

Firms' Price, Cost and Activity Expectations: Evidence from Micro Data

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The views expressed in this paper are solely those of the authors and should not be taken to represent the views of the Bank of England (or any of its committees) or Barclays. Tomasz's analytical contribution was completed while employed at the Bank of England.

The data on individual firms used in our paper are proprietary and are obtained under licence from the Confederation of British Industry (CBI). The licensing contract permits Bank of England staff to use the data for research purposes.

This work also contains statistical data from ONS which are Crown Copyright. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

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The CBI Industrial Trends Survey

- Business Surveys were first set up in Germany in 1948
- The CBI set up its Industrial Trends survey in 1958 It asks a range of retrospective and prospective questions to which qualitative answers are provided- e.g. What has been the trend over the last three months with regard to the volume of employment? Answers are trichotomous- Up, No change or Down.
- NIESR carried out a substantial programme of work on these microdata (e.g. Mitchell, Smith and Weale, EJ 2005, Pesaran and Weale North Holland Volume 2006, Lui Mitchell and Weale JRSS 2011, and Mitchell, Smith, and Weale, JAE 2013
- In 2008 the survey was extended to ask for quantitative information about wage and price changes

The Focus of this Paper

- Examine both qualitative and quantitative expectations data, looking at influences on expectations and relationship between expectations and outturns.
- Focus on:
 1. Past and expected future increase in volume of new orders. (Q)
 2. Past and expected future increase in employment. (Q)
 3. Past and expected future increase in unit costs.(Q)
 4. Past and expected future increase in industry price.
 5. Past and expected future increase in own price.
 6. Past and expected future increase in own wage rates.

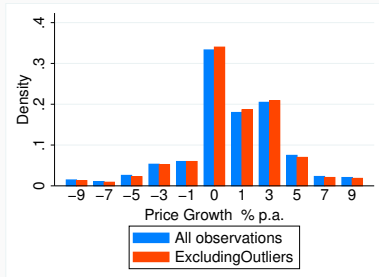
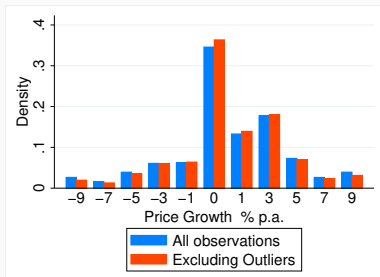
Q indicates qualitative response.

Correlations- Polychoric and Polyserial where Relevant

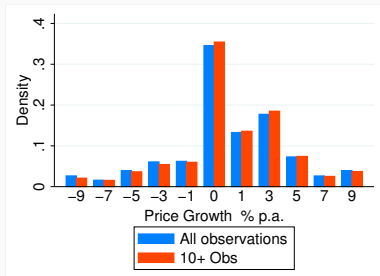
	Exp. price growth	Exp. wage growth	Exp. cost growth	Exp. empl. growth	Exp. orders growth
Variable type	C	C	Q	Q	Q
Exp. wage growth	0.25				
Exp. cost growth	0.35	0.12			
Exp. empl. Growth	0.19	0.32	0.03		
Exp. orders growth	0.14	0.23	-0.02	0.47	
Past price growth	0.58	0.2	0.24	0.14	0.06
Past wage growth	0.13	0.53	0.03	0.16	0.1
Past cost growth	0.33	0.12	0.61	0	-0.01
Past empl. Growth	0.19	0.3	0.07	0.37	0.24
Past orders growth	0.2	0.29	0	0.4	0.43
Rate of operation	0.09	0.19	0.02	0.17	0.12

	Past price growth	Past wage growth	Past cost growth	Past empl. growth	Past orders growth
Variable type	C	C	Q	Q	Q
Past wage growth	0.2				
Past cost rise	0.31	0.05			
Past employment rise	0.15	0.26	0.06		
Past orders rise	0.13	0.16	-0.04	0.49	
Rate of operation (C)	0.09	0.19	0.01	0.26	0.32

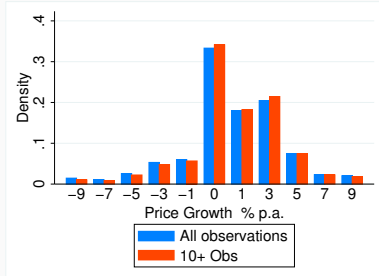
The Distribution of Past and Expected Price Changes



Past Price Growth



Expected Price Growth



Past Price Growth

Expected Price Growth

Macro and Micro Determinants of Price and Wage Expectations

	Exp. Price Growth	Exp. Price Growth	Exp. Price Growth	Exp. wage growth	Exp. wage growth	Exp. wage growth
Output price growth (2-digit)	0.007 (0.22)		0.000 (0.08)	-0.018 (-1.30)		-0.000 (-0.12)
IR inflation forecast	0.253 (1.37)		0.010 (0.19)	-0.090 (-1.02)		-0.004 (-0.15)
IR GDP forecast	0.588** (3.42)		0.166 (0.78)	0.449** (4.91)		0.374** (5.11)
CPI inflation (whole economy)	0.217 (1.24)		0.024 (0.27)	0.332** (3.84)		0.103** (3.13)
AWE wage growth	0.041 (0.62)		-0.000 (-0.02)	0.113** (3.27)		0.020 (0.55)
Unemployment rate	-0.134 (-0.75)		-0.014 (-0.19)	-0.102 (-1.26)		0.002 (0.09)
Import price growth	0.053 (1.72)		0.060** (2.74)	-0.028 (-1.87)		-0.000 (-0.13)
Past orders rise		0.507** (2.85)	0.085 (0.44)		0.460** (4.92)	0.329** (3.09)
Past orders unchanged		0.414** (2.67)	0.045 (0.34)		0.202** (2.60)	0.058 (0.59)
Past employment rise		0.520* (2.43)	0.195 (0.79)		0.468** (4.08)	0.394* (2.56)
Past employment unchanged		0.230 (1.24)	0.019 (0.21)		0.231* (2.50)	0.169 (1.18)
Past cost rise		1.987** (6.43)	1.729** (7.47)		0.415** (3.61)	0.035 (0.42)
Past cost unchanged		1.004** (3.66)	0.984** (4.73)		0.194 (1.80)	0.006 (0.14)
Rate of operation		0.023** (3.30)	0.028** (5.20)		0.010** (3.67)	0.010** (3.43)
Constant	-0.490 (-0.45)	-2.562** (-4.36)	-3.530 (-1.54)	0.883 (1.65)	0.478* (2.18)	-1.254 (-1.14)
Observations	2163	2163	2163	2179	2179	2179
Adjusted R ²	0.051	0.101		0.049	0.090	

t statistics in parentheses

* p < 0.05, ** p < 0.01

Expectations of Orders, Employment and Costs

	Exp. orders rise	Exp. orders rise	Exp. orders rise	Exp. employment rise	Exp. employment rise	Exp. employment rise	Exp. cost rise	Exp. cost rise	Exp. cost rise
Output price growth (2-digit)	1.001 (0.02)		1.006 (0.17)	1.014 (0.43)		1.002 (0.04)	1.008 (0.24)		1.019 (0.51)
IR inflation forecast	1.315 (1.26)		1.347 (1.33)	1.059 (0.23)		1.136 (0.49)	1.676* (2.43)		1.352 (1.20)
IR GDP forecast	1.475 (1.90)		1.342 (1.37)	1.900** (2.74)		1.557 (1.76)	1.206 (0.91)		0.736 (-1.26)
CPI inflation (whole economy)	0.990 (-0.05)		0.979 (-0.10)	1.165 (0.65)		1.167 (0.62)	0.990 (-0.05)		0.761 (-0.99)
AWE Wage growth	0.892 (-1.37)		0.851 (-1.85)	0.919 (-0.90)		0.914 (-0.89)	1.090 (0.92)		0.944 (-0.51)
Unemployment rate	0.838 (-0.85)		0.792 (-1.09)	1.012 (0.05)		0.953 (-0.20)	0.814 (-0.90)		0.873 (-0.51)
Import price growth	1.025 (0.76)		1.035 (1.01)	0.980 (-0.52)		0.969 (-0.78)	1.123** (3.14)		1.120** (2.59)
Past orders unchanged		0.820 (-1.02)	0.782 (-1.25)		2.032** (2.84)	1.937** (2.61)		1.290 (1.19)	1.215 (0.89)
Past orders rise		2.080** (3.57)	2.049** (3.44)		4.740** (5.72)	4.511** (5.47)		0.933 (-0.28)	0.896 (-0.43)
Past employment unchanged		1.018 (0.08)	0.987 (-0.06)		0.700 (-1.41)	0.655 (-1.65)		1.156 (0.56)	1.242 (0.80)
Past employment rise		1.178 (0.67)	1.144 (0.54)		1.022 (0.08)	0.975 (-0.09)		1.348 (0.97)	1.392 (1.03)
Rate of operation		1.001 (0.08)	1.001 (0.14)		1.009 (1.10)	1.009 (1.02)		1.003 (0.51)	1.005 (0.78)
Past cost unchanged		0.832 (-0.73)	0.800 (-0.87)		1.151 (0.50)	1.131 (0.43)		1.226 (0.58)	1.120 (0.31)
Past cost rise		0.641 (-1.62)	0.577 (-1.91)		0.972 (-0.09)	0.898 (-0.34)		11.206** (6.69)	9.746** (6.06)
Pst. wages		1.043 (0.73)	1.056 (0.92)		0.975 (-0.38)	0.974 (-0.39)		0.960 (-0.58)	0.957 (-0.61)
Past inflation		1.005 (0.20)	1.005 (0.16)		1.081* (2.42)	1.070* (2.01)		1.020 (0.66)	1.030 (0.91)
Observations	1040	1040	1040	851	851	851	1035	1035	1035
BIC	827.4	811.6	846.2	664.8	626.6	663.9	750.3	635.7	657.0

Exponentiated coefficients; t statistics in parentheses

* p < 0.05, ** p < 0.01

Actual and Expected Price Increases

The dependent variable is past price growth.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Exp. Price Growth (lag 3)	0.355** (8.05)	0.356** (7.86)	0.317** (6.53)	0.271** (2.97)	0.221* (2.28)	0.218* (2.16)	0.217* (2.12)	0.267* (2.42)	0.290** (4.00)
Observations	1968	1968	1960	670	670	670	632	574	688
Adjusted R ²	0.09	0.15	0.35	0.18	0.24	0.68	0.67	0.67	-
BIC	8762.6	8807.1	9413.9	2598.8	2650.7	2147.6	2091.0	1670.1	-

t statistics in parentheses

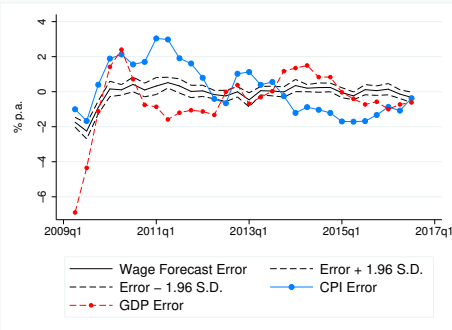
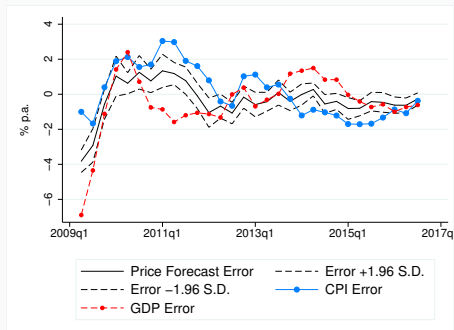
* $p < 0.05$, ** $p < 0.01$

Source: CBI and ONS data

The table reports the coefficient on expected price growth in equation (??) for various combinations of control variables. Except for model (9) standard errors are robust. The models are as follows:

1. Firm fixed effects.
2. Firm and time fixed effects.
3. Firm and interactive time/SIC 2-digit sector fixed effects.
4. Firm fixed effects. Firm level controls
5. Firm and time fixed effects. Firm-level controls.
6. Firm and interactive time/sector fixed effects. Firm level controls.
7. Firm and interactive time/sector fixed effects. Firm level controls. Only firms with 10+ responses.
8. Firm and interactive time/sector fixed effects. Firm level controls. Outliers removed.
9. Firm and time fixed effects. Firm-level controls. Estimated by Bayesian model averaging

Frame Title



Mean Price Forecast Errors

Mean Wage Forecast Errors

Source: CBI and ONS data and *Inflation Report Notes: The figure report forecast errors in price and wage survey forecasts compared to the Bank of England's Monetary Policy Committee CPI and GDP forecasts*

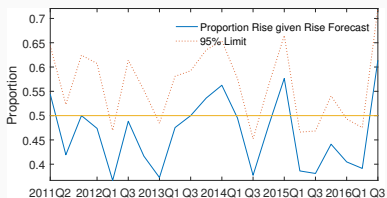
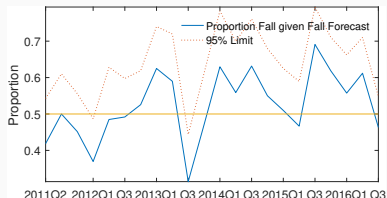
Explaining wage and price forecast errors

	No Time Dummies		Time Dummies		Time Dummies: BMA	
	(1) $\hat{\epsilon}$ (Prices)	(2) $\hat{\epsilon}$ (Wages)	(3) $\hat{\epsilon}$ (Prices)	(4) $\hat{\epsilon}$ (Wages)	(5) $\hat{\epsilon}$ (Prices)	(6) $\hat{\epsilon}$ (Wages)
Price Growth Expectations (lag 4)	-0.697** (-11.33)	-0.033 (-1.70)	-0.707** (-11.82)	-0.035 (-1.80)	-0.699** (-17.77)	-0.001 (-0.19)
Wage Growth Expectations (lag 4)	0.099 (1.28)	-0.675** (-12.23)	0.118 (1.48)	-0.673** (-12.32)	0.034 (0.46)	-0.674** (-19.20)
IR Inflation Forecast Error	0.575** (2.71)	-0.037 (-0.38)				
IR Growth Forecast Error	0.405** (2.79)	-0.119 (-1.47)				
Expected cost rise (lag 4)	0.279 (1.50)	0.045 (0.48)	0.082 (0.44)	-0.001 (-0.01)	0.002 (0.07)	-0.001 (-0.04)
Rate of Operation (lag 4)	-0.003 (-0.52)	0.001 (0.44)	-0.001 (-0.20)	0.002 (0.60)	0.000 (0.03)	0.000 (0.08)
Expected employment rise (lag 4)	0.155 (0.86)	0.044 (0.43)	0.097 (0.51)	0.029 (0.28)	0.005 (0.11)	0.001 (0.08)
Expected orders rise (lag 4)	0.140 (0.75)	0.071 (0.81)	0.144 (0.77)	0.070 (0.79)	0.007 (0.14)	0.002 (0.12)
Past Price Increase (lag 4)	-0.121* (-2.08)	0.024 (1.48)	-0.124* (-2.14)	0.022 (1.34)	-0.116** (-3.42)	0.000 (0.12)
Past Wage Increase (lag 4)	0.122 (1.56)	-0.154** (-3.55)	0.127 (1.62)	-0.156** (-3.60)	0.049 (0.62)	-0.150** (-5.04)
Observations	1836	1829	1836	1829	1836	1829
No. restrictions	8	8	8	8	8	8
χ^2	284	300	292	304	532	494

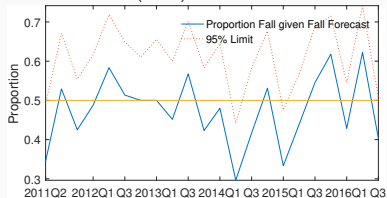
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$

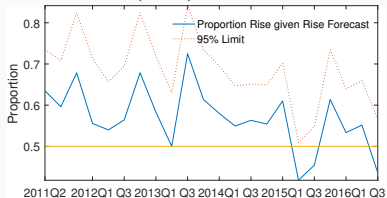
Rationality Tests: New Orders and Employment



New orders (Fall)



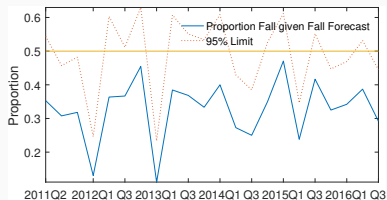
New orders (Rise)



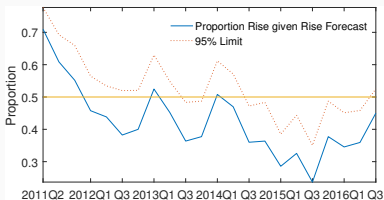
Employment (Fall)

Employment (Rise)

Rationality Tests: Unit Costs



Cost (Fall)



Cost (Rise)

Conclusions

- Firms' expectations of wage and price growth influenced by both aggregate and idiosyncratic factors. Price expectations are mainly influenced by firm-specific factors while wage expectations are more influenced by aggregate variables. Cost expectations are influenced by past cost movements and import prices.
- Price setting behaviour also seems to depend significantly on past price expectations. Use of Bayesian model averaging suggests that this is a robust result.
- We find, however, that the hypothesis that firms expectations of wage and price growth is rational are strongly rejected.
- There is also evidence that firms expectations of cost movements are not rational, with some firms expecting cost increases significantly higher than materialise at the same time as others expect cost increases significantly lower than materialise.