



# Estimation of historical inflation expectations

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Received 18 July 2015

## Abstract

Expected inflation is a central variable in economic theory. Economic historians have estimated historical inflation expectations for a variety of purposes, including studies of the Fisher effect, the debt deflation hypothesis, central bank credibility, and expectations formation. I survey the statistical, narrative, and market-based approaches that have been used to estimate inflation expectations in historical eras, including the classical gold standard era, the hyperinflations of the 1920s, and the Great Depression, highlighting key methodological considerations and identifying areas that warrant further research. A meta-analysis of inflation expectations at the onset of the Great Depression reveals that the deflation of the early 1930s was mostly unanticipated, supporting the debt deflation hypothesis, and shows how these results are sensitive to estimation methodology.

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*JEL classification:* N11; N12; N13; N14; E30; E31; D84

*Keywords:* Inflation expectations; Fisher effect; gold standard; Hyperinflation; Great Depression; Rational expectations; Debt deflation

## 1. Introduction

Expected inflation is a variable of central importance in economic theory. Inflation expectations appear in two of the most empirically scrutinized macroeconomic relationships, the Fisher effect and the Phillips curve. Today, central banks around the world devote considerable resources to monitoring the inflation expectations of consumers, forecasters, and financial market participants using surveys and financial data. But for much of economic history, such indicators do not exist. In this piece, I survey the approaches used to estimate historical inflation expectations, highlight key methodological considerations, and introduce a new approach using quantitative news analysis.

I group approaches to estimating historical inflation expectations into three main categories: time series, market-based, and narrative. Time series approaches use univariate or multivariate statistical methods to construct inflation forecasts and use these forecasts as proxies for historical agents' expectations. Market-based approaches use asset prices to make inferences about inflation expectations. The narrative approach entails examination of news articles or other records to gather information about what agents believed and expected.

All three approaches have been employed to test for the presence of the Fisher effect during the classical gold standard era (Barsky and DeLong, 1991; Perez and Siegler, 2003; Mitchener and Weidenmier, 2010). Motivated by the work of Cagan (1956), researchers have also estimated inflation expectations in the 1920s hyperinflation economies (Frenkel, 1977; Garber, 1982).

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<http://dx.doi.org/10.1016/j.eeh.2016.01.002>

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Explanations of the onset of the Great Depression hinge on whether deflation was anticipated, while explanations of the recovery depend on when positive inflation expectations reappeared, and whether a “regime change” under Roosevelt generated inflationary expectations (Cecchetti, 1992; Temin and Wigmore, 1990; Eggertsson, 2008; Jalil and Rua, 2015).

Table 1 summarizes the papers that estimate inflation expectations in these eras by category of approach. Different approaches to estimating inflation expectations lead to different results, and even papers that use the same category of approach can obtain different results depending on data selection and other choices. For example, Fig. 1 plots three estimates of expected inflation from 1928 to 34. These and other estimates differ in the extent to which deflation was anticipated and in the timing of the return of positive inflation expectations.

The primary challenge of estimating historical inflation expectations is that it requires inferring what agents *would have* expected, given their information sets and models of the economy, not what agents *could have* expected using modern econometric methods and data. *Forecastable* is not equivalent to *expected*, but time series approaches use the former as a proxy for the latter. For example, many early studies of the pre-war classical gold standard era estimate univariate time series models of inflation to measure its persistence. Findings of low persistence are interpreted as evidence

that inflation was unforecastable based on its lags, and therefore that expectations were roughly constant.

Investors in the Great Depression era and earlier certainly did not explicitly use time series methods to forecast inflation before these methods were invented or sufficient computing power was available. The question is whether they used rules of thumb that would resemble the results of such methods. This is not implausible; Fisher (1930) notes that “if inflation is going on, [businessmen] will scent rising prices ahead,” possibly *as if* they used a simple autoregressive model of inflation dynamics.

Estimation of inflation expectations via the time series approach is very sensitive to the choice of price index used to construct the inflation measure. Wholesale price data displays less persistence than retail price data (Hanes, 1999). Measurement error also leads to underestimation of inflation persistence through attenuation bias. This can lead to a false conclusion that inflation was unforecastable based on its own lags, even if businessmen did form expectations adaptively. Estimation of models of inflation dynamics should ideally use real-time data and construct out-of-sample forecasts that are more likely to resemble forecasts that could have feasibly been made *ex ante*. Even with real-time data, however, the time series approach will not detect a regime change in inflation expectations, as is hypothesized to have occurred in 1933.

Table 1  
Approaches to estimating historical inflation expectations in the literature.

	Time Series	Narrative	Market
<b>Classical gold standard</b>	Fisher (1930) Sargent (1973a) Shiller and Siegel (1977) Barsky (1987) Benjamin and Kochin (1984) Barsky and DeLong (1991) Perez and Sieglar (2003)	Barsky and DeLong (1991)	Perez and Sieglar (2003) Mitchener and Weidenmier (2010)
<b>Hyperinflation</b>	Cagan (1956) Sargent and Wallace (1973) Salemi (1976) Khan (1977)		Frenkel (1977) Garber (1982) Webb (1986)
<b>Great Deflation</b>	Dominguez et al. (1988) Cecchetti (1992) Romer (1992) Evans and Wachtel (1993) Fackler and Parker (2005) Dorval and Smith (2013) Davis (2015)	Dominguez et al. (1988) Nelson (1991) Evans and Wachtel (1993) Klug et al. (2005) Romer and Romer (2013)	Hamilton (1987); Hamilton (1992) Voth (1999) Fackler and Parker (2005)
<b>Recovery from Great Depression</b>	Dominguez et al. (1988) Cecchetti (1992) Romer (1992) Eggertsson (2008) Davis (2015)	Jalil and Rua (2015) Orphanides (2004) Klug et al. (2005)	Temin and Wigmore (1990) Hamilton (1992)

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