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Updates to Household Inflation Expectations: Signal or Noise?

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Abstract

Using data from the New York Fed's Survey of Consumer Expectations, we examine the information content of the updates to household inflation expectations. We find that, although consumers frequently revise their expectations, the adjustments are largely uninformative.

Updates to Household Inflation Expectations: Signal or Noise?

1. Introduction

Consumer inflation expectations are of significant interest to both researchers and policymakers. Monetary authorities around the world routinely monitor these expectations using household surveys. Empirical studies often find that households are inattentive to inflation news and slow to adapt their expectations to the latest economic realities.[2] A few recent papers estimated the speed of adaptation and found that households frequently revise their expectations. For example, Dräger and Lamla (2012) examined the data from the University of Michigan's Survey of Consumers. They found that consumers, on average, update their expectations every eight months. Using the responses from New York Fed's Survey of Consumer Expectations (without rounding them), Binder (2017) estimated that consumers update their expectations at a much higher rate – about five times in eight months. In addition, the author examined the size of the revisions and showed that respondents with higher levels of education, income, and numeracy are more likely to make small revisions.

Rather than focusing on the frequency of the revisions, we attempt to find out if they actually contain useful information. This is an important yet unanswered question since we cannot ascertain whether consumers are indeed attentive to inflation news if they do not revise their expectations accordingly, even when revisions are frequently made.[3] In this letter, we show that the revisions are largely uninformative: They exhibit negative serial correlation and cannot be explained by

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[2] Mankiw and Reis (2002) provided a theoretical framework on information stickiness resulted from inattention.

[3] Using the Michigan survey, Pfajfar and Santoro (2013) highlighted the disconnection between inflation news and the frequency of revisions. They found that having access to more news does not diminish the gap between consumer expectations and professional forecasts.

recent changes in the actual inflation rate. In addition, the revisions of the headline inflation rate and those of specific items have very low correlations. Moreover, we find that the same holds true regardless of the magnitude of the revisions and the survey respondents' level of numeracy, education, and income.

2. Data

We use the data from New York Fed's Survey of Consumer Expectations (SCE) – a monthly survey of about 1,300 households in the US. The survey includes up to 12 consecutive responses from each respondent, who supplies quantitative expectations of the headline inflation rate and the inflation rate of gas, food, medical care, college education, rent, and gold over the next 12 months. For headline inflation, the survey also collects expectations over the 12-month period ending in three years. In addition, the survey records each respondent's level of education, income, and numeracy.[4] Our data set covers the 61-month period from June 2013 to June 2018, with 80,370 observations from 11,829 respondents. Following the recommendation of Binder (2017), we do not round the expectations to the nearest integer.[5] The actual inflation rate is calculated as the percent change from a year ago.

3. Information content of the revisions

3.1 Efficiency of the expectations

Let $y_{i,t,h}$ be the expectation of individual i reported at month t about the actual inflation rate A_{t+h}, where $h \in \{12,36\}$ is the forecast horizon. The revision $r_{i,t,h}$ is defined as $y_{i,t,h} - y_{i,t-1,h}$. If $r_{i,t,h}$ contains all the relevant inflation news that becomes available during month t, then $y_{i,t,h}$

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[4] Several questions on probability and basic economic concepts are used to put respondents into two groups: high numeracy and low numeracy.

[5] We use unrounded data so that small revisions are not ignored. Our main conclusions stay the same even if we round the expectations.

is considered "efficient" in the sense of Nordhaus (1987). Efficient revisions cannot be explained by past revisions, i.e., in the regression

$$r_{i,t,h} = \alpha + \beta r_{i,t-1,h} + u, \tag{1}$$

both α and β should be 0. Although Nordhaus defined efficiency based on fixed target forecasts, we argue that, in the eyes of ordinary consumers, A_{t+h} and A_{t+h+1} are essentially the same when h is large (such as when $h = 36$), so that the efficiency concept applies. We estimate equation (1) separately for respondents with different levels of numeracy, education, and income. We also perform the estimation using the data from everyone. Table 1 reports the estimated coefficient $\hat{\beta}$, its p-value, and the $\bar{R}^2$. The results clearly demonstrate the inefficiency – about 24% of the variations in the revisions can be explained by the same respondent's revision in the previous month. For all the groups, β is negative and statistically significant, while the constant is insignificant. As discussed in Clements (1998), one possible explanation of this result is that the revisions do not reflect any news, or that no significant news was available. A negative β may also be a signal of overreaction to news.[6] To explore further, we proceed with comparisons of the revisions and two observable measures of inflation news.

Category	Group	One-year-ahead expectations			Three-year-ahead expectations		
		$\bar{R}^2$	$\hat{\beta}$	p-value	$\bar{R}^2$	$\hat{\beta}$	p-value
Everyone	Everyone	0.229	-0.43	0.00	0.245	-0.49	0.00
Numeracy	High Numeracy	0.220	-0.41	0.00	0.193	-0.41	0.00
	Low Numeracy	0.235	-0.43	0.00	0.265	-0.52	0.00
Education	College Degree	0.240	-0.43	0.00	0.210	-0.43	0.00
	Some College	0.222	-0.42	0.00	0.278	-0.55	0.00
	High School	0.230	-0.44	0.00	0.210	-0.42	0.00
Income	Over 100k	0.209	-0.39	0.00	0.346	-0.70	0.00
	50k to 100k	0.266	-0.46	0.00	0.218	-0.43	0.00
	Under 50k	0.219	-0.42	0.00	0.223	-0.44	0.00

Table 1. Efficiency of the expectations

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[6] Bordalo *et al.* (2018) obtained the same results, albeit using data from professional forecasters. Fuhrer (2018), on the other hand, noted the opposite after examining data from both professionals and households.

3.2 Revisions and recent changes in the actual inflation rate

Arguably, the best objective measure of recent inflation news is the change in the actual inflation rate. We assess how well the revisions can be explained by this measure using the following regressions: [7]

$$r_{i,t,h} = \gamma + \sum_{s=1}^{6} \theta_s \Delta A_{t-s} + u,$$ (2)

where the lags on the right-hand-side account for potential information stickiness and over/under-reaction to news. Table 2 reports the adjusted R-squared, the sum of the θs and their joint significance. For all the groups, the recent changes in the actual inflation rate (ΔA_{t-s}) are statistically insignificant and have virtually no explanatory power. This result highlights the disconnection between household expectations and the headline inflation rate. It also helps to explain the lack of rationality at the aggregate level. In the standard Mincer–Zarnowitz regression of actual values on forecasts, rational forecasts should have a coefficient of one and the constant should be zero. We ran the regressions using aggregate data and found that the coefficient of the expectations is negative and mostly insignificant while the constant is highly significant in all the cases.

Category	Group	One-year-ahead expectations			Three-year-ahead expectations		
		$\bar{R}^2$	$\sum \hat{\theta}_s$	p-value	$\bar{R}^2$	$\sum \hat{\theta}_s$	p-value
Everyone	Everyone	0.000	-0.19	0.81	0.000	-0.04	0.96
Numeracy	High Numeracy	0.000	0.39	0.55	0.000	0.13	0.82
	Low Numeracy	-0.001	-1.61	0.46	0.001	-0.52	0.82
Education	College Degree	0.000	-0.52	0.52	0.000	-0.35	0.66
	Some College	0.001	-0.98	0.43	-0.001	-0.01	0.99
	High School	-0.003	3.26	0.41	-0.002	0.90	0.82
Income	Over 100k	-0.001	0.69	0.56	-0.001	0.38	0.72
	50k to 100k	-0.001	-1.02	0.41	-0.001	-0.25	0.85
	Under 50k	0.000	-0.13	0.93	0.000	0.03	0.99

Table 2. Explaining the revisions using the changes in the actual inflation rates

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[7] Given the publication lag of the actual inflation rate, when responding to the survey in, say, October, consumers only have access to the actuals up to September.

3.3 Revisions to headline inflation expectations and those of specific items

Previous research found that consumers are more likely to react to their own subjective experience than to aggregate shocks.[8] We obviously cannot observe a consumer's private information set. However, we can examine the correlations between the revisions to the headline inflation expectations and those of specific items such as gas and food.[9] If the revisions are simply noise, the correlations should be zero. In Table 3, we report these correlations. For brevity, we omit all but three groups: those with at least a college degree, those with no more than a high school diploma, and everyone. From Table 3, it is clear that the correlations are weak. On average, the correlation between the revisions to the headline inflation and that of a particular item is only 0.04. The differences across the items are minor, so are the differences across numeracy, education, and income groups. These results are consistent with those reported in Binder (2018), who found that households do not attach much weight to gas price when forming their expectations, despite the prominence of gas price in average consumers' daily lives.

Category	One-year-ahead expectations			Three-year-ahead expectations		
	Everyone	College	High school	Everyone	College	High school
Gas	0.054	0.045	0.048	0.037	0.023	0.019
Food	0.055	0.053	0.018	0.049	0.021	0.018
Medical Care	0.047	0.047	0.060	0.050	0.035	0.065
College Education	0.056	0.051	0.069	0.038	0.049	0.031
Renting	0.060	0.038	0.098	0.042	0.036	0.060
Gold	0.016	0.023	0.021	0.005	-0.009	0.047

Table 3. Correlations between the revisions of the headline inflation rate and those of specific items

3.4 Does the magnitude of the revisions matter?

Next, we look at whether the information content of big revisions differs from that of small revisions. Considering that the change in the actual inflation rate from one month to the next is

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[8] See, among others, Curtin (2003), Souleles (2004), and Lahiri and Zhao (2017).

[9] Instead of looking at the correlations, we also examined the sign of the revisions and reached similar conclusions based on Cramér's V.

usually small, if big revisions are more likely to be irrational, then small revisions may be more informative. On the other hand, if a typical consumer tends to ignore (or remain ignorant of) small changes in the actual inflation rate and makes meaningful revisions only in response to big news/shocks, then we should see the reverse.

We repeat the three exercises above separately for small and large revisions. Two definitions of "small" are considered: 2% and 10%.[10] To maintain a reasonable sample size, we do not separate the respondents into demographic groups. The results from estimating equations (1) and (2) are reported in Table 4. The correlations between the revisions to the headline rate and that of specific items are reported in Table 5. These results clearly suggest that the magnitude of the revisions matters very little. Regardless of the magnitude, the revisions are inefficient and they cannot be explained by the changes in the actual rate. However, the big revisions, on average, have slightly higher correlations with the revisions of specific spending items, although they are less efficient than the small revisions.

Magnitude	One-year-ahead expectations			Three-year-ahead expectations		
	Equation (1)					
	$\bar{R}^2$	$\hat{\beta}$	p-value	$\bar{R}^2$	$\hat{\beta}$	p-value
<=2%	0.000	-0.01	0.00	0.000	-0.01	0.00
>2%	0.231	-0.43	0.00	0.246	-0.49	0.00
<=10%	0.010	-0.08	0.00	0.007	-0.08	0.00
>10%	0.239	-0.43	0.00	0.253	-0.50	0.00
Magnitude	Equation (2)					
	$\bar{R}^2$	$\sum\hat{\theta}_s$	p-value	$\bar{R}^2$	$\sum\hat{\theta}_s$	p-value
<=2%	0.000	-0.09	0.46	0.001	-0.03	0.78
>2%	0.000	-0.48	0.81	0.000	0.03	0.99
<=10%	0.000	-0.30	0.27	0.000	-0.13	0.62
>10%	0.000	0.47	0.96	-0.002	1.08	0.89

Table 4. Estimation results based on revisions with varying magnitudes

[10] We also considered 1% and 5% and reached the same conclusions. About 70% of the revisions are smaller than 2% in magnitude. About 16% and 9% of the revisions are bigger than 5% and 10% respectively.

Category	One-year-ahead expectations				Three-year-ahead expectations			
	<=2%	>2%	<=10%	>10%	<=2%	>2%	<=10%	>10%
Gas	0.054	0.065	0.054	0.089	0.037	0.042	0.037	0.058
Food	0.055	0.059	0.055	0.062	0.048	0.051	0.048	0.057
Medical Care	0.046	0.051	0.046	0.064	0.048	0.053	0.048	0.070
College Education	0.055	0.059	0.055	0.070	0.038	0.041	0.038	0.048
Renting	0.059	0.064	0.059	0.075	0.042	0.044	0.042	0.052
Gold	0.015	0.017	0.015	0.016	0.006	0.006	0.006	0.003

Table 5. Correlations between the revisions to the headline inflation and that of specific items calculated using revisions with varying magnitudes

4. Concluding remarks

This letter contributes to the literature by providing evidence that shows a lack of information in the updates to household inflation expectations. We show that although the revisions are frequently made, they are inefficient and they cannot be explained by recent changes in the actual inflation rate. Moreover, we document a lack of strong correlations between the revisions to the headline inflation rate and that of specific items such as food, gas, rent, and college education. We therefore caution against simply using the frequency of revisions as a measure of how attentive households are to inflation news. We hope that our results motivate further studies on the type and amount of information households collect and utilize in forming their expectations.

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