



Research Program on Forecasting

Expectations and Forecasting during the Great Depression: Real-Time Evidence from the Business Press

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RPF Working Paper No. 2016-011
<http://www2.gwu.edu/~forcpgm/2016-011.pdf>

November 13, 2016

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Abstract

How was the Great Depression viewed in real time? This paper yields a new perspective on this question by quantifying the qualitative statements of economic analysts in the business press and at the Federal Reserve Board. We compare the statements of economic analysts about current and future conditions to what actually happened to the American economy in the Great Depression. While Depression-era economic forecasters were able to accurately assess what was happening contemporaneously in the economy, forecasters were persistently optimistic that “the corner had been turned” and that a strong recovery was imminent even as the economy continued to decline. This optimism was based on the use of analogies and rules of thumb which were no longer applicable.

Key Words: Great Depression, Qualitative Forecasts, Business Expectations

¹ Corresponding author: mathy@american.edu, American University, 4400 Massachusetts Ave. NW, Washington, DC 20016. This paper was written when this author was visiting George Washington University’s Forecasting Group and Economics Department. Their hospitality is much appreciated.

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1. Introduction

The Great Depression represents the greatest economic calamity in American history. It is, therefore, of interest to determine how and why expectations changed as the Depression evolved. Despite all that has been written about the Great Depression, our knowledge about the way economic agents interpreted and responded to these events is limited. We know that the Depression was not forecasted in advance and even predictions about the stock market differed. Before the Crash in October 1929, Irving Fisher had said that “[s]tock Prices are not too high, and Wall Street will not experience anything of the nature of a crash,” (quoted in Ahamed 2009, p. 350). On the other hand, Roger Babson had predicted on September 5th that the stock market would decline significantly (15-20%) and that in its wake “factories will get shut down ... men will be thrown out of work ... the vicious circle will get in full swing and the result will be a serious business depression.” (Ahamed 2009, p. 348).

If most individuals had not predicted the great Depression, the question is whether it was even forecastable. Dominguez et al. (1988) used the actual forecasts of Harvard and Yale and found that, even using modern forecasting techniques, both would have failed to predict the Great Depression contemporaneously. Klug et al. (2002) found that railroad shippers made forecasts of demand for railroad cars and they were persistently overoptimistic.

On the other hand, there is an ongoing debate whether the deflation was anticipated. A number of studies have addressed this issue. Hamilton (1992) found that deflation was not

anticipated in the Depression based on commodity futures prices. Cecchetti (1992) criticized some of Hamilton's analysis and found that deflation was forecastable at a 3-6 month horizon using time-series techniques. More recently, Binder (2016) used a meta-analysis of time-series, market-based, and narrative approaches and found that the deflation of the Great Depression was not anticipated on the whole. Finally, policymakers were caught by surprise by the length and depth of the Depression and the policy response was woefully lacking (Brown 1956; Friedman and Schwartz 1963).

While less attention has been devoted to the business community's real-time forecasts and expectations during this period, there have been a small number of studies that have examined this topic. For example, Romer (1989) found that the forecasts of the business press became more uncertain in the wake of the stock crash of '29 and Nelson (1990) looked at expectations of deflation in the business press for 1929-1930. Goldfarb, Stekler, and David (2005) (GSD) also analyzed the qualitative forecasts of the business community, but only for the early years of the Depression.

In order to obtain a better understanding of the expectations of economic agents, this paper will examine the business forecasts made during the entire Depression up to the trough. This will enable us to determine how well the business and financial community assessed the economic situation and whether subsequent developments were forecasted in advance. There are no quantitative forecasts that are available for this analysis. Rather we will utilize the qualitative statements about economic conditions and the outlook for the future that appeared in the business press during this time period. Several recent papers have shown that it is possible to convert qualitative statements into quantitative numbers and to obtain meaningful results. (See Balke and Petersen, 2002; Goldfarb et. al, 2005; Lundquist and Stekler, 2012, and Stekler and Symington,

2016). Moreover, the validity of this approach was established by Stekler and Symington (2016) and Ericsson (2016). Both papers showed that a scoring system, designed to measure the state of the economy, when applied to the FOMC Minutes nearly replicated the Greenbook forecasts. The Greenbook forecasts were not available until five years after the FOMC Minutes were published.³

This paper will utilize the methodology originally developed in GSD that converts qualitative statements into quantitative measures and thus permits us to evaluate those statements. This methodology has been subsequently used in other contexts and is now well-established. (See Lundquist and Stekler, 2012, and Stekler and Symington, 2016).

After we have quantified the statements made by in the business press, we compare these measures with the qualitative surveys of economic activity that were published in the *Federal Reserve Bulletin* and with an indicator of the actual performance of the economy. In addition to providing new information about the Depression, the quantification of these qualitative forecasts, itself, makes several contributions. First, in general there is information in qualitative data, which has long been overlooked when focusing primarily on quantitative data (Starr 2014). Because there were very few quantitative forecasts made in this period, the use of qualitative forecasts yields a rich dataset of historical forecasts. This permits us to understand how the business community and government analysts viewed events as the Depression developed.

The results that we present below indicate that economic agents were in real-time able to accurately assess the generally negative conditions that prevailed in the economy from 1929-

³ The members of the FOMC had access to the Greenbook forecasts but they were not made available to the general public for five years.

1933⁴. However, their forecasts of the future are persistently optimistic even in the midst of a declining economy. Moreover, as the Depression worsened, the number of forecast declined, while at the same time, there was an increase in the number of expressions of uncertainty. This leads us to conclude that eventually forecasters were reluctant to continue to make positive forecasts given the deteriorating economic environment.

The remainder of the paper is as follows. The next section discusses the data used in this study and the methodology used to analyze the data. The third section outlines the scoring procedure used to convert the qualitative statements into quantitative data followed by a presentation of our results. The fifth and sixth sections discuss why the business press failed to forecast the Depression and present our conclusions.

2. Data and Methodology

We examine both qualitative forecasts and quantitative data. The qualitative forecasts came from three sources: *The New York Times* (NYT), the *Commercial and Financial Chronicle* (CFC), and the *Federal Reserve Bulletin* (FRB). The CFC is a weekly publication that is a compendium of information of and about the business and financial community. It contains the speeches and forecasts that are of the most interest to these communities. The NYT was used because of its prominence in the financial center of the United States. There were frequent reports made by New York City banks like First National City and Guaranty Trust Company and private forecasters like Haney and Babson. The full list of analysts/forecasters can be found in Appendix A.

⁴ While this may seem trivial, data release lags mean that a recession may not be observable in real time. For example, the NBER business cycle dating committee did not release the start date of the most recession (12/07) until a year after it had started, despite its severity (NBER 2008). Naturally, no one dated recessions during the 1930s.

Finally, each issue of the *Federal Reserve Bulletin (Bulletin)* contains a monthly survey of national economic conditions, also expressed in qualitative terms. This monthly survey was very broad and contained statements about six economic indicators: industrial production, employment, construction, railroad loadings, department store sales, and the price level. By combining the information from these six indicators we were able to construct an index that can be used as a benchmark for comparison with contemporaneous business forecasts.

The two newspapers and the bulletin were read by the authors manually. The statements made by economic analysts contained in the newspaper excerpts were identified and transcribed. They were then scored by the system first developed by GSD. Each statement was divided into two categories. The first referred to the current state of economic conditions – called a nowcast in the contemporary economic forecasting literature. The second referred to statements about future economic conditions – a forecast. Each category was then scored and two time series were created. The first was the real-time scored nowcasts; the second consisted of the business sector's scored forecasts. The qualitative statements in the *Bulletin*, about the six sectors of the economy, were treated in a similar way, and a series, called the Bulletin Scores was created. However, it should be noted that the Federal Reserve Bulletins only contained information about the current economic situation and had no forecasts.

We also utilized the Federal Reserve's Index of Industrial Production to determine whether the time series of our calculated quantitative scores of the qualitative forecasts corresponded with the actual trajectory of the US economy. That index was used because, in this time period, movements in this series corresponded closely with changes in the overall economy. The Index of Industrial Production has been rebased many times, and we wanted to use real-time data that corresponded as closely as possible to the events that were occurring during the Great

Depression. Consequently, we used the values of that index that were contained in the release of January 1935.

3. Scoring

The scoring system that was applied to both the nowcasts and forecasts is shown in Table 1. It is virtually identical to the scoring system that was developed by Goldfarb et al. (2005) and was used to score each statement. Based on the statements made by forecasters, certain terms are coded to refer to varying degrees of optimism or pessimism about the economy's present or future prospects. The scoring method for 1929-1930 is the same as in GSD while those of 1931-1933 are based on GSD but are updated based on the findings of Ericsson (2016). He found that the GSD scoring method was generally accurate but needed a larger range of negative values during the Great Recession. Because the declines during the Great Depression were even larger than those that occurred in the Great Recession, this suggestion applies even more forcefully to this study. GSD used a scale from -1 to +1 in gradations of 1/4. To incorporate the suggestions of Ericsson (2016), even more strongly negative statements were scored as -1.5 or -2. These values correspond to a downturn of historic severity.

As indicated, the *Federal Reserve Bulletin* contained statements about six economic indicators: industrial production, employment, construction, railroad loadings, department store sales, and the price level. The *Bulletin* uses a slightly different terminology than was used in the business press. We therefore scored those statements according to the terminology shown in Table 2. The statements made for each sector are scored individually and the overall score is the average of these six series, which we call the Bulletin Score. The criteria associated with each score can be found in the same table.

4. Results

Our results can be divided into several categories. We first present the overall business and Bulletin nowcasts and compare them to the overall trend in the economy. Then we explicitly compare the business index with the benchmark, the Bulletin Scores. Finally, we examine the business forecasts that are supposedly reflecting the outlook for the economy several quarters in the future.

4.1 Nowcasts

Figure 1 presents the cumulative changes in the scores of the business and Bulletin Scores nowcasts as well as the FRB Index of Industrial Production over the course of the Depression. Because the Bulletin Scores series contains six components it is not identical to the index and is somewhat smoother. Nevertheless, the graph shows that the Bulletin Scores series is calibrated with the industrial production index and thus can be considered an accurate nowcast of the economic situations. This finding yields two important results. First, this again demonstrates the validity of converting qualitative statements into quantitative forecasts. In this case, it enables us to analyze forecasts in a period of historical interest when there were no explicit predictions.

Second, the Bulletin Scores enable us to have a benchmark against which the business nowcasts can be judged. From the beginning of the Depression until mid-1932, the business nowcasts and the Bulletin Scores showed similar movements. Then the business scores showed an upward trend whereas the Bulletin Scores continued declining. Thus in this period, the business community became more optimistic than was reflected in the Bulletin index. One explanation is that the business community paid more attention to changes in production than to

the other components of the Bulletin Scores.⁵ The Index of Industrial Production had reached its trough in July 1932 and the increase in the business scores seems to have occurred after production began to increase. The Depression did not reach the actual trough until March 1933, as defined by the National Bureau of Economic Research, and this is reflected in the decline in the Bulletin Scores which contain five additional measures of economic activity.

Since the quantified Bulletin Scores are calibrated with the Industrial Production index, they can be used as a benchmark for evaluating the business nowcasts⁶. Figure 2 shows the monthly changes in the Bulletin scores and the business nowcasts. On average the two series display similar patterns. In fact, the correlation between the Bulletin Scores and the private sector forecasts is 0.80. Given this relationship between the benchmark and the private sector nowcasts, we conclude that the business community was able to assess economic conditions as they were occurring.

4.2 Timeline of Forecasts

When evaluating the business statements about future economic activity, it is first necessary to make an assumption of how far into the future they were projecting. We assume that they are concerned with economic activity one or two quarters ahead as the forecasts never reference long periods in the future. There is no obvious benchmark with which we can compare the business forecasts. We can create such a benchmark because we have demonstrated that changes in the Bulletin Scores are calibrated with changes in the Industrial Production index and thus reflect the actual changes that happened. Thus we can compare the value of the Bulletin Scores nowcasts made in $t+2$ with the business forecasts made in t for $t+2$. This comparison is

⁵ Babson, quoted in the September 8th issue of the NYT, argued that business had hit bottom and that the worst was over as prices and the stock market were rising.

⁶ The correlation between the two series is .95.

presented in Figure 3. The forecasts are consistently optimistic with positive scores whereas the outcomes are consistently negative. Beginning in early 1930 and throughout the Depression, the business sentiment was consistently overoptimistic and were systematically biased (Examples of some of the events that occurred and the way they were interpreted are presented in Appendix B).

5. Explanation of the Overoptimistic Forecasts

Our main findings were that during the Depression, the business community correctly assessed economic conditions in real-time but the forecasts were consistently overoptimistic. What explains this over optimism? It would be simplistic to say that their theory was inadequate or that this result is in accord with more recent findings that forecasters are generally overoptimistic during recessions. (Fildes and Stekler, 2002). We believe that the over optimism can be explained by the forecasters reliance on analogies or ad hoc rules.⁷

5.1 Forecasting by Analogy

Forecasting by analogy was well-established in the 1930s. Consequently, one argument, that recovery would come quickly, relied on analogies and the periodicity of cycles. Goldfarb et al. (2005) provide a number of such examples indicating that the Depression should end soon. For example, Persons (1931) argued that the situation in the early 1930s was more similar to the recessions of 1884-1885, 1907-8, and 1920-1. None of these recessions had lasted longer than 25 months or seen declines in output of more than 25%, and thus the economy was due for a recovery. At the end of 1930, this line of reasoning justified the forecast that a recovery was

⁷ Many forecasters at the time placed the majority of the blame for the Depression on price imbalances or a bubble-and-bust cycle on Wall Street, and thought that recovery would come once these imbalances were corrected (Adams et al., 1931; King, 1932).

imminent.⁸ With hindsight it is obvious that the Great Depression was not analogous to any previous period.

5.2 Rule of Thumb Indicators

In reading the business press, we frequently read that “a recovery would occur because production was less than consumption”. This was one of the rules of thumb that contemporary forecasters had developed to forecast when recoveries would happen. Haney (1931, pp. 157-8) provides twelve criteria to identify a business cycle trough which would be followed by a recovery. These are: (1) low interest rates, (2) time-money rates above call-money interest rates, (3) commercial paper rates above time-money interest rates, (4) interest rates on short-time money below bond yields, (5) production below normal, (6) the ratio of inventories to production of manufactured goods is high and declining, (7) unfilled orders have been declining and are very low, (8) commodity prices were declining but are beginning to stabilize, (9) the ratio of raw material prices to finished commodities prices is low but increasing, (10) employment is beginning to decline more slowly, or even to increase, (11) payrolls have stabilized, and (12) the stock market has begun increasing again (12). Monthly data of these indicators from 1929 to 1933 are presented in Table C1 of the Appendix.

An analysis of these data might show when troughs would be predicted according to Haney’s methodology. We, therefore, score these criteria and then determine the number of criteria out of the 12 that were satisfied in every month, another way that we quantify qualitative forecasting measures. The criteria for scoring the indicators are presented in Table C1 and the reasons for choosing those criteria are presented in Appendix C. A time series of the number of indicators that satisfied Haney’s criteria is shown in Figure 5. More than half the indicators

⁸ Goldfarb et al. provide an extensive critique of analogy based forecasting as applied in 1929 and 1930.

satisfy the criteria throughout the Great Depression. It is, therefore, not surprising that individuals who had been trained to examine these ratios were optimistic and consistently expected an upturn to occur.⁹ Moreover, the number of indicators does not increase after the actual trough, so forecasters would have been no more likely to forecast the actual trough after erroneously expecting an upturn during the long downturn of 1929-1933. While Haney's criteria may have been effective in previous recessions, contemporary forecasting methods failed during the Depression, which was a fundamentally different crisis than what had come before.

5.3 Did Forecasters Adjust?

One would expect that forecasters would recognize their mistakes and would make some adjustments as it became evident that the economy was continuing to decline. We have two types of fragmentary evidence to indicate that such adjustments did in fact occur. The first piece of evidence is the recognition that the economy was not behaving as had been expected. This is reflected in the number of statements which indicated that there was a great amount of uncertainty about what was likely to happen. In fact, approximately 8% of all statements discussed uncertainty in 1931, and about 5% made similar statements to that effect in 1932. Two explicit statements illustrate this point. In January 1933, the Johnson and Higgins President said "I cannot venture to predict what business will be like" and the Hill Brothers Merchants said "In these times prophecies are dangerous." (New York Times, January 3, 1933).

This uncertainty and/or the unwillingness to make another bad forecast provides the second piece of evidence about the adjustments that were made. The business community continued to discuss the current economic situation but the number of statements about the future

⁹ Even the quantitative forecasters at Harvard and Yale were overoptimistic (Dominguez et al., 1988).

was greatly reduced. The ratio of the number of forecasts in a month to the number of nowcasts is plotted in Figure 5. While there is some noise, there is a considerable downward trend. In late 1929, the number of nowcasts and forecasts is roughly equal, while by 1932 there were half as many forecasts as nowcasts. The unwillingness to forecast, given the high degree of uncertainty during this period (Mathy 2015), is consistent with ambiguity aversion (Ellsberg 1961), where forecasters choose not to participate given the inability to assign probabilities to future outcomes. Perhaps there was also a sense that the structure of the economy had changed and individuals might have considered how many times they had been incorrect previously.

6. Conclusion

This paper has made several contributions. Although the business and financial communities had made no explicit forecasts during the Depression, we were able to create a series of such forecasts. We used qualitative statements published in the financial press and converted this information into quantitative statements. We compared these forecasts with quantitative forecasts obtained in a similar way from assessments of economic conditions contained in *Federal Reserve Bulletin*. These assessments were shown to be accurate and served as a benchmark against which the business nowcasts were judged. The results showed that the business analysts were well able to comprehend the current situation. However, the business analysts made forecast that were persistently overoptimistic. Several possible explanations for this optimism were presented. We also quantified qualified criteria for determining a trough in economic activity and found that contemporary forecasting methods would have not been more likely to call a bottom when the actual bottom occurred. In addition to providing insights about

the forecasting process during the Depression, this paper again demonstrates the feasibility of using qualitative information to generate and analyze economic forecasts.

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Table 1: Scoring rubric for translating qualitative statements into quantitative scores

| General Outlook | Type of Statement Made | Score Assigned |
|------------------------|--------------------------------------|-----------------------|
| Positive | Vigorous Recovery | +1 |
| Positive | Rapid Recovery | +3/4 |
| Positive | Strong Recovery | +1/2 |
| Positive | Mild Recovery | +1/4 |
| Neutral | Seasonal Changes, Offsetting Changes | 0 |
| Negative | Mild Decline | -1/4 |
| Negative | Steady Decline | -1/2 |
| Negative | Rapid Decline | -3/4 |
| Negative | Vigorous Decline | -1 |
| Strongly Negative | Disastrous Collapse in Output | -3/2 |
| Strongly Negative | Worst downturn in U.S. History | -2 |

Notes: These scores were assigned to both nowcasts and forecasts for a given analyst.

Table 2: Scoring Rubric for individual *Federal Reserve Bulletin* Statements

| General Outlook | Type of Statement Made | Score Assigned |
|------------------------|--------------------------------|-----------------------|
| Positive | Robust Recovery | +1 |
| Positive | Considerable Advances | +3/4 |
| Positive | Significant Advances | +1/2 |
| Positive | Above Seasonal Variation | +1/4 |
| Neutral | Seasonal Variation | 0 |
| Negative | Significant Declines | -1/4 |
| Negative | Considerable Declines | -1/2 |
| Negative | Rapid Decline | -3/4 |
| Negative | Severe Decline | -1 |
| Strongly Negative | Disastrous Collapse in Output | -3/2 |
| Strongly Negative | Worst downturn in U.S. History | -2 |

Note: Overall score is the average of six series, based on Industrial Output, Employment, Construction, Railroad Loadings, Department Store Sales, and the Price Level.

Table 3: Haney's criteria for predicting a trough and corresponding quantification

| Number | Criteria | Quantification |
|--------|---|---|
| 1 | low interest rates | Commercial paper rates are below 5% |
| 2 | time-money rates above call-money interest rates | Time-money rates > call-money interest rates |
| 3 | commercial paper rates above time-money interest rates | Commercial paper rates > time-money interest rates |
| 4 | interest rates on short-time money below bond yields | Interest rates on short-time money < bond yields |
| 5 | production below normal | Industrial production index is below 8 |
| 6 | the ratio of inventories to production of manufactured goods is high and declining | Ratio of manufacturing inventories to manufacturing production >14 AND current > lagged (increasing) |
| 7 | unfilled orders have been declining and are very low | Unfilled steel order < 4 AND current < lagged (increasing) |
| 8 | commodity prices were declining but are beginning to stabilize | Produce Price Index declining (current PPI < lagged PPI) and lagged PPI declining (lagged PPI < twice lagged PPI) |
| 9 | the ratio of raw material prices to finished commodities prices is low but increasing | Farm PPI/Industrial PPI < 1.6 and declining (current < lagged) |
| 10 | employment is beginning to decline more slowly, or even to increase | Monthly change in employment lower than lagged monthly change AND current > lagged |
| 11 | payrolls have stabilized | Absolute value of (change in payrolls x lagged change in payrolls) < 0.25 |
| 12 | the stock market has begun increasing again | Dow Jones Industrial Average > lagged DJIA |

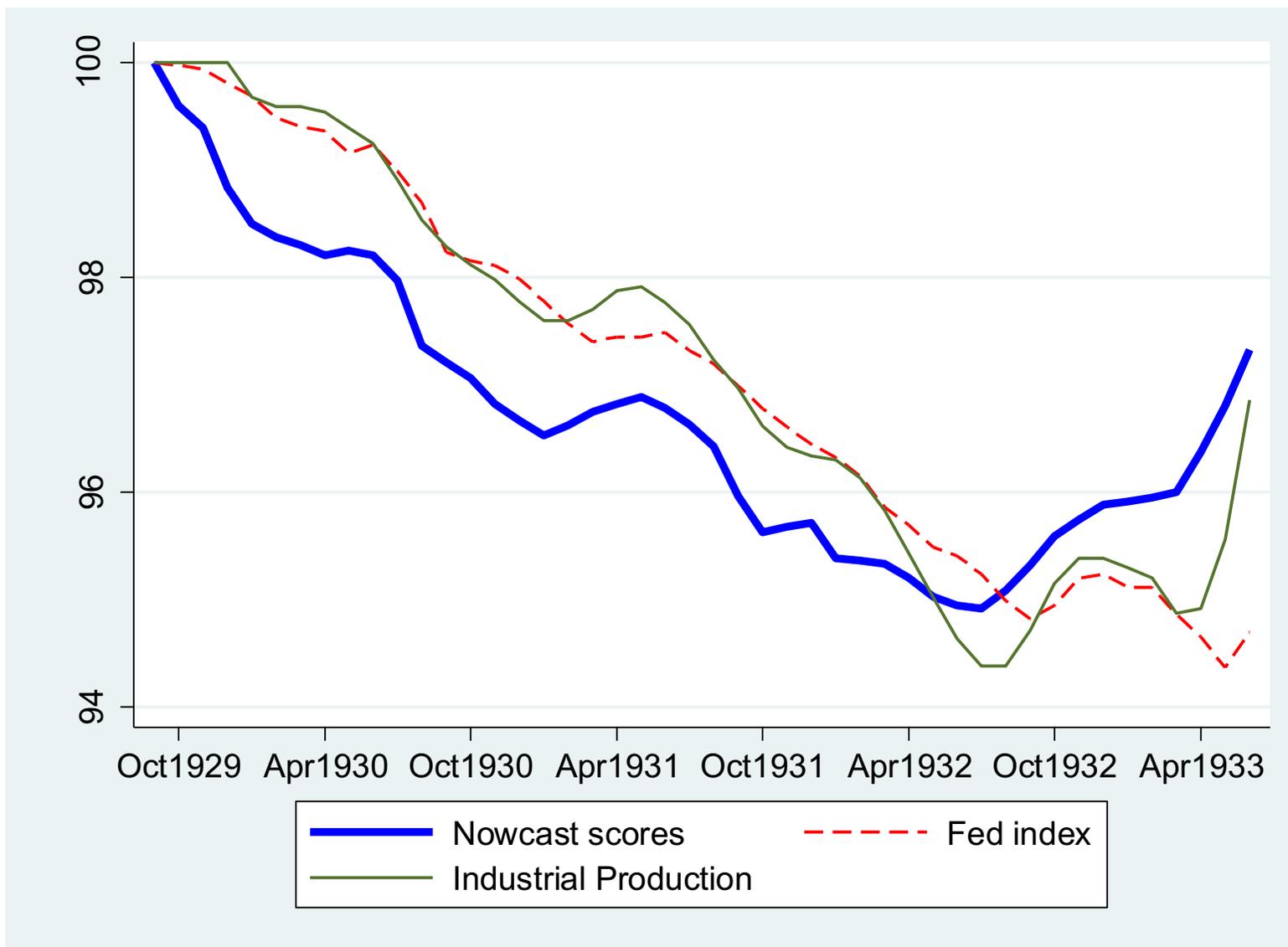
Notes: Criteria from Haney (1931, p. 157-8) which predict a trough in the business cycle. All data from Federal Reserve Economic Database.

| Year | Month | Commercial Paper | Time Loans | Call Money | Treasury Bonds | Industrial Production | Manufacturing Production | Manuf. Inventories | CPI | Producer Price Index | Factory Employment | Factory Payrolls | Dow-Jones Stock Prices | Unfilled Steel Orders | PPI industrial | PPI farm |
|------|-------|------------------|------------|------------|----------------|-----------------------|--------------------------|--------------------|------|----------------------|--------------------|------------------|------------------------|-----------------------|----------------|----------|
| 29 | 1 | 5.5 | 7.7 | 7.1 | 4.7 | 7.8 | 7.3 | 104.1 | 17.1 | 16.5 | 8216 | 18.8 | 307.3 | 4.1 | 15.7 | 26.7 |
| 29 | 2 | 5.6 | 7.7 | 7.1 | 4.4 | 7.8 | 7.7 | 105.6 | 17.1 | 16.4 | 8411 | 20.1 | 309.0 | 4.1 | 15.6 | 26.6 |
| 29 | 3 | 5.7 | 8.0 | 9.1 | 4.6 | 7.8 | 8.0 | 104.8 | 17.0 | 16.6 | 8517 | 20.5 | 308.9 | 4.4 | 15.7 | 27.1 |
| 29 | 4 | 5.9 | 8.7 | 8.9 | 4.8 | 7.9 | 8.2 | 105.5 | 16.9 | 16.5 | 8619 | 20.7 | 309.2 | 4.4 | 15.6 | 26.5 |
| 29 | 5 | 6.0 | 8.8 | 8.9 | 5.1 | 8.1 | 8.3 | 107.3 | 17.0 | 16.3 | 8609 | 20.7 | 310.3 | 4.3 | 15.6 | 25.8 |
| 29 | 6 | 6.0 | 8.1 | 7.7 | 4.8 | 8.1 | 8.2 | 107.0 | 17.1 | 16.4 | 8630 | 20.4 | 316.5 | 4.3 | 15.6 | 26.1 |
| 29 | 7 | 6.0 | 7.8 | 9.2 | 4.6 | 8.2 | 8.0 | 108.6 | 17.3 | 16.6 | 8674 | 19.7 | 341.5 | 4.1 | 15.6 | 27.1 |
| 29 | 8 | 6.1 | 8.9 | 8.2 | 4.7 | 8.2 | 8.1 | 109.2 | 17.3 | 16.6 | 8826 | 20.6 | 359.2 | 3.7 | 15.5 | 27.1 |
| 29 | 9 | 6.1 | 8.9 | 8.5 | 4.6 | 8.1 | 8.2 | 110.8 | 17.3 | 16.6 | 8912 | 20.8 | 362.4 | 3.9 | 15.6 | 26.9 |
| 29 | 10 | 6.1 | 7.8 | 6.4 | 4.4 | 8.0 | 8.1 | 110.8 | 17.3 | 16.4 | 8805 | 20.6 | 291.5 | 4.1 | 15.6 | 26.2 |
| 29 | 11 | 5.4 | 5.5 | 5.4 | 3.5 | 7.6 | 7.3 | 111.7 | 17.3 | 16.1 | 8447 | 19.0 | 228.2 | 4.1 | 15.5 | 25.5 |
| 29 | 12 | 5.0 | 4.8 | 4.8 | 3.0 | 7.2 | 6.5 | 111.9 | 17.2 | 16.1 | 8133 | 18.4 | 247.2 | 4.4 | 15.4 | 25.7 |
| 30 | 1 | 4.9 | 4.7 | 4.6 | 3.4 | 7.2 | 6.8 | 112.1 | 17.1 | 15.9 | 7930 | 17.5 | 255.7 | 4.5 | 15.2 | 25.5 |
| 30 | 2 | 4.6 | 4.7 | 4.3 | 3.4 | 7.2 | 7.1 | 111.5 | 17.0 | 15.7 | 7944 | 18.1 | 267.4 | 4.5 | 15.1 | 24.7 |
| 30 | 3 | 4.1 | 4.1 | 3.7 | 3.0 | 7.1 | 7.1 | 111.8 | 16.9 | 15.5 | 7909 | 18.1 | 278.3 | 4.6 | 15.0 | 23.9 |
| 30 | 4 | 3.9 | 4.1 | 4.0 | 3.0 | 7.0 | 7.2 | 111.2 | 17.0 | 15.5 | 7865 | 17.9 | 285.5 | 4.4 | 15.0 | 24.2 |
| 30 | 5 | 3.7 | 3.5 | 3.1 | 2.4 | 6.9 | 7.1 | 111.3 | 16.9 | 15.3 | 7727 | 17.4 | 266.7 | 4.1 | 14.9 | 23.5 |
| 30 | 6 | 3.4 | 2.9 | 2.6 | 1.9 | 6.7 | 6.7 | 111.4 | 16.8 | 15.0 | 7566 | 16.8 | 243.2 | 4.0 | 14.6 | 22.5 |
| 30 | 7 | 3.2 | 2.8 | 2.2 | 1.8 | 6.4 | 6.1 | 111.2 | 16.6 | 14.5 | 7304 | 15.4 | 229.8 | 4.0 | 14.4 | 21.0 |
| 30 | 8 | 3.0 | 2.6 | 2.2 | 1.5 | 6.3 | 6.1 | 111.2 | 16.5 | 14.5 | 7243 | 15.2 | 228.8 | 3.6 | 14.2 | 21.4 |
| 30 | 9 | 3.0 | 2.6 | 2.2 | 1.8 | 6.2 | 6.3 | 109.8 | 16.6 | 14.5 | 7323 | 15.4 | 225.0 | 3.4 | 14.2 | 21.5 |
| 30 | 10 | 3.0 | 2.5 | 2.0 | 1.7 | 6.0 | 5.9 | 107.2 | 16.5 | 14.3 | 7169 | 15.1 | 198.8 | 3.5 | 14.0 | 20.8 |
| 30 | 11 | 3.0 | 2.2 | 2.0 | 1.4 | 5.9 | 5.5 | 106.1 | 16.4 | 14.0 | 6894 | 14.0 | 181.0 | 3.6 | 13.8 | 20.0 |
| 30 | 12 | 2.9 | 2.2 | 2.2 | 1.5 | 5.7 | 5.2 | 100.9 | 16.1 | 13.7 | 6698 | 13.7 | 172.2 | 3.9 | 13.6 | 19.0 |
| 31 | 1 | 2.8 | 2.1 | 1.6 | 1.2 | 5.7 | 5.3 | 99.1 | 15.9 | 13.5 | 6467 | 12.7 | 167.3 | 4.1 | 13.4 | 18.4 |
| 31 | 2 | 2.5 | 1.9 | 1.5 | 1.1 | 5.7 | 5.6 | 97.2 | 15.7 | 13.2 | 6522 | 13.5 | 181.6 | 4.0 | 13.3 | 17.7 |
| 31 | 3 | 2.5 | 2.1 | 1.6 | 1.4 | 5.8 | 5.8 | 95.5 | 15.6 | 13.1 | 6559 | 13.8 | 180.1 | 4.0 | 13.1 | 17.8 |
| 31 | 4 | 2.4 | 2.1 | 1.5 | 1.5 | 5.9 | 5.9 | 93.0 | 15.5 | 12.9 | 6557 | 13.5 | 158.0 | 3.9 | 12.9 | 17.7 |
| 31 | 5 | 2.1 | 1.7 | 1.5 | 0.9 | 5.8 | 5.8 | 92.6 | 15.3 | 12.6 | 6507 | 13.3 | 141.5 | 3.6 | 12.8 | 16.9 |
| 31 | 6 | 2.1 | 1.4 | 1.5 | 0.6 | 5.6 | 5.5 | 92.0 | 15.1 | 12.4 | 6362 | 12.7 | 139.3 | 3.5 | 12.6 | 16.5 |
| 31 | 7 | 2.0 | 1.4 | 1.5 | 0.4 | 5.6 | 5.3 | 90.9 | 15.1 | 12.4 | 6271 | 12.1 | 145.4 | 3.4 | 12.6 | 16.4 |

| | | | | | | | | | | | | | | | | |
|----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|-------|-----|------|------|
| 31 | 8 | 1.9 | 1.5 | 1.5 | 0.4 | 5.4 | 5.2 | 89.8 | 15.1 | 12.4 | 6290 | 12.0 | 139.8 | 3.2 | 12.6 | 16.1 |
| 31 | 9 | 1.9 | 1.7 | 1.5 | 0.5 | 5.1 | 5.1 | 88.8 | 15.0 | 12.3 | 6318 | 11.6 | 118.4 | 3.1 | 12.6 | 15.3 |
| 31 | 10 | 3.4 | 3.2 | 2.1 | 1.7 | 4.9 | 4.8 | 87.2 | 14.9 | 12.1 | 6091 | 11.2 | 98.1 | 3.1 | 12.4 | 14.8 |
| 31 | 11 | 4.0 | 3.5 | 2.5 | 1.8 | 4.9 | 4.6 | 86.2 | 14.7 | 12.1 | 5869 | 10.6 | 103.4 | 2.9 | 12.5 | 14.8 |
| 31 | 12 | 4.0 | 3.4 | 2.7 | 2.4 | 4.8 | 4.3 | 83.4 | 14.6 | 11.8 | 5806 | 10.5 | 82.8 | 2.7 | 12.3 | 14.1 |
| 32 | 1 | 4.0 | 3.6 | 2.7 | 2.5 | 4.7 | 4.3 | 81.6 | 14.3 | 11.6 | 5648 | 9.8 | 78.6 | 2.7 | 12.2 | 13.3 |
| 32 | 2 | 3.9 | 3.6 | 2.5 | 2.4 | 4.6 | 4.4 | 81.0 | 14.1 | 11.4 | 5743 | 10.1 | 78.9 | 2.6 | 12.1 | 12.8 |
| 32 | 3 | 3.5 | 3.1 | 2.5 | 2.3 | 4.5 | 4.3 | 80.7 | 14.0 | 11.4 | 5657 | 9.6 | 81.1 | 2.5 | 12.0 | 12.7 |
| 32 | 4 | 3.4 | 2.7 | 2.5 | 1.1 | 4.2 | 4.1 | 79.8 | 13.9 | 11.3 | 5470 | 9.0 | 64.1 | 2.3 | 12.0 | 12.4 |
| 32 | 5 | 3.0 | 1.6 | 2.5 | 0.3 | 4.1 | 4.0 | 79.0 | 13.7 | 11.1 | 5259 | 8.5 | 51.9 | 2.2 | 11.9 | 11.8 |
| 32 | 6 | 2.8 | 1.5 | 2.5 | 0.3 | 3.9 | 3.9 | 77.0 | 13.6 | 11.0 | 5097 | 7.9 | 46.9 | 2.0 | 11.9 | 11.6 |
| 32 | 7 | 2.6 | 1.4 | 2.1 | 0.2 | 3.8 | 3.6 | 75.2 | 13.6 | 11.1 | 4923 | 7.4 | 47.8 | 2.0 | 11.8 | 12.1 |
| 32 | 8 | 2.2 | 1.4 | 2.0 | 0.1 | 3.9 | 3.7 | 73.8 | 13.5 | 11.2 | 5059 | 7.5 | 64.4 | 2.0 | 11.9 | 12.4 |
| 32 | 9 | 2.1 | 1.3 | 2.0 | 0.0 | 4.2 | 4.2 | 72.0 | 13.4 | 11.3 | 5333 | 8.1 | 71.0 | 2.0 | 11.9 | 12.4 |
| 32 | 10 | 1.9 | 1.0 | 1.4 | 0.0 | 4.3 | 4.2 | 70.1 | 13.3 | 11.1 | 5423 | 8.5 | 65.3 | 2.0 | 11.9 | 11.8 |
| 32 | 11 | 1.7 | 0.5 | 1.0 | 0.0 | 4.3 | 4.1 | 69.1 | 13.2 | 11.0 | 5350 | 8.1 | 62.2 | 2.0 | 11.9 | 11.8 |
| 32 | 12 | 1.5 | 0.5 | 1.0 | 0.0 | 4.2 | 3.8 | 66.1 | 13.1 | 10.8 | 5252 | 7.9 | 58.9 | 2.0 | 11.7 | 11.1 |
| 33 | 1 | 1.4 | 0.5 | 1.0 | 0.1 | 4.2 | 3.9 | 65.3 | 12.9 | 10.5 | 5110 | 7.4 | 61.9 | 1.9 | 11.4 | 10.8 |
| 33 | 2 | 1.4 | 0.7 | 1.0 | 0.0 | 4.2 | 3.9 | 64.8 | 12.7 | 10.3 | 5227 | 7.7 | 55.2 | 1.9 | 11.2 | 10.3 |
| 33 | 3 | 2.8 | 2.9 | 3.3 | 1.3 | 3.9 | 3.6 | 64.7 | 12.6 | 10.4 | 5029 | 7.1 | 57.8 | 1.8 | 11.2 | 10.8 |
| 33 | 4 | 2.6 | 1.3 | 1.4 | 0.5 | 4.2 | 4.2 | 63.6 | 12.6 | 10.4 | 5160 | 7.5 | 66.7 | 1.9 | 11.1 | 11.2 |
| 33 | 5 | 2.1 | 1.0 | 1.0 | 0.3 | 4.9 | 4.8 | 63.2 | 12.6 | 10.8 | 5399 | 8.3 | 83.3 | 1.9 | 11.3 | 12.7 |
| 33 | 6 | 1.7 | 0.9 | 1.0 | 0.1 | 5.7 | 5.6 | 63.4 | 12.7 | 11.2 | 5781 | 9.2 | 93.8 | 2.1 | 11.7 | 13.4 |
| 33 | 7 | 1.5 | 1.2 | 1.0 | 0.2 | 6.2 | 5.9 | 64.2 | 13.1 | 11.9 | 6155 | 9.9 | 98.6 | 2.0 | 12.3 | 15.2 |
| 33 | 8 | 1.5 | 1.1 | 1.0 | 0.0 | 6.0 | 5.7 | 66.3 | 13.2 | 12.0 | 6570 | 11.0 | 98.9 | 1.9 | 12.6 | 14.6 |
| 33 | 9 | 1.3 | 0.6 | 0.8 | 0.0 | 5.6 | 5.6 | 68.0 | 13.2 | 12.2 | 6860 | 11.5 | 99.5 | 1.8 | 13.0 | 14.4 |
| 33 | 10 | 1.3 | 0.7 | 0.8 | 0.1 | 5.3 | 5.2 | 69.7 | 13.2 | 12.3 | 6827 | 11.4 | 91.7 | | 13.1 | 14.1 |
| 33 | 11 | 1.3 | 0.8 | 0.8 | 0.2 | 5.0 | 4.7 | 71.3 | 13.2 | 12.3 | 6555 | 10.5 | 95.5 | | 13.1 | 14.3 |
| 33 | 12 | 1.4 | 1.1 | 0.9 | 0.3 | 5.1 | 4.6 | 73.5 | 13.2 | 12.2 | 6413 | 10.4 | 99.1 | | 13.2 | 14.0 |

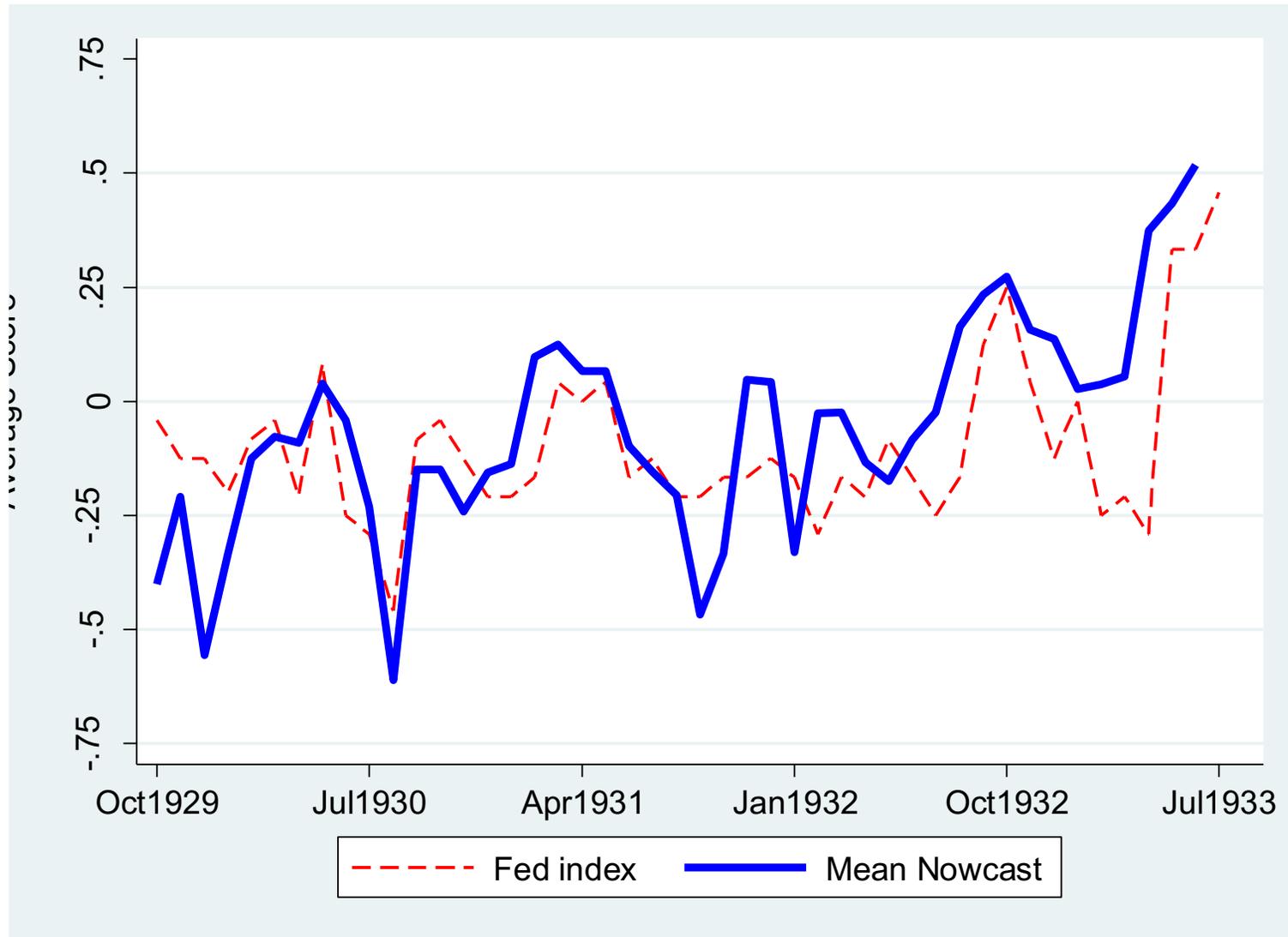
Appendix B: Figures

Figure 1: Cumulative Changes in Industrial Production and Fed and Business Press nowcasts



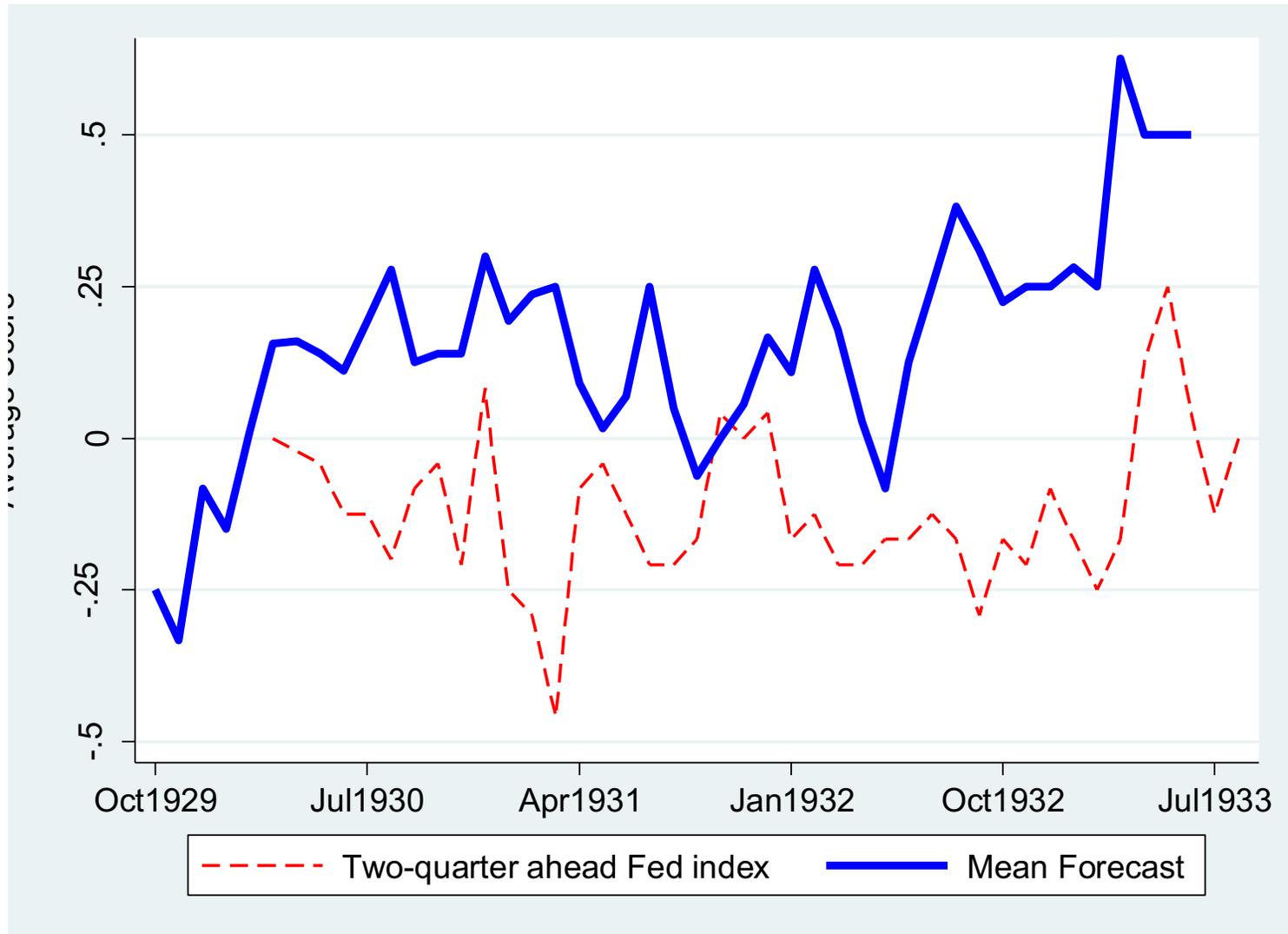
Notes: Changes in industrial production scaled by a factor of 3. Nowcast and Fed index scoring described in text. Industrial Production data from Federal Reserve Board of Governors.

Figure 2: Fed and Business Press Nowcasts



Notes: Nowcast and Fed index scoring described in text.

Figure 3: Business Press Forecasts compared to future values of Fed index



Notes: Nowcast and Fed index scoring described in text. Two-quarter ahead values of Fed index used as nowcast forecasts for next quarter with approximately a one-quarter lag for data releases.

Figure 4: Monthly Ratio of Forecasts to Nowcasts

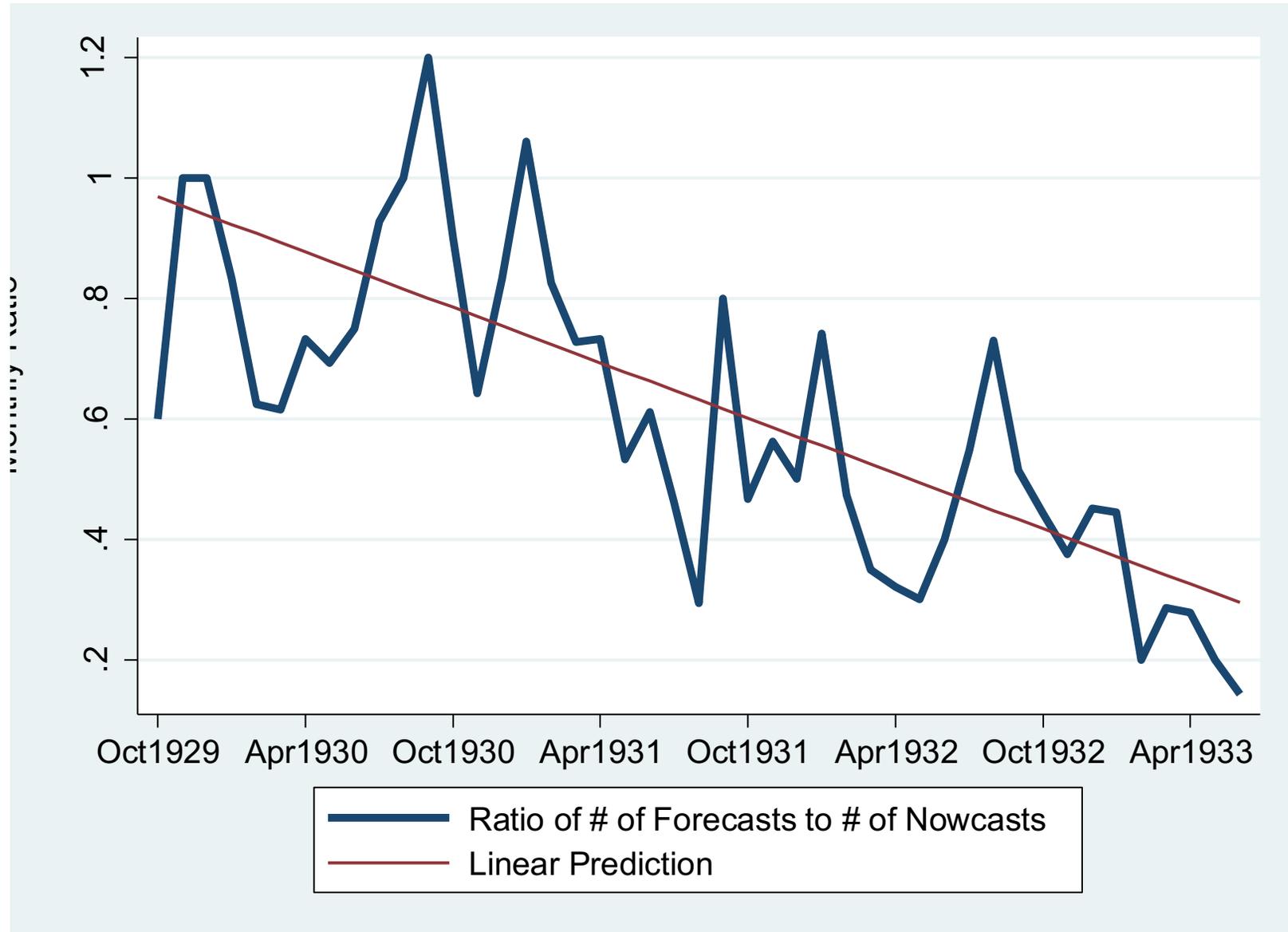
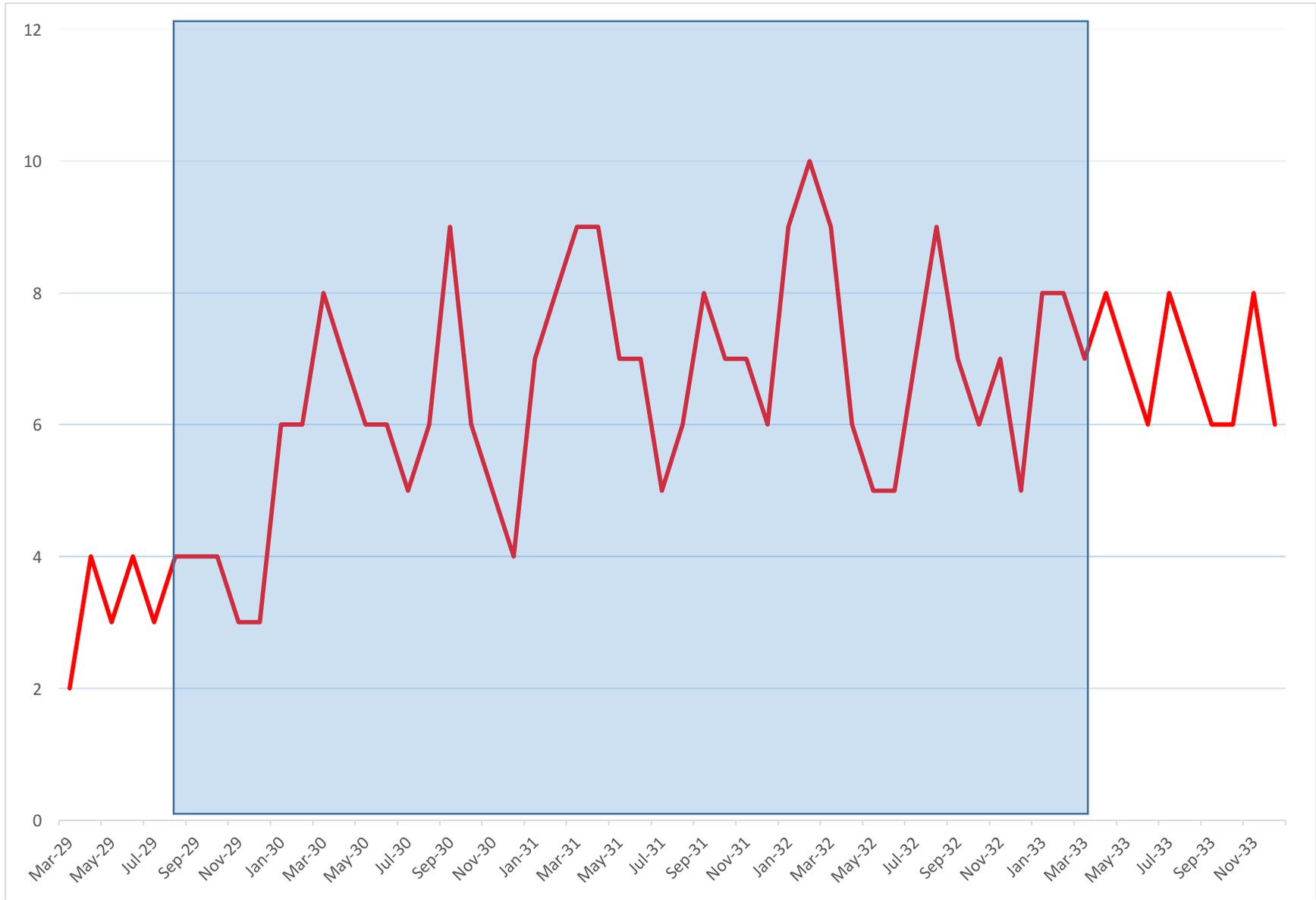


Figure 5: Number of Haney's conditions satisfied



Note: Number of Haney's (1931) conditions for a business cycle trough satisfied out of 12. Blue bars indicate recession periods, so actual trough is March 1933

Appendix A:

Business analysts making nowcasts and forecasts

Advertising Federation of America
American Banker's Association
American Federation of Labor
American Iron and Steel Institute
American Machinist
American Metals Market
American Petroleum Institute
American Tobacco
Ayres Cleveland Trust
Babson
Baldwin Locomotive
Bank of America
Banker's Journal
Barnes of National Business Survey Conference
Betron, Griscom and Co.
Bradstreet
Broadstreet
Brooklyn Trust
Brookmire Economic Service
Builder's Outlook
Bureau of Labor Statistics
Business Bureau Indiana University
California Chamber of Commerce
Central Republic Bank of Chicago
Central Republic Trust of Chicago
Chain Store Age
Chase National Bank
Chatham Phoenix National Bank
Chemical Bank and Trust
Chicago Fed President
Cleveland Trust
Coal Age
Commercial and Financial Chronicle
Conference of Statisticians in Business
Continental Can
Cotton Textile Merchants
Dawes (former president of Reconstruction Finance Corporation)
Dr. Handy, Brookings Institution
Dr. J. M. Keynes
Dr. Lewis Haney (NYU)
Dr. Mills (Columbia)
Dr. Nadler, (NYU)
Dry Goods Trade Observer
Dun and Bradstreet
Dun and National Credit Office
Dun's Review
Ernst and Ernst
F. W. Dodge
First Minneapolis Trust Co.
First National Bank of Boston
First National Bank of Chicago
First National Bank of Chicago
First National Bank of NY
Fleischer American National Bank of Indiana
Fletcher American National Bank
Foreman State National Bank of Chicago
General Electric
Goodyear Tire and Rubber
Guaranty Trust of New York
Guardian Detroit Union Group
Guardian Trust of Cleveland
Guardian Union Trust of Michigan
Halsey, Stewart, and Co.
Hardware Age
Henry Ford
Hibernia Bank and Trust Co. of New Orleans
Horwath and Horwath
IBM
Indiana Limestone
Indiana University
Investment Bankers Association of America
Iron Age
Irving Trust
J. Henry Schroeder Banking Corp.
J.C. Penny
John D. Rockefeller
La Salle Extension University
Lehman Bros.
Lewis E. Pierson, Irving Trust Co.
Lincoln Cromwell
Los Angeles Chamber of Commerce
Marine Trust Co. of Buffalo

Mercantile Bank and Trust Co.
Midland Bank of Cleveland
Mr. Edie of American Capital
National Association of Credit Men
National Association of Manufacturers
National Association of Purchasing Agents
National Association of Real Estate Boards
National Business Conference-Baldwin
National City Bank of New York
National Credit Corp.
National Drygoods Retail Association
National Industrial Conference Board Statisticians
National Lumber Association
National Shawmut Bank of Boston
New Jersey Bankers
New York Central Railroad
New York Times
New York Times Annalist
Newspaper Editorial
Newspaper Editorial Forecast
Northwest Bank Corporation of Minneapolis
Northwest National Bank
Ohio State University
President B&O Railroad
Proctor and Gamble
Purchasing Agents
Reports from Federal Reserve Districts
Schwab
Secretary of Commerce Hoover (Chapin)
Secretary of Commerce P. Lamont
Security First National Bank of LA
Silberling
Sir Josiah Stamp
Sloan, CEO General Motors
Standard American Corporation of Chicago
Standard Oil of Indiana
Standard Oil of New Jersey
Steiner American Institute of Banking
Swift and Co.
Union Guardian Trust of Detroit
Union Trust of Cleveland
University Atlas Cement Co.
University of Buffalo

University of Indiana
University of Minnesota
University of Texas
U.S. Building and Loan League
U.S. Chamber of Commerce
U.S. Steel
Wells Fargo Bank
Westinghouse
Wisconsin Bank Shares
President of Woolworth's

Appendix B: Timeline of economic events and correspondence to nowcasts and forecasts

After the Great Crash business analysts were generally pessimistic. On November 9th of 1929, *Iron Age*, a steel industry publication, said that the stock crash made buyers of steel more cautious, and automakers quoted in the *CFC* said that “an unmistakable atmosphere of caution and a more frank and searching view of the general business situation.” After a pause early in 1930, the first banking crisis accelerated the downturn in mid-1930 which the business press was generally able to track in real-time. However, they forecasted a speedy recovery, contrary to what was to come. As an example, Babson indicated that there was no reason to believe that the present slump will last much longer (*New York Times*, October 24, 1930).

The downturn was severe in mid-1931, and the nowcasts, while exhibiting some fluctuations were generally pessimistic, while the forecasts continued to be optimistic. However, after the United Kingdom departed from the gold standard and the Federal Reserve raised interest rates, an even more severe banking and financial crisis resulted. The business press nowcasts do get more pessimistic during the period, and the forecasts do become somewhat less optimistic during the period.

There was another banking panic originating in Chicago in early 1932 (Wicker 2000), which caused the economic indicators to decline with the nowcasts. The forecasts become pessimistic, though they are still significantly higher than the actual future performance of the economy. There is a significant increase in optimism after some legislation to fight the Depression was passed. (*National City* discusses this in the March 1st edition of the *NYT*). There is a revival in business conditions in the Fall of 1932. Babson argues that business has hit bottom and that the worst was over as prices and the stock market were rising (September 8th issue of the *NYT*).

The start of 1933 began with much discussion of the prospects for the newly elected Roosevelt Administration in the midst of a brewing banking crisis which came to a head in March. There still were few forecasts of what the New Deal would mean for business, as little indication had been given during the campaign.¹⁰ In the February 4th, 1933 issue of the *New York Times*, Dun's Review stated that business is better than sentiment, which is the opposite of what happened in previous years. Here the nowcasts were overly optimistic as were the forecasts, as the business press expected that the improvement in conditions in 1932 would continue.

The trough of the Depression was in March 1933, which also corresponded to the inauguration of the new president on the fourth day of that month. However, economic conditions at the start of the month were poor, as a result of the banking crisis and banking holiday which followed. In response, President Roosevelt suspended some aspects of the gold standard. However, this suspension of the gold standard was not viewed positively by the business press. Instead of making nowcasts or forecasts, the main focus was on the catastrophic consequences of inflationary measures.

Recovery would begin in the spring of 1933 and some forecasters, like Colonel Ayres of the Cleveland Trust, would quickly forget their dire predictions about the dangers of expansionary monetary policy and the end of the American gold standard, and would see that conditions had improved by June, 1933. Jalil and Rua (2015) surveyed the business press and also found that they anticipated a recovery as a result of the policy changes of 1933.

¹⁰ Roosevelt did campaign against the budget deficits of his predecessor, and did implement austerity policies in the form of the Economy Act which reduced spending and the deficit significantly.

Appendix C: Discussion of Haney's Qualitative Criteria and how these were quantified

Contemporary forecasters developed some non-statistical rules of thumb to diagnose when recoveries would happen. Haney (1931)'s forecasting textbook provides twelve criteria to identify a business cycle trough which would be followed by a recovery, which are listed in Table 4: low interest rates (1), time-money rates above call-money interest rates (2), commercial paper rates above time-money interest rates (3), interest rates on short-time money below bond yields (4), production below normal (5), the ratio of inventories to production of manufactured goods is high and declining (6), unfilled orders have been declining and are very low (7), commodity prices were declining but are beginning to stabilize (8), the ratio of raw material prices to finished commodities prices is low but increasing (9), employment is beginning to decline more slowly, or even to increase (10), payrolls have stabilized (11), and the stock market has begun increasing again (12). Monthly data corresponding to these indicators is displayed in Table 5 from 1929 to 1933, which will allow for an analysis of where troughs would be predicted according to Haney's methodology. We also quantify these criteria by month and then sum up the number of criteria out of the 12 are satisfied to predict a trough in a given month.

Looking at interest rate data, commercial paper, time money (loans made for longer periods), call money (a loaned that can be liquidated or "called" in at any time), and Treasury bond interest rates, these all fall throughout this period even when recovery begins in March 1933 so this first indicator could have potentially predicted a trough at any point during this period. This condition is coded as 1 whenever commercial paper rates are below 5%, the level they stood at in late 1929. The NBER dates the beginning of the recession of 1929-1933 to have begun in August 1929, and call money rates were smaller than time-money rates for most of the month from that peak until April 1932. This would have meant that for the second criteria a

trough would be called incorrectly until about a year before the actual trough, which would not have been predicted. Short-time money interest rates are never below bond yields during this period. The fifth criteria is “production below normal”, which is coded as 1 whenever industrial production index is below 8, which is roughly its level in mid-1929. Production is low for all of 1920-1933 by that criteria. Next, we code the ratio of manufacturing inventories to manufacturing production as high if this ratio is larger than 14, and rising if the current month’s value is larger than the previous month’s. This condition is satisfied for a few months in every year. The seventh criterion is that unfilled orders are low and declining, with low defined as unfilled steel order below 4, roughly the level in 1929, and with declining defined the current value behind below the lagged value. This criterion is fulfilled from February 1931 to March 1933 with the exception of a few months.

Commodity prices are measured by the Producer Price Index (PPI), and defined as declining but stabilizing if the current month sees a decline but the decline is smaller than the previous month. As commodity prices fell massively during the 1929-1933 recession and then shot up after recovery started, this criterion is only true in a few months. Using the PPI for farm products as a measure of raw materials and the PPI for industrial production as the measured of finished good prices, this ratio is defined as low if it is below 1.6, which is lower than any ratio in 1929, and defined as declining as above. This condition is only satisfied for a few months before March 1933, when it is satisfied until August of the month, which would only identify a trough after the fact. Employment is defined as declining more slowly if the monthly change is lower in the current than the former month, and increasing if it is rising, one of which is satisfied in almost every month in the sample. To defined stabilized payrolls, the absolute value of the change in payrolls this month multiplied by the lag of the change in payrolls must be below 0.25

(0.5²). While there are some periods of stabilization, payrolls decline fairly steadily with some periods of slowing before rising quickly again in the recovery. The final criteria is an increase in the stock market, which means that the stock market is rising. While there are a few periods when this occurs, the stock market doesn't begin a prolonged increase until March 1933 when the trough is already reached.

The sum of these scores, which must be between 0 and 12, are graphed in Figure 5. While there are some fluctuations in the series, roughly 5 to 9 of the indicators are satisfied during the recession, even in 1930 when the trough is three years away. There are more of these criteria satisfied during the recession than before in early 1929, which is consistent with a higher likelihood of a trough in the near future. There is no increase in the number of criteria satisfied either in the month preceding the actual trough, on that month, or in the months immediately following the trough. Consistent with our findings above, it is clear that the heuristics used to identify and forecast business cycle troughs were unsuccessful during this Depression period.