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Trust the Experts? Relative Performance of Inflation Expectations, 1946-2022

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I study long-run series of individual and professional inflation forecasts from the University of Michigan Survey of Consumers and Livingston Survey of professional economists. I find that the average professional forecast generally outperforms the average consumer forecast. However, that superior performance is attributable exclusively to periods of low and stable inflation. During periods of high inflation and inflation regime change—both from low and stable to high inflation, and from high inflation to disinflation—the average consumer forecast is more accurate and rational (unbiased, with serially uncorrelated errors) and efficient (fully exploits available information). I find 3.5% inflation to be a critical threshold above which consumers rationally predict inflation. Professional forecasters affiliated with commercial banks and labor organizations generally outperform other professionals during periods of price stability, with the latter also exhibiting less bias and more rationality and efficiency than other professionals during periods of inflation regime change.

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1 Introduction

I use the two oldest continuous surveys of inflation expectations—the Livingston Survey of professional economists and University of Michigan Survey of Consumers—to evaluate the relative accuracy, rationality, and efficiency of households and professionals in forecasting inflation under different inflation regimes.

I find that while professionals outperform consumers in forecasting inflation over the entire period since 1960, their superior performance is attributable to periods of low and stable inflation. During periods of high inflation and inflation regime change—both from low and stable to high inflation, and from high inflation to disinflation—consumers are not only more accurate, but also exhibit forecast rationality and efficiency. Among professionals, I find that forecasters affiliated with labor organizations exhibit the least bias and greatest rationality and efficiency during transitions to an inflationary regime.

Specifically, whereas professional economists are generally unbiased and pass most tests of forecast rationality outside periods of inflation regime change, they fail all tests of forecast bias, rationality, and efficiency during periods of regime change. In contrast, whereas consumers are generally biased and fail all tests of forecast rationality outside periods of regime change, they are unbiased during transitions to an inflationary regime, and pass key tests of forecast rationality and efficiency during regime transitions—both from low and stable to high inflation, and from high inflation to disinflation.

Similarly, whereas professional economists are more accurate and unbiased than consumers when inflation is below a statistically critical threshold of 3.5%, when inflation is above 3.5%, not only are consumers unbiased and more accurate than professionals, they are also more rational and efficient. Moreover, whereas I can confidently reject the null hypotheses that consumers are unbiased, rational, and efficient in their inflation forecasts when inflation is below 3.5%, I cannot reject the same null hypotheses when inflation is above 3.5%.

Among professionals, while those affiliated with commercial banks and labor organizations outperform other professionals during periods of price stability, forecasters affiliated with labor organizations also exhibit less bias and more rationality and efficiency during periods of inflation regime change. While I can reject the null hypothesis that all categories of professional economists are unbiased during periods of regime change, economists associated with labor organizations exhibit the smallest mean error of any professional group during a shift to an inflationary regime. During a shift to a disinflationary regime, economists affiliated with the Federal Reserve exhibit the smallest mean error.

I contribute to the existing literature in five original ways, both empirically and methodologically. First, I test whether forecast accuracy, rationality, and efficiency vary across surveys, across inflation regime, and across surveys across inflation regime. Second, I test whether forecast accuracy, rationality, and efficiency vary across different types of professional economists, and across different types of professional economists across different inflation regimes. Third, I address the issue of serial correlation in forecasts with overlapping inflation horizons by clustering standard errors separately at overlapping forecast-pair levels. Fourth, I ensure parallel construction of forecasts. Fifth, I extend the evaluation of long-run relative forecast performance through the entirety of the period of price stability since the mid-late 1980s.

More substantively, I contribute to the extant literature in two primary ways. First, complementing Mankiw et al. (2003) and Reis (2021a, 2021b), I find that adjustments in inflation expectations vary across types of agents across inflation regimes, with consumers updating their expectations more accurately, rationally, and efficiently when the level of inflation, or the magnitude of an inflationary or disinflationary shock, are above critical thresholds.

Second, my results lend support to former Federal Reserve Chairman Alan Greenspan's definition of price stability as a level of inflation low enough that agents do not need to think about it in their daily decision-making (FOMC 1996). The evidence reported here suggests that 3.5% inflation appears to be a critical threshold above which consumers pay such close attention to inflation that they pass standard tests of forecast unbiasedness, rationality, and efficiency, and I cannot reject the Mincer-Zarnowitz null hypothesis that actual inflation on average moves one-for-one with the average consumer forecast. The same is true during inflation regime transitions, which I define as forecast observations for which the actual forward five-year average inflation rate is at least two standard deviations above (below) the actual trailing five-year average.

The remainder of this paper is as follows. In section 2, I review the empirical literature on the comparative evaluation of consumers and professional economists in forecasting inflation. In section 3, I discuss the parallel construction of consistent series of 12-month inflation expectations for both consumers and professional economists, and report summary statistics. In section 4, I formally evaluate the accuracy, rationality, and efficiency of consumer and professional inflation forecasts under different inflation regimes. In section 5, I similarly evaluate the performance of inflation forecasts by different categories of professional economists under different inflation regimes. Section 6 discusses the empirical results and concludes.

2 Literature Review

In response to Muth (1961) and Friedman (1968), numerous studies examined the accuracy, rationality, and efficiency of both survey and market measures of inflation expectations in the context of the Great Inflation of the late 1960s through the early 1980s. As the oldest continuous measures of inflation expectations, the Livingston Survey of professional economists—currently conducted by the Federal Reserve Bank of Philadelphia—and the Survey of Consumers by the Institute for Social Research at the University of Michigan received particular attention. While a substantial empirical literature has generally demonstrated that inflation expectations often differ across economic agents, and that those disagreements generate differences in forecast accuracy, rationality, and efficiency, no study has examined whether relative differences in the performance of inflation forecasts across different types of agents varies systematically across different inflation regimes.

Though early studies using the Livingston survey of professional economists (eg. Turnovskv 1970; Gibson 1972; Pyle 1972; and Turnovskv and Wachter 1972) found that nominal interest rates generally moved in line with inflation expectations, tests of forecast accuracy and rationality were mixed, with Turnovsky (1970) finding an improvement in forecast accuracy and rationality during the early 1960s. Gibson (1972) similarly found a stronger effect of inflation expectations—as measured by the Livingston survey—on nominal interest rates after 1959 versus before. However, as Carlson (1977) pointed out, these studies incorrectly calculated inflation expectations in the Livingston survey, which given the logistics of the survey were in fact implicit eight- and fourteen-month forecasts rather than six- and twelve-month forecasts. Gordon (1971) recognized the timing issue, but incorrectly computed seven- and thirteen-month forecasts. Analyzing the 1961-1977 period and adjusting for the timing issue, Brown and Maital (1981) rejected the hypothesis of fully rational expectations in the Livingston survey, though Vanderhoff (1984) and Pesando (1975) presented arguments for why evidence of irrationality in the Livingston survey may not mean that financial market experts are in fact irrational.

Several studies in the 1980s compared the relative performance of the Livingston and Michigan surveys in accurately and rationally predicting inflation. Analyzing a 1956-1980 sample period, Gramlich (1983) found that while the rationality hypothesis could be rejected for both surveys, economists surveyed by Livingston appeared to be more biased and inefficient than households in their inflation forecasts. However, Bryan and Gavin (1986b) demonstrated that Gramlich (1983) neglected to address the issue of serial correlation in forecast errors within overlapping forecast horizons. Correcting for the issue of serial correlation, Bryan and Gavin (1986b) found that mean forecasts in the Michigan survey exhibited statistical properties consistent with rationality.

Similarly, Bryan and Gavin (1986a) found that the Michigan survey was preferable to the Livingston survey on the basis of historical accuracy and consistency with standard tests of rationality, though also that a simple ARIMA model performed about as well as the Michigan survey. Addressing the issue of overlapping forecast horizons, Batchelor and Dua (1989) found that the apparent superiority of the Michigan survey was due to its larger sample size. Moreover, finding that neither survey was significantly correlated with the error in the other, they concluded that neither survey could be considered more rational than the other.

More recent studies have generated mixed results, with the most recent indicating that professional forecasters in the Livingston survey outperform households in the Michigan survey. Like earlier studies, Thomas (1999) found that consensus household forecasts generally outperformed those of professional economists in a Mincer-Zarnowitz test of forecast rationality over a 1960-1997 sample period, and that both outperformed simple time series forecasts. But Thomas (1999) also found that both failed tests of full exploitation of available macroeconomic data. However, Mehra (2002) found that while the Livingston inflation forecasts were generally unbiased and efficient over a 1961-2000 sample period, they were biased during the 1961-1980 subperiod. In contrast, whereas Michigan forecasts were generally biased over the entire sample, they were unbiased during the 1961-1980 subperiod.

Using a slightly more recent sample period, Ang et al. (2007) found the Livingston survey generated more accurate forecasts than the Michigan survey, though that the latter is somewhat less biased than the former during periods of decelerating inflation. However, the sample periods differ between surveys in Ang et al. (2007), with Livingston spanning 1952-2002 and Michigan spanning 1978-2002. Insofar as there may be year-specific shocks to forecast accuracy that are constant across surveys but vary over time, tests of forecast bias will not be strictly comparable across surveys.

After conducting a battery of tests, in a highly influential paper Mankiw et al. (2003) found that neither survey is consistent with either rational or adaptive expectations, but rather with a sticky-information model in which expectations are updated in a staggered fashion. Similarly, Reis (2021a, 2021b) observes gradual changes in second- and third- moments of inflation expectations during periods of inflation regime change, with dispersion increasing and the distribution flattening during the transition.

3 Data and Descriptive Statistics

The two surveys I use in this study—the Livingston Survey of professional economists and the University of Michigan Survey of Households—are the two oldest continuous surveys of inflation expectations in the United States. However, the challenge to evaluating relative forecast performance between these surveys is ensuring parallel construction of the two expectations series, particularly as the relevant surveys changed over time in both frequency and content.

From the inception of the Livingston survey in 1946 through December 1991, survey participants were provided with the most recent monthly CPI print and asked to report their forecasts of the level of the CPI in six and 12 months. Questionnaires were typically mailed in early May and early November for the June and December surveys, respectively, after the release of the official CPI reports for April and October, respectively. In the event that new CPI data became available between the date on which respondents submitted their forecasts and actual publication of the survey results, Livingston often adjusted respondents' forecasts to reflect his assessment of what their forecasts would have been had they been in receipt of the latest CPI data (Thomas 1999).

The timing of the survey's circulation meant there was ambiguity as to the base period from which respondents were implicitly making their forecasts. After carefully studying the survey data, including original individual responses, and surveying 50 respondents, Carlson (1977) concluded that most respondents were effectively submitting eight- and 14-month forecasts and assuming the rate of inflation to remain roughly constant within those forecast intervals. Following Carlson (1977), I therefore compute eight- and 14-month CPI inflation forecasts as compound annual growth rates and assume respondents expected the rate of inflation to remain constant within the forecast interval, which thereby allows me to calculate implicit six- and 12-month forecasts. For surveys since December 1991, respondents were additionally asked to provide their current-month (June or December) forecasts and to base their six- and 12-month CPI level forecasts off those current-month predictions, which permits explicit computation of six- and 12-month inflation forecasts thereafter.

An additional complication is that whereas from the survey's inception through the June 2004 survey, respondents were asked to provide their forecasts of the seasonally unadjusted level of the CPI, since and including the December 2004 survey they have only been asked to provide forecasts of the seasonally adjusted level of the CPI. As respondents were not also asked to provide seasonal adjustment factors, for actual inflation from December 2004 on I compute year-over-year percent changes in the Bureau of Labor Statistics' (BLS) seasonally adjusted CPI, whereas one would ordinarily calculate year-over-year percent changes in the seasonally unadjusted index. Before December 2004 I use the BLS' seasonally unadjusted estimates.

To ensure parallel construction of inflation expectations in the Michigan survey of consumers, I first restrict the sample to the June and December surveys, which are available with monthly frequency from January 1978. For earlier years, I splice the monthly data with quarterly survey data from 1960 through 1977. Similar to the Livingston survey, the quarterly Michigan surveys were conducted in May and November. Sample restriction constitutes an improvement on previous comparative evaluations of surveys of inflation expectations not only because forecast residuals may be correlated with seasonal factors or month-specific shocks, but also because the differential frequency of the Michigan and Livingston surveys implies differential statistical power in hypothesis testing.

The Michigan survey has also evolved over time. Until the second quarter of 1966, participants were simply asked: "Do you think prices will go up in the next year, or go down, or stay the same?" From 1966:Q2 through 1977:Q3, survey respondents who indicated that they expected prices to increase were then also asked to report within specified ranges by how much they expected prices to increase. From 1977:Q4 on, participants were then asked to report their expected rate of inflation. Scholars have extended the inflation rate time series back through 1960 by converting the earlier qualitative responses into quantitative estimates using a variety of methodologies (De Menil and Bhalla 1975; Lahiri and Fishe 1981; and Batchelor 1986). I analyze mean rather than median forecasts because quantitative estimates of the latter remain experimental (Mankiw et al. 2003).

Within the Livingston survey microdata, it is also possible to analyze individual responses by institutional category. Respondents were categorized by their institutional affiliation, with the following possible categories: academic institution, commercial banking, consulting, Federal Reserve, government, industry trade group, insurance company, investment banking, labor, nonfinancial business, other / unknown.

The complete series are reported in Figure 1 and summary statistics in Tables 1 and 2. Panel A of Table 1 indicates that over the entire sample period from 1960 through 2022, the mean forecast error (where $\varepsilon_t \equiv \pi_t - E_{t-12}\pi_t$) of the Livingston survey was positive, while that of the Michigan survey was negative, meaning that consumers on average overestimated future inflation while professional forecasters on average underestimated future inflation. On average, professionals surveyed by Livingston underestimated inflation by slightly less than consumers overestimated inflation, with the mean absolute error (*MAE*) and root-mean-square error (*RMSE*) of the Livingston survey both smaller than the *MAE* and *RMSE* of the Michigan survey of consumers.

However, Panels B through F of Table 1 indicate that the smaller mean error (by magnitude), *MAE*, and *RMSE* of the Livingston survey relative to the Michigan survey is not constant across time. Whereas the Livingston survey, on average, produced smaller forecast residuals than the Michigan survey during the period preceding the Great Inflation (1966-1980) and during the Great Moderation of 1987-2020 (Panels B and E), forecast errors during the Great Inflation, Volcker disinflation of the 1980s (1980-87), and post-pandemic inflation of 2021-2022 were smaller in magnitude, on average, for the Michigan survey of consumers than for the Livingston survey of professionals.

Table 2 reports mean forecast errors and mean absolute forecast errors by institutional category in the Livingston survey from 1946 through 2022, ordered by mean error from smallest to largest. The panel is unbalanced, as not all institutional categories had individuals surveyed in all surveys within the sample period (see Table 3). Therefore, unconditional comparisons of forecast errors between institutional categories is not possible, as the magnitude of mean forecast errors in the survey varies across time. To provide a more informative summary comparison of means across categories, I therefore highlight in bold typeface those institutional categories with individual responses in a majority of decades since 1946.

Mean errors reported in Panel A of Table 2 indicate that over the entire 1946-2022 sample period, professional forecasters in most institutional categories tended to underestimate future inflation, resulting in positive residuals. Among institutional categories with observations in the majority of decades, respondents from labor organizations, academic institutions, and government produced the smallest mean errors (by magnitude), with the mean error of respondents from nonfinancial businesses constituting the median. Mean errors of respondents from commercial and investment banks and other / unknown were all above the median mean error by institutional category. Among all institutional categories, respondents from the Federal Reserve exhibited the second-largest mean error, and the largest absolute error.

As reported in Panel B of Table 2, during the Great Inflation respondents from labor organizations again exhibited the smallest mean error (by magnitude), and also the smallest mean absolute error. Respondents from investment banks and other / unknown also exhibited mean errors below the median by institutional category. In contrast, respondents from academic institutions, nonfinancial businesses, and commercial banks all exhibited mean errors above the median. Respondents from the Federal Reserve had the largest mean error and mean absolute error of any institutional category during the Great Inflation.

Finally, Panel C of Table 2 indicates that during the Volcker disinflation of 1980-1987, respondents from academic institutions, the Federal Reserve, and government exhibited the smallest mean errors. In contrast to the 1966-1980 period, from 1980 through 1987 respondents from investment banks, other / unknown, and labor organizations exhibited the largest mean errors.

4 Relative Forecast Performance, Michigan versus Livingston

A. Tests of forecast rationality and efficiency

a. Bias

I conduct a standard measure of forecast bias by estimating:

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 Survey + \varepsilon_t \tag{1}$$

where *Survey* is a binary variable equal to one if the observation is from the Michigan survey and zero if from the Livingston survey. The null hypothesis that forecasts in each survey are unbiased implies that $\alpha_1 = \alpha_1 + \alpha_2 = 0$, i.e. the mean error of the Livingston survey (α_1) and Michigan survey ($\alpha_1 + \alpha_2$) are both zero.

Because June and December surveys include overlapping forecast horizons, ε_t is potentially serially correlated if inter-survey rates of actual inflation are correlated and agents use observed inflation to update their expectations. Though this possibility was recognized by earlier scholars (Bryan and Gavin 1986), more recent studies of surveys of inflation expectations have not addressed the issue of serial correlation, which could bias standard errors. While Bryan and Gavin (1986) address the problem by restricting their sample to nonoverlapping survey observations at 12-month intervals, I instead retain all June and December observations but introduce binary indicator variables for each overlapping June-December and December-June pair and jointly cluster robust standard errors separately at the June-December and December-June pair levels (eg. June 1946 paired with December 1946 and December 1946 also paired with June 1947).

Results of estimating equation (1) are reported in Table 4. Consistent with the summary statistics reported in Table 1, estimates of α_1 indicate that while I cannot reject the null hypothesis that the Livingston survey is unbiased ($\alpha_1 = 0$) over the entire sample period from 1960-2022, or during the subperiods of price stability from 1960-1965 and 1987-2020, I can reject the null hypothesis during both the Great Inflation and the Volcker disinflation. Specifically, during the period from 1966 to 1980, Livingston respondents on average underestimated actual inflation by 2.15 percentage points. In contrast, during the Volcker disinflation of 1980-1987, Livingston respondents on average overestimated actual inflation by 1.48 percentage points.

In contrast to the professional forecasters, results reported in Table 4 indicate that over the entire sample period I can reject the null hypothesis that the mean consumer respondent is unbiased ($\alpha_1 + \alpha_2 = 0$), with consumers on average overestimating future inflation by 0.54 percentage point. During the period of the Great Moderation, the overprediction bias was even larger, at 1.09 percentage points, than over the entire 1960-2022 sample period. However, during the Great Inflation I cannot reject the null hypothesis of unbiasedness at any conventional significance level.

Comparing differences in mean forecast residuals between the two surveys, results reported in Table 4 indicate that I can reject the null hypothesis of no difference over the entire sample period, with a statistically significant difference in means of -1.02. This difference in mean errors is approximately constant across time, with the exceptions of the Great Inflation and the Volcker disinflation. During the Great Inflation, the mean forecast error of the Michigan survey was a statistically significant 1.22 percentage points smaller than that of the Livingston survey, which indicates that the smaller mean forecast error of the Michigan survey during the Great Inflation was not simply a consequence of Michigan respondents predicting higher inflation generally, but also of Michigan respondents upwardly revising their inflation forecasts by more than Livingston respondents between 1966 and 1980. Relative to their 1960-1965 mean forecast, consumers in the

Michigan survey upwardly revised their average inflation expectations during 1966-1980 by 4.12 percentage points, compared to 3.92 percentage points among Livingston respondents.

Similarly, during the Volcker disinflation of 1980 to 1987 the mean forecast error of the Michigan survey was smaller (in magnitude) than that of the Livingston survey, with Michigan respondents predicting inflation 0.06 percentage point lower than Livingston respondents. Though I cannot reject the null hypothesis of no difference in means, the change from a negative and statistically significant difference in mean errors to a positive difference indicates that consumers downwardly revised their inflation expectations by more than professional forecasters during the Volcker disinflation. Relative to their 1966-1980 mean forecast, consumers in the Michigan survey downwardly revised their inflation expectations during 1980-1987 by 0.75 percentage point, whereas Livingston respondents on average upwardly revised their inflation expectations during the disinflation by 0.53 percentage point. During the Great Moderation from 1987 through 2020, the difference in means then reverted to its pre-1966 and overall sample average, with consumers on average predicting an inflation rate 1.08 percentage points higher than professionals.

To more formally test whether the relative accuracy of the average consumer forecast varies systematically with the level of inflation, I estimate the following logistic model:

$$P(Y = 1 \mid \pi_t) = F(\alpha + \beta\pi_t) \tag{2}$$

where Y is a binary variable equal to one if the absolute error of the Michigan survey is smaller than the absolute error of the Livingston survey (i.e. if $|\pi_t - E_{t-12}\pi_t|^{Michigan} < |\pi_t - E_{t-12}\pi_t|^{Livingston}$), and zero otherwise. Figure 2 reports the average predicted probability from estimating equation (2) that $|\pi_t - E_{t-12}\pi_t|^{Michigan} < |\pi_t - E_{t-12}\pi_t|^{Livingston}$ | at each half-percentage point increment of actual inflation. Results indicate that the predicted probability that the mean consumer forecast is more accurate than the mean professional forecast flips from below 50% to above 50% when inflation is between 3.5% and 4.0% ($p = 0.00$). For every half-percentage point increment of observed inflation above 3.5%, the predicted probability that the mean consumer is more accurate than the mean professional is greater than 50% and increasing in the level of actual inflation.

I then test whether the mean error varies by survey when inflation is either above, or less than or equal to, 3.5% by estimating the following:

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 Survey + \alpha_3 \Pi_t^{3.5} + \alpha_4 Survey \cdot \Pi_t^{3.5} + \varepsilon_t \tag{3}$$

where the dependent variable is the forecast residual at time t for the forecast made at time $t - 12$, *Survey* a binary variable equal to one if the observation is from the Michigan survey and zero if from the Livingston survey, $\Pi_t^{3.5}$ is a binary variable equal to one if actual inflation in the 12 months through time t was greater than 3.5% and zero otherwise, α_1 a constant, and ε an error term. To address serial correlation in forecast errors and potential heteroscedasticity, I cluster robust standard errors separately at the June-December and December-June pair levels.

The coefficient α_3 indicates whether average forecast residuals in the Livingston survey are different when inflation is greater than 3.5% versus when inflation is less than or equal to 3.5%, with $\alpha_3 + \alpha_4$ indicating the same for the Michigan survey. The mean error of the Livingston survey is therefore equal to α_1 when actual inflation is less than or equal to 3.5%, and $\alpha_1 + \alpha_3$ otherwise, while the mean error of the Michigan survey is equal to $\alpha_1 + \alpha_2$ when actual inflation is less than or equal to 3.5%, and $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$ otherwise.

Results of estimating equation (3) are reported in Table 5. Whereas the mean error of the Michigan survey is -1.47 percentage points and I can reject the null hypothesis of unbiasedness ($\alpha_1 + \alpha_2 = 0$) when inflation is less than or equal to 3.5%, it is just 0.61 percentage point when inflation is greater than 3.5%, and a Wald test cannot reject the null hypothesis of unbiasedness ($\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 0$). In contrast, the mean error of the Livingston survey is -0.36% when inflation is less than or equal to 3.5%, but 1.37% when inflation is above 3.5%, and I can reject the null hypothesis of unbiasedness ($\alpha_1 + \alpha_2 = 0$).

b. Autocorrelated forecast errors

A second test of forecast rationality is that forecast errors should be uncorrelated over non-overlapping forecast horizons. Autocorrelation would imply that there is information in the previous period's forecast errors that on average is not being exploited in generating the current-period forecast. To assess this prediction, for each survey I regress forecast errors at time t from forecasts at time $t - 12$ on forecast errors at time $t - 12$ from forecasts at time $t - 24$:

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta(\pi_{t-12} - E_{t-24}\pi_{t-12}) + \gamma(\pi_{t-12} - E_{t-24}\pi_{t-12}) \cdot \Pi_t^{3.5} + \varepsilon_t \qquad (4)$$

where α_1 is again a constant and $\Pi_t^{3.5}$ is a binary variable equal to one if actual inflation in the 12 months through time t was greater than 3.5%, and zero otherwise. The coefficient α_2 indicates whether forecast bias differs systematically when inflation is greater than 3.5% versus less than or equal to 3.5%. The coefficient γ indicates whether any correlation between current and lagged forecast errors differs systematically when inflation is greater than versus less than or equal to 3.5%. The null hypothesis of forecast rationality across all levels of inflation implies that $\alpha_1 = \beta = 0$ when inflation is less than or equal to 3.5%, and that $\alpha_1 + \alpha_2 = \beta + \gamma = 0$ when inflation is greater than 3.5%. Results of estimating equation (4) are reported in Table 6.

Results indicate that whereas I can reject the null hypothesis that forecast errors are serially uncorrelated in the Livingston survey across all inflation levels, in Wald tests I cannot reject the joint null that errors are unbiased and serially uncorrelated in the Michigan survey when inflation is above 3.5%. This result again implies that while the Michigan survey does not generally exhibit forecast rationality, it does exhibit forecast rationality when inflation is above a certain threshold.

c. Mincer-Zarnowitz regressions

A third test of forecast rationality is that the truth should, on average, move one-for-one with the forecast (Mincer and Zarnowitz 1969; Farmer et al. 2022). To assess this prediction, for each survey I regress actual inflation at time t on inflation forecasts at time $t-12$:

$$\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta E_{t-12}\pi_t + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \varepsilon_t \tag{5}$$

Once again, α_1 is a constant and $\Pi_t^{3.5}$ a binary variable equal to one if actual inflation in the 12 months through time t was greater than 3.5%, and zero otherwise. The coefficient α_2 indicates whether forecast bias differs systematically when inflation is greater than 3.5% versus less than or equal to 3.5%. The coefficient γ indicates whether any correlation between actual inflation and lagged inflation forecasts differs systematically when inflation is greater than versus less than or equal to 3.5%. The null hypothesis of forecast rationality across all levels of inflation implies that $\alpha_1 = 0$ and $\beta = 1$ when inflation is less than or equal to 3.5%, and that $\alpha_1 + \alpha_2 = 0$ and $\beta + \gamma = 1$ when inflation is greater than 3.5%. Results of estimating equation (5) are reported in Table 7.

Results indicate that whereas I can reject the null hypothesis of Mincer-Zarnowitz rationality in the Livingston survey across all inflation levels, in Wald tests I cannot reject the joint null in the Michigan survey when inflation is over 3.5% ($\alpha_1 + \alpha_2 = 0$, $\beta + \gamma = 1$). This result again implies that while the Michigan survey does not generally exhibit forecast rationality, it does exhibit forecast rationality when inflation is above a certain threshold.

d. Full exploitation of information

A fourth measure of forecast efficiency is whether there is information in the forecasts themselves that can be used to predict forecast errors, which would violate the rationality assumption that all information is fully exploited. To assess this prediction, for each survey I regress forecast residuals at time t on inflation forecasts at time $t-12$:

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta E_{t-12}\pi_t + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \varepsilon_t \tag{6}$$

α_1 is again a constant and $\Pi_t^{3.5}$ a binary variable equal to one if actual inflation in the 12 months through time t was greater than 3.5%, and zero otherwise. The coefficient α_2 indicates whether forecast bias differs systematically when inflation is greater than 3.5% versus less than or equal to 3.5%. The coefficient γ indicates whether any correlation between current forecast errors and lagged inflation forecasts differs systematically when inflation is greater than versus less than or equal to 3.5%. The null hypothesis of forecast rationality across all levels of inflation implies that $\alpha_1 = \beta = 0$ when inflation is less than or equal to 3.5%, and that $\alpha_1 + \alpha_2 = \beta + \gamma = 0$ when inflation is greater than 3.5%. Results of estimating equation (6) are reported in Table 8.

Results indicate that whereas I can reject the null hypothesis that information is fully exploited in the Livingston survey across all inflation levels, in Wald tests I cannot reject the joint null that errors are unbiased and information fully exploited in the Michigan survey when inflation is over 3.5% ($\alpha_1 + \alpha_2 = \beta + \gamma = 0$). This result again implies that while the Michigan survey does not generally exhibit forecast rationality, it does exhibit forecast efficiency when inflation is above a certain threshold.

e. Full exploitation of macroeconomic information

A fifth measure of forecast efficiency is whether public information available at the time of the forecast is fully exploited. Specifically, I estimate the effect on forecast residuals of the inflation rate, Treasury-bill rate, and unemployment rate observed in the months immediately prior to the month of the forecast. While one-month lags of the Treasury-bill rate and unemployment rate were available to survey respondents throughout the sample period, as noted in section (3), above, the inflation rate was only available with a two-month lag. I also nest equation (5), above, in this specification to control for the forecast itself. I therefore estimate:

$$\begin{aligned}\pi_t - E_{t-12}\pi_t = \alpha_1 &+ \beta E_{t-12}\pi_t \\ &+ \varphi\pi_{t-14} + \kappa i_{t-13} + \delta U_{t-13} \\ &+ \alpha_2\Pi_t^{3.5} + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \lambda\pi_{t-14} \cdot \Pi_t^{3.5} + \varepsilon_t\end{aligned} \tag{7}$$

Here, α_1 is again a constant and $\Pi_t^{3.5}$ a binary variable equal to one if actual inflation in the 12 months through time t was greater than 3.5%, and zero otherwise. The coefficients φ, κ, and δ indicate the effects on forecast errors of the most recently observed values of inflation, Treasury-bill rates, and unemployment rates, respectively, at the time of the forecast. The coefficient α_2 indicates whether forecast bias differs systematically when inflation is greater than 3.5% versus less than or equal to 3.5%. The coefficient γ indicates whether any correlation between current forecast errors and lagged inflation forecasts differs systematically when inflation is greater than versus less than or equal to 3.5%. Similarly, the coefficient λ indicates whether any correlation between current forecast errors and the most recently observed actual inflation rate differs systematically when inflation is greater than versus less than or equal to 3.5%. The null hypothesis of forecast rationality across all levels of inflation implies that $\alpha_1 = \beta = 0$ when inflation is less than or equal to 3.5%, and that $\alpha_1 + \alpha_2 = \beta + \gamma = 0$ when inflation is greater than 3.5%. The null hypothesis that macroeconomic data are fully exploited implies that $\varphi = \kappa = \delta = 0$ when inflation is less than or equal to 3.5%, and that $\varphi + \lambda = \kappa = \delta = 0$ when inflation is greater than 3.5%. Results of estimating equation (7) are reported in Table 9.

Results indicate that whereas in Wald tests I can reject the joint null hypothesis that available macroeconomic information is fully exploited in the Livingston survey across all inflation levels ($\varphi = \kappa = \delta = 0$), I cannot reject the joint null in the Michigan survey when inflation is over 3.5%. The positive and statistically significant estimated coefficient on lagged inflation (φ) in the Michigan survey when inflation is less than or equal to 3.5% implies that consumers underreact to recent inflation news when inflation is low. In contrast, the null hypothesis that $\varphi + \lambda = \kappa = \delta = 0$ cannot be rejected ($p = 0.23$) in the Michigan survey, which implies that consumers react rationally to recent inflation news when inflation is above 3.5%.

Negative and statistically significant estimated coefficients on the unemployment rate (δ) indicate that both consumers and professionals underestimate the effect of recent unemployment news on future inflation, though the magnitude of the underreaction is quantitatively small and applies to consumers only when inflation is less than or equal to 3.5%. Similarly, the negative and statistically significant estimated coefficient on lagged Treasury-bill rates indicate that professionals underestimate the effect of recent interest rate news on future inflation, though the magnitude of the underreaction is quantitatively small.

Wald tests reject the joint null that errors are unbiased and other information fully exploited in both surveys and across inflation levels ($\alpha_1 = \beta = 0$ and $\alpha_1 + \alpha_2 = \beta + \gamma = 0$). However, when inflation is above 3.5%, the joint null can only be rejected in the Michigan survey at the 10% significance level, which implies that the null hypothesis of forecast rationality is only weakly rejected in the Michigan survey when inflation is greater than 3.5%, whereas it can be strongly rejected at the 1% significance level when inflation is less than or equal to 3.5%.

B. Inflation regime change

To test whether inflation expectations of consumers and professional forecasters responded differently to inflationary and disinflationary regime change, rather than just different inflation levels, I define an inflationary (disinflationary) regime shock, $\Pi_t^{inf, dis}$, at time t as a binary indicator variable equal to one if the actual forward five-year average inflation rate is at least two standard deviations above (below) the actual trailing five-year average inflation rate at time t, and zero otherwise. That is,

$$\Pi_t^{inf} = 1 \text{ if } \bar{\pi}_{[t+1,\, t+60]} > \bar{\pi}_{[t-1,\, t-60]} + 2\sigma_{[t-1,\, t-60]} \text{ and } \pi_t > \bar{\pi}_{[t-1,\, t-60]} + 2\sigma_{[t-1,\, t-60]} \quad (8)$$
$$= 0 \text{ otherwise}$$

$$\Pi_t^{dis} = 1 \text{ if } \bar{\pi}_{[t+1,\, t+60]} < \bar{\pi}_{[t-1,\, t-60]} - 2\sigma_{[t-1,\, t-60]} \text{ and } \pi_t < \bar{\pi}_{[t-1,\, t-60]} - 2\sigma_{[t-1,\, t-60]} \quad (9)$$
$$= 0 \text{ otherwise}$$

This definition allows us to both identify a persistent regime change, as well as the precise timing of that regime shift (Figure 3). I then estimate average differences in forecast residuals by survey fully interacted with the inflation and disinflation shock series constructed in equations (8) and (9). Specifically, I estimate:

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \beta Survey + \gamma_1 Survey \cdot \Pi_t^{inf} + \gamma_2 Survey \cdot \Pi_t^{dis} + \varepsilon_t \quad (10)$$

where the dependent variable is the average five-year forward forecast residual, *Survey* a binary variable equal to one if the observation is from the Michigan survey and zero if from the Livingston survey, $\Pi_t^{inf,\, dis}$ is as defined above, α_1 a constant, and ε an error term. To address serial correlation in forecast errors and potential heteroscedasticity I again cluster robust standard errors separately at the June-December and December-June pair levels. To ensure consistent identification of shocks as defined in equations (8) and (9), I restrict the sample to survey observations before 2017.

Results of estimating equation (10) are reported in Table 10. While I cannot reject the null hypothesis that the Livingston survey is unbiased outside periods of inflationary and disinflationary regime change ($\alpha_1 = 0$), I can strongly reject the null hypothesis that the mean consumer respondent is unbiased outside periods of inflationary and disinflationary regime change ($\alpha_1 + \beta = 0$). However, estimates of α_2 and γ_1 indicate that while an inflationary shock has a large, positive, and statistically significant impact on mean forecast errors, almost half of this main effect is offset by the interaction effect of the shock with the Michigan survey. This indicates that the positive effect on forecast residuals of an inflationary regime shock is smaller among Michigan respondents than among Livingston respondents.

Similarly, during periods of a disinflationary regime shock, estimates of α_3 and γ_2 indicate that while a disinflationary shock has large, negative, and statistically significant impact on mean forecast errors, more than half of this main effect is offset by the interaction effect of the shock with the Michigan survey. This indicates that the negative effect on forecast residuals of a disinflationary regime shock is smaller among Michigan respondents than among Livingston respondents.

Table 10 also reports the sum of estimated coefficients from equation (10) for both inflationary and disinflationary shocks. Wald tests indicate that while I can generally reject the null hypotheses that the sums of estimated coefficients in the event of an inflationary or disinflationary shock are zero, I cannot reject the null that the sum of coefficients for the Michigan survey in the event of an inflationary regime shock is zero. This indicates that consumers are unbiased during periods of transition to an inflationary regime.

Results of estimating equation (10) therefore reinforce results reported in the previous section. Specifically, they indicate that whereas consumers' average forecast errors are generally negatively biased while professionals' average forecast errors are generally unbiased, in periods of inflation regime change—both from a regime of low and stable inflation to an inflationary regime and from an inflationary to a disinflationary regime—consumers' forecast errors are not only smaller than those of professional forecasters, but are also revised by more, and in the correct direction, in response to those shocks.

For additional tests of forecast rationality and efficiency, I also re-estimate equations (4)-(7), replacing $\Pi_t^{3.5}$ with Π_t^{inf} and Π_t^{dis}. Specifically, I estimate:

$$\begin{aligned}\pi_t - E_{t-12}\pi_t = {} & \alpha_1 + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \beta(\pi_{t-12} - E_{t-24}\pi_t) \\ & + \gamma_1(\pi_{t-12} - E_{t-24}\pi_t) \cdot \Pi_t^{inf} + \gamma_2(\pi_{t-12} - E_{t-24}\pi_t) \cdot \Pi_t^{dis} + \varepsilon_t\end{aligned} \tag{11}$$

to test whether forecast errors are autocorrelated;

$$\pi_t = \alpha_1 + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \beta E_{t-12}\pi_t + \gamma_1 E_{t-12}\pi_t \cdot \Pi_t^{inf} + \gamma_2 E_{t-12}\pi_t \cdot \Pi_t^{dis} + \varepsilon_t \tag{12}$$

to test the Mincer-Zarnowitz condition that actual inflation should, on average, move one-for-one with forecasted inflation;

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \beta E_{t-12}\pi_t + \gamma_1 E_{t-12}\pi_t \cdot \Pi_t^{inf} + \gamma_2 E_{t-12}\pi_t \cdot \Pi_t^{dis} + \varepsilon_t \tag{13}$$

to test whether information is fully exploited; and

$$\begin{aligned}\pi_t - E_{t-12}\pi_t = {} & \alpha_1 + \beta E_{t-12}\pi_t \\ & + \varphi\pi_{t-14} + \kappa i_{t-13} + \delta U_{t-13} \\ & + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} \\ & + \gamma_1 E_{t-12}\pi_t \cdot \Pi_t^{inf} + \gamma_2 E_{t-12}\pi_t \cdot \Pi_t^{dis}\end{aligned} \tag{14}$$

$$+ \lambda_1 \pi_{t-14} \cdot \Pi_t^{inf} + \lambda_2 \pi_{t-14} \cdot \Pi_t^{dis} + \varepsilon_t$$

to test whether macroeconomic data are fully exploited. Results of estimating equations (11)-(14) are summarily reported in Table 11.

Results indicate that Livingston respondents generally exhibit forecast rationality and efficiency outside periods of inflation regime change. Specifically, outside periods of regime change I cannot reject the null hypotheses that professionals' forecast errors are unbiased, that their forecast errors are uncorrelated, that actual inflation moves one-for-one with their forecasts, and that information and available macroeconomic data are fully exploited. However, the opposite is true during periods of regime change. During transitions both to an inflationary regime, and from an inflationary to a disinflationary regime, I can reject these null hypotheses with statistical confidence, indicating that professional forecasters fail tests of bias, rationality, and efficiency during such periods.

In contrast, whereas consumer respondents in the Livingston survey generally fail tests of bias, rationality, and efficiency outside periods of inflation regime change, they pass several key tests of forecast rationality during periods of regime change. Specifically, during transitions to an inflationary regime, I cannot reject the null hypotheses that consumers are unbiased, that they fully exploit information, and that actual inflation moves one-for-one with their forecasts. During transitions from an inflationary to disinflationary regime, I cannot reject the null hypothesis that consumers' forecast errors are uncorrelated.

5 Relative Forecast Performance within the Livingston Survey

To evaluate whether forecast bias, rationality, and efficiency varies systematically across different types of professional forecasters and across different types of professional forecasters across different inflation regime transitions, I re-estimate equations (10)-(14) for each major category of respondent to the Livingston survey. Results are reported in Tables 12 through 15. I only report results for affiliations with a sufficient number of observations across all regimes to permit tests of statistical significance.

Results reported in Table 12 reinforce the summary statistics reported in Table 2. Outside periods of inflation regime change, professional economists associated with labor organizations exhibit the smallest mean errors, and I cannot reject the null hypothesis that their average forecast error is equal to zero. I also cannot reject the null hypothesis of unbiasedness outside periods of regime change for economists associated with commercial banks, the Federal Reserve, investment banks, nonfinancial businesses, and other. In contrast, I can reject the null hypothesis that academic and government economists are unbiased, with both underpredicting inflation by a statistically significant average of approximately 50 basis points.

Results reported in Table 12 also indicate that while I can reject the null hypothesis that all categories of professional economists are unbiased during periods of inflation regime change—both to an inflationary regime and from an inflationary to a disinflationary regime—economists associated with labor organizations exhibit the smallest mean error of any professional group during a shift to an inflationary regime. During a shift to a disinflationary regime, economists associated with the Federal Reserve exhibit the smallest mean error.

Results reported in Table 13 indicate that while forecast errors are not autocorrelated for professional forecasters associated with academic institutions, commercial banks, labor organizations, and other outside periods of inflation regime change, forecast errors are autocorrelated for professionals affiliated with all types of institutions during periods of transition to an inflationary regime. However, during periods of transition from an inflationary to a disinflationary regime, professional economists associated with labor organizations and other exhibit forecast errors that are not autocorrelated.

Table 14 reports results from estimating equation (12) for forecast bias and whether actual inflation tracks forecasted inflation one-for-one. Results indicate that while I cannot reject the null hypothesis that professional economists affiliated with commercial and investment banks and nonfinancial businesses are Mincer-Zarnowitz rational during periods of price stability, I can reject the null hypothesis of Mincer-Zarnowitz rationality for all institutional affiliations during periods of transition to an inflationary regime. However, during periods of transition from an inflationary to a disinflationary regime, I cannot reject the null hypothesis of Mincer-Zarnowitz rationality for professional economists affiliated with government and labor organizations.

Results reported in Table 15 suggest a more nuanced picture. First, during periods of price stability I cannot reject the null hypothesis that available macroeconomic data is fully exploited for any category of institutional affiliation. In addition, during periods of price stability I cannot reject the null hypothesis that professional economists affiliated with government and nonfinancial businesses fully and rationally exploit other information. However, during periods of transition to an inflationary regime, I cannot reject the null hypothesis the professional economists affiliated with investment banks fully exploit available macroeconomic data, nor that economists affiliated with commercial banks, government institutions, or labor organizations fully exploit other information.

In contrast, during periods of transition from an inflationary to a disinflationary regime, professional economists associated with most institutions fully exploit information, with the exceptions of economists associated with labor organizations and other. Due to issues of collinearity, I cannot test whether professional economists associated with different types of organizations fully exploit available macroeconomic data during disinflationary transitions.

Together, results reported in Tables 9 through 15 indicate that while professional economists are generally unbiased, rational, and efficient in predicting inflation during periods of price stability, with economists affiliated with commercial banks and labor organizations generally exhibiting the least bias and greatest rationality and efficiency, economists associated with labor organizations also exhibit less bias and more rationality during periods of inflation regime change. Other categories of professional affiliation generally exhibit bias, irrationality, and inefficiency during such transitions, particularly from low and stable inflation to high inflation.

6 Discussion and Conclusion

Using the two oldest and most established surveys of inflation expectations, I find that while professional economists generally outperform consumers in inflation forecast accuracy, rationality, and efficiency, this superior relative performance is driven by periods of low and stable inflation. During periods of high inflation and inflation regime change—both from low and stable to high inflation, and from high inflation to disinflation—consumers are not only more accurate and less biased, but also exhibit forecast rationality and efficiency. Among professional economists, while those affiliated with commercial banks and labor organizations generally outperform during periods of price stability, forecasters affiliated with labor organizations also exhibit the least bias and greatest rationality and efficiency during periods of inflation regime change.

These results lend support to former Federal Reserve Chairman Alan Greenspan's definition of price stability as a level of inflation low enough that agents do not need to think about it in their daily decision-making, as the evidence reported here indicates that once consumers do notice inflation, they pay exceptionally close attention to it. In particular, 3.5% inflation appears to be a critical threshold above which consumers pay sufficiently close attention to inflation that they pass standard tests of forecast unbiasedness, rationality, and efficiency, and with actual inflation on average moving one-for-one with the average consumer forecast. The same is true during large inflationary and disinflationary shocks.

Second, results suggest that skin in the game may play an important role in forecast accuracy. Among professionals, the forecasters exhibiting the least bias, irrationality, and inefficiency are those affiliated with commercial banks and labor organizations, and therefore in the business of extending term loans at interest or negotiating multi-year wage contracts. In both cases, there are substantial costs to persistent large forecast errors. Similarly, the average consumer faces a real cost to persistent large forecast errors in a high-inflation environment that may be proportionately greater, as a share of disposable personal income, than for the average professional economist.

Finally, I find that professionals affiliated with academic and government institutions, including the Federal Reserve, generally underperformed relative to other experts during inflationary shocks. The underperformance of such experts who might reasonably be expected to possess the most sophisticated modeling tools suggests that more sophisticated forecasters may be handicapped in accurately, rationally, and efficiently forecasting inflation during periods of high inflation or inflation regime change because formal models of the inflation-generating process may be flawed when the parameters are nonstationary, or when inflation itself ceases to be trend-stationary.

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Figure 1: Consumer and Professional Forecasts versus Actual Inflation

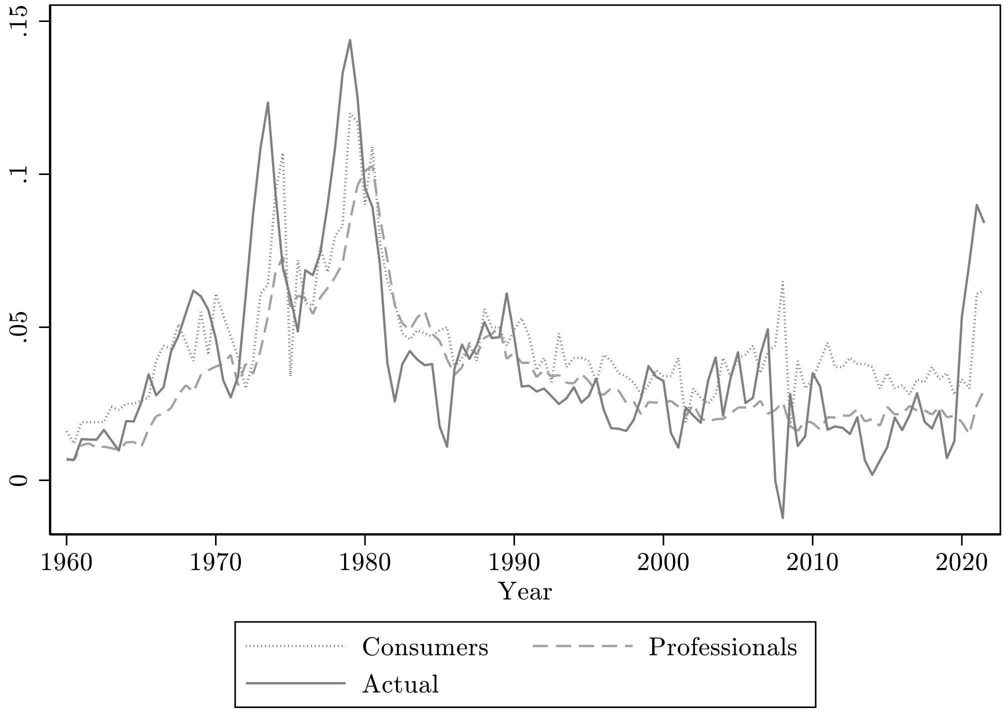

Table 1: Summary Statistics, 1960-2022

		Consumers	Professionals
		(1)	(2)
Panel A. Entire sample, 1960-2022			
	Mean error	-0.54	0.47
	Mean absolute error	1.56	1.42
	RMSE	2.01	2.08
Panel B. Early period, 1960-1965			
	Mean error	-0.52	0.50
	Mean absolute error	0.65	0.51
	RMSE	0.73	0.75
Panel C. Great Inflation, 1966-1980			
	Mean error	0.92	2.15
	Mean absolute error	1.99	2.42
	RMSE	2.53	3.13
Panel D. Volcker disinflation, 1980-1987			
	Mean error	-1.43	-1.48
	Mean absolute error	1.43	1.62
	RMSE	1.86	1.90
Panel E. Great Moderation, 1987-2020			
	Mean error	-1.09	-0.01
	Mean absolute error	1.52	0.97
	RMSE	1.96	1.35
Panel F. Post-pandemic, 2021-2022†			
	Mean error	2.55	5.99
	Mean absolute error	2.55	5.99
	RMSE	2.05	6.02

Notes: All figures reported in percentages. †Actual inflation for the 12 months through December 2022 is calculated as a compound annual growth rate using the most recent available CPI data.

Table 2: Livingston Individual Summary Statistics, 1946-2022

	Mean Error (1)	Mean Absolute Error (2)
Panel A. Entire sample, 1946-2022		
1 Consulting	-0.02	1.15
2 Industry trade group	-0.10	0.93
3 Insurance company	-0.12	1.35
4 Labor	0.42	1.94
5 Academic institution	0.68	1.48
6 Government	0.86	1.63
7 Nonfinancial business	0.89	1.74
8 Commercial banking	0.94	1.79
9 Investment banking	1.00	1.92
10 Federal Reserve	1.01	2.21
11 Other / unknown	1.08	2.01
Panel B. Great Inflation, 1966-1980		
1 Labor	1.94	2.31
2 Investment banking	2.07	2.38
3 Other / unknown	2.09	2.61
4 Government	2.09	2.41
5 Academic institution	2.11	2.42
6 Nonfinancial business	2.13	2.41
7 Commercial banking	2.27	2.54
8 Federal Reserve	2.68	2.96
Consulting	*N/A*	*N/A*
Industry trade group	*N/A*	*N/A*
Insurance company	*N/A*	*N/A*
Panel C. Volcker disinflation, 1980-1987		
1 Academic institution	-1.20	1.41
2 Federal Reserve	-1.32	1.71
3 Government	-1.34	1.42
4 Nonfinancial business	-1.46	1.63
5 Commercial banking	-1.46	1.55
6 Consulting	-1.54	1.63
7 Investment banking	-1.70	1.81
8 Other / unknown	-1.75	2.65
9 Labor	-2.34	2.50
10 Insurance company	-3.65	3.65
Industry trade group	*N/A*	*N/A*

Notes: All figures reported in percentages. Institutional categories with responses in a majority of decades since 1946 are highlighted in bold typeface. Actual inflation rate for the 12 months through December 2022 is calculated as a compound annual growth rate using the most recent available CPI data.

Table 3: Livingston Institutional Coverage by Decade

Category	*Decades with observations*
Academic institution	All
Commercial banking	All
Consulting	1980s, 1990s, 2000s, 2010s
Federal Reserve	1970s, 1980s
Government	All
Industry trade group	1990s, 2000s, 2010s
Insurance company	1980s, 1990s, 2000s, 2010s
Investment banking	All
Labor	1940s, 1950s, 1960s, 1970s, 1980s, 1990s, 2000s
Nonfinancial business	All
Other / unknown	1940s, 1950s, 1960s, 1970s, 1980s, 1990s, 2000s, 2010s

Table 4: Mean Forecast Error by Time Period

	1960-2022	*1960-1965*	*1966-1980*	*1980-1987*	*1987-2020*	*2021-2022*
	(1)	(2)	(3)	(4)	(5)	(6)
α_1: Professionals	0.47	0.50	2.15***	-1.48**	-0.01	5.99
	(0.11)	(0.26)	(0.67)	(0.46)	(0.22)	*N/A*
$\alpha_1 + \alpha_2$: Consumers	-0.54**	-0.52*	0.92	-1.43**	-1.09***	2.55
	p = 0.04	p = 0.05	p = 0.16	p = 0.02	p = 0.00	*N/A*
α_2: Difference	-1.02***	-1.02***	-1.22***	0.06	-1.08***	3.44
	(0.11)	(0.14)	(0.24)	(0.20)	(0.11)	*N/A*
R^2	0.30	0.48	0.07	0.00	0.11	0.93
N	248	24	58	28	134	4

Notes: All figures reported as percentages. Robust standard errors are clustered at the overlapping forecast-pair level and reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Figure 2: Predicted Probabilities that Consumer *AE* < Professional *AE*
By Inflation Level

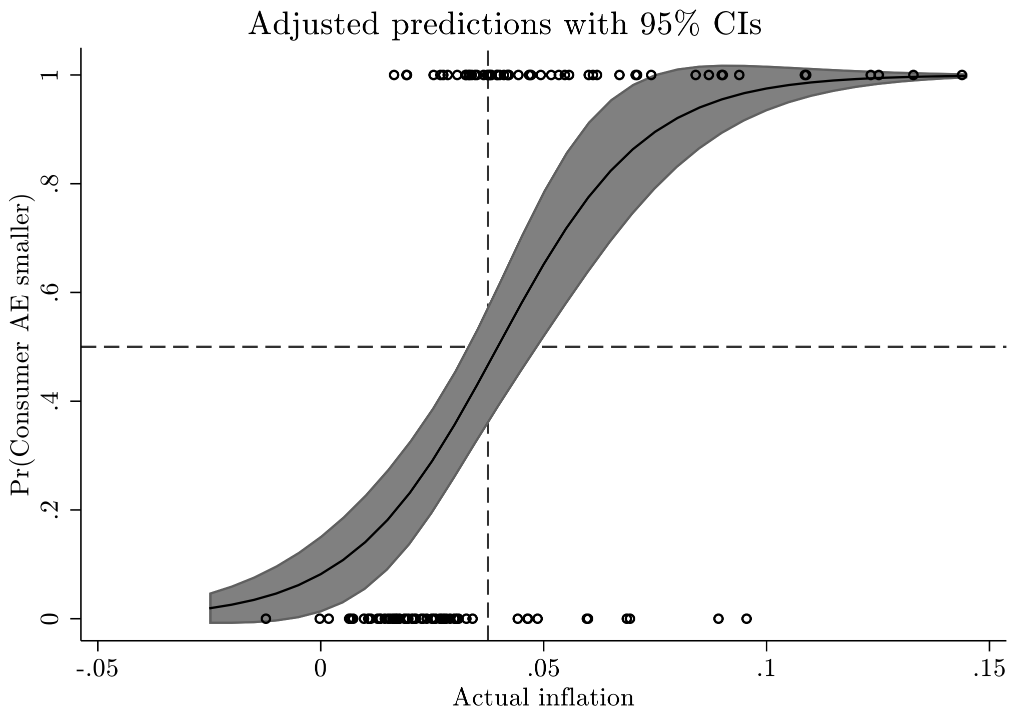

Table 5: Mean Forecast Errors by Inflation Level

$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 Survey + \alpha_3 \Pi_t^{3.5} + \alpha_4 Survey \cdot \Pi_t^{3.5} + \varepsilon_t$				
	Panel A: $\Pi_t^{3.5} = 0$ ($\pi <= 3.5\%$)		*Panel B:* $\Pi_t^{3.5} = 1$ ($\pi > 3.5\%$)	
	(1)	(2)	(3)	(4)
Consumers	$\alpha_1+\alpha_2$:	-1.47%***	$\alpha_1+\alpha_2+\alpha_3+\alpha_4$:	0.61%
		(0.00)		(0.12)
Professionals	α_1:	-0.36%**	$\alpha_1+\alpha_3$:	1.37%**
		(0.03)		(0.01)
Difference	α_2:	-1.11%***	$\alpha_2+\alpha_3$:	-0.76%***
		(0.00)		(0.00)
Smaller Mean Error?	Professionals***		Consumers***	
	(0.00)		(0.00)	
R^2	0.30			
N	146		102	

Notes: p-values are reported in parentheses. Robust standard errors (not reported) are clustered at the overlapping forecast-pair level. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 6: Test of Autocorrelated Forecast Errors

$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta(\pi_{t-12} - E_{t-24}\pi_{t-12}) + \gamma(\pi_{t-12} - E_{t-24}\pi_{t-12}) \cdot \Pi_t^{3.5} + \varepsilon_t$		
	Consumers	*Professionals*
	(1)	(2)
β: $(\pi_{t-12} - E_{t-24}\pi_t)$	-0.02	0.12
	(0.19)	(0.24)
γ: $(\pi_{t-12} - E_{t-24}\pi_t) \cdot \Pi_t^{3.5}$	0.20	0.23
	(0.25)	(0.31)
α_1: Constant	-1.81%***	-0.53%**
	(0.45)	(0.21)
$\alpha_1 + \alpha_2$	0.61%**	1.10%***
	$p = 0.04$	$p = 0.00$
$\beta + \gamma = 0$?	YES	NO*
	$p = 0.27$	$p = 0.09$
$\alpha_1 = \beta = 0$?	NO***	NO**
	$p = 0.00$	$p = 0.01$
$\alpha_1 + \alpha_2 = \beta + \gamma = 0$?	YES	NO***
	$p = 0.11$	$p = 0.00$
R^2	0.42	0.35
N	59	59

Notes: Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10

Table 7: Mincer-Zarnowitz Regressions

$\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta E_{t-12}\pi_t + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \varepsilon_t$		
	Consumers	*Professionals*
	(1)	(2)
β: $E_{t-12}\pi_t$	0.07	0.37***
	(0.23)	(0.13)
γ: $E_{t-12}\pi_t \cdot \Pi_t^{3.5}$	0.83**	0.46*
	(0.30)	(0.26)
α_1: Constant	1.79%**	1.14%***
	(0.76)	(0.33)
$\alpha_1 + \alpha_2$	1.18%	2.21%**
	$p = 0.23$	$p = 0.03$
$\beta + \gamma = 1$?	YES	YES
	$p = 0.59$	$p = 0.47$
$\alpha_1 = 0, \beta = 1$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
$\alpha_1 + \alpha_2 = 0, \beta + \gamma = 1$?	YES	NO***
	$p = 0.15$	$p = 0.00$
R^2	0.75	0.70
N	120	120

Notes: Robust standard errors are clustered at the overlapping forecast-pair level and reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 8: Test of Full Information Exploitation

$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{3.5} + \beta E_{t-12}\pi_t + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \varepsilon_t$		
	Consumers	*Professionals*
	(1)	(2)
β: $E_{t-12}\pi_t$	-0.93***	-0.63***
	(0.19)	(0.13)
γ: $E_{t-12}\pi_t \cdot \Pi_t^{3.5}$	0.83***	-0.46
	(0.11)	(0.26)
α_1: Constant	1.79%**	1.14%***
	(0.64)	(0.33)
$\alpha_1 + \alpha_2$	1.18%	2.21%***
	$p = 0.23$	$p = 0.03$
$\beta + \gamma = 0$?	YES	YES
	$p = 0.59$	$p = 0.47$
$\alpha_1 = \beta = 0$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
$\alpha_1 + \alpha_2 = \beta + \gamma = 0$?	YES	NO***
	$p = 0.15$	$p = 0.00$
R^2	0.44	0.28
N	120	120

Notes: Robust standard errors are clustered at the overlapping forecast-pair level and reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 9: Test of Full Macroeconomic Information Exploitation

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \beta E_{t-12}\pi_t + \varphi\pi_{t-14} + \kappa i_{t-13} + \delta U_{t-13} + \alpha_2 \Pi_t^{3.5} + \gamma E_{t-12}\pi_t \cdot \Pi_t^{3.5} + \lambda\pi_{t-14} \cdot \Pi_t^{3.5} + \varepsilon_t$$

	Consumers	*Professionals*
	(1)	(2)
β: $E_{t-12}\pi_t$	-1.17***	-0.40*
	(0.28)	(0.22)
γ: $E_{t-12}\pi_t \cdot \Pi_t^{3.5}$	-2.92	0.27
	(1.95)	(0.42)
α_1: Constant	2.83%***	2.90%***
	(0.69)	(0.69)
$\alpha_1 + \alpha_2$	2.40%**	4.35%***
	$p = 0.05$	$p = 0.00$
φ: π_{t-14}	0.40***	0.13
	(0.11)	(0.16)
κ: i_{t-14}	-0.00	-0.00*
	(0.00)	(0.00)
δ: U_{t-14}	-0.00**	-0.00***
	(0.00)	(0.00)
λ: $\pi_{t-14} \cdot \Pi_t^{3.5}$	-0.29	0.04
	(0.20)	(0.29)
$\alpha_1 = \beta = 0$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
$\alpha_1 + \alpha_2 = \beta + \gamma = 0$?	NO*	NO***
	$p = 0.08$	$p = 0.00$
$\varphi = \kappa = \delta = 0$?	NO***	NO*
	$p = 0.00$	$p = 0.05$
$\varphi + \lambda = \kappa = \delta = 0$?	YES	NO***
	$p = 0.23$	$p = 0.01$
R^2	0.49	0.40
N	120	120

Notes: Robust standard errors are clustered at the overlapping forecast-pair level and reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Figure 1: Inflationary and Disinflationary Shocks

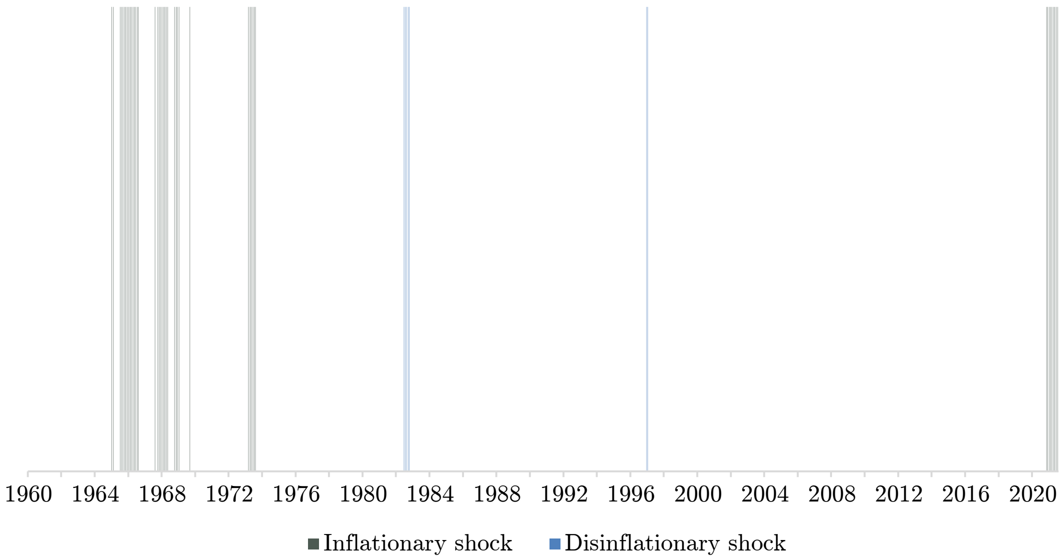

Table 10: Mean Forecast Errors and Inflation Regime Change

$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{inf} + \alpha_3 \Pi_t^{dis} + \beta\,Survey + \gamma_1 Survey \cdot \Pi_t^{inf} + \gamma_2 Survey \cdot \Pi_t^{dis} + \varepsilon_t$			
	Consumers	*Professionals*	*Difference?*
	(1)	(2)	(3)
α_1 (Professionals), $\alpha_1 + \beta$ (Consumers)	-0.69%***	0.25%	YES***
	p = 0.01	p = 0.44	p = 0.00
α_2	2.13%**		
	(0.85)		
α_3	-1.55%***		
	(0.27)		
γ_1	-0.64%***		
	(0.22)		
γ_2	0.82%**		
	(0.33)		
$\Pi_t^{inf} = 1$, $\Pi_t^{dis} = 0$	0.80%	2.38%***	YES***
	p = 0.41	p = 0.01	p = 0.00
$\Pi_t^{inf} = 0$, $\Pi_t^{dis} = 1$	-1.41%***	-1.29%***	NO
	p = 0.00	p = 0.00	p = 0.72
R^2		0.12	
N		228	

Notes: Robust standard errors are clustered at the overlapping forecast-pair level and reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 11: Summary Results of Rationality and Efficiency Tests by Inflation Regime

	Consumers (1)	*Professionals* (2)
Panel A: Autocorrelation		
$\alpha_1 = \beta = 0$?	NO***	YES
	$p = 0.00$	$p = 0.11$
$\alpha_1 + \alpha_2 = \beta + \gamma_1 = 0$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
$\alpha_1 + \alpha_3 = \beta + \gamma_2 = 0$?	YES	NO***
	$p = 0.17$	$p = 0.00$
Panel B: Mincer-Zarnowitz		
$\alpha_1 = 0, \beta = 1$?	NO***	YES
	$p = 0.01$	$p = 0.64$
$\alpha_1 + \alpha_2 = 0, \beta + \gamma_1 = 1$?	YES	NO***
	$p = 0.23$	$p = 0.00$
$\alpha_1 + \alpha_3 = 0, \beta + \gamma_2 = 1$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
Panel C: Full information		
$\alpha_1 = \beta = 0$?	NO***	YES
	$p = 0.01$	$p = 0.64$
$\alpha_1 + \alpha_2 = \beta + \gamma_1 = 0$?	YES	NO***
	$p = 0.23$	$p = 0.00$
$\alpha_1 + \alpha_3 = \beta + \gamma_2 = 0$?	NO***	NO***
	$p = 0.00$	$p = 0.00$
Panel D: Full macroeconomic information		
$\varphi = \kappa = \delta = 0$?	NO***	NO**
	$p = 0.00$	$p = 0.05$
$\varphi + \lambda_1 = \kappa = \delta = 0$?	NO***	NO*
	$p = 0.00$	$p = 0.08$
$\varphi + \lambda_2 = \kappa = \delta = 0$?	NO***	NO***
	$p = 0.00$	$p = 0.01$

Table 12: Mean Forecast Errors by Inflation Regime

$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \beta\,Survey + \gamma_1 Survey \cdot \Pi_t^{inf} + \gamma_2 Survey \cdot \Pi_t^{dis} + \varepsilon_t$			
	$\Pi_t^{inf}, \Pi_t^{dis} = 0$	$\Pi_t^{inf} = 1, \Pi_t^{dis} = 0$	$\Pi_t^{inf} = 0, \Pi_t^{dis} = 1$
	$(\alpha_1 + \beta)$	$(\alpha_1 + \alpha_2 + \beta + \gamma_1)$	$(\alpha_1 + \alpha_3 + \beta + \gamma_2)$
	(1)	(2)	(3)
Academic	0.43*	2.30**	-1.33***
	(0.06)	(0.02)	(0.00)
Commercial banking	0.35	2.22***	-1.41***
	(0.15)	(0.01)	(0.00)
Federal Reserve	0.92	2.79***	-0.84***
	(0.18)	(0.00)	(0.00)
Government	0.51**	2.38**	-1.25***
	(0.04)	(0.04)	(0.00)
Investment banking	0.28	2.15***	-1.48***
	(0.26)	(0.00)	(0.00)
Labor	0.19	2.06***	-1.57***
	(0.58)	(0.01)	(0.00)
Nonfinancial business	0.30	2.17**	-1.46***
	(0.20)	(0.01)	(0.00)
Other	0.51	2.38***	-1.25***
	(0.15)	(0.01)	(0.00)

Notes: p-values are reported in parentheses. Robust standard errors (not reported) are clustered at the overlapping forecast-pair level. Estimates are reported in percentages. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 13: Test of Autocorrelated Forecast Errors by Inflation Regime

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \alpha_2 \Pi_t^{inf} + \alpha_3 \Pi_t^{dis} + \beta(\pi_{t-12} - E_{t-24}\pi_t) + \gamma_1(\pi_{t-12} - E_{t-24}\pi_t) \cdot \Pi_t^{inf} + \gamma_2(\pi_{t-12} - E_{t-24}\pi_t) \cdot \Pi_t^{dis} + \varepsilon_t$$

	$\Pi_t^{inf}, \Pi_t^{dis} = 0$ ($\alpha_1 = \beta = 0$?)	$\Pi_t^{inf} = 1, \Pi_t^{dis} = 0$ ($\alpha_1 + \alpha_2 = \beta + \gamma_1 = 0$?)	$\Pi_t^{inf} = 0, \Pi_t^{dis} = 1$ ($\alpha_1 + \alpha_3 = \beta + \gamma_2 = 0$?)
Academic	YES	NO***	NO*
	(0.17)	(0.00)	(0.10)
Commercial banking	YES	NO***	NO*
	(0.16)	(0.00)	(0.06)
Government	NO***	NO***	NO***
	(0.00)	(0.00)	(0.00)
Investment banking	NO***	NO***	NO***
	(0.00)	(0.00)	(0.00)
Labor	YES	NO***	YES
	(0.78)	(0.00)	(0.43)
Nonfinancial business	NO*	NO***	NO**
	(0.08)	(0.00)	(0.04)
Other	YES	NO***	YES
	(0.19)	(0.00)	(0.34)

Notes: p-values are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 14: Mincer-Zarnowitz Tests by Inflation Regime

$$\pi_t = \alpha_1 + \alpha_2 \Pi_t^{inf} + \alpha_3 \Pi_t^{dis} + \beta E_{t-12}\pi_t + \gamma_1 E_{t-12}\pi_t \cdot \Pi_t^{inf} + \gamma_2 E_{t-12}\pi_t \cdot \Pi_t^{dis} + \varepsilon_t$$

	$\Pi_t^{inf}, \Pi_t^{dis} = 0$ ($\alpha_1 = 0, \beta = 1$?) (1)	$\Pi_t^{inf} = 1, \Pi_t^{dis} = 0$ ($\alpha_1 + \alpha_2 = 0, \beta + \gamma_1 = 1$?) (2)	$\Pi_t^{inf} = 0, \Pi_t^{dis} = 1$ ($\alpha_1 + \alpha_3 = 0, \beta + \gamma_2 = 1$?) (3)
Academic	NO*	NO***	NO***
	(0.09)	(0.00)	(0.00)
Commercial banking	YES	NO***	NO***
	(0.24)	(0.00)	(0.00)
Government	NO**	NO***	YES
	(0.02)	(0.00)	(0.95)
Investment banking	YES	NO***	NO***
	(0.17)	(0.00)	(0.00)
Labor	NO**	NO***	YES
	(0.01)	(0.00)	(0.15)
Nonfinancial business	YES	NO***	NO***
	(0.25)	(0.00)	(0.00)
Other	NO*	NO***	NO***
	(0.10)	(0.00)	(0.00)

Notes: p-values are reported in parentheses. Robust standard errors (not reported) are clustered at the overlapping forecast-pair level. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 15: Tests of Full Information Exploitation by Inflation Regime

$$\pi_t - E_{t-12}\pi_t = \alpha_1 + \beta E_{t-12}\pi_t + \varphi\pi_{t-14} + \kappa i_{t-13} + \delta U_{t-13} + \alpha_2\Pi_t^{inf} + \alpha_3\Pi_t^{dis} + \gamma_1 E_{t-12}\pi_t \cdot \Pi_t^{inf} + \gamma_2 E_{t-12}\pi_t \cdot \Pi_t^{dis} + \lambda_1\pi_{t-14} \cdot \Pi_t^{inf} + \lambda_2\pi_{t-14} \cdot \Pi_t^{dis} + \varepsilon_t$$

	$\Pi_t^{inf}, \Pi_t^{dis} = 0$		$\Pi_t^{inf} = 1, \Pi_t^{dis} = 0$		$\Pi_t^{inf} = 0, \Pi_t^{dis} = 1$
	$(\alpha_1 = \beta = 0?)$	$(\varphi = \kappa = \delta = 0?)$	$(\alpha_1 + \alpha_2 = \beta + \gamma_1 = 0?)$	$(\varphi + \lambda_1 = \kappa = \delta = 0?)$	$(\alpha_1 + \alpha_3 = \beta + \gamma_2 = 0?)$
	(1)	(2)	(3)	(4)	(5)
Academic	NO*	YES	NO**	NO***	YES
	(0.06)	(0.39)	(0.02)	(0.00)	(0.13)
Commercial banking	YES	YES	YES	NO**	YES
	(0.19)	(0.37)	(0.76)	(0.02)	(0.99)
Government	YES	YES	YES	NO**	YES
	(0.27)	(0.84)	(0.20)	(0.01)	(0.15)
Investment banking	NO*	YES	NO***	YES	YES
	(0.05)	(0.45)	(0.00)	(0.51)	(0.67)
Labor	NO***	YES	YES	NO**	NO***
	(0.00)	(0.65)	(0.28)	(0.03)	(0.00)
Nonfinancial business	YES	YES	NO***	NO***	YES
	(0.29)	(0.32)	(0.00)	(0.00)	(0.33)
Other	NO**	YES	NO***	NO***	NO**
	(0.03)	(0.41)	(0.00)	(0.00)	(0.04)

Notes: p-values are reported in parentheses. Robust standard errors (not reported) are clustered at the overlapping forecast-pair level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.