQ} &= -35.81 + .39 \text{ INDEX}_t
\end{align*}$$

$$R^2 = 43\%$$
$$R^2 = 54\%$$

Using all 10 INDEX components raises the R² to 44 percent (38 percent adjusted R²) compared to equation 6.1, but all coefficients are statistically insignificant and often carry a theoretically incorrect sign [Exhibit 6.3]. This is a result of the collinearity that exists among the components (see Appendix 1). Two of the variables, inventory plans, INVPLN, and expected changes in real sales volume, EXSALES, each performs as well as the INDEX in predicting changes in GDP.

**Exhibit 6.3**

**Explanatory Power of INDEX Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Bivariate</th>
<th>Full Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIREPLN</td>
<td>.23</td>
<td>.14</td>
</tr>
<tr>
<td>JOBOPEN</td>
<td>.06</td>
<td>.01</td>
</tr>
<tr>
<td>CXPLN</td>
<td>.22</td>
<td>.09</td>
</tr>
<tr>
<td>INVPLN</td>
<td>.51</td>
<td>.36</td>
</tr>
<tr>
<td>INVSAT</td>
<td>.72</td>
<td>.22</td>
</tr>
<tr>
<td>GTEX</td>
<td>.29</td>
<td>.26</td>
</tr>
<tr>
<td>EXBUSCOND</td>
<td>.04</td>
<td>.05</td>
</tr>
<tr>
<td>EXCREDIT</td>
<td>.28</td>
<td>.15</td>
</tr>
<tr>
<td>EARN</td>
<td>.17</td>
<td>.17</td>
</tr>
<tr>
<td>EXSALES</td>
<td>.20</td>
<td>.39</td>
</tr>
</tbody>
</table>

35 The survey data used are collected in the first month of each quarter. To predict growth for a calendar year, the best results are obtained using the July survey (referred to as the third quarter survey). To predict growth from the second quarter to the second quarter of the next year, the October survey provides the forecast, etc.
7. **OTHER INDICATORS**

A number of popular survey indicators used by analysts to anticipate changes in economic activity include the University of Michigan Consumer Confidence Index (MICH) and the Conference Board Consumer Confidence Index (CONF). Business owners are, of course, consumers and as such, their views should be reflected in both indices [Equations 7.1 and 7.2]. Although the NFIB INDEX is related to these indicators in a way that would be expected, the relationships are not strong.

\[
\begin{align*}
\text{[7.1]} \quad \text{MICH} &= -8.42 + 1.02 \text{ INDEX} \\
\text{[7.2]} \quad \text{CONF} &= -228.59 + 3.27 \text{ INDEX}
\end{align*}
\]

The variance in the two consumer confidence indices is substantial relative to the INDEX [see, Exhibit 7.1]. Thus, it is not surprising that the NFIB INDEX explains relatively little of the variance in these two measures.

The Index of Leading Economic Indicators (LEI) is also a popular and widely used forecasting measure. The LEI leads changes in economic activity (GDP). But, its components are, with few exceptions, such as the University of Michigan Consumer Confidence Index, subject to revisions that are often substantial. Thus, one cannot be sure a signal exists unless the change in the LEI is substantial and persistent. The LEI’s relationship to the INDEX is not strong, either on a concurrent basis or with NFIB data leading [Equation 7.3].

\[
\text{[7.3]} \quad \text{LEI} = -3.12 + .96 \text{ INDEX}
\]

The Index of Leading Economic Indicators (LEI) is also a popular and widely used forecasting measure. The LEI leads changes in economic activity (GDP). But, its components are, with few exceptions, such as the University of Michigan Consumer Confidence Index, subject to revisions that are often substantial. Thus, one cannot be sure a signal exists unless the change in the LEI is substantial and persistent. The LEI’s relationship to the INDEX is not strong, either on a concurrent basis or with NFIB data leading [Equation 7.3].
The LEI and the consumer sentiment measures receive considerable attention in the press and their release often moves financial markets. One would expect, then, to observe a substantial relationship between changes in GDP and these measures. However, the $R^2$ is only 2 percent between the LEI and GDP [Equation 7.4]. The University of Michigan Index (MICH) and the Conference Board Index (CONF) performances are somewhat better with $R^2$ statistics of 19 percent [Equation 7.5] and 12 percent [Equation 7.6] respectively and neither performs better with one or two quarter leads. None of the three perform as well as the NFIB INDEX with its $R^2$ of 37 percent [Equation 7.7].

\[
\begin{align*}
\text{Equation 7.4} & \quad \%\Delta GDP = -1.49 + 0.05 \text{ LEI} \\
\text{Equation 7.5} & \quad \%\Delta GDP = -7.01 + 0.11 \text{ MICH} \\
\text{Equation 7.6} & \quad \%\Delta GDP = -2.06 + 0.05 \text{ CONF} \\
\text{Equation 7.7} & \quad \%\Delta GDP = -47.75 + 0.51 \text{ INDEX}
\end{align*}
\]

A priori, it is not clear whether the level of these indices should be used to anticipate changes in GDP or changes in these indices. Converting the predictors to percentage changes, the $R^2$ for the LEI rises to 25 percent, while MICH falls to 9 percent; CONF remains about the same, 13 percent, and INDEX falls to 4 percent. Percentage changes perform more poorly for all except the LEI, but the INDEX level produces a better predictive performance than all of the other three indicators.
CONCLUDING OBSERVATIONS

Small business produces half of the private sector GDP and accounts for an even larger fraction of the private sector labor force and net new jobs created. As a consequence, the collective actions of small firm owners have a major impact on the U.S. economy. The economic indicators pioneered by NFIB are shown to have strong empirical relationships to important economic measures such as the growth in GDP, the inflation rate, the unemployment rate, inventory investment and the Employment Cost Index.

The NFIB indicators are good predictors of changes in the final BLS/BEA numbers. The best models tend to anticipate economic activity by one or two quarters. Because the NFIB survey measures are never revised, their relationship to NIPA and other BLS and BEA data that are subject to revision can provide a sound guide to the direction of the economy. NFIB measures may, therefore, be better indicators of change than the preliminary releases of their “real” values. That means the NFIB forecasts are useful and a great way to monitor the economy even when they differ from the preliminary figures released by government agencies.
BIBLIOGRAPHY AND RELATED READING


APPENDIX 1: PRINCIPAL COMPONENT ANALYSIS OF THE SMALL BUSINESS OPTIMISM INDEX

“Optimism” is a conceptual construct that cannot be directly measured. Consequently, subjects are asked a number of questions that relate to dimensions that might be part of “optimism.” These measures can then be combined in some way to identify a construct more closely approximating the concept.

As the correlation matrix below shows, several single components have a high correlation with GDP growth (REALSAL is correlated .62) and with other INDEX components (EARN and GTEX are correlated .81). Using all 10 of the INDEX components to predict the percentage change in GDP produces a higher R² (44 percent vs. 37 percent for the INDEX alone), but only one of the components is significant. This may be acceptable for an overall forecast of GDP growth, but no partial analysis would be reliable (for example, using the change in HIRE-PLN, ceteris paribus, to assess the possible impact of the change on GDP).

EXHIBIT A1.1

CORRELATION MATRIX OF VARIABLES IN SMALL BUSINESS OPTIMISM INDEX AND GDP

<table>
<thead>
<tr>
<th></th>
<th>HIRE</th>
<th>OPEN</th>
<th>EXCRED</th>
<th>EBCOND</th>
<th>REALSAL</th>
<th>EARN</th>
<th>INVSAT</th>
<th>INVPLN</th>
<th>GTEX</th>
<th>CAPX</th>
<th>SALES</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPEN</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCRED</td>
<td>0.42</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBCOND</td>
<td>-0.24</td>
<td>0.63</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REALSAL</td>
<td>0.71</td>
<td>0.01</td>
<td>0.47</td>
<td>0.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARN</td>
<td>0.63</td>
<td>0.04</td>
<td>0.01</td>
<td>-0.63</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVSAT</td>
<td>0.41</td>
<td>0.06</td>
<td>0.32</td>
<td>0.09</td>
<td>0.63</td>
<td>0.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVPLN</td>
<td>0.68</td>
<td>0.28</td>
<td>0.52</td>
<td>0.19</td>
<td>0.78</td>
<td>0.68</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GTEX</td>
<td>0.71</td>
<td>0.44</td>
<td>0.59</td>
<td>0.02</td>
<td>0.80</td>
<td>0.51</td>
<td>0.51</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPX</td>
<td>0.83</td>
<td>0.18</td>
<td>0.34</td>
<td>-0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SALES</td>
<td>0.32</td>
<td>0.31</td>
<td>0.38</td>
<td>-0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.38</td>
<td>0.83</td>
<td>0.38</td>
<td>1.00</td>
</tr>
<tr>
<td>% GDP</td>
<td>0.37</td>
<td>0.10</td>
<td>0.36</td>
<td>0.22</td>
<td>0.43</td>
<td>0.43</td>
<td>0.43</td>
<td>0.43</td>
<td>0.43</td>
<td>0.43</td>
<td>0.34</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Principal components and related techniques such as factor analysis and cluster analysis can be employed when a number of measurements are taken that are related to some underlying conceptual construct such as “optimism.” The results of the analysis are presented in Exhibits A1.2 and A1.3. The information content of the 10 components of the INDEX can be reasonably represented by linear combinations of the 10 components combined into four new indices. These four independent constructs account for 88 percent of the variation contained in the 10 question series.
Good Time to Expand dominates the first component with strong contributions from Hiring Plans, Inventory Plans and Expected Real Sales gains. Trailing reports of improved earnings play a supporting role. The second component is dominated by Expected Business Conditions. This INDEX component is highest when the percent of firms with hard-to-fill job openings is lowest (at or near the trough in the business cycle). The third component is dominated by Inventory Satisfaction and, to a lesser degree, by Planned Capital Outlays. However, the latter never loads more than .6 in any component. Component four represents the Credit Outlook. The variable appears to be independent of the other nine Index variables, although it is not a significant factor.36

---

**EXHIBIT A1.2**

**Principal Components Analysis: Small Business Optimism Index**

<table>
<thead>
<tr>
<th>Component Number</th>
<th>Eigenvalue</th>
<th>Component</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.9</td>
<td>49.0</td>
<td>49.0</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>21.0</td>
<td>70.0</td>
</tr>
<tr>
<td>3</td>
<td>1.2</td>
<td>12.0</td>
<td>82.0</td>
</tr>
<tr>
<td>4</td>
<td>0.6</td>
<td>5.6</td>
<td>87.6</td>
</tr>
<tr>
<td>5</td>
<td>0.4</td>
<td>4.1</td>
<td>91.7</td>
</tr>
<tr>
<td>6</td>
<td>0.4</td>
<td>3.7</td>
<td>95.4</td>
</tr>
<tr>
<td>7</td>
<td>0.2</td>
<td>1.8</td>
<td>97.2</td>
</tr>
<tr>
<td>8</td>
<td>0.2</td>
<td>1.5</td>
<td>98.7</td>
</tr>
<tr>
<td>9</td>
<td>0.1</td>
<td>0.8</td>
<td>99.5</td>
</tr>
<tr>
<td>10</td>
<td>0.0</td>
<td>0.5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**EXHIBIT A1.3**

**Principal Components: Small Business Optimism Index**

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiring Plans</td>
<td>0.85</td>
<td>-0.4</td>
<td>0.14</td>
<td>0.00</td>
<td>0.24</td>
</tr>
<tr>
<td>Job Openings</td>
<td>0.45</td>
<td>-0.79</td>
<td>-0.13</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>Credit Outlook</td>
<td>0.64</td>
<td>0.35</td>
<td>0.34</td>
<td>0.54</td>
<td>0.00</td>
</tr>
<tr>
<td>Expected Business Conditions</td>
<td>0.00</td>
<td>0.91</td>
<td>0.25</td>
<td>0.00</td>
<td>0.15</td>
</tr>
<tr>
<td>Expected Real Sales</td>
<td>0.77</td>
<td>0.46</td>
<td>0.00</td>
<td>-0.23</td>
<td>0.00</td>
</tr>
<tr>
<td>Net Earnings Change</td>
<td>0.86</td>
<td>0.00</td>
<td>-0.14</td>
<td>-0.12</td>
<td>-0.39</td>
</tr>
<tr>
<td>Inventory Satisfaction</td>
<td>0.52</td>
<td>0.23</td>
<td>-0.75</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Inventory Plans</td>
<td>0.88</td>
<td>0.18</td>
<td>-0.20</td>
<td>0.00</td>
<td>0.25</td>
</tr>
<tr>
<td>Good Time to Expand</td>
<td>0.91</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.28</td>
</tr>
<tr>
<td>Planned Capital Outlays</td>
<td>0.61</td>
<td>-0.26</td>
<td>0.60</td>
<td>-0.34</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* An analysis of the same 10 factors not seasonally adjusted yields basically the same patterns.
APPENDIX 2: SMALL BUSINESS ECONOMIC TRENDS QUESTIONNAIRE

NFIB RESEARCH FOUNDATION SMALL BUSINESS ECONOMIC SURVEY

Please (circle) the appropriate answers or fill in the blanks.

1. What is your form of business organization?
   [ ] Proprietorship [ ] Partnership [ ] Corporation [ ] Sub-S Corporation

2. Please classify your major business activity(ies) using one of the categories of exemptions below. (If more than one applies, circle the one which contributes the most toward your gross sales or total revenue.)
   [ ] Construction (general contractor, painting, carpentry, plumbing, heating, electrical, highway, etc.)
   [ ] Manufacturing and mining (including candy processing, printer, publisher, etc.)
   [ ] Transportation, travel agency, communication, public utility (truckers, movers, broadcasters, etc.)
   [ ] Wholesale (including grain elevator, livestock dealer, distributor of equipment, manufacturer’s rep., etc.)
   [ ] Retail (including service station, restaurant, bar, radio and TV store, drug store, florist, apparel, etc.)
   [ ] Agriculture, veterinarian, forestry, landscaping, fisheries, etc.
   [ ] Financial, insurance, real estate, banks, savings & loans, etc.
   [ ] Beauty salons, barber shop, garage, motel, hotel, repair service, bookkeeping service, photographer, funeral director, rental agency, credit bureau, laundry, etc.
   [ ] Professional (dentist, attorney, engineer, architect, accountant, skilled nursing care facility, etc.)
   [ ] Other (please describe)

3. What is the [ ]_ most important problem facing [ ] your business today? (Please circle only one of the following.)
   [ ] Tax
   [ ] Financing & interest rates
   [ ] Quality of labor
   [ ] Inflation
   [ ] Cost of labor
   [ ] Government regulations & red tape
   [ ] Poor sales
   [ ] Competition from large businesses
   [ ] Other (please explain)

4. Do you think the next three months will be a good time for small businesses to expand substantially?
   [ ] Yes [ ] No [ ] Uncertain

5a. Why? (Circle answer) — most important reason.
   [ ] Economic conditions
   [ ] Financing & interest rates
   [ ] Political climate
   [ ] Other (please explain)

5. About the (next six months) do you think that six months from now general business conditions will be better than they are now about the same, or worse?
   [ ] Much better
   [ ] Somewhat better
   [ ] About the same
   [ ] Somewhat worse
   [ ] Much worse
   [ ] Don’t know

6a. During the last 3 months or calendar quarter was your gross sales volume?
   [ ] Under $1,500
   [ ] $1,500 to $5,000
   [ ] $5,000 to $24,999
   [ ] $25,000 - $49,999
   [ ] $50,000 - $74,999
   [ ] $75,000 - $98,999
   [ ] $100,000 - $149,999
   [ ] $150,000 - $249,999
   [ ] $250,000 or more

6b. Did your sales volume increase, decrease, or remain the same during the last calendar quarter?
   [ ] Much higher
   [ ] Higher
   [ ] About the same
   [ ] Lower
   [ ] Much lower

7. Were your [ ] labor costs?
   [ ] Higher or lower
   [ ] About the same
   [ ] Higher
   [ ] Lower
   [ ] About the same

7a. [ ] Cost of materials?
   [ ] Higher or lower
   [ ] About the same
   [ ] Higher
   [ ] Lower

8. Overall, what do you expect to happen to the [ ] volume (number of units) of goods and services that you will sell during the next three months?
   [ ] Go up a lot
   [ ] Stay the same
   [ ] Go down a little
   [ ] Go down a lot

9. What is the most important reason? (Circle one only)
   [ ] Sales volume
   [ ] Labor costs
   [ ] Cost of materials
   [ ] Insurance costs
   [ ] Price change for your product or service
   [ ] Other (please explain)

10. Does your business specialize in any particular product or service?
    [ ] Yes
    [ ] No

11. [ ] Other (please describe)
How are your average weekly gross profits now compared to three months ago? (Circle:)
1. Lower now
2. No difference
3. Higher now
4a. If higher or lower, by what percent, on an average?
1. 0.0 - 1.9%
2. 2.0 - 2.9%
3. 3.0 - 3.9%
4. 4.0 - 4.9%
5. 5.0 - 7.9%
6. 8.0 - 9.9%
7. 10% or more
10. Is the next three months, do you plan to change the average weekly gross profits of your goods and/or services? (Circle:)
1. Yes, raise prices
2. Yes, lower prices
3. No change
4. Don't know
10b. If raise or lower, by what percent, on an average?
1. 0.0 - 1.9%
2. 2.0 - 2.9%
3. 3.0 - 3.9%
4. 4.0 - 4.9%
5. 5.0 - 7.9%
6. 8.0 - 9.9%
7. 10% or more
8. Don't know
11. How many employees do you have at this present time including yourself?
1. One
2. Two
3. 3-6
4. 7-19
5. 20-39
6. 40 or more
11b. In the last three months, did you hire temporary or leased employees (other than substitutes for sick or vacationing workers)? (Circle:)
1. Yes
2. No
12. During the last three months, did the total number of employees in your firm increase, decrease, or stay about the same? (Circle:)
1. Increased by _____ employees
2. Decreased by _____ employees
3. Stayed the same
12a. If the total number of employees increased or decreased, was that change due primarily to seasonal factors affecting your business? (Circle:)
1. Yes
2. No
13. If you have filed or attempted to fill any job openings in the past three months, how many qualified applicants were there for the position? (Mark ONE best answer.) (Circle:)
1. Few
2. Some
3. Lot
4. None
5. Not applicable
14. In the next three months, do you expect to increase or decrease the total number of people working for you? (Circle:)
1. Increase
2. Keep the same
3. Decrease
15. Do you have any job openings that are not able to fill right now? (Circle:)
1. Yes, for skilled labor
2. Yes, for unskilled labor
3. No
16. During the last three months, did you increase or decrease your inventories? (Circle:)
1. Increased a lot
2. Increased
3. About the same
4. Decreased a lot
5. Decreased
6. Not applicable
17. At the present time, do you feel your inventories are too large, about right, or too low? (Circle:)
1. Too large
2. About right
3. Too low
4. Not applicable
17a. Looking ahead to the next three to six months, do you expect or balance, to add to your inventories, keep them about the same, or decrease them? (Circle:)
1. Add a lot
2. Add
3. About the same
4. Decrease a lot
5. Decrease
6. Not applicable
18. If you borrow money regularly (at least once every 3 months) as part of your business activity, how does the rate of interest on your most recent loan compare with that paid three months ago? (Circle:)
1. Much higher
2. Same
3. Much lower
4. Unavailable, do not borrow regularly
18a. Are these loan terms easier or harder to get than they were three months ago? (Circle:)
1. Easier
2. Same
3. Harder
4. Don't know
18b. Do you expect it to remain easier or harder to obtain your required financing during the next three months? (Circle:)
1. Easier
2. Same
3. Harder
4. Don't know
(See next page)
19. If you borrowed within the last three months for business purposes, and the loan maturity (payback period) was 1 year or less, what interest rate did you pay? _____% or Prime + _____.

20. During the last 6 months were you able to borrow money? [ ] Yes [ ] No [ ] Did not want to borrow.

21. During the last 6 months has your firm made any capital expenditures to improve or purchase equipment, buildings, or land? (Check all that apply)

   - Vehicles: [ ] Yes, purchased [ ] Yes, leased
   - Equipment: [ ] Yes, purchased [ ] Yes, leased
   - FURNITURE, FURNITURE: [ ] Yes, purchased [ ] Yes, leased
   - Additional Buildings, Land: [ ] Yes, purchased [ ] Yes, leased
   - Improved Buildings: [ ] Yes, purchased [ ] Yes, leased

21a. If yes, what was the total cost of all these projects?

   - $20,000 - 39,999
   - $40,000 - 99,999
   - $100,000 - 499,999
   - $500,000 - 999,999
   - $1 million or more

22. Looking ahead to the next three to six months, do you expect any capital expenditures for plant and/or physical equipment?

   [ ] Yes [ ] No [ ] Don't know

23. Over the past three months did you change average employee compensation (wages and benefits but not Social Security, FICA taxes, etc.)?

   [ ] Increased a lot [ ] About the same [ ] Decreased a lot [ ] Decreased

24. Do you plan to change average employee compensation (wages and benefits but not Social Security, FICA taxes, etc.) during the next three months?

   [ ] Increase a lot [ ] About the same [ ] Decrease a lot [ ] Decrease

25. How do you evaluate the economic policies of the [ ] (circle the appropriate number)

   - Excellent 2 3 4 5
   - Fair 1 2 3 4 5
   - Poor 1 2 3 4 5

   a) President
   b) Congress
   c) Governor
   d) State legislature

26. Please indicate the geographic area that best describes the community in which your business is located:

   [ ] A metropolitan/micropolitan area (population of over 100,000 in city and immediate area)
   [ ] A small city (population over 15,000 but under 100,000 in city and immediate area)
   [ ] A rural area (population under 15,000 in city and surrounding communities)