

Was the Deflation of the Depression Anticipated? An Inference Using Real-time Data

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Abstract

Theories that explain the behavior of the economy during the Depression are based on assumptions about agents' expectations about future price trends. This paper uses real-time information from the Depression period to infer whether deflation was anticipated. The information includes the forecasting methodology of that time as well as projections about anticipated output that were obtained from the textual analysis of business statements. We infer that deflation was not anticipated because agents did not expect economic output to consistently decrease.

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WAS THE DEFLATION OF THE DEPRESSION ANTICIPATED? AN INFERENCE USING REAL-TIME DATA

In a recent paper, Binder (2016) surveyed several approaches for estimating inflationary expectations. The approaches include time series models, market-based analyses using asset prices, and narratives that examine information available in published sources that might indicate what people expected to happen. Moreover, Binder noted the challenge involved in “inferring what agents *would have* expected given their information..., not what agents *could have* expected using modern econometric methods and data.” (Binder, 2016, p. 2).

This issue is particularly important in the case of the Great Depression because theories that explain the behavior of the economy during this period include assumptions about agents’ expectations about future price trends. While economists have attempted to determine whether the deflation of that period was anticipated (Cecchetti, 1992; Hamilton, 1992 ; Klug et al., 2005), the results were obtained using modern time series approaches that do not necessarily reflect what actually occurred in real-time. We take the narrative approach and only use information that was contemporaneously available during this period.

By taking a narrative approach, this paper is able to show that the deflation that occurred during the Great Depression could not have been anticipated. In the absence of a quantitative record, the narrative approach may yield important insights about agents’ expectations during the Depression because it utilizes actual real-time data. A number of studies have already used this approach examining descriptive analyses or using textual analysis to look for key words such as inflation or deflation. (Romer, 1990; Nelson, 1991; Romer and Romer, 2013; Jahil and Rua, 2013; Binder, 2016).

Our narrative approach focuses on the forecasting methodology that was employed during this period, showing the relation between forecasts of economic activity and the expected change in prices. Using a large number of qualitative output forecasts that were obtained from financial publications, we are, thus, able to infer what agents *would have* expected during the Great Depression using only real-time information.

This analysis involves three methodological and/or logical steps. First, using the forecasting methods that existed in the 1930s, we determine how changes in the overall price level were predicted at that time. Second, it is necessary to obtain real-time forecasts of output, but there are no quantitative output forecasts for this period. We, therefore, use forecasts generated by using a textual analysis of real-time qualitative statements about economic activity (Mathy and Stekler, 2017). Finally, given the relation between output and prices and the information about output forecasts, we show that agents could not have expected prices to decrease consistently throughout the Depression.

The next section presents the forecasting methodology that prevailed through the Depression focusing on the relation between changes in output and prices. We then describe the process for converting qualitative statements about the current and future levels of economic activity into quantitative forecasts that we can analyze. The remaining sections present our results and conclusions.

I. Forecasting during the Depression

Several sources describe the forecasting approach that prevailed during the 1920s and early 1930s. (Hardy and Cox, 1927; Haney, 1931; Persons, 1931.) The approach in those books was highly descriptive and imprecise. The basic premise of the forecasting framework at that time was

that the economy experienced periodic cycles which moved with regularity from one phase of the cycle to the next one.

Thus, the process for making statements about future economic activity consisted of two steps. First, because the economy experienced periodic cycles and exhibited some degree of regularity, it was necessary to understand the current phase of the cycle. For this purpose, the forecaster collected the data and weighed the positive and negative effects of each piece of information.³ From that information, the current position was ascertained. Was this condition normal? Or was it above (below) normal? The prevailing view was that if activity was above (below) normal it was expected to decline (increase). (Hardy and Cox, p.17.)

Because this method did not provide quantitative estimates or the expected length of that phase of the cycle, it was often suggested that the current situation be compared with historical data from previous cycles. Thus, analogies were used to compare the current state with previous cycles. This would determine how long the economy would remain in its current state and when it could be expected to recover from a recession.⁴ A real-time illustration of this approach, written in the Fall of 1930, indicated the economy would recover in early 1931. (Persons, 1931, pp. 7-47.)

This method is designed to forecast the level of business activity but we are concerned with expectations about prices. The forecasting methodology that existed at that time did not predict prices. Rather price changes were positively associated with changes in business activity. In essence, forecasters expected that demand shocks would predominate, which would generate a robust

³ The literature of the time period called this the cross-cut method. We now call it cross-sectional analysis that is useful for nowcasting.

⁴ In examining the business statements that we discuss below there were frequent analogies that referred to previous business cycles. This confirms that this approach was used in making projections during the Depression.

positive correlation between changes in output and prices. (In fact, historical statistics indicate that this assumption was empirically accurate.⁵)

In essence, forecasters expected that demand shocks would predominate, which would generate a robust positive correlation between changes in output and prices. While Cooley and Ohanian (1991) argue that prices were not procyclical in the postwar period, they find that the price level was strongly procyclical in the interwar period, especially during the Great Depression. While there was a secular deflation between the Civil War and the turn of the century, there had been a strong correlation between output and the price level for the three decades that preceded the Great Depression. The decades prior had seen a large inflation during the WW1 boom and its aftermath, and a sharp recession in the deflationary recession of 1920-1921. Using the annual percent changes in monthly measure of the price level and the business cycle, prices and the business cycle have a correlation of 0.43 over the 1900-1929 period, and a correlation coefficient of 0.58 over the 1920-1929 period. The belief that prices and the business cycle were correlated was quite reasonable, a view that was only reinforced by the experience of the Great Depression.⁶

Hardy and Cox (1927) show how the forecasting services handled price changes in their method and reports. For example, the Brookmire Service indicated that changes in commodity prices were representative of changes in general business activity. (p.63). Similarly, The Harvard Service believed that changes in business activity led price changes by about two months, but that

⁵ Cooley and Ohanian (1991) find that the price level was strongly procyclical in the interwar period, especially during the Great Depression. The correlation between price and output changes was 0.70 for the 1920-1939 period and 0.80 for the years 1929-1939.

⁶ The Business Cycle series is "Index of American Business Activity for United States" from the Cleveland Trust Company, NBER Macrohistory series M12003USM516NNBR, available monthly 1/1855-12/1970. The price level series is "Index of the General Price Level for United States" from the New York Fed, 1913=100, available monthly 1/1855-11/1939. Percent changes calculated as annual log differences.

some prices would change before and some after the economy changed direction. (pp. 70, 90). In any event, prices in the future will behave as they have done in the past. (p.137).

This discussion yields two conclusions: first, the price level was not a variable that was forecast; second, changes in the price level were believed to be positively related to the forecast of business activity. Thus, any forecasts of business activity or measures of output expectations could serve as proxy variables for the price level predictions.

II. Qualitative Business Forecasts of Economic Activity

In order to obtain an understanding of agents' expectations about economic activity, this section will examine the business forecasts made during the entire recessionary phase of the Depression up to the 1933 trough. This enables us to determine how well the current economic situation was assessed and how well the future conditions were forecast. No quantitative forecasts are available for this period. 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.⁷ The qualitative forecasts came from *The New York Times* (NYT) and the *Commercial and Financial Chronicle* (CFC).⁸ The method was developed by Goldfarb et al. (2005), who only examined the 1929-30 forecasts, and used by Mathy and Stekler (2017) to evaluate the real-time nowcasts and forecasts for the entire recessionary phase of the Depression.

The qualitative statements in the two publications were scored by the system developed by Goldfarb et al. (2005). Each statement was divided into two categories which were scored

⁷ 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; Ericsson, 2016; Goldfarb et. al, 2005; Lundquist and Stekler, 2012, and Stekler and Symington, 2016).

⁸ The CFC is a weekly publication that is a compendium of information of and about the business and financial community.

separately. The first referred to the current state of economic conditions; the second referred to statements about the future economic conditions.

The scores were based on particular words or phrases contained in the statements that indicate varying degrees of optimism or pessimism about the state of the economy. More specifically, they were scored on an index that runs from +1 to -2. For example, words that indicate extremely good performance, such as a vigorous recovery, have a score of +1; lower positive scores were assigned to words that reflect a lower level of positive economic activity. Similarly, if the words suggested a weakening of economic activity, a score of $-1/4$ was assigned. The scores became more negative if the statements reflected a further deterioration of the economy with those indicating a crisis receiving a score of $-1\frac{1}{2}$ or -2. The words used and the associated scores are presented in Table 1.

The chronologically ordered sequence of these scores created two times series- one for the nowcasts; the other for the forecasts. Figure 1 shows the relation between the nowcasts and the Index of Industrial Production for the same quarter and Figure 2 presents the business sector's scored forecasts made in quarter t and the Index of Industrial Production in quarter t+2. Figure 1 shows that the business community made accurate nowcasts, i.e. these nowcasts closely reflect the real-time economic conditions that prevailed during the Depression. On the other hand, the forecasts present a different picture. In late 1929 and early 1930, the business forecasts did expect the economy to decline further. However, after this initial period of the Depression, the forecasts consistently indicate that the business community expected the economy to recover and real output to increase. (The observations in Figure 2 are consistently above the zero line). The forecasts may have been wrong but this is what the forecasting community of the time believed. These forecasts

are consistent with the method that was described above: if activity was below normal it was expected to increase.

III. Inference: Was Deflation Anticipated in the Depression?

The purpose of this paper has been to use real-time information so determine whether the deflation of the Depression was anticipated. We now show that logical inference can answer that question. The real-time literature and forecasts yielded two results: 1. The forecasting method of that period indicated that price and output movements were generally expected to move in the same direction; and 2. After early 1930, the business community consistently expected output to increase in the future. *Therefore, we must infer that the business community could not have expected prices to consistently decrease in the future, i.e. the deflation was not anticipated.*

IV. Conclusions

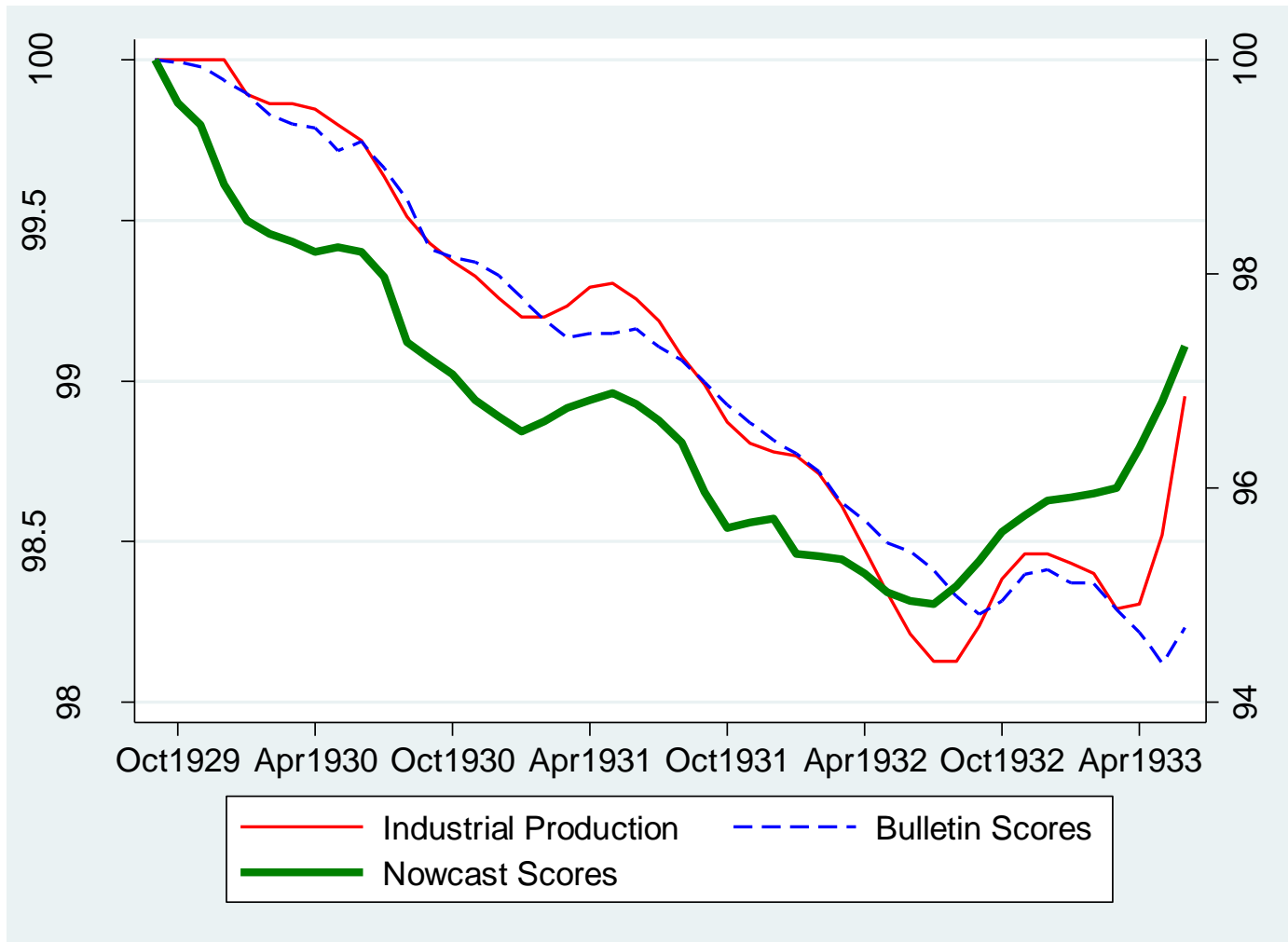
This is the first study that has used real-time information to determine whether the deflation of the Depression was anticipated. We combined the forecasting literature of that period with output forecasts that were obtained from a textual analysis of business statements made during the Depression. The logical inference obtained from this analysis is that the deflation was not anticipated.

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

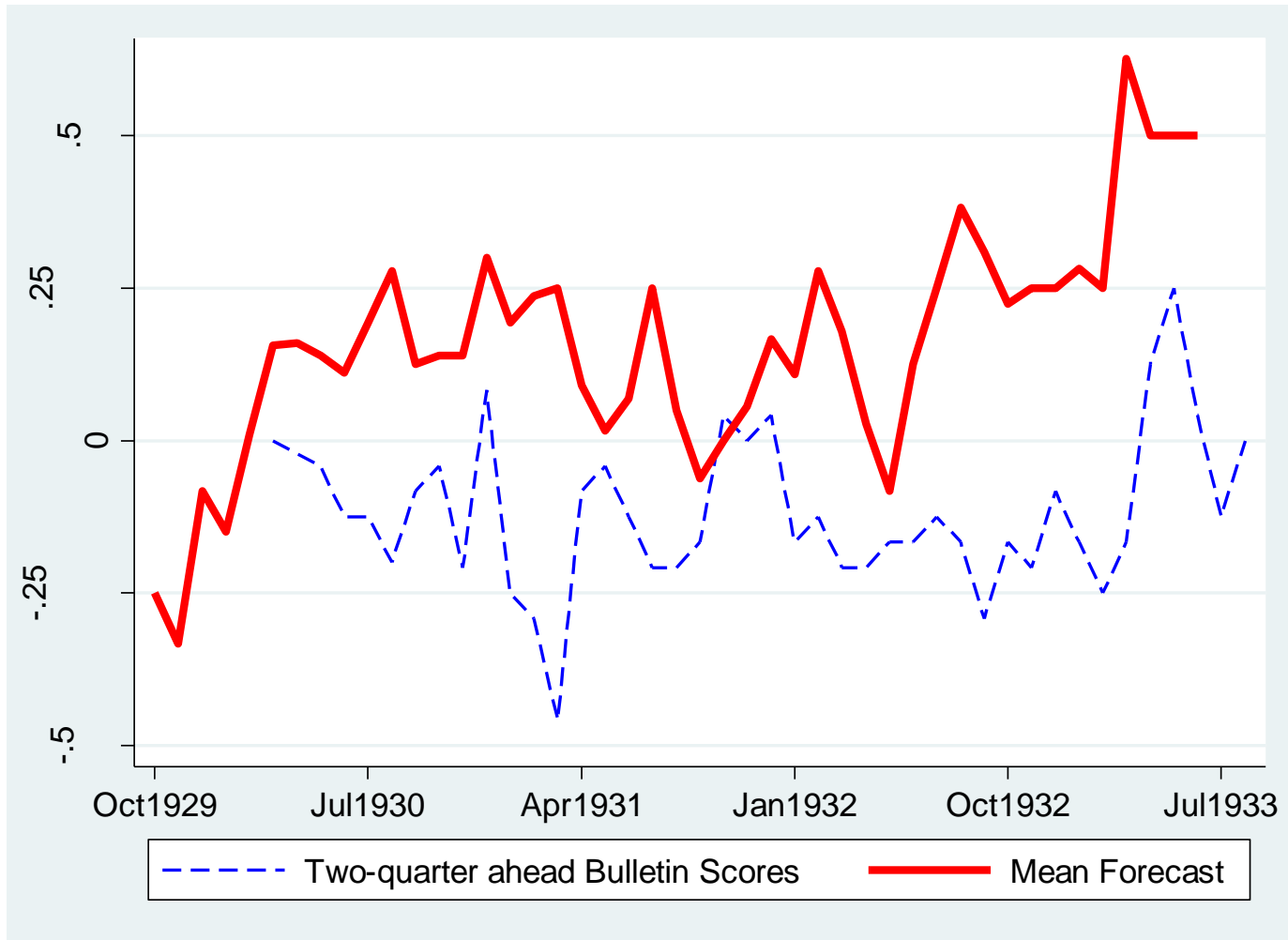
Notes: These scores were assigned to both nowcasts and forecasts for a given analyst. Source: *Commercial and Financial Chronicle and New York Times*.

Figure 1: Cumulative Changes in Industrial Production and Federal Reserve Bulletin and Business Press Nowcasts



Notes: Nowcasts derived from *Commercial and Financial Chronicle* and *New York Times*. Federal Reserve Bulletin scores are based on various issues of the *Federal Reserve Bulletin*. Industrial Production data from Federal Reserve Board of Governors, plotted on right axis. Nowcast and Federal Reserve Bulletin Index scoring described in text, plotted on left axis.

Figure 2: Business Press Forecasts compared to future values of Fed index



Notes: Nowcasts derived from *Commercial and Financial Chronicle* and *New York Times*. Federal Reserve Bulletin scores are based on various issues of the *Federal Reserve Bulletin*. Nowcast and Fed Bulletin scores described in text. Two-quarter ahead values of Federal Reserve Bulletin index used as forecasts for next quarter as there is an approximately one-quarter lag for data releases.

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