Bar Ilan University

Department of Economics

The Dynamics of Firm Expectations after an Inflation Surge

Students: Matan Goldman, T.Z. 208889782

        Hila Perl, T.Z. 343840625

The Dynamics of Firm Expectations after an Inflation Surge

By Matan Goldman and Hila Perl

Abstract

In the wake of the Covid-19 pandemic, this research explores the effects of inflation surges on firm expectations and behavior. Utilizing exclusive data from the Israeli Central Bureau of Statistics, we investigate the evolution of inflation expectations within Israeli firms from late 2021 to early 2023. Our analysis highlights that the most pronounced impact of inflation shocks occurs during the third quarter of 2022, driving heightened inflation expectations, increased disparities among firms' viewpoints, and larger errors from actual inflation. These outcomes are largely the same across firm sectors and sizes and are found to also affect pricing strategies although not employment.

Contents

Introduction

      After decades of stable inflation, the world was rocked during the emergence from the Covid-19 pandemic with inflation surges. These surges were especially noticeable in America, hitting a maximum inflation peak of 9.1% in June 2020 after having stable monetary policy for the past 20 years. It also affected Israel, reaching a peak of 5.3% as recently as December 2022 (OECD). While the main effect of inflation shocks is the one that hits our pockets, it is also essential to understand how they impact the expectations for inflation, which in turn can affect inflation in a potentially disastrous feedback loop. Graph 1 shows a clear rise in average expectations with inflation, but it's impossible to know from this what part of the rise is attributable to the inflation shock itself. In our essay we examine the emerging effects of the Covid-19 inflation shocks on the expectations of Israeli firms from the end of 2021 to the beginning of 2023. Using novel data from the Israeli Central Bureau of Statistics (CBS) we find that the effects of the shock peaked in the third quarter of 2022, including an increase in: the expectations themselves, disagreement amongst firms, and the error from the actual inflation rates.

Graph 1

Average Quarterly Expectations for Yearly Inflation VS Actual Inflation
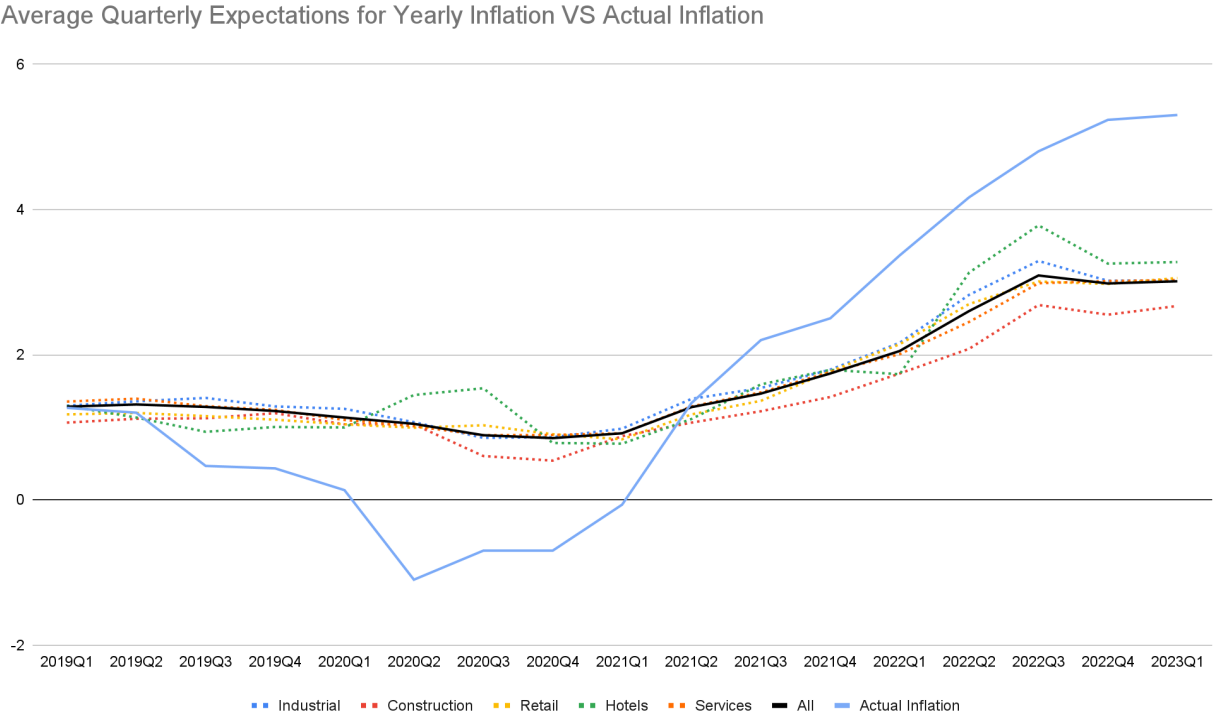
Literature Review

Causes of Hyperinflation and Inflation shocks and Central Bank Responses

The study of the properties of inflation shocks and hyperinflation started as far back as 1956 with Cagan and was further studied by Sargent and Wallace in 1981 and then Marcet and Nicoli who were able to look into the inflation shocks of the 1980's and its connection to fiscal discipline and the need to lower seigniorage to prevent hyperinflations. The more recent inflation shocks from the Covid-19 crisis have their own unique causes and characteristics, demanding updated research to understand it. Different economists have theorized as to the causes ranging from unrestrained monetary policies with stimulus checks and quantitative easing, while others have pointed to labor shortages and global supply chain bottlenecks (Cochrane, 2022, Di Giovanni, 2022). Recent research relating to the inflation after Covid-19 has shown that inflation tends to be persistent, with surges often followed by high inflation rates for several years after their peak. Additionally, after an inflation surge, short-term inflation expectations tend to gradually catch up with realized inflation, while long-term inflation expectations exhibit mild but persistent increases (Blanco et. al, 2022).

What's apparent, however, is that the central bank failed to act in a manner that would prevent these shocks. The reason for this delay in enacting the appropriate policy has been attributed to the uncertainty of the economy during 2020-2022 and the belief that the inflation shocks would be temporary, overconfidence on the ability of inflations expectations to remain anchored, overreliance on the credibility of the central bank to maintain inflation rates, and viewing the early inflation as a market correction to previously low inflation (Reis, 2022). Other economists have speculated about the political pressures that may have contributed to the Federal Reserve's delayed response. They have also studied the potential effects of this delay, such as larger fluctuations in the policy rate, unemployment, and inflation. They note that the cost of the delay depends on whether the public assumes the central bank will eventually respond. They recommend that the Federal Reserve always assume inflation shocks will be persistent and not temporary. (Walsh, 2022).

Hyperinflation in Israel

While much of the literature has dealt with hyperinflation and inflation shocks in the USA and drawn clear parallels to the inflation shocks of the 1980's, as our essay deals with the Israeli economy, it is essential to understand Israel's bout of hyperinflation in 1985. The hyperinflation in Israel was caused by four main factors: general reliance on debt due to the instability of the region and need to finance constant wars, the oil crisis and the subsequent rise in oil prices, changes in monetary policy that depegged the shekel foreign exchange rate, and the collapse of the stocks of the four largest Israeli banks. These factors caused the Israeli public to abandon the shekel in favor of the dollar, a stable currency, causing a steep devaluation of the shekel. This coupled with strong labor unions who pegged wages to inflation, led to the eventual 480% hyperinflation in 1985.

The Israeli government was able to successfully disinflate the economy through short term freezing of prices and wages, significant budget cuts, financial aid from the United States to reduce debt, and reintroducing a set exchange rate for the shekel to the dollar. However, most importantly and what makes the current inflation situation significantly different than the previous, is that the government granted the central bank autonomy to decide the monetary policy. This limits the government's ability to take on debt and allows the interest rate to be moved as needed in order to stabilize the economy (Charles and Marie, 2019).

The Forming of Inflation expectations

While the connection between inflation and inflation expectations has always been known dating back to naive expectations and up to today with rational ones, there is a nascent field of literature exploring how exactly these expectations are formed. While expectations are dependent on the information available to entities, it is unclear if these entities have access to all information at once or only partial information and if their information is constantly updated or updated at discrete periods so that they may have outdated information. Researchers incorporating these theories into their models have found that expectations don't adjust 1 to 1 after shocks, converge independently of the type of shock and agent, and that there is no discernable increase in disagreement after a shock amongst experts, although there is for consumers after oil shocks. (Coibion and Gorodnichenko, 2008).

While there are different types of expectations depending on the entity, our paper focuses specifically on business expectations. One such paper who focused on these used survey data from New Zealand to show that firm expectations are largely heterogeneous and resemble more closely consumer expectations than those of professional forecasters. They also showed that when firms are exposed to more relevant information, their predictions rise in their accuracy. Additionally firms that have more of a need for information are more likely to be accurate, although firms in general rarely ever expect inflation to fall (Coibion, et al 2018). Another paper focused on an experiment with firm inflation expectations in Italy. It found that consistently supplying inflation information to firms before they filled out their expectations, increased the accuracy of their expectations and lowered disagreement. Another finding was that expectations had a direct effect on if a firm would raise their price, and if there was lower bound for the central bank, would also decrease employment (ibid, 2019). It should be noted, however, that there are researchers who disagree with the use of surveys to accurately represent expectations (Pesaran and Weale, 2005).

Anchoring of Expectations

Recent monetary policy has had a focus on "anchoring" inflation expectations meaning that the expectations move little from a set number (usually the inflation target). The literature has shown that when expectations are firmly anchored, countries have less sensitivity to macroeconomic shocks and return to their original state sooner (Bems Et. al, 2018). In terms of how expectations get anchored, research has shown that this is correlated to consistent and effective behavior by the central bank (Carvalho, 2017). However recent empirical data from New Zealand has shown that despite successful inflation targeting for the past 25 years, managers of firms have a wide variance in their expectations of inflation implying a failure of effective monetary policy to anchor inflation expectations, or at least for firms (Kumar, 2015). With the Covid-19 pandemic and the recent inflation surges coupled with the Federal reserve failing to act in a timely manner, some researchers have worried that inflation expectations will unanchor from their anchor thus causing increased variance in inflation (Blanchard 2022).

Expectation and Inflation modeling

While models do exist to attempt to plot inflation expectations, their parameters are constantly being tweaked in order to achieve increased empirical accuracy. Some economists have attempted to improve their models by adding inflexible prices while still maintaining the ability for ongoing inflation (Christiano et. al, 2005). Other researchers have focused on the appropriate scope used in their models, and if including previous sudden hyperinflation events help improve the accuracy in measuring inflation around the Covid-19 pandemic (Schmitt-Grohe and Uribe, 2022).

Summary Statistics and Methodology

Data cleaning and Summary Statistics

Our data is taken directly from the CBS Business Climate survey, and primarily uses the question: "According to your evaluation, what is your expectation for Cumulative percentage change on consumer price index?" This query pertains to both a three-month and one-year timeframe, permitting responses between -99.99 and 99.99. The survey is released monthly and is tailored to five different sectors: Industrial, Construction, Retail, Hotels (having this as its own sector is unique to Israel), and Service. The expectations and consistency for which firms need to respond to the survey is based on their size group of which there are six. For the purposes of our research, we group the sizes into three: 1-49 employees as small, 50-249 as medium, and 250+ as big.

As our data is from survey data there are a number of preprocessing steps we need to perform before the data is usable. First we exclude all firms who never answered the question, leaving us with 2200 unique businesses. We then remove outliers which we define as any projection above 10% growth and below -4% as we consider these estimates extreme and not representative of the actual sample's expectations. From these, 281 data points were removed which only amounted to 10 unique businesses meaning that most of the extreme expectations were focused in just a few firms. Finally we remove all firms that never answered the question at least 4 times in a row in order to add expectation lags to the regression and we are left with 1419 firms for the 3 month sample and 1430 for the year sample.

Table 1

Summary statistics by sector and size		3 months expectations		Year expectations		Distributions (same for 1 year and three months)	
		Standard sample	Reduced Sample	Standard sample	Reduced Sample	Standard sample	Reduced Sample
Sectors	Industrial	409	234	416	233	29%	36%
	Construction	207	63	204	63	15%	10%
	Retail	195	90	201	90	14%	14%
	Hotels	71	26	72	26	5%	4%
	Services	555	253	556	250	39%	39%
Size	Small	200	43	205	43	14%	7%
	Medium	415	166	418	164	29%	25%
	Big	882	498	886	494	62%	76%
All		1419	657	1430	653	100%	100%

Within this sample the majority of firms are either in the industrial or service industry and due to the sample and weighting techniques of the CBS, the majority size are big businesses (250+ employees) as can be seen in Table 1. It should be noted that firms that switch sectors or size at some point during the timeframe are counted in both of the categories that they're found in accounting for the slightly higher than 100% present in the total of the different categories. The span of the sample stretches from April 2016 until February 2023, with the lags going back until January 2016, when the current iteration of the survey was implemented.

We also create a reduced sample of 657 firms, who reported their inflation expectations at least 38 times. This additional analysis acts as a robustness check, based on the idea that firms consistently providing responses demonstrate a greater level of consideration and informed expectations. The main distribution changes from this is an increase in the amount of industrial at the expense of construction and hotel firms in the sample. For size we see a growth in the amount of big businesses at the expense of medium, but mainly small firms.

Methodology

For our research we evaluate the following regression:

$$Expectations_{Sec,Size,i,t} = \alpha + \beta_1 \sum_{t-3}^{t-1} Expectations_{Sec,Size,i,t} + \beta_2 \sum_{2021Q4}^{2023Q1} Inflation\ Shock_D + \gamma X_i$$

Here, the dependent variable denotes the expectations for a given firm *i* and time period *t* within the sector *Sec* and size group *Size*. The explanatory variables consist of the following components:

1. *Expectations*: This represents the three previous months of inflation expectations for the specified firm.
2. *Inflation Shock*: A series of dummies, starting from the fourth quarter of 2021 through the first quarter of 2023, designed to capture the impact of inflation shocks on expectations in comparison to pre-shock levels.
3. *X*: This factor encompasses the individual firm characteristics, including size, sector, and the one way fixed effects.

The initiation of the inflation shock is pinpointed to September 2021, coinciding with the first instance of inflation exceeding 2%. To analyze the data, we employ a panel regression framework, incorporating one-way fixed effects to account for individual firm-specific effects. Additionally, we perform an alternative regression without the inclusion of expectation lags.

To explore the influence of inflation shock periods on various factors, we undertake further tests by substituting the expectation value with the standard deviation of the month by sector for both three-month and year-long expectations. Furthermore, we assess the effect of the inflation shock periods on the error value associated with three-month expectations.

Subsequently, we conduct two additional panel regression analyses employing one-way fixed effects. These analyses are focused on addressing two relevant survey questions that pertain to the firm's anticipated changes in both pricing and employee levels over the forthcoming three-month period. The original survey featured five response options, ranging from "increase sharply" and "increase slightly" to "stay the same," "fall slightly," and "fall sharply." To enhance the applicability of the regression models, we condense these responses into three distinct possibilities: "rise" (coded as 1), "stay the same" (coded as 0), and "fall" (coded as -1).

To ensure the robustness of our findings, we undertake a series of robustness checks. Specifically, we execute all the regressions using a standard ordinary least squares (OLS)

approach, both with and without incorporating lags. Furthermore, in order to expand the scope of our analysis, we conduct the regressions on both the sample dataset and the population dataset. For the latter, we incorporate survey weights provided by the CBS (Central Bureau of Statistics), which serve to offer greater representation to smaller and medium-sized firms. All these regressions can be found in the appendix.

Results

In table 2, all regressions exhibit a notable peak of heightened annual inflation expectations in the shock dummies, reaching approximately 0.77 during the third quarter of 2022. The coefficients depicted in Graph 2 correspond to the regression in column (1), revealing an almost linear ascent until the third quarter of 2022, succeeded by a decline in the subsequent quarter and a minor resurgence in the initial quarter of 2023. Akin to this pattern, the Reduced regression in column (2) demonstrates a comparable trajectory, albeit with slightly diminished outcomes—likely stemming from the exclusion of firms with limited observations, who might tend to provide elevated inflation estimates. The omission of lags accentuates the coefficient impact, given the fewer controlled variables, thereby attributing more influence to the underlying shocks themselves. Unexpectedly, the coefficients in the reduced model surpass those of the expanded model for the lagless regression.

In column (5), which represents the standard deviation indicating the disagreement among firms, the coefficients follow a nearly linear progression, as depicted in graph 3. Subsequently, after the third quarter of 2022, the coefficients demonstrate a more gradual increase. This pattern suggests that following the initial inflationary shocks, the disagreement among firms experienced a significant rise until the third quarter, after which it stabilized. This upward trajectory in disagreement aligns with our expectation type, consistent with the findings of Coibion and Gorodnichenko (2008) regarding consumer expectations and oil shocks. Notably, the coefficients observed in the reduced panel are noticeably smaller, showing a decline after the third quarter of 2022. This implies reduced disagreement among firms that have participated for an extended duration.

Table 2

Dependant variable: Expectations for change in inflation in a year	Standard	Reduced	Standard Lagless	Reduced Lagless	Std deviation	Std deviation reduced
	Panel	Panel	Panel	Panel	Panel	Panel
	(1)	(2)	(3)	(4)	(5)	(6)
Lag 1 month	0.47007	0.500981			0.349164	0.455564
	(0.00468)	(0.00534)			(0.00458)	(0.00511)
Lag 2 months	0.15744	0.177455			0.087906	0.064572
	(0.00464)	(0.00555)			(0.0038)	(0.00428)
Lag 3 months	0.05524	0.065724			-0.02747	-0.01497
	(0.00389)	(0.00467)			(0.00282)	(0.00302)
2021 9-12	0.24970	0.226728	0.505292	0.511793	0.190649	0.140762
	(0.016)	(0.017)	(0.0197)	(0.0221)	(0.00341)	(0.00344)
2022 q1	0.41763	0.383267	0.885317	0.901571	0.311146	0.29048
	(0.0205)	(0.0219)	(0.0251)	(0.0283)	(0.00457)	(0.00463)
2022 q2	0.70007	0.628425	1.488659	1.507337	0.424899	0.353188
	(0.0194)	(0.0208)	(0.0231)	(0.026)	(0.00484)	(0.00499)
2022 q3	0.76915	0.672733	1.975351	1.999352	0.539763	0.492872
	(0.019)	(0.0203)	(0.0211)	(0.0239)	(0.00558)	(0.00592)
2022 q4	0.55852	0.442876	1.838641	1.871366	0.557455	0.45206
	(0.0194)	(0.0209)	(0.0213)	(0.0241)	(0.0059)	(0.0062)
2023 1-2	0.59427	0.480681	1.877656	1.874048	0.566162	0.437343
	(0.0234)	(0.025)	(0.0268)	(0.0302)	(0.00672)	(0.0068)
Construction	0.255354	1.391424	0.49977	2.0071	0.066629	-0.02246
	(0.1578)	(0.3908)	(0.1952)	(0.5117)	(0.0326)	(0.0657)
Retail	0.483605	0.387367	1.607485	1.600654	-0.1407	-0.15363
	(0.1971)	(0.1912)	(0.2436)	(0.2502)	(0.0417)	(0.038)
Hotels	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Services	0.130837	0.194211	0.383562	0.738575	0.006312	-0.00474
	(0.0822)	(0.0985)	(0.1016)	(0.1289)	(0.0172)	(0.0195)
Medium sized	0.113125	-0.0101	0.157459	-0.10948		
	(0.0936)	(0.0331)	(0.1158)	(0.0433)		
Small sized	0.153252	-0.25603	0.283289	-0.52216		
	(0.0986)	(0.1172)	(0.122)	(0.1535)		
Constant	0.868092	0.288679	1.725	0.969238	0.49783	0.469543
	(0.3554)	(0.1066)	(0.4395)	(0.1394)	(0.0721)	(0.0219)
Observations	1430	653	1430	653	1475	658
R-squared	0.7358	0.737	0.5957	0.5491	0.8474	0.8685

Table 3

Dependant variable: Expectations for change in inflation in a 3 months	Standard Panel (1)	Reduced Panel (2)	Standard Lagless Panel (3)	Reduced Lagless Panel (4)	Std deviation Panel (5)	Std deviation reduced Panel (6)
Lag 1 month	0.34449	0.357515			0.173394	0.320892
	(0.00499)	(0.00565)			(0.00473)	(0.00534)
Lag 2 months	0.14504	0.174211			0.203943	0.205154
	(0.00498)	(0.00577)			(0.00442)	(0.0051)
Lag 3 months	0.05857	0.069383			0.049413	-0.03034
	(0.00457)	(0.00539)			(0.00408)	(0.00444)
2021 9-12	0.09826	0.087082	0.190292	0.198144	0.148704	0.110859
	(0.01040)	(0.0111)	(0.0115)	(0.0126)	(0.00393)	(0.00364)
2022 q1	0.18664	0.184556	0.311572	0.317378	0.081273	0.078134
	(0.01320)	(0.0142)	(0.0147)	(0.0161)	(0.00497)	(0.00453)
2022 q2	0.33127	0.305786	0.566852	0.566146	0.134351	0.111952
	(0.01230)	(0.0132)	(0.0135)	(0.0148)	(0.00463)	(0.00427)
2022 q3	0.35267	0.320338	0.702392	0.700729	0.2981	0.239374
	(0.01160)	(0.0125)	(0.0123)	(0.0135)	(0.00455)	(0.00422)
2022 q4	0.27848	0.234277	0.617839	0.612102	0.232158	0.202214
	(0.01180)	(0.0127)	(0.0124)	(0.0137)	(0.00482)	(0.00455)
2023 1-2	0.26850	0.228147	0.603364	0.582944	0.300622	0.222456
	(0.01440)	(0.0154)	(0.0154)	(0.017)	(0.00585)	(0.00547)
Construction	0.056648	0.29278	0.116771	0.393949	0.036038	0.010862
	-0.1095	(0.3083)	(0.122)	(0.3533)	(0.0379)	(0.0673)
Retail	0.157264	0.146681	0.311908	0.313864	-0.10258	-0.15611
	-0.1264	(0.1233)	(0.1408)	(0.1413)	(0.0483)	(0.0403)
Hotels	0	0	0	0	0	0
Services	0.048772	0.08031	0.093568	0.213355	-0.00205	-0.01459
	-0.0542	-0.0665	(0.0604)	(0.0762)	(0.0199)	(0.0207)
Medium sized	0.036864	0.007835	0.130468	0.010586		
	-0.0673	-0.0212	(0.0749)	(0.0243)		
Small sized	0.042989	-0.05948	0.140302	-0.16437		
	-0.0701	-0.0822	(0.0782)	(0.0942)		
Constant	0.705484	0.114507	1.155528	0.266209	0.216641	0.283779
	-0.2305	-0.0687	(0.2568)	-0.0788	-0.0834	-0.0228
Observations	1419	657	1419	657	1486	662
R-squared	0.5641	0.5494	0.4588	0.408	0.5197	0.584

Graph 2

Regression Coefficients Year Predictions
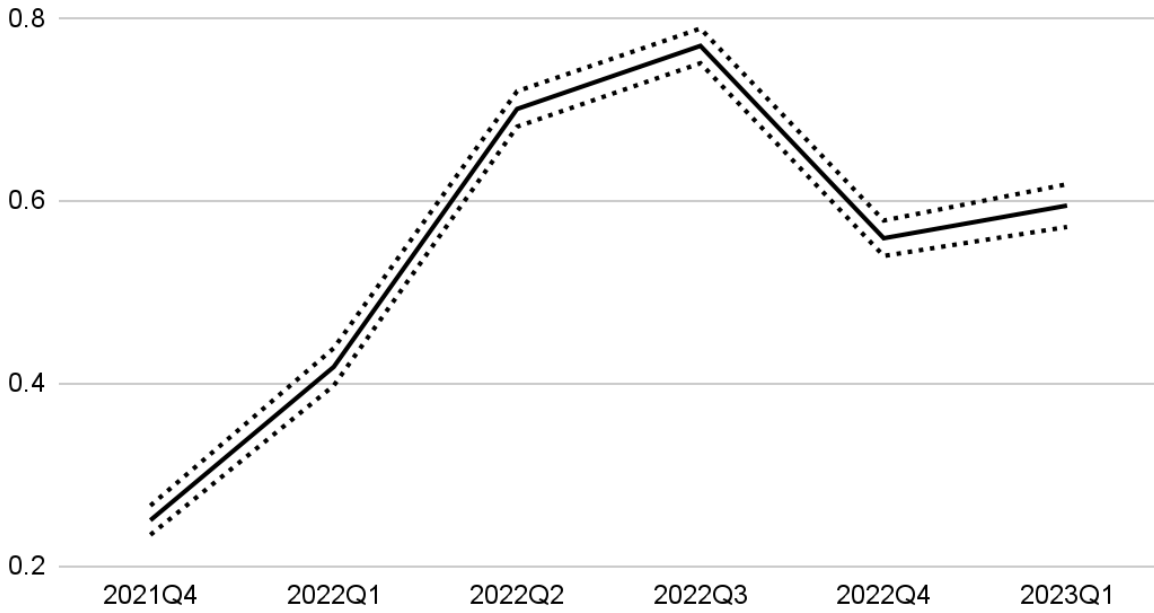
Graph 3

Year Expectations Standard Deviation
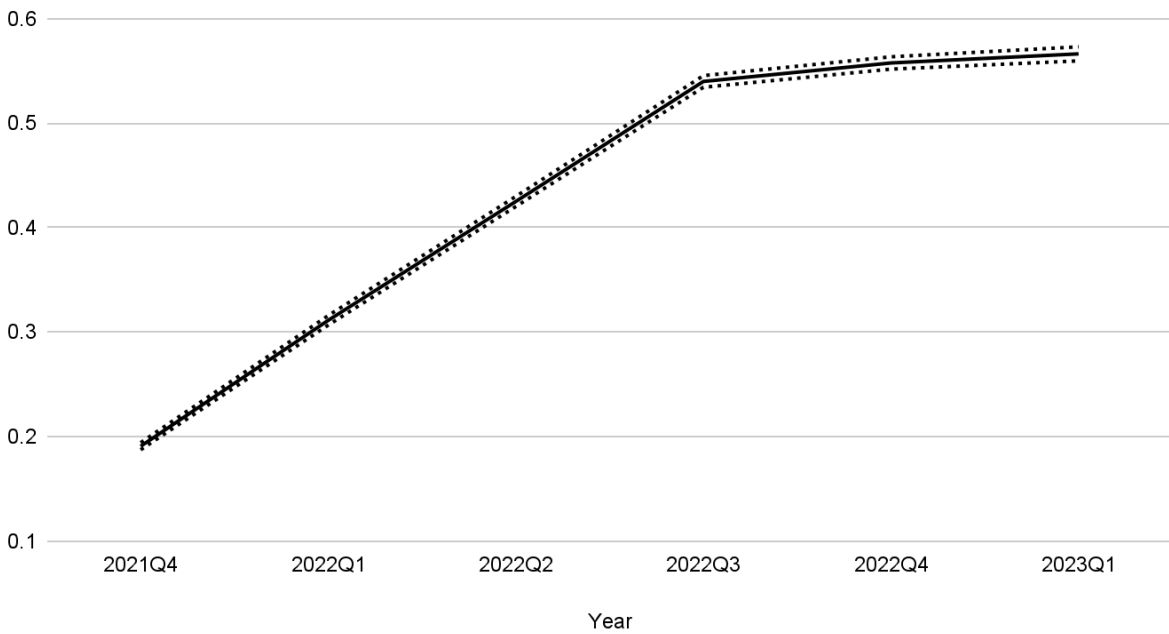
In terms of differences across sectors and size, in relation to the industrial sector in column (1) the other sectors' coefficients are higher, but only retail is statistically significant. It should be noted that there were difficulties receiving coefficients for the hotel industry with one way fixed effects, likely due to the small sample size, but there are coefficients for the OLS regression available in the appendix. In regards to size, neither the coefficients for small nor medium sized businesses are statistically significant.

Graph 4 shows both the expectation and standard deviation coefficients overlaid on top of eachother for column (1) and (5). We can see the similarities in the trend, with some type of turning point in the third quarter of 2023. For the expectations, the coefficient starts to fall and for the standard deviation the slope noticeably decreases.

Graph 4

Year Predictions VS Standard Deviation
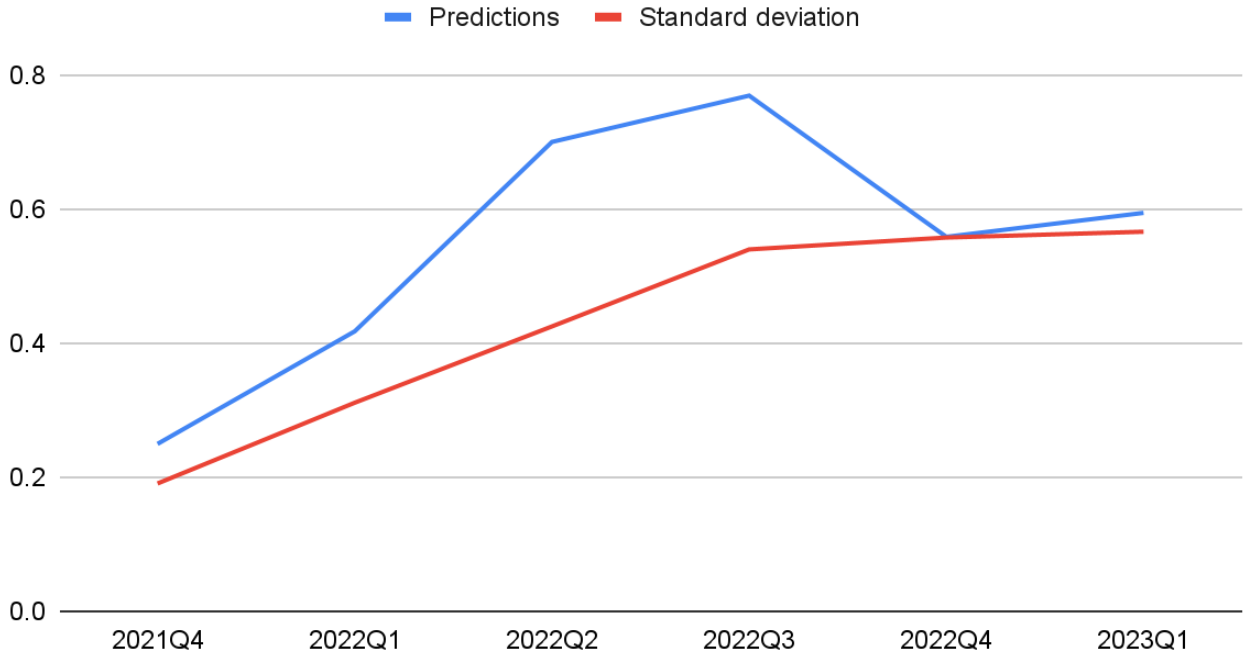
Graph 5

3 Month Expectations
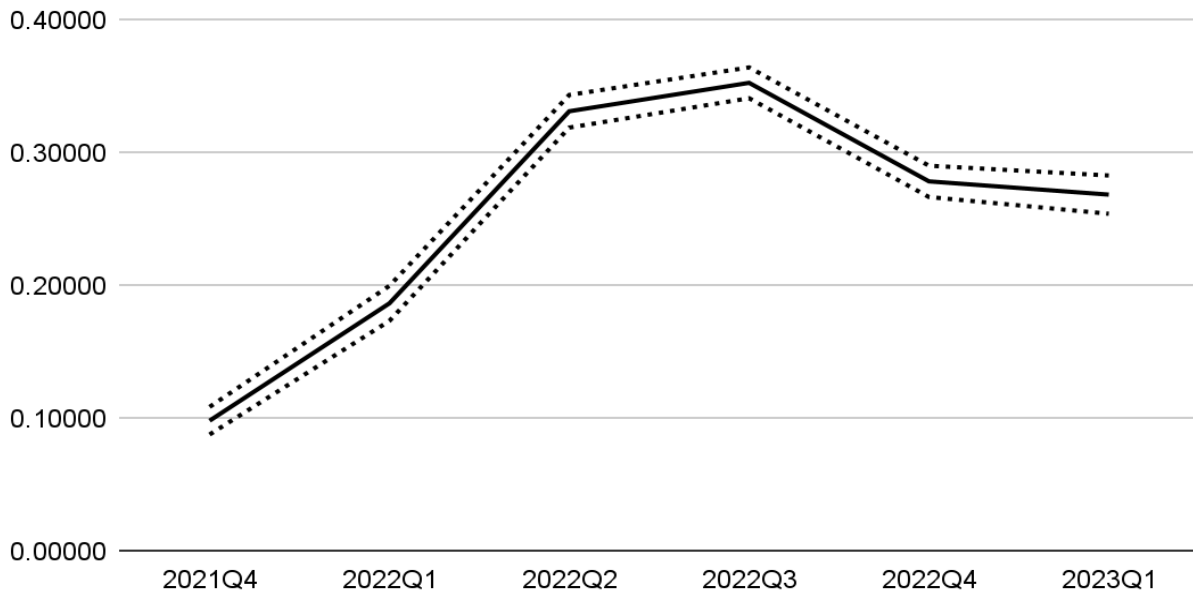
For the 3 month predictions in table 2 column (1) we receive a similar trend for the coefficients with a peak in the 3rd quarter of 2022, albeit comparatively modest, hovering around 0.35. This observation underscores the lower expected inflation for 3 months in relation to a year. Moreover we see smaller coefficients for the reduced panel and increased ones for the lagless regressions corroborating the results for the year predictions. Graph 5 shows a similar trend to graph 2, albeit a bit less steep of a curve demonstrating the visual similarities between the inflation shocks.

Conversely, the coefficients associated with the 3-month standard deviation, found in column (5), deviate from the relatively linear progression observed in the year expectations. Instead, they exhibit oscillations between quarters, as illustrated in graph 6. While a peak remains evident in the third quarter of 2022, a corresponding apex emerges in the first quarter of 2023. These divergences likely mirror the heightened uncertainty surrounding the short-term effects of inflationary shocks, in contrast to the more consistent and enduring alterations observed in long-term inflation trends.

Graph 6

Standard Deviation 3 Months

std 3 month
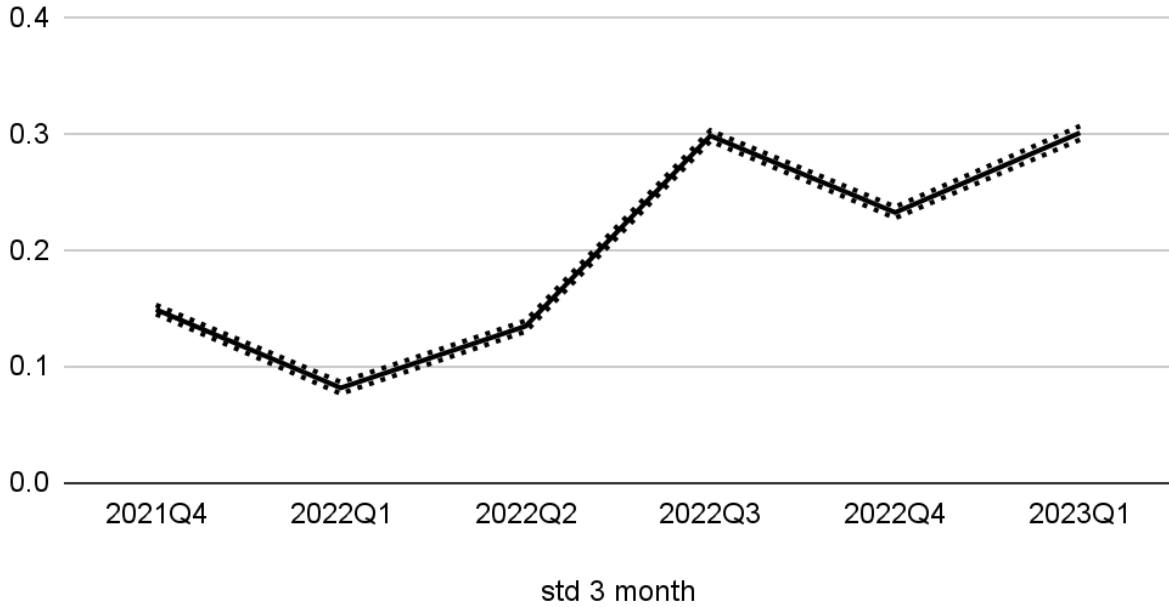
Regarding the 3-month expectations, we conducted a regression analysis on the error term, defined as the difference between the projected inflation rate in three months and the actual inflation rate in three months. Due to our sample being confined until February 2023, running the error regression on year-long inflation expectations for all requisite quarters was unfeasible. In terms of the results, we can see in table 4 column (1) that the inflation shock coefficients are all negative, meaning that firms consistently underestimated the 3 month inflation rate. Concerning the overarching patterns, graph 7 aligns with the expectation and standard deviation regressions, displaying a peak (or, in this instance, a valley due to the negative coefficients) in the third quarter of 2022, followed by a stabilization in subsequent quarters. Notably, the standard deviation for the coefficients increases significantly for the last quarter implying a high variance in the errors of the firms.Graph 8 superimposes all the three-month regressions, with the error regression's coefficients altered to positive values for clarity of interpretation.

Table 4.

Dependent Variable: Error value for three month predictions	Standard Panel (3)	Reduced Panel (3)	Standard Lagless Panel (3)	Reduced Lagless Panel (12)
Lag 1 month	0.716395	0.727533		
	(0.00412)	(0.00475)		
Lag 2 months	0.096629	0.108251		
	(0.00414)	(0.00487)		
Lag 3 months	-0.01075	-0.01536		
	(0.00282)	(0.00316)		
2021 9-12	-0.67108	-0.66292	-2.36762	-2.45069
	(-0.0151)	(0.0166)	(0.0208)	(0.0235)
2022 q1	-0.78762	-0.74208	-3.21928	-3.29223
	(-0.0199)	(0.0219)	(0.0266)	(0.0301)
2022 q2	-0.67348	-0.6361	-3.62001	-3.69307
	(0.02)	(0.0221)	(0.0245)	(0.0277)
2022 q3	-0.93318	-0.88003	-3.94651	-4.00862
	(0.0194)	(0.0214)	(0.0225)	(0.0254)
2022 q4	-0.6643	-0.61508	-3.99175	-4.05694
	(0.0206)	(0.0228)	(0.0227)	(0.0257)
2023 1-2	-0.66296	-0.61618	-3.7761	-3.85501
	(0.0292)	(0.0322)	(0.0397)	(0.0451)
Construction	0.219176	0.445608	0.447398	1.119982
	(0.132)	(0.2866)	(0.2065)	(0.4655)
Retail	0.071621	0.032897	0.07441	-0.00883
	(0.1651)	(0.1706)	(0.2583)	(0.2771)
Hotels	0	0	0	0
	(0)			
Services	0.046497	0.090738	0.04221	0.195189
	(0.0721)	(0.0922)	(0.1128)	(0.1498)
Medium sized	0.055461	-0.0044	0.198794	-0.03342
	(0.0827)	(0.028)	(0.1294)	(0.0455)
Small sized	0.083148	-0.02886	0.301714	-0.17006
	(0.0866)	(0.1074)	(0.1355)	(0.1745)
Constant	0.170353	-0.04926	0.439999	-0.15487
	(0.4161)	(0.0931)	(0.6509)	(0.1512)
Observations	1496	662	1496	662
R-squared	0.8977	0.9012	0.7496	0.7394

Graph 7

Error 3 Months
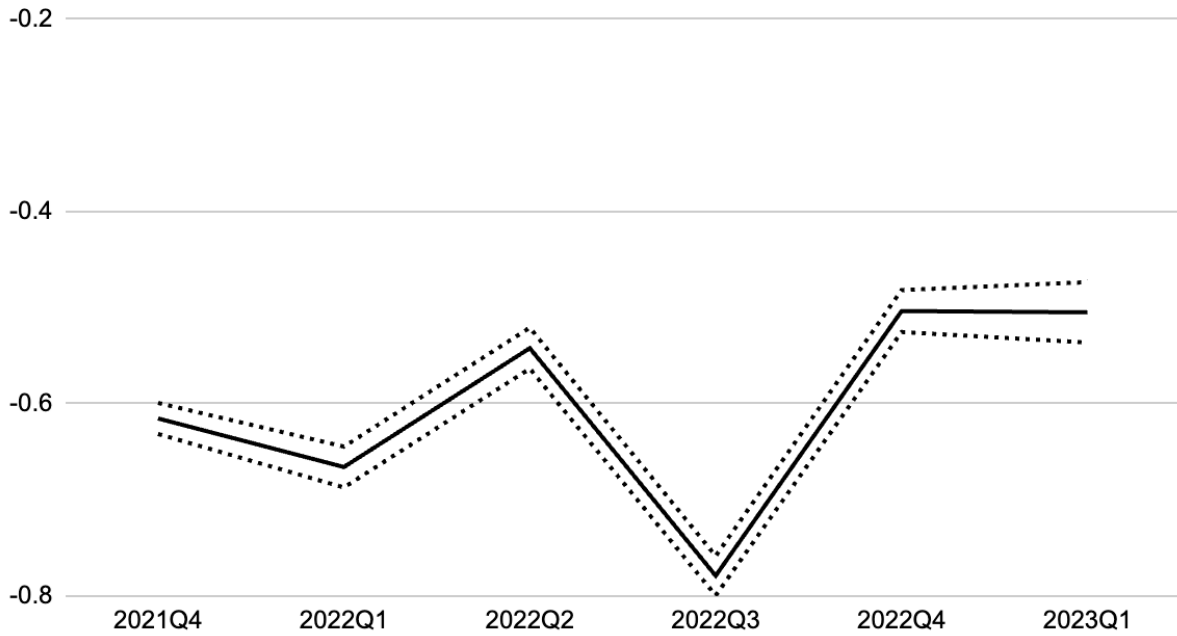
Graph 8

3 Month Predictions, Standard Deviation and Inverted Error
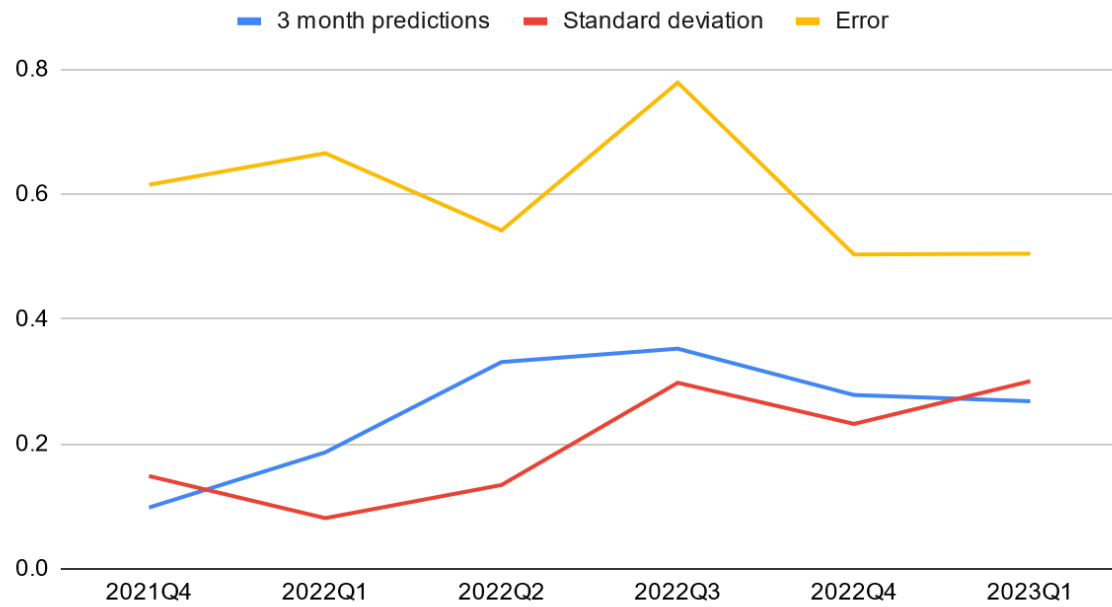
Table 5

Dependant variable: How do you expect prices/Employee level to change? (panel)	Standard	Lagless	Standard	Lagless
	Prices		Employee level	
	(1)	(2)	(3)	(4)
Lag 1 month	-0.03002		-0.02792	
	(0.00184)		(0.00186)	
Lag 2 months	-0.00888		-0.00797	
	(0.00183)		(0.00183)	
Lag 3 months	-0.00016		-0.0045	
	(0.00157)		(0.00159)	
2021 9-12	0.097821	0.095809	0.033274	0.032991
	(0.00668)	(0.0067)	(0.00739)	(0.00741)
2022 q1	0.170695	0.168666	0.065004	0.063907
	(0.00884)	(0.00886)	(0.0098)	(0.00982)
2022 q2	0.160826	0.158726	0.085982	0.084455
	(0.00779)	(0.00781)	(0.00864)	(0.00866)
2022 q3	0.092039	0.088819	0.044878	0.042035
	(0.00687)	(0.00689)	(0.00767)	(0.00769)
2022 q4	0.076362	0.07559	-0.00624	-0.00829
	(0.00689)	(0.00691)	(0.0077)	(0.00772)
2023 1-2	0.087364	0.088228	0.008124	0.006474
	(0.0086)	(0.00862)	(0.00962)	(0.00964)
Construction	-0.26252	-0.20678	-0.01662	0.009398
	(0.0569)	(0.057)	(0.058)	(0.0581)
Retail	0.140431	0.133579	-0.01349	-0.01443
	(0.0858)	(0.086)	(0.0868)	(0.087)
Hotels	0	0	0	0
Services	-0.15316	-0.10331	-0.0213	0.014971
	(0.0405)	(0.0406)	(0.0408)	(0.0409)
Medium sized	-0.00647	-0.03315	0.065113	-0.10054
	(0.0124)	(0.0245)	(0.0136)	(0.0247)
Small sized	0.026828	-0.02381	0.167765	-0.16613
	(0.0274)	(0.0275)	(0.0281)	(0.0282)
Constant	0.153113	0.038895	0.177674	0.144685
	(0.3755)	(0.3776)	(0.4346)	(0.4365)
Observations	2624	2624	2731	2731
R-squared	0.2637	0.2597	0.2923	0.2891

Table 5 shows us the regression from the additional questions we used. In column (1), focusing on the price change regression, a discernible trend emerges: while all inflation shock dummy coefficients exhibit positivity, the influence of these shocks on firms indicating their intent to raise prices within three months remains relatively modest when juxtaposed with the realized inflation rates. The highest coefficient is the first quarter of 2022 which only increased the chance of firms saying they would raise prices by a mere 17% while inflation was already above 4%. This discovery lends support to the findings of Coibin et al. (2019), underscoring a direct impact of expectations on firms' price decisions—although our analysis shows it to be small. This suggests that despite firms anticipating heightened prices, they generally did not perceive themselves as primary contributors to these inflationary dynamics. We also find statistically significant coefficients for both the construction and service industries, that in relation to the industrial industry, they were less likely to say they'll raise prices. This implies a concentration of price-raising firms within the industrial sector, while the construction and service industries exhibit a more restrained inclination to do so.

In terms of plans to change employment levels, the coefficients are all relatively small, and some statistically significant, implying little effect of the inflation shocks on firms employment level plans, potentially out of line with Coibin's findings. It's important to note, however, that the R squared is relatively low in these regressions, around 0.25, and in the appendix with the OLS regressions in table 7 they are even smaller at around 0.02 implying poor explanatory power for these regressions.

Conclusion

Our research adds novel data and findings to the nascent literature of firm expectations, specifically how they are affected by sudden inflation shocks. We use the quarters between September 2021 until February 2023 as dummies to test the effect of different periods during the inflation shock and find an immediate jump in both the 3 month and year long expectations of firms culminating in the third quarter of 2022 with a .35 rise for three months and .79 for year expectations. When switching the dependent variable to standard deviation as a proxy for disagreement, we find a nearly linear rise for the year expectations which flattens out after the third quarter of 2022. This is contrasted with the disagreement for the three month expectations which shows much more variance in the intensity of the coefficients. Running the regression on a

reduced sample of firms that had a minimum number of responses to expectations noticeably reduced the disagreement amongst the firms.

In addition to the aforementioned regressions that were run for both sets of expectations, we also performed a regression on the expectation errors for the three month expectations which also showed a peak in the third quarter of 2022 before falling.

Finally we run two regressions on survey questions asking firms if they plan to raise or reduce prices and employment for their firms for which we found a small but significant increase in the likelihood that firms plan to raise prices during episodes of inflationary shocks. Notably, these effects exhibited variations across sectors, signifying a nuanced response. Conversely, our scrutiny revealed no discernible alterations in anticipated employment changes in response to these shocks.

Our research offers valuable insights into the intricate connection between inflation shocks and firms' expectations. This holds significant relevance for policymakers and researchers alike, as it contributes to a deeper comprehension of the factors underlying firm-level inflation expectations—a pivotal element with the capacity to influence overall inflation dynamics. By delineating the characteristics of inflation expectations in the aftermath of inflation shocks, our study establishes a foundational understanding upon which further exploration can be built. This groundwork serves as a valuable resource for continued investigations seeking to unravel the complex interplay between economic shocks and firms' anticipatory responses, ultimately fostering a more nuanced comprehension of the broader economic landscape.

Bibliography

Bems, R., F. Caselli, F. Grigoli, and B. Gruss (2021): "Expectations' anchoring and inflation persistence," Journal of International Economics, 132, 103516.

Blanchard, O. (2022): "Why I worry about inflation, interest rates, and unemployment," Peterson Institute for International Economics, 03-14-2022.

Blanco, Julio and Ottonello, Pablo and Ranosova, Tereza, The Dynamics of Large Inflation Surges (October 2022). NBER Working Paper No. w30555, Available at SSRN: https://ssrn.com/abstract=4259479

Cagan, P. (1956): "The monetary dynamics of hyper-inflation," in Studies in the Quantity Theory of Money, ed. by M. Friedman. Chicago: University of Chicago Press.

Carl E. Walsh, 2022. "**Inflation Surges and Monetary Policy**," IMES Discussion Paper Series 22-E-12, Institute for Monetary and Economic Studies, Bank of Japan.

Carvalho, C., S. Eusepi, E. Moench, and B. Preston (2022): "Anchored Inflation Expectations," American Economic Journal: Macroeconomics.

Christiano, L., M. Eichenbaum, and C. Evans (2005): "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy," Journal of Political Economy, 113(1), pp. 1–45.

Cochrane, J. H. (2022): "Inflation Past, Present and Future: Fiscal Shocks, Fed Response, and Fiscal Limits," Working paper, National Bureau of Economic Research.

Coibion, Olivier, Yuriy Gorodnichenko, and Saten Kumar. (2018): "How Do Firms Form Their Expectations? New Survey Evidence." American Economic Review, 108 (9): 2671-2713.

Coibion, O., and Y. Gorodnichenko (2012): "What can survey forecasts tell us about information rigidities?," Journal of Political Economy, 120(1), 116–159.

Coibion, O., Gorodnichenko, Y., &, Ropele, T. (2023): "Inflation Expectations and Misallocation of Resources: Evidence from Italy," Working Paper 31190. DOI: 10.3386/w31190. Issue Date: April 2023.

Ibid. — (2015): "Information rigidity and the expectations formation process: A simple framework and new facts," American Economic Review, 105(8), 2644–2678.

Di Giovanni, J., S. Kalemli-Özcan, A. Silva, and M. A. Yildirim (2022): "Global Supply Chain Pressures, International Trade, and Inflation," Working paper, National Bureau of Economic Research.

Kumar, S., H. Afrouzi, O. Coibion, and Y. Gorodnichenko (2015): "Inflation Targeting Does Not Anchor Inflation Expectations: Evidence from Firms in New Zealand," Brookings Papers on Economic Activity.

Marcet, A., and J. P. Nicolini (2003): "Recurrent Hyperinflations and Learning," American Economic Review, 93(5), 1476–1498.

Pesaran, M. H., and M. Weale (2006): "Survey expectations," Handbook of Economic Forecasting, 1, 715–776.

Reis, R. (2022a): "The Burst of High Inflation in 2021–22: How and Why Did We Get Here?," in How Monetary Policy Got Behind the Curve—And How to Get it Back, ed. By M. Bordo, J. Cochrane, and J. Taylor. Hoover Institution Press.

Sargent, T. J., and N. Wallace (1981): "Some unpleasant monetarist arithmetic," Federal Reserve Bank of Minneapolis Quarterly Review, 5(3), 1–17.

Sébastien Charles & Jonathan Marie (2021) How Israel avoided hyperinflation. The success of its 1985 stabilization plan in the light of post-Keynesian theory, Review of International Political Economy, 28:3, 528-558,

Uribe, M., and S. Schmitt-Grohé (2017): Open economy macroeconomics. Princeton: Princeton University Press.

Appendix For The Dynamics of Firm Expectations after an Inflation Surge

Graph 1: Yearly Average Inflation Expectations

Yearly Inflation Expectations including Real

Legend: Industrial, Construction, Retail, Hotels, Services, All, Real

Table 1: Weighted Expectations for Change in Inflation in a Year

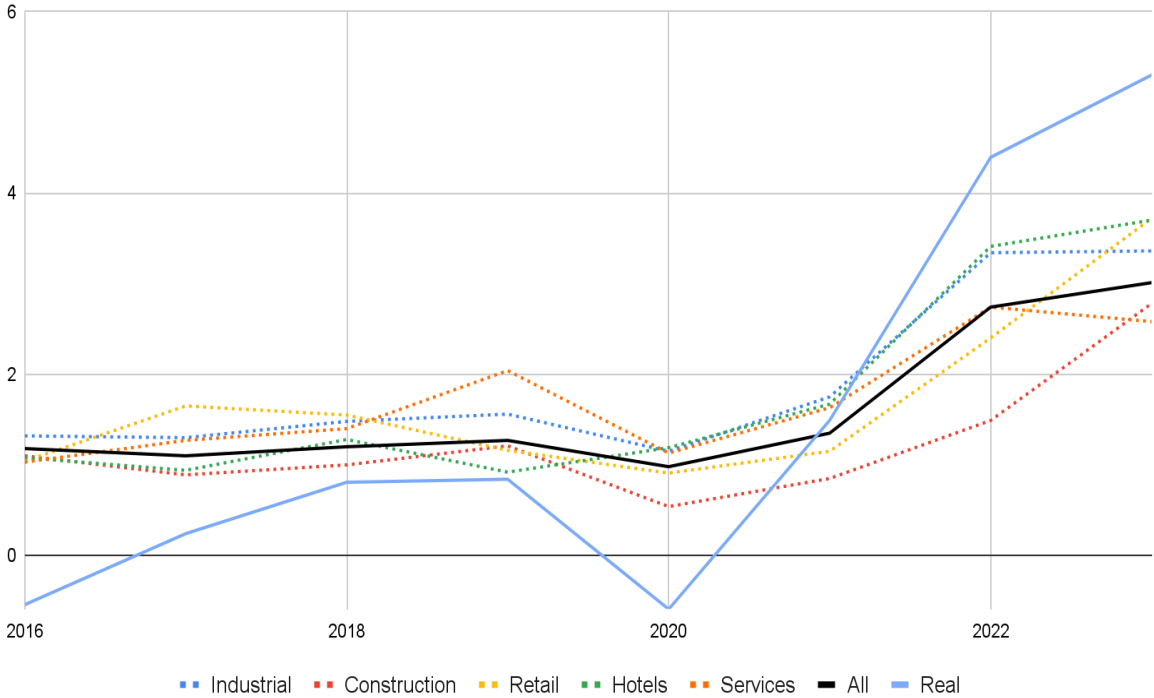| Dependant variable: Expectations for change in inflation in a year	Standard	Reduced	Standard Lagless	Reduced Lagless	Std deviation
	Weighted	Weighted	Weighted	Weighted	Weighted
	(1)	(2)	(3)	(4)	(5)
Lag 1 month	0.54517	0.46336			0.49376
	(0.00424)	(0.00535)			(0.0045)
Lag 2 months	0.26533	0.2482			0.10267
	(0.00451)	(0.00561)			(0.00464)
Lag 3 months	0.0787	0.12808			0.02269
	(0.00382)	(0.005)			(0.00383)
2021 9-12	0.17827	0.2453	0.36653	0.59778	0.86621
	(0.01783)	(0.02057)	(0.02842)	(0.03047)	(0.0334)
2022 q1	0.14827	0.07799	0.54048	0.75391	0.91103
	(0.0223)	(0.02654)	(0.03552)	(0.03912)	(0.04344)
2022 q2	0.26865	0.28799	0.83946	0.96767	0.83929
	(0.02223)	(0.02595)	(0.03531)	(0.03822)	(0.04073)
2022 q3	0.47252	0.56714	1.81832	1.88053	1.38688
	(0.02174)	(0.02459)	(0.03354)	(0.03498)	(0.03801)
2022 q4	0.21663	0.26674	1.79288	1.61991	1.91854
	(0.02226)	(0.02561)	(0.03407)	(0.03653)	(0.03887)
2023 1-2	0.31749	0.39225	1.49535	1.32057	1.28573
	(0.02668)	(0.03037)	(0.04194)	(0.04461)	(0.04943)
Construction	-0.13836	-0.14436	-0.7296	-0.62984	0.83193
	(0.01604)	(0.01665)	(0.02532)	(0.02448)	(0.02717)
Retail	-0.04599	-0.12647	-0.23999	-0.4597	-0.14384
	(0.01848)	(0.02052)	(0.02948)	(0.03042)	(0.02212)
Hotels	-0.04638	-0.02309	-0.13198	-0.01659	-0.63098
	(0.03933)	(0.04453)	(0.0628)	(0.06623)	(0.0389)
Services	-0.02018	-0.03871	-0.11007	-0.11501	1.30385
	(0.01304)	(0.01318)	(0.02081)	(0.01959)	(0.02282)
Medium sized	0.00404	0.02366	0.08483	0.11579	
	(0.02122)	(0.01885)	(0.03388)	(0.02802)	
Small sized	0.03675	0.0268	0.24596	0.15226	
	(0.0205)	(0.01857)	(0.0327)	(0.02761)	
Constant	0.14319	0.23024	1.33453	1.35723	1.05767
	(0.02171)	(0.01967)	(0.03374)	(0.02791)	(0.01888)
Observations	41987	31562	41987	31562	43578
R-squared	0.6726	0.63	0.1653	0.1816	0.7176

Table 2: Weighted Expectations for Change in Inflation in 3 Months

Dependant variable: Expectations for change in inflation in a 3 months	Standard	Reduced	Standard Lagless	Reduced Lagless	Standard Deviation	Std Deviation Reduced
	Weighted	Weighted	Weighted	Weighted	Weighted	Weighted
	(1)	(2)	(3)	(4)	(5)	(6)
Lag 1 month	0.41314	0.37079			0.29441	0.33157
	(0.00483)	-0.00571			(0.00467)	(0.00527)
Lag 2 months	0.16980	0.22159			0.14022	0.21143
	(0.00480)	-0.00594			(0.00475)	(0.00505)
Lag 3 months	0.14642	0.14825			0.08887	-0.02378
	(0.00446)	-0.00555			(0.00441)	(0.00438)
2021 9-12	0.14161	0.10744	0.29274	0.24262	0.6976	0.10911
	(0.01172)	-0.01369	-0.01459	(0.01693)	(0.02247)	(0.00358)
2022 q1	0.10144	0.05132	0.30028	0.22074	0.13813	0.07763
	(0.01453)	-0.01768	-0.01809	(0.02186)	(0.02949)	(0.00446)
2022 q2	0.22841	0.1777	0.4882	0.36048	0.28937	0.11062
	(0.01469)	-0.01742	-0.01822	(0.02154)	(0.02692)	(0.00421)
2022 q3	0.33759	0.24398	0.78305	0.6228	0.79059	0.23492
	(0.01374)	-0.01617	-0.01674	(0.01967)	(0.02467)	(0.00416)
2022 q4	0.20692	0.09348	0.71855	0.46876	0.90704	0.19519
	(0.01418)	-0.01691	-0.01717	(0.02062)	(0.02502)	(0.00448)
2023 1-2	0.10335	0.08831	0.57916	0.37902	0.75843	0.21526
	(0.01721)	-0.02045	-0.02112	(0.02518)	(0.03232)	(0.0054)
Construction	-0.10149	-0.08115	-0.31976	-0.25677	0.37069	-0.00605
	-0.01052	-0.01133	-0.01302	(0.01396)	(0.01774)	(0.00276)
Retail	-0.03536	-0.06012	-0.15906	-0.20844	-0.31531	-0.06592
	-0.01217	-0.01431	-0.01517	(0.0177)	(0.01546)	(0.00242)
Hotels	0.04839	-0.00526	0.12938	0.02998	-0.39861	-0.03042
	-0.02549	-0.03178	-0.03186	(0.03945)	(0.02605)	(0.00425)
Services	-0.05607	-0.02619	-0.20234	-0.0812	0.51823	0.01137
	-0.00853	-0.00906	-0.01059	(0.01123)	(0.0129)	(0.00174)
Medium sized	0.01667	0.01379	0.07345	0.04818		
	-0.01396	-0.01321	-0.01744	(0.01639)		
Small sized	0.04507	0.02948	0.15721	0.08696		
	-0.0135	-0.01302	-0.01685	(0.01616)		
Constant	0.12637	0.13079	0.50978	0.50808	0.82982	0.23223
	-0.0142	-0.01356	-0.01744	-0.0164	-0.01362	-0.00334
Observations	39329	29642	39329	29642	43906	33473
R-squared	0.443	0.3998	0.1292	0.0752	0.4735	0.5792

Table 3: Weighted Error Value for 3 Month Predictions

Dependent Variable: Error value for three month predictions	Standard	Reduced	Standard Lagless	Reduced Lagless
	Weighted	Weighted	Weighted	Weighted
	(1)	(2)	(3)	(4)
Lag 1 month	0.67591	0.6213		
	(0.0041)	(0.00522)		
Lag 2 months	0.11141	0.17482		
	(0.00391)	(0.00531)		
Lag 3 months	0.00949	0.02026		
	(0.00266)	(0.00363)		
2021 9-12	-0.65687	-0.63886	-2.46811	-2.46352
	(0.01569)	(0.0182)	(0.02029)	(0.02355)
2022 q1	-0.89752	-0.88497	-3.37069	-3.38619
	(0.01997)	(0.02418)	(0.02515)	(0.03098)
2022 q2	-0.74407	-0.71052	-3.79927	-3.88111
	(0.02181)	(0.02599)	(0.02577)	(0.03073)
2022 q3	-0.98305	-0.95237	-4.00699	-4.07325
	(0.02093)	(0.02483)	(0.0239)	(0.02817)
2022 q4	-0.69246	-0.67616	-3.97946	-4.18159
	(0.02211)	(0.027)	(0.02452)	(0.02969)
2023 1-2	-0.66658	-0.60622	-3.81979	-4.03599
	(0.03253)	(0.03901)	(0.0435)	(0.05158)
Construction	-0.04936	-0.07971	-0.21656	-0.25731
	(0.01175)	(0.01294)	(0.01754)	(0.01937)
Retail	-0.01391	-0.03051	-0.12856	-0.19199
	(0.01374)	(0.01681)	(0.02054)	(0.02519)
Hotels	0.05508	0.01807	0.1105	0.08481
	(0.02973)	(0.03718)	(0.04447)	(0.05579)
Services	-0.03772	-0.0209	-0.18096	-0.0728
	(0.00965)	(0.01035)	(0.0144)	(0.01552)
Medium sized	0.01785	0.01279	0.05972	0.05726
	(0.01621)	(0.01541)	(0.02424)	(0.02312)
Small sized	0.03324	0.01583	0.11684	0.03218
	(0.01563)	(0.01511)	(0.02337)	(0.02266)
Constant	-0.04756	-0.04427	-0.02074	-0.04372
	(0.0161)	(0.01526)	(0.02409)	(0.02289)
Observations	43536	32104	43536	32104
R-squared	0.8599	0.8605	0.6864	0.6858

Table 4: Weighted Expected Change in Prices/Employee Level

Dependant variable: How do you expect prices/Employee level to change?	Standard	Lagless	Standard	Lagless
	Prices		Employee Level	
	(1)	(2)	(3)	(4)
Lag 1 month	-0.0104		-0.00376	
	(0.00166)		(0.00135)	
Lag 2 months	-0.0017		-0.00127	
	(0.00175)		(0.00141)	
Lag 3 months	0.00143		-0.00715	
	(0.00142)		(0.00124)	
2021 9-12	0.13191	0.12859	0.05022	0.05072
	(0.00714)	(0.00713)	(0.00725)	(0.00726)
2022 q1	0.21452	0.21046	0.09037	0.08995
	(0.01028)	(0.01028)	(0.01052)	(0.01052)
2022 q2	0.19904	0.19402	0.06243	0.06059
	(0.00938)	(0.00936)	(0.00953)	(0.00953)
2022 q3	0.13685	0.13544	-0.01114	-0.01173
	(0.00806)	(0.00806)	(0.00835)	(0.00836)
2022 q4	0.15239	0.15148	-0.0304	-0.03038
	(0.00719)	(0.0072)	(0.00753)	(0.00754)
2023 1-2	0.12685	0.12688	0.05164	0.05297
	(0.00948)	(0.00949)	(0.00989)	(0.00989)
Construction	-0.00182	0.0126	-0.00504	0.00137
	(0.0059)	(0.00564)	(0.0058)	(0.00578)
Retail	0.01927	0.00765	-0.02574	-0.01091
	(0.00598)	(0.00583)	(0.00617)	(0.00603)
Hotels	-0.04695	-0.0413	-0.0961	-0.0874
	(0.01786)	(0.01786)	(0.01905)	(0.01905)
Services	-0.0024	0.00934	0.08773	0.09407
	(0.00509)	(0.0049)	(0.00506)	(0.00503)
Medium sized	0.01547	0.01331	-0.08109	-0.0828
	(0.01103)	(0.01104)	(0.01176)	(0.01177)
Small sized	-0.02755	-0.02903	-0.09058	-0.09026
	(0.01058)	(0.01058)	(0.01129)	(0.0113)
Constant	0.02138	-0.00872	0.10463	0.06869
	(0.01154)	(0.01092)	(0.01207)	(0.01163)
Observations	83208	83208	90565	90565
R-squared	0.0229	0.022	0.0154	0.014

Table 5: Unweighted Expectations for Change in Inflation in a Year

Dependant variable: Expectations for change in inflation in a year	Standard	Reduced	Standard Lagless	Reduced Lagless	Std Deviation	Std Deviation Reduced
	Unweighted	Unweighted	Unweighted	Unweighted	Unweighted	Unweighted
	(1)	(2)	(3)	(4)	(5)	(6)
Lag 1 month	0.57290	0.56212			0.37973	0.46775
	(0.00437)	(0.00515)			(0.00444)	(0.00504)
Lag 2 months	0.20855	0.21205			0.09571	0.0682
	(0.00461)	(0.00552)			(0.00373)	(0.00425)
Lag 3 months	0.08167	0.0948			-0.02405	-0.01123
	(0.00376)	(0.00459)			(0.00267)	(0.00298)
2021 9-12	0.17676	0.18472	0.5036	0.52753	0.19018	0.1398
	(0.01577)	(0.01696)	(0.02523)	(0.02737)	(0.00329)	(0.00339)
2022 q1	0.29393	0.30365	0.88905	0.92552	0.30392	0.28657
	(0.02031)	(0.02179)	(0.03238)	(0.03504)	(0.00444)	(0.00457)
2022 q2	0.49283	0.48501	1.82276	1.48233	0.4106	0.34581
	(0.01893)	(0.02041)	(0.02688)	(0.03225)	(0.0047)	(0.00492)
2022 q3	0.45289	0.45754	1.46045	1.96072	0.51308	0.47953
	(0.01781)	(0.01945)	(0.02974)	(0.02956)	(0.00539)	(0.00583)
2022 q4	0.22295	0.19663	1.9348	1.82546	0.52752	0.4364
	(0.0179)	(0.01977)	(0.02699)	(0.02976)	(0.00566)	(0.00609)
2023 1-2	0.26459	0.24833	1.85655	1.83637	0.53442	0.42181
	(0.02213)	(0.02415)	(0.03408)	(0.03741)	(0.00644)	(0.00669)
Construction	-0.03555	-0.04205	-0.19057	-0.22332	0.06624	-0.0002203
	(0.0122)	(0.01389)	(0.01956)	(0.02247)	(0.00247)	(0.00262)
Retail	-0.01289	-0.00809	-0.09533	-0.07832	-0.08571	-0.0955
	(0.01037)	(0.01134)	(0.01664)	(0.01838)	(0.00221)	(0.00241)
Hotels	0.00221	0.01931	-0.00023971	0.12676	-0.08005	-0.084
	(0.01777)	(0.02069)	(0.02852)	(0.03353)	(0.00365)	(0.00408)
Services	-0.00271	0.00696	-0.0365	0.01635	0.00058754	0.00563
	(0.00792)	(0.00858)	(0.01271)	(0.01391)	(0.00157)	(0.00163)
Medium sized	0.00258	0.01513	0.04552	0.07225		
	(0.00801)	(0.00928)	(0.01286)	(0.01503)		
Small sized	0.0245	0.03236	0.18911	0.22081		
	(0.01311)	(0.01645)	(0.02101)	(0.02663)		
Constant	0.14737	0.14123	1.1761	1.16398	0.52665	0.42421
	(0.0076)	(0.00819)	(0.01019)	(0.01089)	(0.00504)	(0.00507)
Observations	41987	31562	41987	31562	44517	33240
R-squared	0.7096	0.7235	0.2516	0.2734	0.8426	0.8668

Table 6: Unweighted Expectations for Change in Inflation in 3 Months

Dependant variable: Expectations for change in inflation in a 3 months	Standard	Reduced	Standard Lagless	Reduced Lagless	Standard Deviation
	Unweighted	Unweighted	Unweighted	Unweighted	Unweighted
	(1)	(2)	(3)	(4)	(5)
Lag 1 month	0.44647	0.42802			0.20584
	(0.00475)	(0.00550)			(0.00461)
Lag 2 months	0.20740	0.22526			0.2204
	(0.00488)	(0.00573)			(0.00434)
Lag 3 months	0.11599	0.12374			0.0515
	(0.00442)	(0.00528)			(0.00394)
2021 9-12	0.06969	0.05644	0.21266	0.20408	0.14917
	(0.01025)	(0.01113)	(0.01359)	(0.01481)	(-0.0038)
2022 q1	0.15190	0.15119	0.34433	0.33265	0.08232
	(0.01316)	(0.01420)	(0.01744)	(0.0189)	(-0.00483)
2022 q2	0.25141	0.23529	0.58956	0.56549	0.13405
	(0.01218)	(0.01317)	(0.01599)	(0.01736)	(-0.0045)
2022 q3	0.22610	0.21474	0.72219	0.69234	0.28765
	(0.01121)	(0.01226)	(0.01442)	(0.01584)	(-0.00441)
2022 q4	0.15140	0.1177	0.64033	0.59438	0.2178
	(0.01125)	(0.01243)	(0.01445)	(0.01603)	(-0.00463)
2023 1-2	0.14295	0.12279	0.61342	0.57026	0.28247
	(0.01392)	(0.01524)	(0.01815)	(0.01996)	(-0.00561)
Construction	-0.02151	-0.0203	-0.06461	-0.06862	0.04335
	(0.00807)	(0.00926)	(0.01073)	(0.01236)	(-0.00283)
Retail	-0.01138	-0.01009	-0.04722	-0.0444	-0.0472
	(0.00692)	(0.00760)	(0.00920)	(0.01015)	(-0.00243)
Hotels	0.01641	0.01847	0.05526	0.06853	-0.01999
	(0.01184)	(0.01409)	(0.01574)	(0.01883)	(-0.00415)
Services	-0.0026	-0.00050961	-0.00767	0.00318	-0.00403
	(0.00527)	(0.00576)	(0.00702)	(0.00769)	(-0.00181)
Medium sized	0.0119	0.01451	0.04159	0.04655	
	(0.00530)	(0.00618)	(0.00704)	(0.00825)	
Small sized	0.03024	0.03534	0.14307	0.1188	
	(0.00859)	(0.01074)	(0.01139)	(0.01433)	
Constant	0.08473	0.08491	0.40804	0.41122	0.27938
	(0.00470)	(0.00507)	(0.00570)	(0.00610)	(0.00348)
Observations	39329	29642	39329	29642	44875
R-squared	0.517	0.5194	0.1451	0.1416	0.5028

Table 7: Unweighted Error Value for 3 Month Predictions

Dependent Variable: Error value for three month predictions	Standard	Reduced	Standard Lagless	Reduced Lagless
	Unweighted	Unweighted	Unweighted	Unweighted
	(1)	(2)	(3)	(4)
Lag 1 month	0.7419	0.74424		
	(0.00395)	(0.00466)		
Lag 2 months	0.10498	0.11241		
	(0.00406)	(0.00483)		
Lag 3 months	-0.00161	-0.00685		
	(0.00269)	(0.0031)		
2021 9-12	-0.62097	-0.61525	-2.50427	-2.48049
	(0.01447)	(0.01615)	(0.02172)	(0.02449)
2022 q1	-0.69191	-0.66579	-3.33878	-3.31572
	(0.01909)	(0.02126)	(0.02801)	(0.03133)
2022 q2	-0.54999	-0.54214	-4.08116	-3.71497
	(0.01901)	(0.0213)	(0.02342)	(0.02892)
2022 q3	-0.80534	-0.77888	-3.716	-4.02952
	(0.01819)	(0.02055)	(0.02579)	(0.02652)
2022 q4	-0.5107	-0.50354	-4.03979	-4.09744
	(0.01913)	(0.0218)	(0.02346)	(0.02674)
2023 1-2	-0.49417	-0.50488	-3.85104	-3.89684
	(0.02793)	(0.03143)	(0.04191)	(0.04741)
Construction	0.00537	-0.00647	-0.01923	-0.07175
	(0.0099)	(0.0118)	(0.01678)	(0.02027)
Retail	-0.00418	-0.00554	-0.0316	-0.03984
	(0.00855)	(0.00973)	(0.01449)	(0.01672)
Hotels	0.01698	0.01359	0.08301	0.10912
	(0.01486)	(0.01806)	(0.02518)	(0.03103)
Services	-0.00065168	0.00255	0.00073066	0.01062
	(0.00649)	(0.00729)	(0.011)	(0.01253)
Medium sized	0.0093	0.01124	0.03056	0.03719
	(0.00655)	(0.00791)	(0.01111)	(0.01359)
Small sized	0.01543	0.01173	0.08712	0.0593
	(0.01035)	(0.01363)	(0.01754)	(0.02343)
Constant	-0.0586	-0.06021	-0.11069	-0.12619
	(0.00522)	(0.00571)	(0.00882)	(0.00978)
Observations	43536	32104	43536	32104
R-squared	0.8931	0.8994	0.6928	0.7028

Table 8: Unweighted Expected Change in Prices/Employee Level

Dependant variable: How do you expect prices/Employee level to change?	Standard	Lagless	Standard	Lagless
	Prices		Employee Level	
	(1)	(2)	(3)	(4)
Lag 1 month	-0.0228		-0.02641	
	(0.00188)		(0.0019)	
Lag 2 months	-0.00387		-0.00541	
	(0.00198)		(0.00199)	
Lag 3 months	0.00306		-0.00313	
	(0.00167)		(0.00172)	
2021 9-12	0.1018	0.09973	0.0432	0.04314
	(0.00731)	(0.00732)	(0.00823)	(0.00827)
2022 q1	0.17663	0.174	0.07269	0.06988
	(0.00976)	(0.00978)	(0.01101)	(0.01106)
2022 q2	0.17232	0.09189	0.1065	0.01388
	(0.00859)	(0.0074)	(0.00971)	(0.00844)
2022 q3	0.10402	0.16998	0.06637	0.10552
	(0.00749)	(0.00861)	(0.0085)	(0.00975)
2022 q4	0.09207	0.10164	0.01311	0.06571
	(0.00738)	(0.0075)	(0.0084)	(0.00854)
2023 1-2	0.10484	0.10504	0.03213	0.03309
	(0.00933)	(0.00935)	(0.01063)	(0.01068)
Construction	-0.01331	0.01847	0.03428	0.06047
	(0.00492)	(0.00457)	(0.00522)	(0.00516)
Retail	-0.01394	-0.0185	-0.03058	0.00643
	(0.0047)	(0.0047)	(0.00555)	(0.00541)
Hotels	-0.00713	-0.002	-0.05705	-0.04704
	(0.00859)	(0.0086)	(0.00997)	(0.01)
Services	-0.02079	-0.00034857	0.09053	0.10614
	(0.00387)	(0.00369)	(0.0042)	(0.00418)
Medium sized	-0.00661	-0.00831	-0.08749	-0.09152
	(0.00352)	(0.00353)	(0.00398)	(0.00399)
Small sized	-0.02233	-0.02619	-0.08833	-0.09207
	(0.00416)	(0.00416)	(0.00458)	(0.0046)
Constant	0.0748	0.00563	0.15013	0.04768
	(0.00513)	(0.00308)	(0.00516)	(0.00351)
Observations	83208	83208	90565	90565
R-squared	0.018	0.0144	0.0272	0.0186